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# Benefits and challenges of collaborative networks addressing food system disruptions during the COVID-19 pandemic

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The COVID-19 pandemic disrupted food systems with disproportionate impacts on marginalized social groups, which in the USA included racial and ethnic minorities, working class families, immigrants, seniors, and people with disabilities, among others. The pandemic also greatly affected the operations of nonprofit organizations, which play important roles in disaster response. We explored how social networks supported non-profit organizations' efforts to address increased food insecurity and food-related business disruptions during the pandemic in the Chicago region, IL, USA. We used mixed methods including a Social Network Analysis (SNA) of 48 organizations and their reported partners plus focus group discussions with representatives of 20 organizations to learn about their experiences. SNA revealed that partnership interactions occurred more often among organizations of similar type or within the same sector, although cross-sectoral interactions also took place. Over half of the interactions occurred through established relationships among organizations, while at least 32% of interactions involved newly created partnerships. Focus group participants reported that partnering with other entities was essential to implement program activities, increase resources (e.g., funding, volunteers, food and supplies for distribution, facilities or land), and expand outreach and services to broader audiences. Yet, participants also described challenges of collaboration, such as disrespectful treatment, inequitable workloads, and poor coordination among some partners. Building genuine relationships, clarifying roles, sharing resources equitably, and fostering trust through transparency and accountability were recommended for effective partnerships. Our results demonstrate the importance of social networks to overcome challenges caused by disasters and suggest directions for future research exploring how to foster cross-sectoral collaborations to create equitable, sustainable, and resilient food systems.

## KEYWORDS

resilience, focus groups, social network analysis, social equity, community food systems

## 1 Introduction

The COVID-19 pandemic disrupted food systems on supply and demand sides, exacerbating existing patterns of food insecurity while also exposing food industry workers to increased health risks and threatening livelihoods of small-scale producers and businesses (e.g., [Clay and Rogus, 2021](#)). Among other actors, non-profit organizations played critical roles responding to these impacts, particularly food insecurity, despite themselves facing

unprecedented operational challenges, such as dramatically reduced staff and volunteer availability due to illness and fears of illness, issues with scheduling and communication arising from the inability to operate in-person, and increased difficulties in food distribution associated with the need for social distancing, supply shortages, and insufficient physical infrastructure (Dahal, 2023). Food insecurity occurs when households lack reliable access to enough healthy food (Ihab et al., 2015). Food security, on the other hand, describes populations with sufficient supplies of affordable food to meet the needs for a healthy and productive life (Mitenius and van de Ligt, 2023). Understanding of food security has evolved over time, with four commonly cited primary dimensions: availability, access, utilization, and stability (Berry et al., 2015). Food availability refers to the amount, type, and quality of food available to an individual, community, or entire country. Access describes the ability of an individual, community, or country to obtain the type, quality, and quantity of food they require. Utilization involves an individual's or household's capacity to consume and benefit from food (Ericksen, 2008), and food stability refers to access at all times (Mustafa et al., 2024). Recognizing the growing complexity of global food systems, the High Level Panel of Experts (HPLE) on Food Security and Nutrition, in their 15th report, introduced an expanded six-dimensional food security framework that also includes agency and sustainability. Agency refers to the capacity of individuals and groups to exercise voice and make decisions about their food systems, whereas sustainability describes the long-term viability of the ecological and social bases of food systems (Clapp et al., 2022). Food insecurity among vulnerable groups has consistently been among the most urgent problems experienced during disasters and extreme events (Diab, 2021). During the COVID-19 pandemic, human service non-profit organizations experienced a rapid rise in demand for food assistance (Kim and Mason, 2020), especially in low-income communities and communities of color, which already faced disproportionately higher rates of food insecurity prior to the pandemic (Sperling et al., 2022). People newly visited food banks and social groceries to seek support as they lost their jobs or businesses as a direct result of pandemic-related lockdowns (O'Connell et al., 2021).

Hence, non-profit organizations played crucial roles in responding to a dramatic increase in food insecurity and related crises during the pandemic. Partnership and coordination are essential to the successful operation of non-profits during disasters (Jiang and Ritchie, 2017) and a growing body of evidence confirms the importance of collaboration within and across local communities to address food insecurity during the pandemic (e.g., Loukes et al., 2022; Obach et al., 2023; O'Connell et al., 2021). Yet, despite the importance of collaborative networks in responding to food system disruptions, various barriers can impede these processes (Obach et al., 2023; Suarez-Balcazar et al., 2006). To shed light on the role of collaboration in responding to pandemic-related food system disruptions, we explored the social networks that supported non-profit organizations that addressed food insecurity, business disruptions, and related food system impacts of the pandemic in the Chicago, IL, USA metropolitan region, which had a population of 9.3 million people in 2020 (U.S. Census Bureau, 2020). Chicago is one of the nation's most racially and economically segregated cities (Metropolitan Planning Council, 2017) with substantial disparities in public resource investment across neighborhoods. Among many issues where these disparities manifest, food insecurity rates are higher in predominantly

Black and Latine neighborhoods, particularly on Chicago's south and west sides. In June 2021, roughly a year into the pandemic, the City of Chicago reported food insecurity levels in the overall Chicago metro region at 19%, with food insecurity within Latine communities at 29% and in Black communities at 37%—percentages “significantly above pre-pandemic levels” (City of Chicago, Office of the Mayor, 2021). We used mixed methods research combining content analysis of documents, Social Network Analysis (SNA), and focus group discussions to identify characteristics of the social networks that supported pandemic response efforts, perceived benefits and challenges of organizational partnerships, and recommendations for sustaining effective collaborations among organizations. Our findings expand the extant knowledge about the benefits and challenges of social networks within non-profit organizations' pandemic response. They also provide insights for strengthening collaborative networks at local and regional scales as regional food systems are important to create more sustainable, equitable, and resilient food systems for all (Ruhf and Clancy, 2022).

## 1.1 Impacts of COVID-19 pandemic on food system resilience and equity

A “food system” refers to all the processes—producing, processing, distributing, and consuming food—involved in feeding a population (Brown et al., 2015), along with socioeconomic and environmental factors that influence how food system activities are performed (Goodman, 1997; von Braun et al., 2021). Sustainable food systems support food security, make optimal use of natural and human resources, are environmentally sound and economically viable, and provide safe and healthy food for present and future generations (Capone et al., 2014). A sustainable food system cannot exist in the absence of food security, which occurs when all people at all times have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (Shaw, 2007). A *resilient* food system has capacity over time to provide sufficient, appropriate, and accessible food to all, even in the face of various and even unforeseen disturbances (Tendall et al., 2015), ensuring that groups or communities can cope with external stresses and disturbances that arise from social, political, and environmental changes (Toth et al., 2016).

The COVID-19 pandemic underscored the global food system's vulnerability to disruption as it led to changes in consumer demand, restrictions on workers' movements, closure of food production facilities, constrictions in food trade policies, and financial pressures in food supply chains. The implementation of lockdown and containment measures, along with travel restrictions and logistical barriers, led to labor shortages in some agricultural sectors and a mismatch between food supply and demand (Schmidhuber et al., 2020). For instance, labor shortages occurred in France, Germany, Italy, Spain, and Poland's agricultural sectors due to border closures preventing seasonal migrant workers coming to farms (ILO, 2020). In the USA, at least 462 meat packaging, 257 food-processing plants, and 93 farm and production facilities were affected by COVID-19 cases (Aday and Aday, 2020). Furthermore, strict imposition of restrictions on international trade and movement of raw materials exacerbated adverse impacts on production and trade at a range of scales from local to global (Udmale et al., 2020).

The COVID-19 pandemic also illuminated systemic injustices connected to food including lack of affordable, good quality and nutritious food for all; poor pay and working conditions for workers within the food system; concentration of power in the hands of producers; and limited opportunities for participation in food systems transformation (Sanderson Bellamy et al., 2021). Categories of difference (e.g., race, class, gender, ability level, sexuality) are important contributors to social inequity (Valley et al., 2020). The U.S. food system is rife with racial, economic, and other social inequities, including the marginalization of people of color in the agricultural industry and racial disparities in food security (Alkon and Agyeman, 2011). For example, areas with higher percentages of racial or ethnic minorities and higher poverty rates are most often affected by poor access to supermarkets and healthy food (U.S. Department of Agriculture (USDA), 2012; Dutko et al., 2012; U.S. Department of Agriculture (USDA), 2023). The historical evidence shows that pandemics often reinforce society's "fault lines" and most harm marginalized populations (Wade, 2020). Indeed, the COVID-19 pandemic exacerbated multiple racial, economic, and social injustices. In the U.S., the impacts of COVID-19 were worse for people of color, who experienced disproportionate rates of food insecurity before the pandemic (Dubowitz et al., 2021). In 2019, Black families were twice as likely to be food insecure as White families, with 19.1% of Black households and 15.6% of Hispanic households experiencing food insecurity compared to 7.9% for White households (U.S. Department of Agriculture (USDA), 2020). Furthermore, Black and Hispanic Americans more often work in retail, transportation, manufacturing, healthcare, construction, and as farm and food industry workers than their White counterparts. In 2018, Hispanics comprised 64% of farm laborers and Whites 32% (U.S. Department of Agriculture (USDA), 2018). Jobs in these sectors pay lower wages and lack paid sick leave. Those jobs that could not shift to remote virtual work were lost during the pandemic, further exacerbating financial issues among groups already suffering higher rates of food insecurity (Clay and Rogus, 2021). Others, including farm and food industry workers, were classified as "essential workers" during the pandemic, which exposed them to an increased likelihood of contracting COVID-19 and their families to the potential loss of a primary income earner due to death, among other risks (Parks et al., 2020).

