Chapter

Social Resilience in Local Food Systems: A Foundation for Food Security during a Crisis

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Abstract

The Covid-19 pandemic has presented new challenges for food production, distribution, and consumption and has exacerbated existing inequalities in access to food. However, it has also provided new opportunities for local communities to work differently, to increase collaboration, and to improve outcomes for those most in need. This chapter focuses on how various local food initiatives within a specific UK city, Preston in NW England, interact, cooperate and collaborate, and the changes to these interactions during a crisis. The findings derive from a social network analysis (SNA) conducted during summer 2020 examining how relationships changed during the crisis, and online semi-structured interviews. Using resilience as a framework to understand these dynamics, the chapter argues that social preconditions, such as a previously organised local food network in partnership with local authorities, have helped communities to self-organise and respond to difficult circumstances. Moreover, it also highlights the ways in which responses to major disruption (Covid-19) can bring about the collective questioning of current models of emergency food provisioning and create stronger collaborative bonds within already organised networks. We demonstrate that such processes could potentially improve food insecurity outcomes by combining locally grown food and dignified food access options.

Keywords: food resilience, social capital, food security, local food systems, Covid-19, local food initiatives

1. Introduction

The global Covid-19 situation has presented new food production, distribution, and consumption challenges and has potentially exacerbated existing inequalities for those in deprived areas. Significantly, the implications of the Covid-19 pandemic on global food supply chains and food systems' resilience have aggravated food insecurity indicators. As defined by the Food and Agriculture Organisation (FAO), food security is a condition that "exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" ([1], p. 49). The FAO estimates that up to 811 million people worldwide faced hunger in 2020 – up to 161 million more than in 2019 – as conflict, climate extremes, and economic slowdowns, aggravated by the Covid-19 pandemic,

continued to increase in frequency and intensity [2]. The World Food Program (WFP) calculated that the number of acutely food insecure people in the countries where it operates reached more than 271 million people directly due to the aggravating impact of the Covid-19 pandemic. In the UK, it is estimated that the number of people experiencing food insecurity quadrupled due to lack of food in shops, economic impacts, and isolation brought about by the pandemic [3].

As well as these challenges, the Covid-19 situation presents new opportunities for local food initiatives to work differently, increase collaboration, and improve outcomes for those most in need. Local food initiatives usually refer to social innovations that aim to address environmental and social issues derived from current food system structures, reconfiguring food supply chains and relations within a locality [4]. The collective responses of local food initiatives to the disruption caused by Covid-19 provide the perfect space to increase knowledge about how local food systems – collaborative networks that integrate individual local food initiatives efforts [5] – and could potentially lead to better food security outcomes. Case studies have increasingly documented how networked responses in diverse local communities during the Covid-19 crisis managed to respond to rising food insecurity needs and the opportunities this might provide for food systems change [3, 6]. Our research aimed to expand this body of literature by providing knowledge about how various local food initiatives interact, cooperate, and collaborate, how these changed during the Covid-19 pandemic and what this means for a local food system. To date, there are few studies that have investigated the changing structure of local food systems using a comparative research design before and during a disruption. Lessons learned from this examination might help local responses to future crises such as the climate crisis and other external stresses that affect food systems and society.

We focus on the local food system of the Local Authority Area of Preston in the Lancashire region of the UK. In the first section of the chapter, food security resilience is introduced. By providing an overview of the concepts of resilience and social capital, a theoretical framework is presented that is used to unpack the dynamics of Preston's local food system. The following section outline the methodology used to study Preston's local food system – namely, a social network analysis (SNA) conducted during 2020, examining collaborative relationships before and during the crisis, and online semi-structured interviews with a subset of local food initiatives. Next, the results from the research are presented in order to illuminate the changing characteristics of the local food system and its potential outcomes. The final section returns to the concept of food security resilience, using social capital as a proxy, to highlight important lessons learned from the case study presented, namely the relevance of previous social preconditions to ensure adaptation and response.

2. Social resilience, a key factor in addressing food security needs during a crisis

2.1 Food security resilience; beyond ecology

Resilience is a concept that holds different meanings depending on the various situations in which it is being used [7]. Ecology literature usually frames resilience as a technical concept that refers to the "capacity of a system to withstand shocks and external pressures while maintaining its basic structure, processes, and functions" ([8], p. 601) In this context, resilience was perceived as an isolated 'outcome' rather than connected to specific abilities, as many academics and practitioners now

recognise [9]. Resilience thinking has expanded from this initial narrow definition by integrating adaptability and transformability as crucial ingredients [10, 11]. Social theory has contributed to this reconceptualisation adding essential dimensions, such as agency and collective action, to the concept [12]. As such, resilience is defined at the communal rather than individual level, focusing on coordinated efforts and cooperative adaptation [13]. Here, resilience refers to the ability of a given community or group to cope with external shocks and disturbances to its infrastructure and functioning [10]. It involves both the capacity to learn and adapt to ongoing pressures using existing economic, social, and environmental resources while also developing new strategies and capabilities [11].

