Improving Food System Resilience: Digital Food Sharing Pathways of Urban Agriculture in Chicago



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**INTRODUCTION**

Food security describes a state in which citizens have a stable and accessible food supply. The stability of the local food supply is often dependent on a globalized food supply chain, resulting in a food supply that is delocalized. A “disembedded” food supply is sourced outside the local area or region, requiring a network of different food and knowledge pathways to make food accessible to the consumers (Stone and Glover 2017a, 88).  The digitization of these pathways has furthered the delocalization of the food supply through remote coordination and computerized shipping algorithms which facilitate online ordering and the transport of food across hundreds of miles. Digitization has also transformed food accessibility in cities: meal-delivery applications and grocery delivery services have allowed consumers to directly order food to their homes, and social media and the internet have provided a platform for the sharing of food-related skills and knowledge. As such, digital food pathways, the network through which food resources are purchased, distributed, and accessed online, present an important arena for improving food security through increased urban accessibility to food.

Considering that cities will be the site of 80% of food consumption by 2050, evaluating the stability and accessibility or the urban food supply will be key to understanding how to ensure food security in the future (Ellen MacArthur Foundation 2019, 10). Global supply chains and imports are crucial to feeding many cities and regions, where local food shortages might otherwise result from low agricultural yields, natural disasters, seasonal unavailability of produce, or lack of farming due to poor soils or geography. Cities are dependent on outside sources for food, and they can never become fully self-sufficient (Elmqvist 2014); in the case that one mass supply chain is depended on and fails, local food sources become a competitive advantage. Urban agriculture (UA) is one strategy to supplement local supplies and mitigate the instability of the global supply chain by increasing urban residents’ accessibility to local food grown in the city. However, UA producers face unique challenges in increasing accessibility of their food and produce to the local community: often UA producers must invest labor and time to set up a distribution network for local delivery, and the smaller volumes and variability in produce are a challenge for negotiating contracts with mainstream food distributors like grocery stores.

I first compile a database of “collective desire” expressions such as mission statements, business plans, customer service messages, and other expressions of shared institutional goals and interests from a sample of UA food-growing initiatives. I then evaluate whether the goals of urban farms, community gardens and farms, and urban agricultural initiatives in Chicago are consistent with extant potentialities of digital and online technologies. Secondly, through a case study of one urban agricultural group in Chicago, Chicago Honey Co-op, I develop a diagram of food pathways to identify the potential for technologically mediated collaboration and connection across the sector. Understanding the interconnected pathways of food production and knowledge of food production sources within the city helps us approach a broader question: why might UA initiatives be essential in fighting food insecurity and promoting the resilience of urban food systems?

In the literature, the term food insecurity has generally been used to categorize households or geographic areas as food-secure or -insecure. These areas have been identified as “food deserts,” or areas of low food access typically assessed in relationship to supermarkets and food stores through the measurement of distance miles (The Illinois Advisory Committee to the U.S. Commission on Civil Rights 2011). These studies provide a valuable qualitative metric to understand the general landscape of food availability and accessibility. In reality, many people do not regularly purchase food from supermarkets and eat outside of the neighborhood they dwell in, and many people rely on informal food sharing networks for food access (Davies 2019). Yet due to the geographic focus of case studies, this literature makes many assumptions about whether people purchase most food from local grocers and where they choose to shop and why. This literature thus paints an ambiguous picture of food insecurity by failing to account for the multiple food and knowledge pathways used by people to access food. My paper responds to the need for an updated and more complete understanding of the geography of food insecurity and sheds light on questions of mounting importance due to COVID19, which is quickly changing the way that people access food and form knowledge of the food system.