## 1.2 Role of non-profit organizations and social networks in disaster and pandemic response

Non-profit organizations provide substantial support to local communities during crises through emergency management or disaster relief programs. This is perhaps most apparent across low and middle income countries. For example, non-profit organizations contributed to disaster relief and reconstruction after the 2004 Indian Ocean tsunami (Lassa, 2018) and improved labor conditions in industries of Indonesia, India, and Sri Lanka through international campaigns for aid and trade reform following the tsunami (Lewis et al., 2020). Non-profit organizations also have proven themselves as profound actors in responding to disease-related public health crises. For instance, during the 2014–16 Ebola outbreak, non-profit organizations imparted information about the virus and provided people with medical supplies and other basic services (Tully et al.,

2019). In 2019, as COVID-19 emerged in China and eventually spread to different parts of the world, many non-profit organizations not involved directly in the detection and treatment of COVID-19 patients indirectly provided critical services and support in poor communities impacted by the pandemic (Raeymaeckers and Van Puyvelde, 2021). Non-profit organizations worldwide responded to the pandemic by providing job and income generation opportunities, advocating for vaccination, offering psychological support, educating about COVID-19 prevention measures, and delivering routine services. They also played a critical role by providing social support and care to vulnerable populations affected by social distancing measures, public health education and community engagement, and medical supplies and hygiene kits (Fadi et al., 2022). While such studies have examined non-profit organizations' responses to the pandemic, few have explored the nature of social networks and how collaborations contributed to these responses, particularly in the context of food systems.

Social networks involving partnerships among public and nonprofit organizations offer an important way of addressing a wide range of needs faced by communities. A "social network" describes a social structure at a particular point in time in terms of actors (e.g., individuals or organizations) and the links among them. A social network indicates ways that actors are connected through various social familiarities ranging from casual acquaintances to close bonds (Carley, 2022). Collaboration through organizational networks can enhance the efficiency, effectiveness, and capacity of community-based services in addressing complex health and social problems, although the presence of network connections does not necessarily mean that partnerships will succeed (Provan et al., 2005). During crises, the development of networks between public, non-profit, and private organizations providing essential social services seems crucial to produce collective actions (Sanzo et al., 2015) as network members share resources and collectively learn to face the challenges of critical situations (Belso-Martínez et al., 2020). For example, Guijuan and Wang (2020) found that non-profit organizations' collaboration among themselves in the Wenchuan, China earthquake relief efforts was key to leverage limited resources and expand on the power of any single organization acting alone. Similarly, studying Cyclone Maria in Australia, Jiang and Ritchie (2017) identified resource sharing as central to stakeholder collaboration during and in the aftermath of an unexpected disaster.

The COVID-19 pandemic equally underscored the importance of collaboration among organizations during disaster response. In Belgium, community-based organizations initially faced challenges in promptly responding to the pandemic's impacts and lacked information about how other organizations were operating; however, over time they began to collaborate in an advocacy coalition of social workers and nonprofit members, enabling them to collectively address the crisis through innovative practices supporting vulnerable groups (Raeymaeckers and Van Puyvelde, 2021). In Denmark, the vast majority of COVID-19 related support was distributed through existing social networks and, therefore, not available to those lacking social connections (Carlsen et al., 2021).

In addition to these broader studies highlighting the importance of collaboration among organizations during disaster response, a few have examined the importance of networks in the food system during the pandemic. In Cape Town, South Africa, community action networks and individuals in the informal economy were essential to

respond to food demands in a more socially inclusive, culturally appropriate, and ecologically regenerative way (Kushitor et al., 2022). In an Indigenous community in Canada, Loukes et al. (2022) highlighted the importance of community-based leadership, plus communication that occurred through community meetings and social media, to keep people informed about pandemic protocols and actions, including food mobilization. In North Carolina, USA, informal networks comprising farmers, food producers, and distributors played a valuable role in facilitating information sharing, logistical planning, and resource exchange (O'Connell et al., 2021). A study by Obach et al. (2023) described how rapidly formed collaborative response networks in the Chicago, IL, USA metropolitan region helped individuals and organizations coordinate their actions to address immediate needs, such as distributing emergency food and personal protective equipment (PPE). Thus, different organizations working at the community level, including non-profit organizations, have been vital to addressing pandemic-related food system disruptions, highlighting the need for further research into their contributions to food system resilience. Many food systems researchers and practitioners have become interested in how knowledge about social networks can contribute to evaluating impacts and developing more sustainable and equitable food systems, including by investigating how food system entities, such as individuals, organizations, or businesses, are or are not connected in collaborative processes (Rocker et al., 2022). Our study helps fill this knowledge gap.

While networks play an essential role in fostering connections among organizations, they also involve challenges and limitations. For instance, in Florida, U.S., community garden leaders observed that major crises like COVID-19 can cause disruptions in commercial food supply chains that leave many communities without a sufficient supply of affordable, nutritious, fresh food. They acknowledged the potential of small growers like community gardens to provide essential foods locally during a crisis but also capacity constraints that limit their ability to fulfill this potential (Schanbacher and Cavendish, 2023). Furthermore, COVID-19 response networks sometimes reproduced social hierarchies of privilege and oppression, limiting the potential to advance racial and economic equity in the food system without explicit attention to disrupting power inequities among network participants (Obach et al., 2023).

Thus, a growing body of evidence across geographic locations and social contexts documents the important role of social networks comprising different organizations, including non-profits, in responding to food insecurity, business disruptions, and related pandemic impacts. Extant research also suggests that collaborative networks can increase resilience within local food systems, improving their ability to withstand future shocks (Loukes et al., 2022; Wentworth et al., 2023). While some studies have examined interaction trends and experiences among organizations engaged in general pandemic response (Raeymaeckers and Van Puyvelde, 2021), few have investigated these patterns among organizations addressing the pandemic's food system disruptions. To help fill this gap, we used the mixed methods of document review, focus groups, and social network analysis to analyze the collaborative networks of non-profit organizations working to mitigate food insecurity, business disruptions, and other food system impacts caused by the COVID-19 pandemic in the Chicago, IL, USA metropolitan region. We investigated the following questions:

- What social networks supported non-profit organizations' efforts to respond to food system disruptions during the pandemic?
- What different types of organizations engaged in collaborative efforts?
  - What types of interactions occurred between organizations?
  - Were the relationships between organizations newly established connections or existing ones?
- How do non-profit organizations perceive the benefits and challenges of partnerships within their food systems work, especially during an unexpected shock?

Our study is the first to our knowledge that combines quantitative data to map network patterns, which visually illustrate the dynamics of social networks, with qualitative data providing an in-depth understanding of network actors' perspectives on their experiences responding to food system disruptions during the COVID-19 pandemic. The results can inform organizations working to promote food system resilience about how to build upon existing networks and foster new relationships in equitable ways to support program activities during crises. The results also can inform donors to plan interventions or launch initiatives that strategically promote long-lasting partnerships and identify lines of inquiry for researchers interested in exploring how organizations in non-food sectors become incorporated into food system networks.

## 2 Materials and methods

Our research focused on the experiences of non-profit organizations responding to the pandemic's food system impacts in the Chicago, IL, USA metropolitan region. We identified organizations through the Chicago Region Food System Fund (the Fund), which launched in June 2020 to address hunger and food business disruptions caused by COVID-19 by bolstering local food systems. In multiple funding rounds, the Fund awarded grants to non-profit organizations engaged in food-related responses to the pandemic in urban, suburban, and rural communities within approximately 200 miles of Chicago. These grantees supported a wide range of people, such as seniors, individuals with disabilities, immigrants, members of the LGBTQ+ community, people experiencing homelessness, and who were ill with COVID-19 or lost jobs due to the pandemic. Many organizations were led and staffed by people of color and worked within communities of color disproportionately impacted by the pandemic (Chicago Region Food System Fund, 2024). We collaborated with the Fund to evaluate their "Resilience Round" of funding, which provided grants to 48 organizations working to promote a resilient and racially, economically just food system. This set of 48 organizations served as the sample for our analysis. A prior 2020 "Response Round" funded 81 organizations engaged in emergency response activities, such as producing food, distributing food, and enhancing the capacity of other organizations to address emergency food needs. A thematic content analysis of the earlier grantees' reports upon conclusion of that funding period identified partnerships as essential to implementing their response efforts (Dahal, 2023). Thus, we iterated our methods to study in greater depth the role of partnerships in pandemic response through the experiences reported by the 48 organizations awarded "Resilience Round" funds in 2021.