Both literature and practice have increasingly acknowledged the potential of resilience thinking to contribute to food security. Tendall et al. [14] develop the notion of food security resilience at the system level by breaking it down into four components: robustness (the capacity to withstand the disturbance in the first place before any food security is lost); redundancy (the extent to which elements of the system are replaceable, affecting the capacity to absorb the perturbing effect of the disturbance and avoid as much food insecurity as possible); flexibility and thus rapidity (or the speed with which the food system can recover any lost food security); and finally, resourcefulness and adaptability (how much of the lost food security is recovered). More broadly, it has been argued that food security resilience is "about the capacities of households and communities, to deal with adverse events in a way that does not affect negatively their long-term wellbeing and/or functioning" ([12], p. 806). Although Tendall et al.'s [14] definition offers a strong starting point to understand how particular local food systems have been able to respond to the Covid-19 pandemic, resilience variables such as those proposed are difficult to observe and measure, and there is no current consensus on how to do so [7].

Therefore, to understand how local food systems can contribute to food security and what is needed to address external stresses, this study assessed the changes in *resilience capacities* (the inputs required to achieve resilience) of Preston's local food system. Although these capacities cannot be regarded as a proxy for the *actual* resilience of a system, there is a direct linkage between them and the potential of a system to be resilient [7]. Thus, they are helpful variables for understanding why a particular system might successfully respond to a specific crisis. Building on literature that integrates social theory into resilience thinking, this study concentrated on social resilience capacities of local food systems using social capital as an analytical tool, which other scholars have regarded as a key feature of community and social resilience [10, 12, 15].

Overall, there is not a universal definition of social capital [16]. Adler and Known [17] categorised definitions of social capital depending on whether their focus was on an individual or a collective group, and divided the definitions into three categories. The first refers to social capital as a resource that an individual has as a result of their external linkages with other actors [13]. The second category focuses on the structure of relations of multiple actors that give the collectivity cohesiveness, which facilitate common goals. In this category, social capital is defined as "the features of social organisation, such as trust, norms, and networks, that can improve the efficiency of society by facilitating coordinated actions" ([18], p. 167). It is thus defined by its function to facilitate certain action within a social structure [19]. The third category of social capital refers to both external linkages and internal linkages of a social grouping. The current study adopts the second view of social capital, as it allows the analysing of local food systems' structure and the collective characteristics that facilitate action in times of crisis. In this regard, it moves away from focussing on an individual resource pool to address adversity towards the social resilience capacities of local food systems as a whole.

To aid the analysis of social capital influence upon the response of local food systems to emergencies, two forms of social capital are examined: bonding and bridging social capital. Bonding usually refers to strong and emotional connections, such as friends or family, among individuals that commonly share similar characteristics in class, race, attitudes, and available information and resources [17, 18, 20]. Bridging describes loose relationships that enables information to be exchanged across diverse groups [16]. Bridging social capital, in contrast to bonding social capital, usually appears in more open networks, increasing chances to expand and access new relationships, information, resources, and opportunities [21].

2.2 The changing relationships of local food initiatives pre- and during Covid-19

The methodology used in this study involved a three-phase process. Phase I consisted of an initial internet search to identify a preliminary list of local food initiatives supporting one or more areas that contribute to the sustainability and food security of the Preston, Lancashire area. Local food initiatives in Preston were identified based on their nature as a component of a local food system as characterised by Clément [22]. Clément identifies local food initiatives as those that focus on direct local food marketing, local food procurement, food access programmes, and food education and policy [21]. We added an overarching criteria of having a specific focus on improving food security and sustainability at the local level and follow ethical principles to differentiate them from the conventional food system [23]. We initially identified 44 organisations in Preston that could be considered local food initiatives working within the local food system.