Other studies have opened the conversation about the complexity and multiple dimensions of food insecurity. The general definition of food insecurity has been expanded by other studies that demonstrate that the complexity of the problem of food insecurity will demand cooperation across sectors and landscapes as well as between actors and species. From this research comes the popular definition of community food security, which involves “a spectrum of actors, projects, and objectives” to create a scenario where “all community residents obtain a safe, culturally acceptable, nutritionally adequate diet through a sustainable food system that maximizes community self-reliance and social justice” (Hamm and Bellows 2003, 40). The literature has acknowledged that food insecurity has multiple dimensions, connecting individual “diets” and local “residents” to a “sustainable food system,” and linking the food system to concepts like “social justice” and “community self-reliance.” However, much of the research literature is outdated and fails to account for the factors of food insecurity that are external to the community or city that is being studied.

The contemporary pathways of food distribution are dominated by global supply chains. As a result of globalization and its counterpart, delocalization, cities have become dependent on external supply chains and food pathways to provide food to cities. The reliance on a global food supply chain rather than local food producers has resulted in the “disembedding” of the food supply. From an urban dweller’s perspective, it is difficult to comprehend how individual actions contribute to a global food system when the distance between food production and consumption has increased as a result of globalization, urbanization and agriculture industrialization (Wittman 2010, 5). An increasingly complex relationship between the individual and the globalized food system is correlated with the disappearance of alternative and local growing and production knowledge from the city. Barthel et al. claim that knowledge and memory of food growing related practices are vanishing from the city (Barthel, Parker, and Ernstson 2015) and broadly write that cities will face threats to food security if there are sudden disruptions of supply chains (Barthel, Parker, and Ernstson 2015). The findings of a mixed-methods, representative survey conducted in post-socialist Hungary found that urban dwellers participated in food self-provisioning (FSP) activities at significantly different rates: one-third of urban residents versus two-thirds (56%) of rural Hungarian residents participating in FSP, and only 7% of the residents of Budapest, Hungary’s largest city, participated in FSP activities (Balázs 2016, 74). The findings of these studies, which point to the distance and “deskilling” of urban residents, are in conflict with the finding of other studies, which observe an increase in demand for locally sourced food and interest in sharing and acquiring food and related knowledge (Conner et al. 2009, 257). As such, my study deliberately focuses on digital food distribution pathways and knowledge sharing omitted by the former. I specifically consider digital platforms and social media as a viable platform for connection and participation in local food systems.

Researchers studying the food sharing ecosystem have concluded that “cities provide a shifting context for diverse “food sharing ecosystems” consisting of actors, material resources, histories, cultures and networks (both on and off-line) that come together to form provisional assemblages around food sharing initiatives” (Edwards and Davies, 2018, 2). While “off line” food pathways might include the physical cultivation and distribution of food in the city, online food pathways include the development of delivery applications: GrubHub and UberEats deliver meals from restaurants, Instacart and Peapod facilitate store-to-residence grocery delivery, and Daily Harvest delivers frozen prepared meals. In addition, companies like Freshly and Blue Apron deliver meal-kits, which encourage residents to practice home-cooking. The emergence of these applications and services has added a digital layer to the urban food supply network.

Additionally, online pathways have interfaces transformed the of food distribution and sharing, opening a platform on social media and the internet for consumers to access food knowledge and skills, including traditional recipes, memories, and guides for learning how to compost or use food waste. In addition, the internet has provided an important platform for UA initiatives to share their desire to meet the needs of certain communities and individuals; statements of “collective desire” are located in UA mission statements and description of activities and services. In addition, digital platforms are useful for promoting these events and services to the communities they want to serve and for connecting with potential volunteers, partner organizations, and customers. Understanding how these pathways contribute to the resources of a community helps us understand how to tackle food insecurity within communities and urban areas. As such, I am studying the food-related interactions, specific to urban agriculture, mediated on two different scales: the tangible pathways that include the physical and digital routes through which food travels and the intangible pathways that consist of the sharing of food related knowledge and skills.