We used mixed methods (Creswell and Clark, 2017) to describe the social networks that supported these organizations and explore their lived experiences of collaboration as they worked to address the increased demand for emergency food assistance and other food system disruptions in their respective communities during the pandemic. Through quantitative SNA, we studied how social networks supported non-profit organizations' efforts to respond to food system disruptions caused by the pandemic. Through qualitative document review and focus group discussions, we explored participants' lived experiences of collaborating with other organizations in their response efforts. Employing mixed methods allowed us to enhance the robustness of the study's results (Christensen and O'Sullivan, 2015) by combining quantitative data to map network patterns describing social networks visually with qualitative data generating in-depth understanding of network actors' perspectives on their experiences.

## 2.1 Quantitative data collection and analysis

Social network analysis (SNA) quantitatively maps the relationships, collaborations, or communication among individuals or organizations (National Research Council, 2003). We conducted SNA using data from reports submitted by the 48 organizations awarded Resilience Round funding in April 2021. SNA systematically describes relationships among individuals, groups, and/or organizations by gathering data about their interactions and using that information to describe various aspects of collaboration, such as frequency, type, or strength of contacts (Christensen and O'Sullivan, 2015). SNA represents individuals, groups, or organizations as 'points' and their relations to each other as 'lines' within 'networks' formed by the intersections that connect them. Through SNA, one can explore the patterns generated by the points and lines visually or mathematically to assess the implications of these patterns for the network's members (Scott, 2012).

The organizations responded to a question in the report submitted at the end of the funding period regarding their collaborative efforts, including what organizations they partnered with, whether the relationship was existing or new, and the nature of their collaboration. We generated an attribute table in Excel listing all organizations identified by the grant recipients as partners, which we categorized into organizational types (Table 1) based on their mission, work nature, and/or sector (e.g., non-profit, consulting) as indicated in the grantee reports or located through an online search. We also organized the types of interaction reported between an organization and its partners into five categories: advocacy and education, financial and transactions, health, operations, or production and distribution, as defined in Table 2. We included details about whether the collaborative relationship was existing or new in an additional spreadsheet.

To generate SNA diagrams from the Excel sheets, we used ORA-LITE software, a network analysis tool developed by researchers at Carnegie Mellon University.<sup>1</sup> To describe the social networks of non-profit organizations responding to the pandemic's food system disruptions, we examined the overall collaborative network of the 48 grantees that received 2021 "Resilience Round"

**TABLE 1** Definitions used to categorize non-profit organizations responding to COVID-19 food system disruptions in the Chicago region and their reported partners by organizational type.

Organization type	Definition
Coalition	Umbrella organizations or networks of organizations that work together in food-related or other (e.g., environmental justice) organizing and policy advocacy.
Consultancy	For-profit businesses that provide consulting services, such as marketing, technical assistance, or IT support.
Educational institutes	Public or private K-12 school, college, university or other educational institutions.
Faith-based	Churches, synagogues, mosques, or other religious institutions. Also includes non-profits that bring together faith institutions but are not affiliated with a single church, mosque, etc.
Farm	Entities that grow food for sale, whether a for- or non-profit organization. Includes family farms but does not include community gardens.
Food pantry	Organizations that provide food for distribution to people in need. Includes food banks.
Governmental	Governmental agencies or departments at the local / municipal, state, or federal level.
Health care	Medical centers, community health clinics, public health associations, medical schools, etc.
Media	Newspapers, TV stations, radio stations, etc.
Non-profit	Non-profit organizations working in local communities that do not fall within another category.
Other food-based	Organizations that promote local foods, such as farmers markets, community gardens, locally owned food manufacturers, farmer cooperatives, food distributors, growing equipment suppliers. Does not include farms or food pantries.
Property management	Private or public entities that manage properties, such as apartment complexes, public housing, or senior centers.
Restaurant	Restaurants, caterers, breweries, or chefs.
Supermarket	Retailers that sell food whether chain or locally owned. Includes grocery stores, produce markets, convenience stores, etc. Does not include farmers markets.
Worker center	Organizations or alliances that provide services to workers and/or advocates for workers' rights.

funding and their reported partners (Figure 1). We also investigated the degree of homophily within the network (Figure 2), which refers to the tendency of contacts within social networks to occur more frequently between entities that share similar rather than dissimilar characteristics (Currarini et al., 2016), and the types of interactions between organizational partners (Figure 3). Furthermore, we examined whether connections among collaborating organizations involved existing or new relationships (Figure 4) and if collaboration among organizations that received larger grants ( $\geq \$65,000$ ) might differ from others (Figure 5). Lastly, using ORA, we calculated measures of "authority centrality," which indicates the significance of an actor in a network based on the number of links

<sup>1</sup> <http://www.casos.cs.cmu.edu/projects/ora/download.php>

**TABLE 2** Types of interaction among non-profit organizations responding to COVID-19 pandemic disruptions in the Chicago region food system and their reported partners.

Interaction type	Examples of activities involved in the partnership
Advocacy and education	Conducting educational programs related to nutrition, gardening guidance, cultivating crops with limited resources and space, etc. Promoting COVID-19 awareness and advocating for essential workers.
Financial and transaction	Re-granting funds to local organizations, receiving food and supply donations, and buying food and PPE products.
Health	Providing vaccines and personal protective equipment (PPE) to essential workers and others. Providing mental health counselling to people impacted by COVID-19.
Operations	Expanding outreach, receiving technical assistance, planning and implementing program activities, reporting, and evaluating.
Production and distribution	Managing venues for food distribution, arranging food services, and growing fresh vegetables for including in meal boxes.

(or connections) it receives from other actors (Belso-Martínez et al., 2020).

## 2.2 Qualitative data collection and analysis

In addition to the SNA, we thematically analyzed qualitative data from the grantee reports and focus group discussions to identify both the benefits and challenges of partnerships. We analyzed the 48 grantees' responses to questions that asked them for the story they most wanted to share about their work to promote food system resilience, something that did not go well and what their organization learned from it, what changes their organization made in its work that it will carry forward into the future, and how these changes made their organization or the Chicago region food system more resilient to future shocks like COVID-19.

We also designed and facilitated focus groups with a subset of purposefully selected grantees. Of the 48 organizations, we invited those that reported a majority people of color across their boards of directors, leadership, and staff to participate in a focus group. We centered the perspectives of people of color because COVID-19 impacted their communities the hardest as evidenced through higher rates of COVID-19 illness, food insecurity, and COVID-19 exposure through frontline work that could not shift online. Hence, their experiences and knowledge are essential to creating an equitable food system. The Fund sent electronic invitations on our behalf to the 37 organizations that met the sampling criteria. The invitation explained the study's purpose and procedures and invited up to two individuals from each organization to participate. Those interested completed a Google form with their contact information and schedule availability. We used this information to schedule the focus groups and all