Phase II involved gathering survey data from key personnel working in these organisations to establish which local food initiatives have active relationships and collaborations and which are more marginal within Preston's local food system. The survey identified how these connections have changed since the Covid-19 crisis developed and enabled comparison with pre-Covid-19 relationships. To do this, we asked questions relating to the scale of interactions between organisations before and during the crisis. To answer these questions participants had to indicate which option best described their relationship with other organisations in the local food system. The scale used in the study was derived from the four Cs of interorganisational partnering to respond to a disaster and Himmelman's collaboration continuum [24, 25]. Reflecting increasing degrees of interaction and integration with other organisations, the options provided were 'communicating' (exchange of ideas and information), 'sharing' (communicating and sharing of resources for mutual benefit), and 'collaborating' (communicating, sharing and working together to create something new). Based on the definitions of bonding and bridging social capital, collaborating refers to the former, while communicating and sharing to the latter.

The survey analysis was coupled with SNA to measure the social capital features of the local food system, following a network approach to social capital, which focuses on the patterns and collection of relationships within a group [26]. SNA has been identified as beneficial for demonstrating the relationships among food systems' actors both visually and numerically [27]. Gephi, an open-source platform for visualising and analysing network graph data, was used to analyse network-based questions to assess the overall characteristics of the local food system and identify central actors within it. Of the 44 identified organisations, 21 local food initiatives completed the survey. Although there are various methods available to impute the missing data of non-respondents, doing so can create biased network measures and metrics [28]. Missing data in this context is missing at random and the probability of it being missing is unrelated to the value of the missing connections and observed organisational attributes [29]. Therefore, the analysis was based

on the 21 responses from local food initiatives that we received. Phase III included semi-structured interviews with key stakeholders in the local food system and will be discussed further in Section 2.3.

2.2.1 The social network of Preston's local food system

Data about social networks is depicted as sociograms. Sociograms are graphs showing network actors (in our case these are local food initiatives which are represented as 'nodes' in the network) and their relationships (these are the connections between the local food initiatives and are represented as 'edges') [30]. Relationships (edges) can be directed (having a certain quality that can be different in both directions) or undirected

Figure 1.
Sociogram pre-Covid-19 - Preston's local food system.

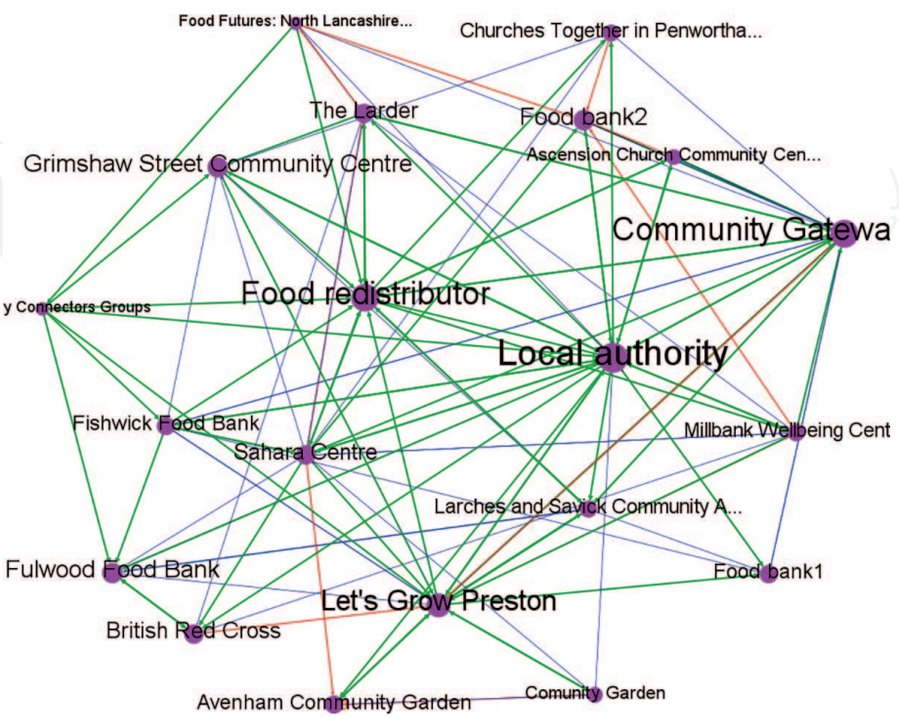

Figure 2.
Sociogram during Covid-19 - Preston's local food system.

(where the type of relationship is not specified). We gathered information about both, as knowing the direction of the edges can provide information about reciprocal relationships. Reciprocal relationships denote the level of trust between organisations because it reflects the cultivation and utilisation of tangible and intangible resources by network members for the common interest [16, 21]. **Figures 1** and **2** illustrate the sociograms of the relationships among organisations before Covid-19 and during Covid-19. For the SNA, we concentrated on measures of connectivity and centrality[1], as they represent some of the fundamental structural properties of importance to any network and have been used to clarify the vulnerability of networks [30].