Concerns about food insecurity compounded with health concerns have spurred a growing collective desire both to have more control over the handling of the food they eat and to support local food businesses. Conversations on the topic of global and local food insecurity and food distribution have been reinvigorated as a result of the ongoing (at the time of writing) global health and economic crisis as a result of the Covid-19 virus. Organizations like The Chicago Council on Global Affairs and USDA have raised concerns about a “looming food crisis”, while Tyson and other meat processing companies (since mandated by an Emergency Production Act to remain open) have warned of massive food waste and even claimed “food supply chain is breaking” (“LIVE STREAM: ‘Avoiding a Looming Food Crisis’” 2020; Tyson 2020, A13). The closing of restaurants and processing plants, food surpluses and food waste on farms, and the demand for delivery-based meal and grocery has posed a challenge of rapid redistribution that has overwhelmed the national food supply chain (Bottemiller Evich 2020). Meanwhile, even as large food companies like Kraft Heinz have donate food and financial resources, the existing infrastructure for combating food insecurity, including food banks, has been overwhelmed because “the numbers turning to food banks are just enormous and beyond the capacity of them to supply,” as Nobel laureate and economist Joseph Stiglitz observed (Kraft Heinz 2020; Stiglitz and Elliot 2020).

# Efforts to mitigate the risks of sudden shocks of global food supply chains to urban food supply might involve increasing urban food self-reliance, allowing for flexibility in sourcing more food from local or regional producers. The key findings from a tracking study of shopper and grocery habits conducted over multiple weeks note that Covid-19 has caused 28% of shoppers to do more shopping online, and that 84% of online grocery shoppers have faced problems mainly relating to delivery and to products being out of stock (Fikes, Feit, and Markenson 2020). These findings indicate first, a growing consumer desire for online grocery shopping and delivery, and second, the need to improve the delivery capacity and food supply of digital and online food distributors.

This paper employs an online survey of UA initiative websites and social media to evaluate the claim that “technologically mediated sharing” might be beneficial in combatting “hunger and food-waste (within and beyond cities)” (Edwards and Davies 2018). Collecting text in which UA organizations state their goals and motivations in expressions of “collective desire” sheds light on whether UA organizations benefit from the digitization of some of their food and knowledge distribution pathways. Secondly, this paper maps out the changes in digital pathways and knowledge systems via a case study of Chicago-based urban agricultural initiative, Chicago Honey Co-op, a honey-making and beekeeping cooperative, and its partnering non-profit, Chicago Honey Co-op Training Center. Diagramming is a strategic response “for a community feeling marginalized or disempowered to reimagine the realities, map out the possibilities, and redefine the territory,” which studies including Edwards and Davies (2017) have employed in their analysis of food-sharing initiatives (Ackerman-Leist 2013, 177). This study presents a potential diagram of the Chicago Honey Co-op food pathways system and suggests that diagramming the food pathways of urban community food systems is a necessary step for understanding of how food, people, and resources are connected in urban areas. Ultimately, this paper contributes to the conversation on urban food insecurity through the question: why might the digitization of food pathways also foster local food pathways via urban agriculture?

**LITERATURE REVIEW**

In the first paragraph of the chapter “Pricing the Future: Grain” in *Nature’s Metropolis*, Cronon quotes a Chicago resident in 1893: “The cities have not made the country . . . on the contrary, the country has compelled the cities . . . Without the former, the latter could not exit. Without farmers there could be no cities.” (Cronon 1992, 97). The constant production of food that goes on in rural areas sustains the city. Cronon also goes on to say that this rural-urban relationship is especially true in the city of Chicago (1992, 97).

Currently, most people are located in cities, and the majority of agricultural land is located outside of cities[[1]](#footnote-1). Yet due to the evolving technological capacity of the food distribution system, the observation made by Cronon’s Chicago resident has never been more true. The city is made possible by rural-urban linkages and the flow of resources into and out of the city, but resources travel farther than ever while the typical urbanite has less knowledge of growing practices. The city generates an outpouring of technology and digital knowledge, but its population is dependent on national or global food routes, which also depend on digitally coordinated shipping and distribution to function. As such, the digital and online technologies that have become inextricable from the functioning of the food supply chain, and thus, considerations of food security. Digital food pathways, the network through which food resources are purchased, distributed, and accessed online, present an important arena for increasing cities’ resilience, or capacity to sustain and recover from sudden shocks to the local or global food supply chains. The conversation around local and non-local food supply chains is pertinent to the topic of urban resilience and food insecurity: access to global food supply chains are protective for the food security of local areas in case of local agricultural shocks, and conversely, local areas can also be affected by shocks to global food supply chains.