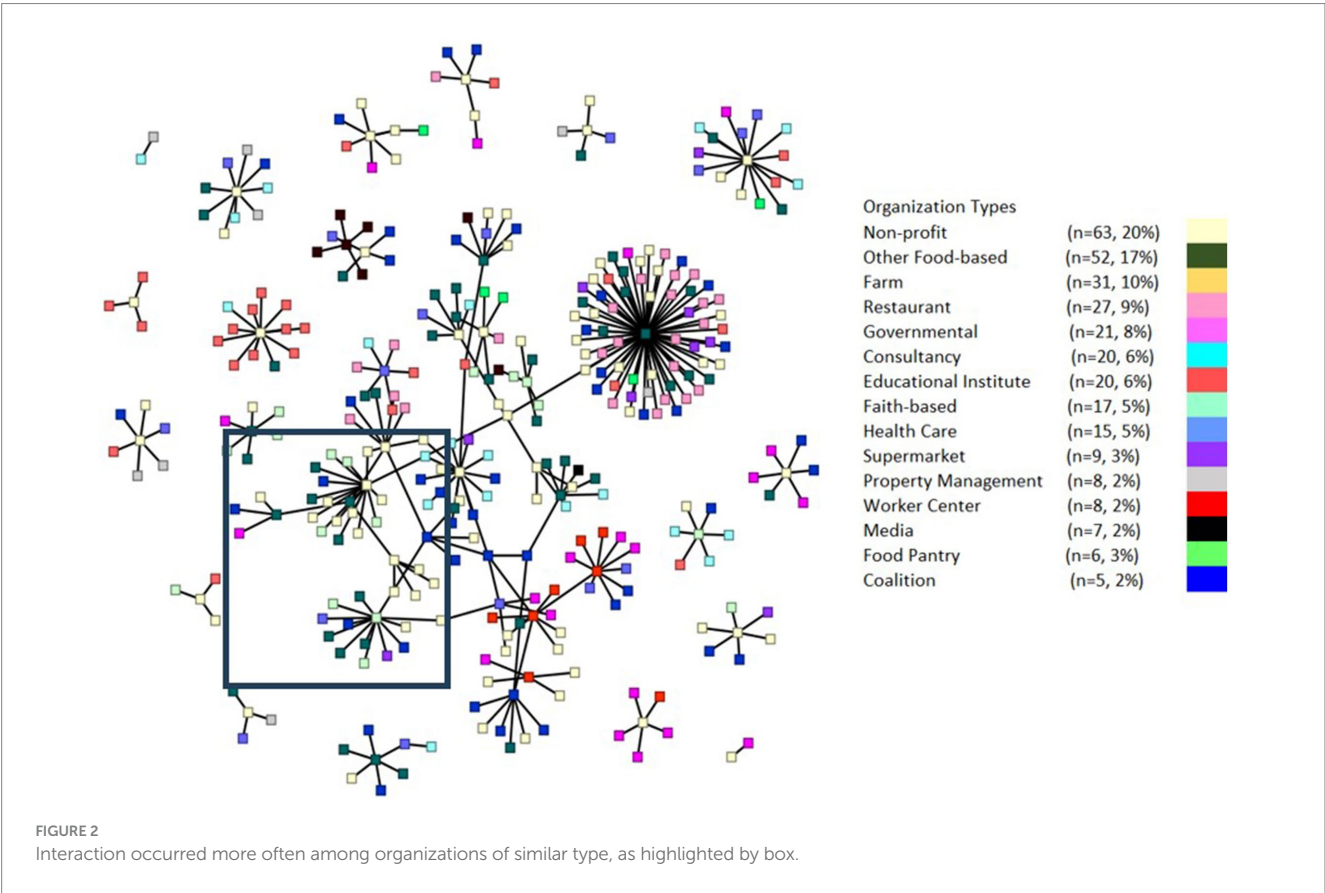
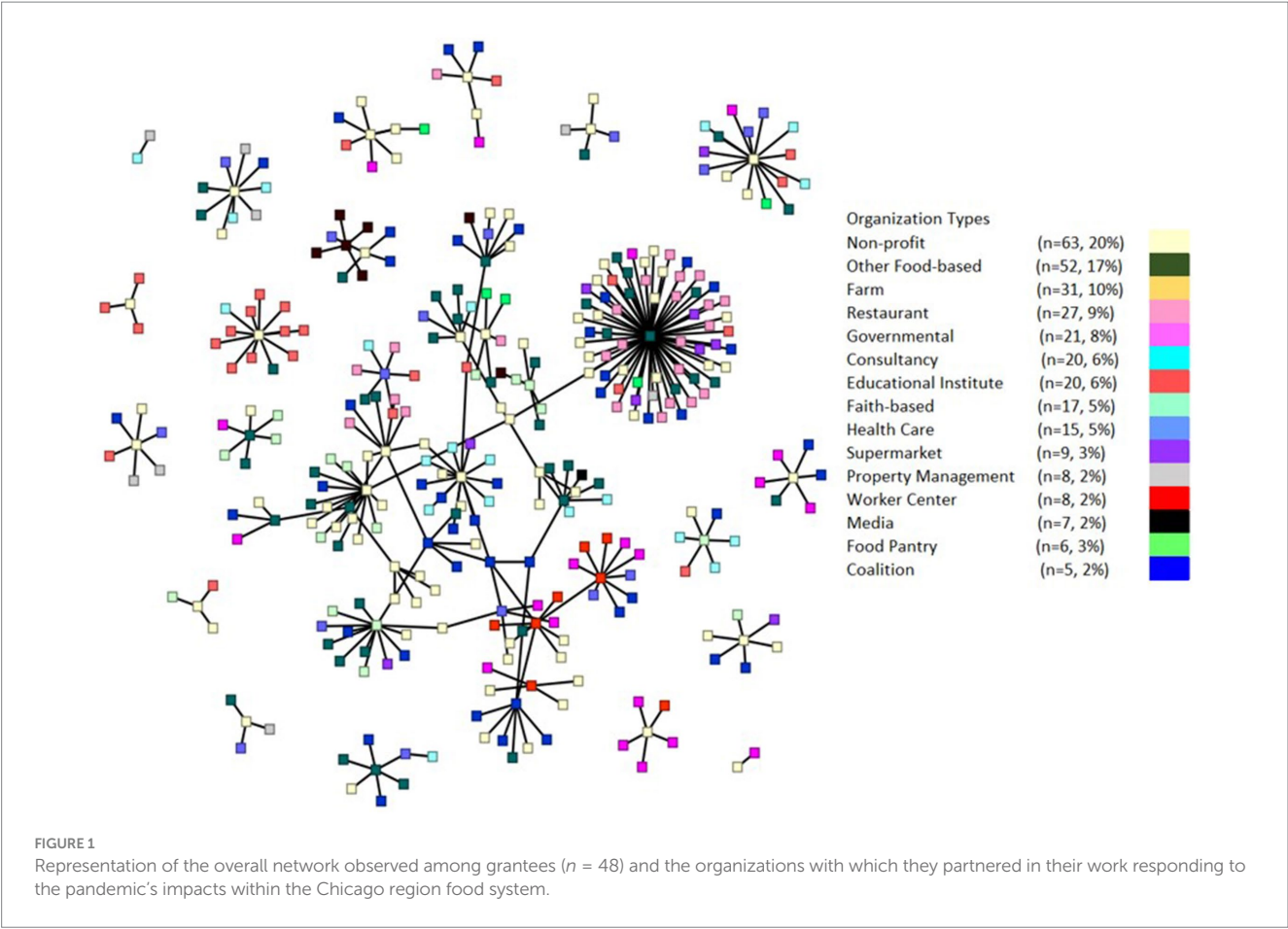
subsequent communications occurred directly between the researchers and participants.