Table 1 shows the local food system's connectivity network measures, comparing pre-and during Covid-19. Network diameter is the longest distance between any two nodes (i.e., how many edges are between the two most distant nodes). A short network diameter means it is possible to move through the network in a very few steps through a small number of nodes and implies that an idea or resource will spread quickly across the network, signalling integration to the system [31]. The average path length is the mean distance between all possible pairs of nodes in the network; the closer to 1, the more connected the network [32]. In the case of Preston, with a diameter of 2 and an average path length of approx. 1.5 even before Covid-19, the local food system was already 'compact' [33].

Similarly, network density – the number of identified links divided by the maximum possible number of links [32] – remains between 0.44 and 0.45. This measure captures the bonding social capital within the local food system, reflecting sociological ideas like cohesion, solidarity, and membership, by calculating how many edges exist between actors compared to how many edges between actors are possible; the closer to 1, the more connected the network is [34]. In terms of resilience, having a medium network density, low diameter, and average path length means that resources can spread quickly between organisations. In times of crisis, such connectivity can facilitate rapid social action and setting up new processes and activities without the potential for duplication of activity and attendant waste of resources, making it easier to respond to changing situations such as Covid-19. This could explain the successful response to food insecurity described by participants (see Section 2.3.). Based on these measures, it could be argued that Preston's local food system already possessed a strong level of bonding social capital, as it demonstrates collective cohesiveness. However, as will be seen next, this changes when looking at the *types* of relationships present.

Figure 1 illustrates the overarching interconnectivity between organisations of Preston's local food system before Covid-19. The size of the nodes in the sociograms indicates the importance of an organisation within the network. The edges (connections) are coloured based on the type of relationship: blue:

Metric	Pre-Covid-19	during Covid-19
Network Diameter	2	2
Network Density	0.442	0.453
Average Path Length	1.568	1.553

Table 1.
Connectivity measures in Preston's local food system.

[1] Connectivity is an aggregate metric that gives information about the cohesiveness of the network as a whole; the interconnectedness of actors. Centrality is a measure relating to individual nodes. It indicates which nodes possesses critical positions in the network [27].

communicating, red: sharing, green: collaborating. The local food system before Covid-19 already shows a high number of edges between the many organisations within it. Approximately half of edges were collaborative relationships, and the other half were communicating and sharing connections (see **Figure 1**). Notably, the sociogram pre-Covid-19 presents a small network of organisations, which share collaborative ties with the same initiatives. In this regard, there was a strong presence of bridging social capital exemplified through weaker ties such as communicating or resource sharing, with a sub-group of organisations with an enhanced bonding social capital reflected through collaborative relationships.

Comparing the sociograms before and during Covid-19, it can be identified that the pandemic has affected the associations between local food systems' members, although the overall features of the local food system remain the same. Significantly, it has increased the quality of interactions. **Figure 2** illustrates a higher number of green coloured, collaborative relationships across the local food system, accounting for 60% of the edges. In this regard, many weaker connections in the form of sharing and communicating pre-Covid-19 were replaced by collaborations during-Covid-19, signalling the creation of bonding social capital from previous connections based on bridging social capital.

Despite the overarching interconnectivity between organisations within Preston's local food system, it can be identified that a small number of organisations have particularly central roles in the network, which has been strengthened during Covid-19. To understand the role of specific organisations within the network, we used centrality measures to identify the most connected actors in the network that hold a significantly higher than average number of links [31]. In-degree centrality is the number of edges pointing towards a node, i.e., how popular or sought-after a given organisation is. Out-degree centrality denotes the outgoing connections of a node with other organisations, which refers to the sociability or outreach of an organisation [31]. This is important to understand the social resilience capacities of a local food system, as it points to particularly influential and prominent actors that could facilitate rapid response, network organisation, or those holding the resources needed to adapt. **Table 2** presents the degree centrality per organisation. The nodes in **Figures 1** and **2** are sized according to their in-degree centrality score, which indicates the number of incoming links a local food initiative possesses. From this, four organisations, the local authority, the food redistributor, CGA (a community housing association), and Let us Grow Preston (LGP - a network of community gardens), can be identified as having high levels of in-degree and out-degree centrality. As such, they hold an advantageous position concerning their roles and leadership within the local food system. This has remained during Covid-19, albeit with the scores increasing for each organisation, indicating an increased number of connections.