**Local Food Insecurity**

Despite wide academic discussion regarding local food movements and food systems, there is limited academic consensus regarding the definition and boundaries of the “local” (Kalfagianni and Skordili 2018, 37; Feagan 2007). Scholar David Harvey critiques the focus on complete localism, seeing that:

“the contemporary emphasis on the local, while it enhances certain kinds of sensitivities, totally erases others and thereby truncates rather than emancipates the field of political engagement and action. While we all may have some “place” (or “places”) in the order of things we can never be purely “local” beings” (Harvey 1996, 195).

However, Harvey’s criticism of the limits and (im)possibility of “purely ‘local’” entities, is one that does not pose a “practical” position on how to “combine local and non-local action in the multi-scalar systems…. intrinsically multi-scalar in the sense that they are neither purely local nor purely global” (Kalfagianni and Skordili 2018, 37). There is a lack of academic agreement regarding the meaning of local and its practicality and desirability (Ackerman-Leist 2013). However, despite the problem of defining or achieving the pure localism, Kalfagianni and Skordili suggest that there is an absence and desire for theories regarding a “practical” response to “combine local and non-local action” (Kalfagianni and Skordili 2018, 37). Nearly twenty years after Harvey claimed the possibility of “purely ‘local’ bodies,” another researcher claimed that reliance on external supply chains means that cities can never become wholly self-sufficient entities (Harvey 1996, Elmqvist 2014). Despite these claims, there is ongoing discussion regarding the potential of cities to develop food self-reliance.

The risks associated with depending primarily on an external food supply has prompted interest in whether cities can achieve and should strive for self-sufficiency to mitigate food insecurity and improve resilience. One study simulated the effects of a single multi-year climate event, similar the U.S. Dust Bowl, on the U.S.’s wheat production and national and global wheat reserves in the present day, finding a similar major agricultural shock would drain U.S. wheat reserves by 94%, reduce wheat exports by more than 40%, and exhaust global wheat reserves by 31% (Heslin et al. 2020). The simulation by Heslin et al. (2020) demonstrates one potential concern of relying primarily on a single mass supply chain. One study demonstrated that growing food in the available green space of a city can provide a significant, though incomplete, source of food in a medium-sized, post-industrial city (Grewal and Grewal 2012).

The fight against food insecurity refers to an enduring struggle to feed citizens during both times of relative peace and crisis. Moreover, food insecurity is a problem of “organized complexity:” a problem connected to a multitude of effects, causes, and symptoms that contribute to a larger issue (Jacobs 1992). If food security is a problem of organized complexity, then such a problem requires a remedy that is equally organized, complex, and holistic (Miazzo 2013). This is to say, that alleviating food security in cities will not come from a single policy or initiative targeting one cause or symptom of the problem, but will require practical action at a “multi-scalar” level by “local and non-local” actors (Kalfagianni and Skordili 2018, 37). Therefore, on one hand, previous studies claiming the impossibility of pure localism and complete urban food self-sufficiency are right; the impossibility acknowledges the interconnectedness of the food supply chains and food pathways. On the other hand, in an increasingly globalized world that is inextricable from its material and digital spaces, any debate considering pure localness or complete urban food self-sufficiency as the goal is not just outdated, but also misguided in light of changes to food and knowledge pathways as a result of delocalization, disembeddedness, and the digitization of food pathways and knowledge. And given that pure localness and complete urban food self-sufficiency is not the goal of local and urban food group and policy movements, like the ones studied by Kalfagianni and Skordilli (2018), then what are the motivations of the initiatives advocating for and engaging in activities that promote local urban food self-sufficiency? I am interested in studying the collective motivations among urban agriculture initiatives.