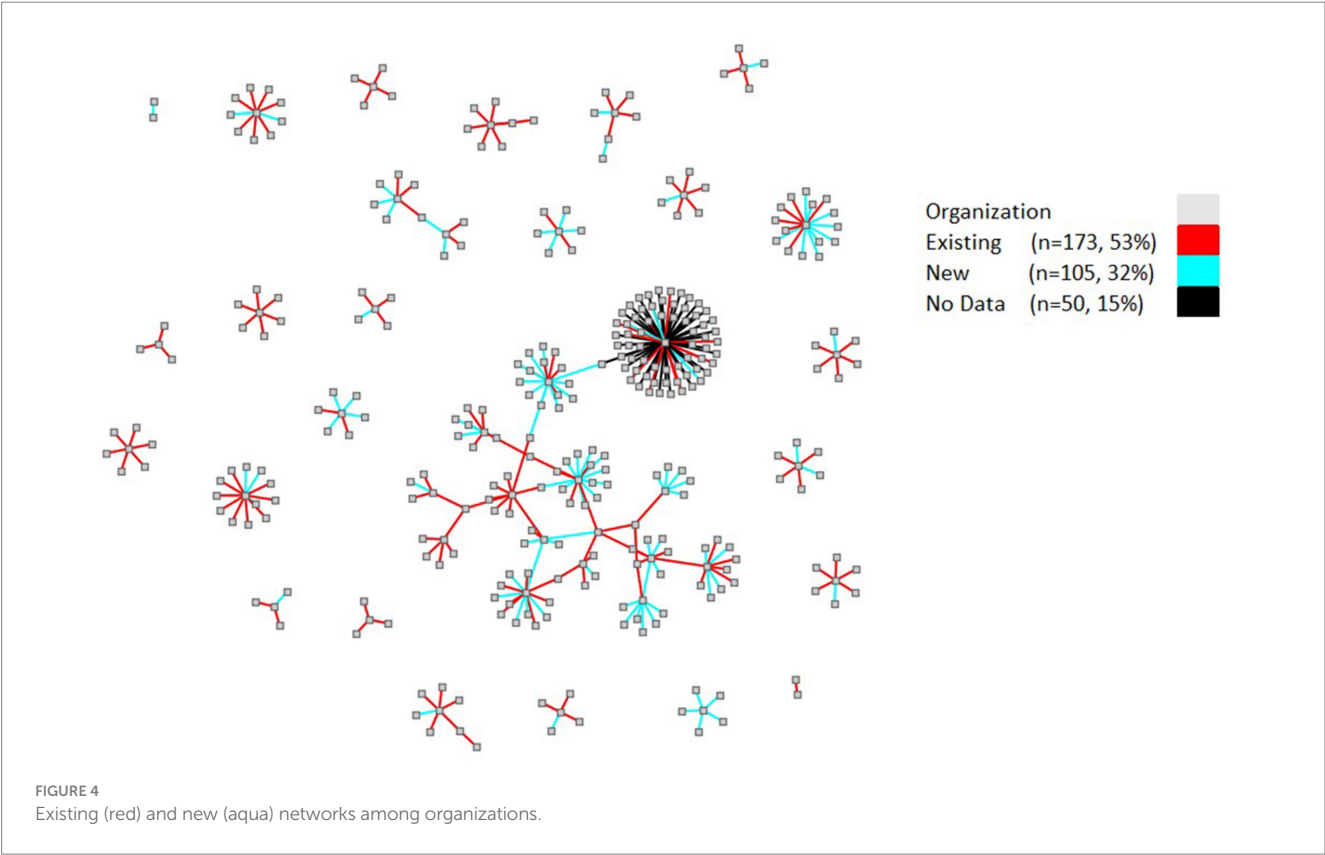
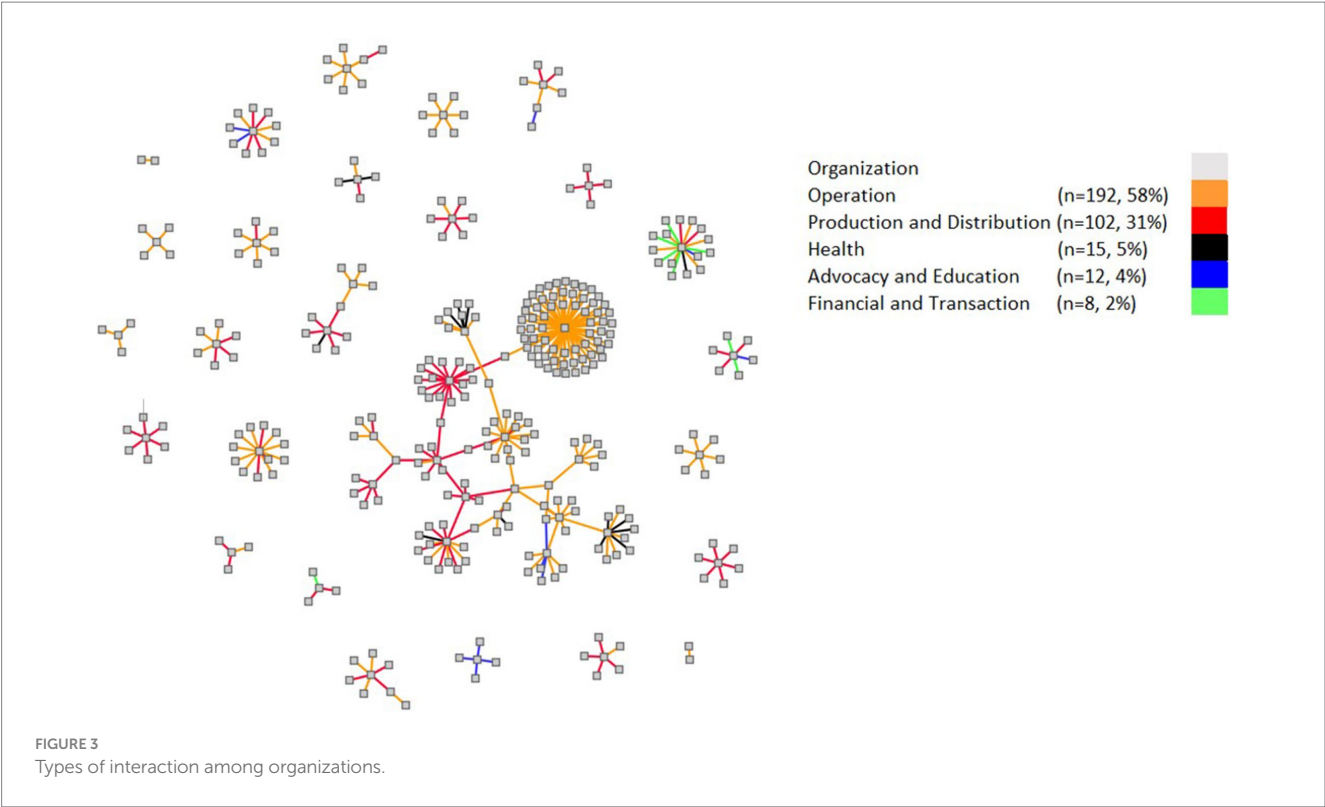
In May and June 2022, we facilitated four focus groups, one in-person and three virtual, with 26 individuals representing 20 organizations. These four focus groups accommodated all organizations that consented to participate. No representatives from the Fund were present during the focus groups, and the identities of participants quoted in subsequent reports summarizing the focus groups results were not disclosed to the Fund. According to self-reported information, seven participants identified as Black / African American, five as Latina or Latinx, three as White, two as Indigenous or American Indian, and one as Asian. Eight did not provide this information. Participants received by email in advance the agenda, list of participating organizations, and consent form. Participating organizations received \$200 per participant in recognition of their time and contributions. Participants came from a range of non-profit organizations. Prior to the pandemic, several organizations engaged in different areas of food and agriculture from food assistance, gardening, and farming to nutritional education, food business incubation, and farm and food industry workers advocacy. Roughly one-third of the organizations did *no* food-related work before the pandemic but became involved with food and/or agriculture due to the increased need for emergency food assistance within their communities during the pandemic. Their food-related work continued at the time of the focus groups in 2022. During each focus group, we explored how the organizations adapted their work during the pandemic in ways that may expand opportunities for longer-term, systemic change within the regional food system. We inquired about participants' experiences of collaboration, to what extent collaboration was important to their ability to pivot during the pandemic, and what recommendations they would offer for developing and sustaining effective partnerships. The discussions were audio-recorded, and the recordings were stored electronically in a password-protected folder and deleted after they were transcribed.

Using NVivo version 12.0 software, we thematically analyzed data from the grantee reports and focus group transcripts at separate points in time and then integrated these analyses. For each data set, we first organized the data into "parent nodes" reflecting the report or focus group questions (e.g., "experiences with and recommendations for effective partnership"). We then inductively reviewed the data within each parent node; using an iterative process, we created "child nodes" (e.g., "addressing community needs through partnership") and, in some instances, a third tier of "baby nodes" (e.g., "building trust," "networking") to represent emergent themes. We then integrated the emergent themes across both datasets to generate the results reported below.

## 3 Results

"I'm grateful to our partners that I mentioned that we had in the past and the new ones that we've met specifically, because of the pandemic, that we wouldn't probably have made these connections if it weren't for this awful thing that happened to us, so I am hopeful for continuing to adapt and pivot in all the what is the unknown ahead of us. And I think the pandemic kind of showed us that we're stronger together than we are individually, so I am grateful to our partners for sure."