Betweenness centrality measures how often a node lies on the shortest path between two other notes. This helps to identify the brokers or gatekeepers, those with links that stretch well beyond their local network neighbours, as these nodes are the critical actors on the path for routes of exchange. Eigenvector centrality measures the influence of a node in a network concerning the importance or connectedness of its neighbours [35]. Both betweenness and eigenvector centrality refers to the effect that an organisation may have within a network. Based on their eigenvector and betweenness scores (see **Table 2**), the local authority and LGP are also the most strategically located overall to create links with other local food initiatives and share information and resources [31, 36]. The position of these organisations has been strengthened during Covid-19, indicating their potential role in structuring an organised response to the crisis, act as a bridge to facilitate information exchange and new information flows (bridging social capital), and increasing trustful connections (bonding social capital).

Name	In-degree		Out-degree		Betweenness C.		Eigenvector C.	
	Pre-Covid	During Covid	Pre-Covid	During Covid	Pre-Covid	During Covid	Pre-Covid	During Covid
Local authority	13	15	16	16	0.239	0.354	0.942	0.960
CGA	11	13	8	9	0.053	0.094	0.953	0.989
Food redistributor	11	12	8	7	0.053	0.066	1.000	1.000
Let us Grow Preston	9	10	12	13	0.119	0.122	0.720	0.709
Food bank2	7	7	2	2	0.000	0.000	0.584	0.536
Fulwood Food Bank	6	7	0	2	0.000	0.055	0.569	0.519
British Red Cross	6	6	1	1	0.003	0.002	0.571	0.522
Sahara Centre	6	6	15	14	0.086	0.053	0.635	0.572
The Larder	6	6	7	6	0.027	0.111	0.619	0.560
Avenh. C.Garden	5	5	4	3	0.016	0.006	0.436	0.401
Grimshaw St. Community C.	5	7	3	4	0.001	0.007	0.509	0.524
Fishwick Food Bank	4	5	1	8	0.001	0.005	0.451	0.450
Food bank1	4	5	5	2	0.003	0.000	0.465	0.500
Larches and S. Community A.	4	4	9	7	0.010	0.006	0.534	0.506
Millbank Wellbeing C.	4	4	7	8	0.004	0.007	0.487	0.449
Ascension Church	3	3	0	4	0.000	0.001	0.352	0.407
Community C. Groups	3	1	3	6	0.008	0.005	0.187	0.012
Churches Together	2	4	3	3	0.001	0.003	0.287	0.423
Comunity Garden	2	3	3	3	0.000	0.005	0.200	0.234
Food Futures	2	1	6	6	0.003	0.054	0.184	0.077

Table 2.
Centrality measures per node.

The following section uses data from semi-structured interviews to build on these findings and provide explanations for why Preston's local food system has remained relatively unchanged in terms of overall characteristics, but more significantly changes in relation to the strength of ties. It explains how the previous structure of the local food system helped a coordinated response to the crisis, and the role of LGP and the local authority in facilitating coordination.

2.3 The importance of previous connections for self-organisation and adaption

In addition to the survey and SNA, we conducted semi-structured, in-depth interviews with a purposively selected subset of survey respondents. Of the 21 respondents to the survey, nine participated in this Phase. Additionally, to gain a deeper insight into Preston's local food system, two local food researchers who had been involved in collaborative work within the local food system before Covid-19 were interviewed. Interviews lasted between 45 and 90 minutes, were conducted online following Covid-19 restrictions, and were recorded with the participant's consent. Interviews were transcribed, and analysis was supported by NVivo software, following Stake's [37] guidelines to qualitative case study analysis, which focuses on pattern recognition across the collected data. The use of case study analysis was intended to gather further explanatory details about the local food system and its changes.

As the SNA has shown, Preston's local food system already had a high degree of connections before Covid-19, including both bonding and bridging social capital. This is mainly because Preston's local authority had created a space in 2019 where local food initiatives within Preston could share their approach to food insecurity, could discuss various models of food aid provision, and foster mutual learning. According to participants, this initiative was taken up very positively by local food initiatives:

> *"My feeling is that they definitely, the meeting I went to, there was an enthusiasm around sharing and working together. There was a collective kind of wanting to do that [...]" (local food expert).*

This demonstrates the potential for developing bonding social capital was present before COVID-19, fostering stronger collective sharing and mutual learning. With the facilitation of the local authority, this embryonic food poverty alliance was working closely with LGP, a community gardens network initiated by the local authority, to grow and collect surplus food from allotments and gardens to use the produce in food insecurity schemes and nutrition education. These events prior to Covid-19 further suggest the centrality of local authorities in fostering coordinated approaches towards food-related issues and increasing social capital within local food systems. In addition, while the local food system was not necessarily demonstrating strong *collaborative* ties pre-Covid-19, as seen in the previous section, it reveals that providing opportunities to share information (bridging) is important in facilitating coherence between organisations and that can lead to increased bonding social capital in local food systems.