**Collective Desire and Diagramming**

While previous studies have focused on an individual’s motivations for growing their own food (e.g. food self provisioning); there are relatively few studies that evaluate the motivations of a multiplicity of groups. A representative study of citizens in post-socialist Hungary focuses on an individual’s motivations for engaging in activities to increase food self-sufficiency, finding that socioeconomic reasons can only partially explain why people engage in food self-provisioning practice. Other reasons, including "reconnection with friends, families, and villagers" and a “collective sense of fulfilment that goes beyond the family when friends and neighbours are invited to pick their own” were motivations for food self-provisioning (Balázs 2016, 77).

Edwards and Davies note that individual and collective desire is essential for sustaining the activities of the four food-sharing initiatives studied: while desire can draw people to participate in food sharing activities and initiatives, a lack of desire or community members to continue one initiative’s activities was identified as the reason for its failure (Edwards and Davies 2018, 15). Moreover, they point to digital food pathways as an important platform for initiatives to connect individuals with the “food they share, swap and sell…the spaces they inhabit….the skills they develop” in addition to the “array of emotions, bodily knowledges, social relationships, new identities and understandings” (Davies et al. 2017; Edwards and Davies 2018). Not only do the authors make the connection between how “action” can be potentiated from “desire”, the authors then diagram the pathways of four food-sharing ecosystems, including food pathways mediated via ICT and digital platforms, the tangible food sharing and activities that involve physical food, activities and “space” and intangible sharing of knowledge and emotion,

Another notable diagram of urban food pathways is the “Tokyo Fruit Paths (with Persimmon Focus)” map, which reveals and traces the “fruit paths” of local fruit growing in Tokyo, thereby visualizing the multivariate interactions and connections that happen on the levels of site, fruit, processing, and consumption (Berthelsen, Braiterman, and Mantell 2013). The aim of this paper is to first conduct an online survey of the motivations of multiple urban agricultures to understand the organization’s desire to serve individuals and the community. After this study of collective desire, I then diagram the food pathways of one case study organization, Chicago Honey Co-op, by synthesizing multiple novel approaches to food pathways diagramming.

Inspired by two previous ethnographic studies that diagram food and knowledge pathways, this paper integrates and builds on their approaches (Edwards and Davies 2018; Berthelsen, Braiterman, and Mantell 2013). Just as the diagram “Tokyo Fruit Paths (with Persimmon Focus)” focuses on the persimmon fruit to illustrate pathways of fruit and knowledge sharing, I focus on the relevance of honeybees and beekeeping to food and knowledge pathways and food insecurity.

**Investigating Honeybee and Beekeeping Pathways**

Honeybee (*Apis mellifera*) worlds, originating from Stone and Glover’s analysis of “disembedded…rice worlds,” provide rich site for analysis and illustration of the topics of this paper: the changes to food and knowledge pathways and the resulting impacts on food insecurity (Stone and Glover 2017).

First, honeybees participate in multiple pathways of the food supply chain: as “workers,” they pollinate crops, but they are also raised as livestock for honey production and beeswax for human consumption. Secondly, the shift to a disembedded and delocalized food system can be seen in the changes to beekeeping over the past century. U.S. “bee knowledge and beekeeping practices” have dramatically transformed from their origin in the “bee lore…bee knowledge and beekeeping practices” of smallholder European domestic beekeeping. Industrial beekeepers in the U.S. currently transport honeybee colonies thousands of miles around the country via semi-truck as “interchangeable and movable units of labor power” mobilized for mass pollination, a service vital to industrial agriculture (Tsing 1995, 123; Cox-Foster and vanEngelsdorp 2009, 40; Kosek 2011, 246).

The industrial apicultural practice of trucking honeybees around the country is completely disembedded from the “local agro-ecological context” of U.S. cropland (Stone and Glover, 2017). This is not only because all species of honeybees are non-native to and therefore disembedded from North America ecosystems, but also because trucking hives around the country has completely disembedded honeybees, displacing hives usually managed at a household or village level by “thousands” of miles (Kosek 2011, 246). These dramatic changes to honeybee worlds have affected the health of honeybee workers and introduced complications for ensuring the stability of agri-food supply chains and food security.