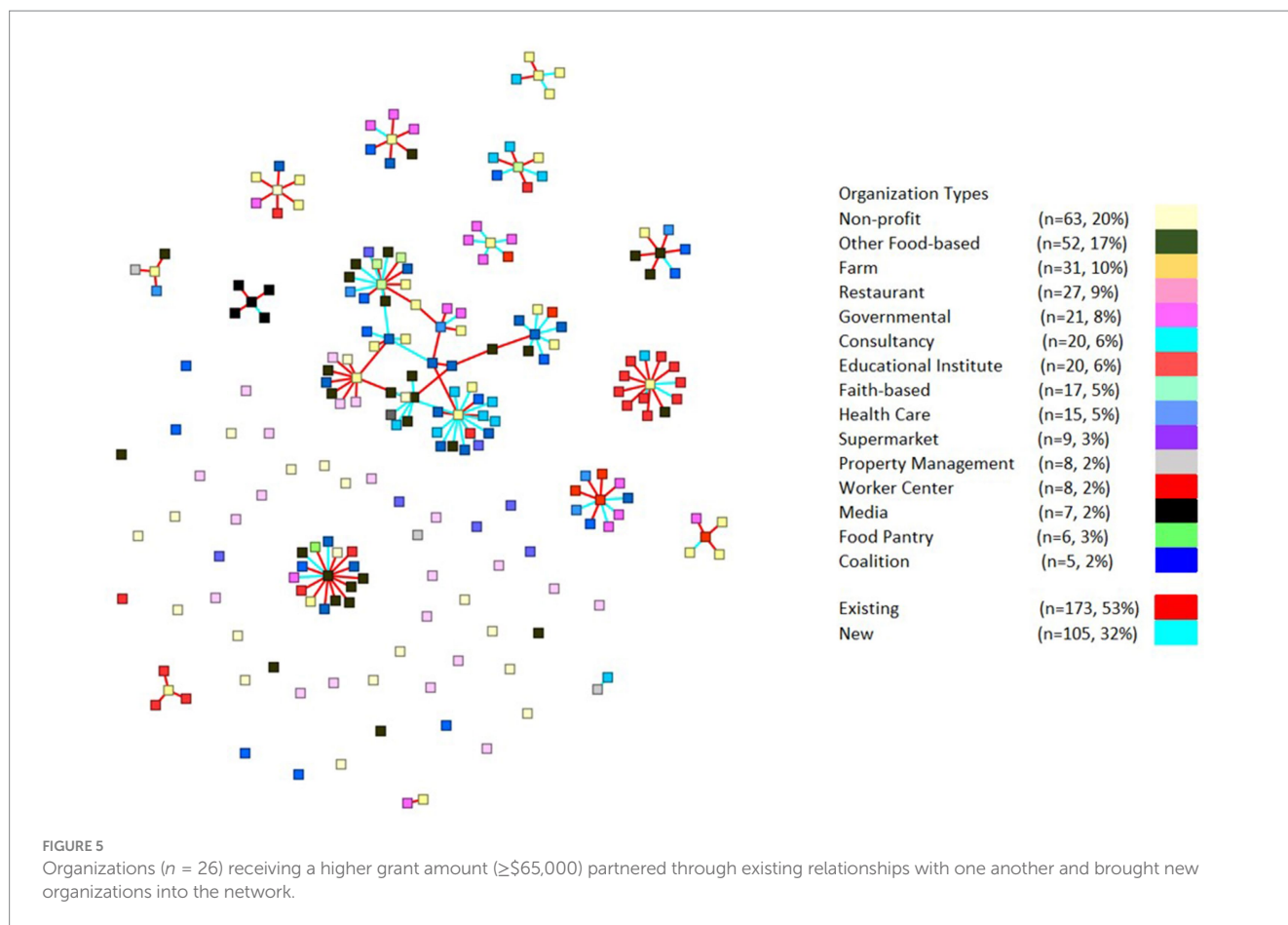




This quote from a representative of an organization working to improve food security in Chicago’s west suburbs reflected a sentiment also expressed by others. In grantee reports, nearly all organizations

identified partnerships as essential to their program activities. Focus group participants explained that partnerships enabled them to expand capacity, funding, and volunteers, plus access food and other





supplies for distribution to people needing them. Some acquired access to facilities like office space or land for growing food and hosting educational events. By coordinating with other organizations, participants also expanded their outreach and provided services to a wider range of people. Below, we describe characteristics of the social networks that supported these partnerships as well as organizational representative's perceptions of their benefits and challenges.

Figure 1, created through SNA, represents the overall network observed among grantees and the entities with which they reported partnering, which includes individuals or organizations that were not part of the funding program and study sample. The square boxes, or "nodes," represent distinct organizations with the central nodes symbolizing grantees and the outer nodes representing their partners. The connections between nodes are represented by lines known as "links." The nodes and links are color-coded to signify their respective types, as indicated in the diagram's interpretive key. Figure 1 illustrates grantees' connections with various types of organizations, such as coalitions, consultancies, farms, and food pantries (Table 1). Several patterns are apparent. First, at the center of the especially dense cluster is a food-based organization that supports farm-to-table programs in their region by collaborating with multiple food-based organizations, farms, restaurants, and educational institutes. Among grantees, this organization was top-ranked by ORA software on its number of network connections, which likely reflects its mission as a convenor bringing others together to achieve food system resilience. Second, a coalition that advocates for implementing policies that advance food justice was

identified as authority central by ORA. A node is authority central to the extent that its in-links come from nodes with many out-links, which means this organization is cited or consulted by many other organizations, who themselves are influential because they share information with many others. The organization's role as a coalition may explain why ORA identified its authority centrality. These results suggest an important role addressing disruptions due to the COVID-19 pandemic of non-profit organizations whose missions emphasize convening food system actors. Third, the intermediate-sized clusters often represent at their nodes organizations that received grants equal to or above \$65,000, which interacted with others through both pre-established connections and newly formed connections (Figure 5). Finally, the smaller clusters or isolated nodes scattered around the periphery represent the interactions among organizations that received smaller funding amounts and reported limited collaboration.

Although many different types of organizations collaborated during the pandemic to address food system disruptions (Figure 1), the SNA revealed that interactions occurred more commonly among organizations of similar types, as shown in Figure 2. For instance, faith-based organizations collaborated primarily with other faith-based organizations, while media-focused organizations partnered with similar entities. Additionally, food-based organizations tended to work together with other food-based organizations. Nonetheless, some grantees reported the value of partnering with dissimilar organizations. For example, an organization in a Mexican community reported:

“One takeaway is that there is tremendous value in partnering with organizations that do very different work than us. We’ve begun seeking longer-term partnerships and collaborations with organizations that are not directly involved in food access work but may be focused on improving health outcomes for residents of the southwest side. We view “health” as encompassing both physical and mental health, providing residents opportunities to access local, sustainably grown food and cultural events like dancing, storytelling, and more.”

Organizations engaged in a wide range of interactions that varied across different partnerships (Figure 3). While some interacted with partners in multiple ways, we prioritized the most common type of partnership reported by grantees. Hence, each line in the figure corresponds to the dominant interaction type, although others might have occurred. The highest percentage of partnerships ( $n = 192$ , 58%) involved operations. Organizations collaborated on tasks like outreach, technical assistance, planning, reporting, and evaluating outcomes. For example, one grantee developed a pro bono relationship with an internationally recognized consulting firm to prepare a five-to-ten-year plan for its environmental and financial sustainability. Another partnered with legal service providers to launch a program connecting pro-bono attorneys with growers to support funding, technical assistance, and advocacy. The second highest percentage of partnerships ( $n = 102$ , 31%) related to food production and distribution. Organizations worked together on activities such as managing venues for food distribution, arranging food services for people in need, and growing fresh vegetables to include in meals for people seeking food assistance. For instance, a worker rights advocacy organization described how they partnered to expand food access for their constituents: “With rising food prices and pandemic assistance disappearing, workers are increasingly struggling to afford food on warehouse wages. [Our organization] has partnered with [the] community center to organize outreach at food distribution events and is considering further organizing outreach with messaging focused on food insecurity.” Moving beyond relief programs, another grantee institutionalized their food distribution efforts into a full-time pantry and opened a community market providing fresh foods in partnership with local farmers to advance their larger vision of food sovereignty. Similarly, one organization that runs catering services leveraged its relationships with local farms and producers to incorporate local foods into their programs, including farm stands, catering, and processing value-added products. Partnerships involving health ( $n = 15$ , 5%) and those related to advocacy and education ( $n = 12$ , 4%) occurred in similar percentages. In these interactions, organizations collaborated with healthcare centers and/or educational institutions to promote COVID-19 awareness, advocate for essential workers, and carry out educational programs related to nutrition and growing crops in the available spaces, for example. Data from grantees’ reports indicated that only 2 % ( $n = 8$ ) of interactions involved financial transactions. This suggests that many collaborations instead involved non-financial assets, such as staff, volunteers, knowledge, skills, space, equipment, supplies, or social capital.

Figure 4 shows the duration of relationships between organizations: approximately half of network links ( $n = 173$ , 53%) were pre-established connections and nearly one-third were newly formed ( $n = 105$ , 32%). Fifteen percent ( $n = 50$ ) are represented as “no data” because grantees did not indicate when the connection formed.

Existing collaborations were observed among organizations of similar types. Newly formed connections were primarily established among food-based organizations, restaurants, farms, and supermarkets. It can be inferred that grantees formed these relationships to collaboratively address the food crisis triggered by the pandemic.

With respect to organizational representatives’ lived experiences of collaboration, this excerpt from a coalition of urban growers reflects a sentiment expressed in many grantee reports: “We learned that relationship & [sic] trust-building takes intention, time, patience, adaptation, and commitment.” An organization working to improve equitable access to fresh food in Black neighborhoods through community projects like greenhouse restoration and a community grow room reported, “We have learned that a food system is not built on food supply; *it’s built on relationships*” (emphasis added). A few grantees described that the networks they developed during their pandemic response are strengthening the regional food system and its capacity to withstand future shocks. For instance, a vocational farm that teaches people to produce and prepare food reflected:

“The foundation is being laid with the relationships being formed will increase local food production and accessibility in the future. As more local food is available and accessible, the food system will not depend upon food travelling thousands of miles when the next pandemic arrives, thus making for increased food security. The linkages in the local logistics e.g., shared trucking, etc., will also strengthen the state food systems for future shocks, either health or climate in nature.”

Participants from focus group discussions also described how their organizations adapted their programs and operations in response to the pandemic’s impacts and these adaptations were largely made possible through partnerships with other organizations. Through collaboration, many organizations helped to meet the increased demand for food assistance caused by the pandemic through a variety of creative approaches, such as coordinating logistics to deliver food boxes, operating community food pantries, connecting local farms to food pantries, and surveying or listening to community members to provide food suitable to their cultural traditions, staple diets, dietary restrictions, and physical resources for cooking. During the one-year funding period, grantees reported distributing an estimated 638,490 pounds of food (e.g., food boxes, prepared meals) in their respective communities; this extended the estimated 9.5 million pounds of food distributed by 81 non-profit organizations awarded grants in the 2020 Response Round of funding. Partnerships expanded existing or created new programs to increase people’s food options through local food production, education, and economic development, such as expanding or creating urban farms and gardens to increase food access and green space while also supporting education, community-building, and mental wellness. Some organizations coordinated educational programs about growing food, culturally-relevant food traditions, or cooking demonstrations with recipes to encourage people to grow and/or eat locally produced foods. A few organizations organized youth education on-site at community gardens and farms or in collaboration with schools and park districts, providing youth opportunities to learn about agriculture, nutrition, and workforce skills, such as culinary arts or carpentry. Some organizations provided small business support and workforce training, including opportunities to

learn skills (e.g., horticulture, carpentry, culinary, entrepreneurship). Organizational representatives reported that this helped build the capacity of local food businesses, create jobs, and contribute to local economies.