Interview findings corroborated the centrality of the local authority and the importance of previous relationships, as found through the SNA, to respond to the Covid-19 food insecurity crisis in the city. Covid-19 acted as a catalyst for the food poverty alliance by strengthening ties that pre-existed the pandemic. Pre-existing relationships that previously simply shared information, extended to collectively working towards a common purpose. In March 2020, the local authority called for a joint meeting of the food poverty alliance and other local food initiatives working

on food access and LGP, leading to the creation of a WhatsApp group for coordination. Multiple interviewees reinforced the importance of the council's leadership in ensuring the successful organisation of networked responses:

> *"And that I think, really, it's just having that permanency, 'cause a lot of the organisations involved in the community food hub and the network are charity-based. So, they can't necessarily focus on that side of um, sort of leading on the project, so what [the local authority] have been doing is they've taken that kind of lead to coordinate things, and I think it definitely needs somebody like that to focus on it, 'cause we are all funding dependent, we might not be here tomorrow, but it still needs somebody to carry on and push that forward" (community food hub).*

The importance of the local authority role in coordinating the food poverty alliance is not only because many local food initiatives are reliant on external funding. Participants, including the local authority, perceived that the alliance was moderated and formed in an inclusive and accepting manner, leading to a feeling of building collective realities and a shared mission under a notion of diversity:

> *"And I think that is partly because from the onset I think we've all recognised that each of the groups are unique and offer their own individual services and I think that has been key. We are not, certainly the network isn't trying to mould everybody to deliver one certain service. It's actually recognising that everybody is [...] unique and special in their own rights" (local authority).*

This signals a high level of respect among the participants of the food poverty alliance, acknowledging the uniqueness of each. Significantly, this indicates that bonding social capital and cohesiveness can still be present in non-homogenous groups, leading to a closely connected network, yet open enough to accept new entries. This acknowledgment of diversity within the alliance has led to the development of new connections. Interviewees agreed that Covid-19 prompted new relations between organisations, which might not have been considered previously. Covid-19 prompted a closer collaboration between food banks organised by diverse faith and ethnic groups and community gardens and sustainable food initiatives. This lead to a cross-fertilisation of beliefs, demographics, and purposes. In terms of social resilience capacity, this meant that bridging social capital was invigorated, promoting channels for the food poverty alliance to expand and potentially build stronger links with heterogenous groups. Indeed, the ability to respond quickly to Covid-19 in terms of food access was attributed to the strengthening of the relationships among these diverse groups:

> *"I know from an organisational point of view, how much I became under pressure at end of March to about July and then is continuing and couldn't have done it without my partners and then having those conversations. And as you know, everybody was learning, we went from face-to-face meetings to learning a technology that nobody was au fait with [...]. Even though, there were difficult times, we got to do it all." (community centre).*

This experience emphasises the importance of developing trust and mutual support in collaborative relationships. In Preston's case, Covid-19 acted as a catalyst to reach higher levels of these attributes, helping member organisations to collectively overcome the challenges imposed by COVID-19 due to the increased strength of their connections. This increased coherence and thus new-found bonding capital among local food initiatives also meant a better response to food access concerns that might have been overlooked otherwise. Notably, this was related to the

increased information sharing among organisations and the exchange of food and resources. While talking about the benefits of joint coordination, one participant explained how, with the help of various providers, they were able to respond to a gap in food access for students in the city:

> *"It came to light through one of the other organisations... There is about three or four hundred students from South India who are in Preston and... The university were just, just 'go away and leave us alone'. So, between us, between the various food providers we got on to the Vice Chancellor and said, 'What are you doing? You should be helping these people'. And... The university said, 'Oh, well we are shut down and we can't do this, and we can't do that...' And we said, 'Yes you can get a key and open the door to one of your big rooms and between us we will find food and the students can come to this one spot'" (community food market).*

This communication between the food initiatives and the university ultimately led to a process being put in place to support these students. The university was not one of the organisations identified for the SNA as they are not a significant part of the local food system in the city, but this example illustrates how a local food system with strong bridging and bonding capital can swiftly identify and support other organisations outside of already established platforms. Furthermore, the ability to feed back to the food poverty alliance was highlighted as important for making sure that those in vulnerable positions were receiving food according to their needs, culture, and eating habits. Significantly, these examples elicited reflection across the local food initiatives, and led to discussions that questioned the adequacy of some of the models and food currently being used:

> *"So, in a crisis situation sometimes you have to do things because if it's a matter of you know somebody going hungry [...] But I said that this is a plan strategy we need [...] be supporting our local small local businesses who are struggling, who may go out of business, who may be forced into poverty if we don't support them. So, you just perpetuate in that cycle and he, he's, I think he's going to get it now" (food hub).*

> *"I was having a meeting the other day and saying 'yes, we are giving food parcels out, but what else goes with giving a food parcel, how are we making a difference other than putting that food on that table, but what else has that family learned? [...] What else is happening in the house? Is there other issues? Who is actually talking?'" (community centre).*

The above statements illustrate ways in which having spaces for discussion and knowledge exchange helps initiatives to move beyond a model of emergency food aid that mainly uses surplus food. Indeed, the prominent participation of LGP, which during the pandemic decided to grow as much food as possible and collect as much fresh local food from allotments and community gardens for the food poverty alliance, has signalled a possible mechanism for introducing other local and sustainable food to address food insecurity needs. The local authority reflects this sentiment:

> *"And then of course, LGP have been key to this, because LGP work with all the local allotments [...], so LGP have been providing all the food hubs with fresh produce and continue to do so. I know in some of the areas they've been talking about more community allotments, growing spaces, having gardens where they can grow their own produce and that will definitely without a doubt will be on the agenda going forward." (local authority).*

Although 'it is by no means perfect' and 'there is still a lot to do', as participants mentioned, the development of the local food system in Preston suggests the importance of developing both bridging and bonding social capital through strong collaborative links and information exchange across the diversity of organisations in the local food system to be able to respond better to future crises. Notably, the role of local authorities has been identified as key in such a process. More importantly, the Covid-19 pandemic has fostered the creation of spaces of mutual reflection, whereby the purpose and avenues of emergency food aid are reconsidered, and more sustainable and structural strategies are considered.

3. Social resilience capabilities for improving food security outcomes during crises

This analysis of how the relationships between Preston's local food initiatives changed because of the Covid-19 pandemic reveals the importance of how social resilience capacities can help communities better respond to shocks and disturbances. Within this local food system strong communicative, sharing, and collaborative relationships and connections were already present before the pandemic hit, with engagement occurring across an already highly connected network. Collaboration, mutual sharing, and communication between different types of local food initiative indicate the presence of both bonding (strong collaborative connections) and bridging (loose relations through sharing and communicating) social capital before Covid-19. In particular, the prior formation of a food poverty alliance by the local authority provided the opportunity to construct a relatively cohesive response to food insecurity. Findings highlight that the critical component of these ties is the quick mobilisation of resources (e.g., food and information). This provided the capacity during Covid-19 to ensure food access across multiple communities during this major disruption to food systems and society's structures. Reflecting on these features of local food systems in relation to the literature on resilience and social capital, can help us better understand the role of networks of local food initiatives in adaptation, crisis mitigation and collective reflection and what these dynamics could mean for future successful food security responses.

Returning to the two types of social capital used to analyse the food security resilience capacity of Preston's local food system, it can be argued that bonding and bridging social capital worked in complementary but distinct ways before and during the crises [21]. Bonding social capital, due to preparatory work of the food poverty alliance, helped the local food system adapt quickly to new ways of delivering food, whilst bridging capital helped integrate a more diverse set of local food initiatives. As explained by Putnam, bonding social capital fosters mobilising solidarity, allowing communities to 'get by', as in the case of increasing exchange of food and resources in Preston. On the other hand, bridging social capital is essential to 'get ahead', broadening identities and reciprocity across diverse groups [21]. In this regard, despite the presence of a relatively collaborative network before Covid-19, which others have argued can limit possibilities for expansion and inclusion [13], the presence of bridging social capital before Covid-19 might have helped the 'openness' of the alliance to create bridges across local food initiatives in terms of religion, type and beneficiaries. In addition, results show how a particular emergency can increase the level and type of social capital within local food systems, from loose connections based on information sharing to collaborative ties, leading to greater bonding social capital. Increased bonding social capital has been related to trust and a sense of unity within communities [38]. Indeed, interviews highlight

new levels of trust and respect among the food poverty alliance and across the local food system, working towards a common aim in a recognition of diversity as a result of newer collaborative relationships.