Yet, not all partnerships proved constructive, and some focus group participants described harmful experiences. For instance, staff of a small organization in a Mexican community reflected, "... the coordination was awful, the additional coordinating work that we had to do was really, really awful and really disrespectful and we decided to no longer partner with that organization that got really big grants, because of the way that they were treating communities of color." Similarly, an organization that provides family and youth services in predominantly Black communities shared:

"... there are some very popular organizations who are receiving funding that will continue to receive funding, because they have received the franchise tag, if we have any basketball fans here, that they're the foundation by which food security lives upon. And I have found those organizations to not be at all encouraging for partnerships or gleaning of information or interested in launching small pilots. And the little guys like my [organization] often get crushed, even though we bring all of the intellectual genius to the table, someone else typically gets the credit for that. So ... there has to be equitable partnerships, and just because I'm a little itty-bitty doesn't mean that I should get less pieces of the responsibility and/or the money. We bring as much knowledge, as much experience to the table, and want to be considered to be an equitable partner regardless of when we got in the game and who else has been in the game prior."

Examples of disrespectful partnerships included doing more work for a project than a partner who received most of its funding, being tokenized in partners' outreach materials but discriminated against in actual service provision, or partners who failed to uphold their commitments ("they hit you and quit you").

In contrast, participants called for and intentionally worked to create partnerships built upon equitable, respectful relationships. "I would not call it a partnership, honestly, they are relationship-building ... that's really what's been sustaining us," said the representative (cited above) of an organization working in a Mexican community. Another organization engaging with workers in the informal economy explained:

"For us, [it's] understanding one another's role and the mission and then the individual that you're looking to be in relationship with. I think a lot of times we're prompted to go into relationships where it's one sided – we're believing that we need something from them and we often give too much or sacrifice too much of ourselves. So we made it part of our culture not to do that. This is who we are and we're unapologetically that. And then accepting us for who we are, and then at the same time us meeting you where you're at, and then in that we can have a true relationship."

To establish long-lasting, effective partnerships, focus group participants recommended building genuine relationships with shared values and understanding of the community; sharing resources equitably; clarifying roles and responsibilities, honoring each other's

business models, and respecting boundaries; and fostering trust through communication, transparency, and accountability as vital strategies for developing sustainable partnerships among organizations (Table 3).

With respect to their general experiences of fundraising, focus group participants raised concerns about needing to compete with one another for financial resources. As the staff of an organization led by people of color that supports urban growers explained:

"... scarcity is a white supremacist mindset, it's fabricated in order to keep us in competition with one another. And one of the most difficult things when it comes to creating partnerships, maintaining collaborations and relationships, is when you feel like you're in competition with other people, other organizations, coalitions, grassroots spaces that are doing dope ass work. And so it's inherent in a grant process. And just rethinking how grant making works, I'd love ... for more intentional thought to be done around moving away from that competition-based mindset of grant making towards something that uplifts and honors the relationships that are already happening within our communities and that sustain our communities. Because, honestly, collective voices are how we're able to continue the work that we're doing in nourishing our communities."

Like this individual, several focus group participants called upon funders to innovate alternative grant making models that promote cooperation, recognizing that societal issues can be addressed more effectively when organizations unite. Participants would like funders to encourage organically developed collaboration across nonprofit organizations but not to impose partnerships upon grantees. The representative of an organization engaging with LGBTQ+ individuals, reflected:

"... forced partnerships don't work, or partnerships where there's a requirement in order for you to access funds that you have to bring in a partner, especially if there's a pre-identified group of partnerships, choose one of these ... And creating a lateral way of connecting because grantees, winners of funds, it becomes hierarchical, like your organization is better, you're making more money, you're worth this much. It's a repetition of oppression. It becomes playing into the systemic issues that we're working against or trying to dismantle. And really [we need to be] building together ... what are your resources, what are my resources, where do we overlap?"

Our initial analysis of the overall network diagram (Figure 1) showed that organizations receiving grants equal to or above \$65,000 often had intermediate-sized clusters. To better understand the nature and duration of relationships between these grantees and their reported partners, we analyzed the network of this sub-set of grantees more closely (Figure 5). Figure 5 was created using data only from organizations receiving an award of \$65,000 or more ( $n = 26$ , 54%). It illustrates the pre-existing and expanded networks among these grantees and their reported partners, which included both other grantees and entities beyond the study sample. Among new relationships formed, some were established with other grantees

**TABLE 3** Recommendations provided by focus group participants for establishing long-lasting and effective partnerships.

Recommendation	Illustrative quote
Build genuine relationships with shared values and understanding of the community	For a good partnership, it has to be a symbiotic relationship. And you have to be compatible with each other. You cannot partner with everybody. And just to take it to one more level, it needs to be a spiritual connection. You have to have the same beliefs, to some degree, same values.
Share resources equitably from an abundance mindset	... every organization, regardless whether they are small and medium or large, has a certain level of privilege and opportunity to think in a framework of abundance and continue to share resources.
Clarify roles and responsibilities, honor each other's business model, and respect boundaries	You have to be very, very clear about what is your role and what is the role of the other organizations because misunderstandings are coming, conflict of interest can show up.
Foster trust through communication, transparency, and accountability	...communication, collaboration, accountability, and transparency are key elements to any relationship

receiving higher fund amounts and others with organizations not previously part of the network. This highlights that organizations with greater resources are positioned better than others to serve connecting roles; however, better resourced organizations should carefully consider their collaborative approach by complying with focus group participants' recommendations for effective partnerships (Table 3).

## 4 Discussion

This study was conducted in collaboration with the Chicago Region Food System Fund to investigate the social networks among nonprofit organizations addressing impacts of COVID-19 in the Chicago region food system. Using mixed methods, we generated findings that are both descriptive and interpretive. Quantitatively mapping data through SNA visually illustrated social network dynamics and highlighted overarching patterns like different types of interactions, a tendency for interactions to occur among similar types of organizations, and pre-existing and new connections. Qualitative data from grantee reports and focus group discussions with a subset of grantees provided in-depth understanding of network actors' perspectives on their experiences, which suggested explanations for these patterns, shed light on partnership benefits and challenges, and identified strategies for building and sustaining effective partnerships. Integrating network diagrams with qualitative thematic analysis allowed us to garner more robust understanding of the social networks among non-profit organizations responding to pandemic related food system disruptions than possible relying on a single method. Below, we situate our findings in the broader research literature and highlight their key implications.

Many non-profit organizations in this study reported that partnerships were essential to their efforts to promote food security and strengthen local food systems. The overall network diagram

showed that varied types of organizations responded to food system disruptions during the COVID-19 pandemic and supports the claim reported by many grantees that working together was important to provide immediate emergency food assistance and that their ongoing projects related to food production, distribution, education, and policy advocacy, among others, can help strengthen local food systems. Nonprofit organizations can enhance performance by engaging in networking activities, as collaboration and cooperation among nonprofits generate value and positive outcomes (Johansen and Leroux, 2013). The overall network analysis also showed the important role of organizations whose missions explicitly involve convening others to address food-related needs. This was true of the organization with the greatest number of network connections and the coalition identified by ORA as authority-central (indicating that it is consulted by many entities who themselves are influential in the network due to their connections with other actors). Such alliances or coalitions are crucial in responding to external shocks like pandemics and positively adapting to disruptions. Organizations can leverage collective strengths and resources through partnerships to achieve comprehensive outcomes, including increasing funding and volunteers, accessing food and other supplies for distribution, acquiring facilities like office spaces or land for food cultivation and educational activities, and expanding outreach and services to a broader audience. Establishing strategic alliances can provide organizations with access to tacit knowledge, skills, new technologies or markets, and the ability to offer a broader range of products and services beyond their organizational boundaries (Chen and Graddy, 2010).

SNA showed that interactions occurred more often among organizations of similar type or within the same sector, although organizations collaborated through varied interactions, including operations, production and distribution, health, advocacy and education, and financial and transaction. Partnerships occur among non-profits who share a common vision, leading to increased effectiveness in their work (Chen and Graddy, 2010). However, our results also indicated that incorporating new organizations into collaborative efforts can contribute to achieving collective aims. This was evident as grantees from within and sometimes across various sectors came together to address the immediate issue of food insecurity during the pandemic. This suggests that potential exists to strengthen the network further through intentional efforts to foster interdisciplinary collaboration among organizations, especially given the key learning expressed by some grantees about the value of working with partners outside of their own sector to achieve integrated outcomes.