The literature on local food systems and local food initiatives has increasingly identified the potential benefits of increased collaboration between different types of organisations working on food-related concerns [39–41]. Our findings show that providing the space for local food initiatives to meet helps shape and develop relationships. This has enabled discussions within the local food system about some of the disadvantages of food aid and the potential to develop avenues of support that can bring about better food insecurity solutions. In particular, this has demonstrated the possibility of creating a bridge between organisations working with vulnerable communities and those focusing on local food, spaces which have previously been heavily criticised for being exclusionary and 'elitist' [42]. Moreover, food aid organisations have frequently been presented as supporting short-term strategies that concentrate on emergency patch work and sacrificing long-term solutions, thereby creating dependant and passive recipients of charity whilst also benefiting big corporations along the way [43, 44]. Providing spaces of deliberation for initiatives within the local food system to develop collective responses to food insecurity is shown to increase the possibility of questioning current models of food provisioning and to develop more imaginative structural solutions.

In addition, this study highlights the importance of a neutral organisation, with resources and strategically located in the local food system, to bridge ties between diverse organisations. Preston's case showcases the role of city councils in developing social capital within local food systems [16]. This means that urban food governance – the modes of interaction within local food systems and the operational and decision-making mechanisms that steer changes in it – have the potential to create synergies within local food systems [45]. Notably, given that local food initiatives often have limited capacities to manage collaborative spaces [46, 47], local authorities have the advantaged position to adopt a leading role in forming partnerships and strategies within the local food system and more so in times of crisis. Moreover, the above findings lend support to acknowledging the need for a coordinated response to emergency situations and crisis. However, this does not mean that, after crisis mitigation, no contingency plans should be adopted in these new collaborative spaces. Previous studies have highlighted the lack of consideration of vulnerabilities of food supply structures and crisis management plans in local food strategies and partnerships [48]. In this sense, local authorities should also take advantage of the collectivisation of food security responses to learn from the experience of the Covid-19 pandemic and ensure that structures, in combination with social resilience capacities, are in place to respond effectively to emerging risks.

Although the lessons learnt from Preston's case reveal the importance of social resilience capacities and urban food governance in being able to respond and adapt to sudden emergencies to ensure food security, the long-term impacts of the changes Covid-19 has had on the dynamics of local food systems remain to be seen. Bonding capital could lead to a close network of those already established initiatives, with less opportunity for others to join. Higher levels of trust among the food poverty alliance might also act as a barrier [36]. In particular, there is a risk of stagnation if the considerations resulting from the reflexive discussions and dialogue among local food initiatives does not lead to a broader focus beyond food poverty. Scholars indicate the deficiencies and challenges of a siloed focus of urban food governance spaces, such as diminishing its potential to create more transformative interventions [48, 49].

4. Conclusions

This article has sought to draw attention to the role of social resilience capacities in helping communities to self-organise and respond to difficult circumstances, especially during times of crises and disruption. This study is primarily aimed at revealing the structures needed to ensure that food access is guaranteed across diverse communities in all circumstances. Using SNA and semi-structured interviews with key actors within Preston's local food system, this research has helped shed some light on the relevance of social capital, both bridging and bonding, in developing collective food security responses in times of crises. Although it is essential to ensure physical infrastructures such as food supply chains and storage are in place to support food security, building social infrastructures like cohesion and trust across local food systems should also become a priority in cities to support populations, particularly those most vulnerable, in disaster. A key actor in Preston in developing these processes has been the local authority. As such, the research finds evidence good urban food governance is important for leveraging the collectivisation of food insecurity initiatives. Given that social capital can be fostered or deteriorated [16], a key focus in the future of local food systems, and urban food governance, should be on harnessing the new found bonding social capital to increase cohesiveness, but also seek to build up connections across diverse communities and local food initiatives.

While we acknowledge that our case may not be representative of all local food systems, it provides a place to begin unpacking the relevance of local food initiatives' relations in addressing food security challenges. The inclusion of diversity within already established networks and alliances within local food systems can lead to collective reflexive processes and questioning of current approaches to food system deficiencies. Future research should examine how the increased collaborative ties developed by the Covid-19 pandemic are affecting local food systems' dynamics in the long-term and if these help move those systems beyond charity-based approaches to food insecurity. A particular focus should be if the increased connectedness of communities and local food initiatives due to solidarity remains even when external shocks are no longer a threat, working towards a collective effort to ensure food for all. With increased research in these areas and others, we will begin to better understand the nuanced nature of social capital and local food initiatives relations for food security resilience and creation of long-term solutions to food insecurity within local food systems.

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