Crisis often presents unfavorable conditions for forming partnerships, as the urgency to address immediate needs becomes a higher priority over building trust and effective coordination (Sanderson Bellamy et al., 2021). Thus, pre-existing partnerships tend to be more helpful during crises, as the established trust facilitates effective collaboration. Indeed, the existing and new network diagram revealed that over half of the interactions occurred through established relationships. Additionally, focus group participants highlighted the need for funders to transform competitive grant-making models to ones that foster cooperation by encouraging organically developed collaborations but not imposing partnerships on grantees. Yet at least 32% of interactions occurred among newly established partners. Newly formed connections primarily occurred among food-based organizations, restaurants, farms, and supermarkets. It can be inferred that grantees formed these relationships to collaboratively address the



food crisis triggered by the pandemic. These results highlight the importance of intentional relationship building from the start of a partnership, as fostering long-lasting relationships can lay the groundwork for swifter collaboration when crises arise. The network diagram showing a wide range of interactions among organizations highlighted that most collaborations involved non-financial assets, such as staff, volunteers, knowledge, skills, space, equipment, supplies, or social capital. The prominence of pre-existing relationships and non-financial, non-transactional interactions, as well as focus group participants' recommendations for effective partnerships, highlight the value of relationships based on trust and commitment to the successful implementation of program activities and improved organizational performance (Sanzo et al., 2015).

Focus group participants described how partnerships enabled them to adapt programs and address increased food needs through food distribution, new community pantries, local food production, farmers markets, farmer support and advocacy, youth education on agriculture and nutrition, and capacity-building of local food businesses, among other initiatives. In addition to promoting food security within their respective communities, organizations reported myriad metrics of their impacts, such as the number of "trainings delivered," "partnerships made," "garden plots built," or "machinery purchased." This suggests a substantive investment in partnerships, education, policy advocacy, and fixed capital that reflects the funding round's call to expand beyond immediate food insecurity challenges and fortify local food systems into the future. Despite grantees' achievements and extensive efforts, food insecurity persists in many communities in the Chicago region. Focus group participants highlighted that the efforts of government and large non-profit organizations were often insufficient to meet the food needs in their communities. As a result, small non-profit organizations, like grantees in this study, frequently found themselves stepping in to respond to crisis due to the pandemic with limited, if any, external support. While social networks helped these organizations to adapt programs and address increased food needs, many lacked sustained support as they operated in isolation due to disconnection between small non-profits and broader governmental efforts. Our findings suggest that although partnerships were essential, they were not sufficient to overcome the widespread food system disruptions caused by the COVID-19 pandemic.

Our results revealed that partnerships played a crucial role in pandemic response; yet, some focus group participants also discussed harmful experiences that occurred within partnerships, which often related to race, ethnicity, and/or organizational culture, size, and resources. Examples included disrespectful treatment, tokenization, inequitable workloads, poor coordination, and lack of accountability among partners, highlighting how broader societal dynamics of privilege and oppression arose within grantees' pandemic response networks even as they aimed to support food needs. These findings align with another pandemic response study from the Chicago region by Obach et al. (2023), which reported that privilege and oppression within a rapid response network required intentional action by facilitators to help shift inequitable power relationships among network participants. While Obach et al. (2023) drew upon ten in-depth interviews, our results come from 48 organizations and combine qualitative analysis with quantitative SNA. Thus, our study offers more robust evidence that these findings are transferable to other contexts.

The study has a few limitations. First, the analysis drew upon self-reported data collected through grantee reports submitted to the Fund, which introduces the potential for bias as grantees might have reported that they used the funds optimally and established effective partnerships. However, reports asked about challenges and lessons learned and focus group discussions also inquired about challenges within partnerships; thus, respondents were encouraged to share not only positive experiences. Second, the identity of the individuals who prepared the reports is unknown, and their responses may differ from others in their organization depending upon their position within it. Also, a minority of organizations did not respond completely to every report prompt. Thus, the research results may not fully represent each organization's experience. Nonetheless, the results draw upon data gathered from 48 distinct organizations working in a variety of sectors and serving diverse communities within a 200-mile radius of Chicago. Thus, they are likely to be transferable across a range of non-profit organizations and community contexts.

The data used in the SNA relied on self-reported information provided by the grantees, which could introduce inaccuracies if the individual completing the report did not have full knowledge of or correctly remember the details of the organization's collaborations. Indeed, in some instances, grantees did not report clear information about when relationships supporting their work during the pandemic were established. Furthermore, we categorized organizations' partners and their interactions into types based on information available in the grantee reports. In some instances, an organization or interaction could fit into multiple types. We used our judgment to suitably place organizations and their interactions based on our category definitions; however, the potential of occasional misclassifications remains. While the SNA diagrams are not comprehensively accurate, they nonetheless offer useful approximations and provide valuable insights into the networks that supported organizations in their efforts to address pandemic-related disruptions in the Chicago region's food system.

Despite its limitations, the research offers a useful example of how to draw upon the strengths of both quantitative and qualitative methods to describe social networks visually and complement that with an in-depth understanding of network actors' perspectives upon their experiences. Our collaboration with a fund focused on building resilience in the regional food system provides unique insights as the study examined organizations' funded efforts to address the pandemic's impacts. The results can inform funders and donors to plan interventions or launch initiatives that move beyond disaster response to promote long-lasting partnerships strategically towards increased food system equity and resilience. Moreover, the results can benefit various organizations engaged in work to strengthen regional food systems. This study highlights how networks can support program activities during crises, the relational rather than transactional connections among many collaborating organizations, and the particularly influential role of better-resourced organizations as connectors. Organizations working to advance food systems equity and resilience also can benefit from focus group participants' recommendations for sustaining effective partnerships involving relationship-building, equitable resource distribution, clear roles and responsibilities, and trust built through communication, transparency, and accountability.

To better understand the role of cross-sector collaboration during crises like the pandemic, future research can explore how organizations from non-food sectors, such as mental health organizations or

organizations supporting domestic violence survivors, incorporated food assistance, gardening, or other activities into their work. Also of interest is how these organizations become connected within food-centered social networks, particularly given that many partnerships are founded on pre-existing relationships, suggesting a degree of trust, rather than solely financial transactions. Exploring further cross-sector collaborations by gaining insights into these organizations' motivations and potentially unique experiences can shed light on how social problems can be approached holistically through coordination across multiple impactful initiatives. Such research can examine strategies for promoting collaboration, effective integration models, and how to maximize positive outcomes of cross-sector partnerships in addressing societal challenges.

## 5 Conclusion

Using mixed methods, this study explored the social networks that supported non-profit organizations' efforts to address increased food insecurity and food-related business disruptions during the COVID-19 pandemic in the Chicago region, IL, USA. The findings revealed that partnerships occurred more often among organizations of similar type, although cross-sectoral interactions also took place. The majority of collaborations occurred through established relationships among organizations but roughly one-third involved newly created partnerships. Participants reported that partnerships were critical to implement program activities, increase resources (e.g., funding, volunteers, food and supplies for distribution, facilities or land), and expand outreach and services to broader audiences. Examples of challenges in collaborations included disrespectful treatment, tokenization, inequitable workloads, poor coordination, and lack of accountability among some partners. Participants observed that effective partnerships require building genuine relationships, clarifying roles, sharing resources equitably, and fostering trust through communication, transparency, and accountability. Our results demonstrate the importance of social networks in responding to pandemic-related food system disruptions and reinforce prior research documenting the value of collaboration in disaster response more generally. We also illuminate challenges of collaboration related to broader societal inequities. Future research can explore how organizations not engaged in food system work become incorporated into these networks to address broader social challenges through cross-sectoral collaborations.

## Data availability statement

The datasets presented in this article are not readily available because data ownership lies not with the university researchers but with the Chicago Region Food System Fund and/or organizations that participated in the study. Requests to access the datasets should be directed to the corresponding author.

## Ethics statement

The studies involving humans were approved by Loyola University Chicago Institutional Review Board. The studies were conducted in

accordance with the local legislation and institutional requirements. The ethics committee/institutional review board waived the requirement of written informed consent for participation from the participants or the participants' legal guardians/next of kin because the study's document review could not practicably be carried out without the waiver, the research involved no more than minimal risk to participants, and the waiver would not adversely affect participants' rights or welfare. Informed consent was obtained from all focus group participants.

## Author contributions

DD: Conceptualization, Formal analysis, Investigation, Methodology, Data curation, Visualization, Writing – original draft. TS: Conceptualization, Formal analysis, Investigation, Methodology, Funding acquisition, Project administration, Supervision, Writing – review & editing.

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## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## Generative AI statement

The authors declare that no Gen AI was used in the creation of this manuscript.

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