The disembedding and delocalizing of honeybee and beekeeping bodies, knowledge and practices has already presented challenges for food and knowledge pathways and increased risk of food insecurity. The shift from domestic to industrial beekeeping practices has involved exposure other practices of industrial agriculture, including the fertilizers and pesticides, The application of pesticides and fertlizers has directly killed many pollinators, and scientific consensus has been reached that increased vulnerability to virus strains as a result of exposure to pesticides and fertilizers was likely a large contributing factor to Colony Collapse Disorder (CCD) in 2006-7, a the mysterious episode of adult honeybee worker disappearances and deaths (USDA 2012, v-vi).

The same industrial agricultural production that has caused the death of honeybees and other native pollinator species, relies on honeybee pollination at least partially for the pollination of as many as 100 crops, or nearly one-third of U.S. crops (National Honey Bee Health Stakeholder Conference Steering Committee 2012). Some crops rely entirely on honeybee pollinators: the USDA reported that in 2012, “a single crop,” almonds farmed in California, “now require over 60% of managed colonies” (USDA 2012, 5)[[2]](#footnote-2). Given so many crops depend on honeybees and pollinators, colony collapse and pollinator scarcity pose threats to national food production and food insecurity.

Urban agriculture could meet 100% of honey demand in a medium-sized agricultural city like Cleveland, even though demand could not be wholly met for other products within the city (Grewal and Grewal 2012). I investigate honeybee worlds and pathways within the context of an urban agriculture initiative, which not only adds to the conversation regarding the potential food self-sufficiency of cities, but also the potential to adhere or revert to traditional domestic European beekeeping practices.

By focusing on the pathways of honeybee and beekeeping practices and knowledge facilitated by the beekeeping cooperative Chicago Honey Coop, I add to an ongoing conversation regarding how “bee knowledge and beekeeping practices” can be re-localized and re-embedded within the context of the cities. I adapt previous examples and approaches to diagramming food pathways, systems, and ecosystems, and synthesize a diagramming method that illustrates the interconnected pathways that honeybees and humans participate in via the on and offline food pathways of Chicago Honey Co-op,

Moreover, my paper will address the desire for urban beekeeping and the motivations of smallholder apiculture. My paper contributes to the ongoing conversation about localism by considering how the internet and online technologies have bridged access between local and global food and knowledge pathways. In addition, I present diagramming as a method for approaching practical action that combines non-local and local actors at multiple levels.

My research contributes to the ongoing discussion about urban food insecurity by providing an updated understanding of contemporary pathways of food distribution and knowledge sharing, and will address the question: how does Chicago Honey-Coop establish a unique food supply chain and facilitate different sorts of knowledge pathways through on-line and off-line platforms?

**DATA & METHODS**

My data is composed of exclusively web-based material, collected from two main processes: constructing a database of “collective desire” and diagramming the food and knowledge pathways of a case study, Chicago Honey Co-op.

## **Database of Collective Desire**

The first process started with a data-set downloaded from the Chicago Urban Agriculture Mapping Project (CUAMP), an interactive tool and public resource that maps and displays self-reported urban agricultural initatives across the city. I used a subset of the UA initiatives identified through CUAMP, used to identify the sample of urban agriculture initiatives. The second data-set was collected using a methodology inspired by the web-searching process inspired by (Davies et al. 2017). This second data-set allowed for the third round of data collection specific to my case study.

CUAMP was chosen over other mapping sites (American Community Garden Association, SHARECITY100 Database, NeighborSpace) for its publicly available data, its local parameters that limit mapping to sites within Chicago, and its collection of “urban agriculture” groups identifiable by the terms used by organizations in their missions. Within the CUAMP tool, the following options are available on the side bar to narrow down the mapped results.

* 1. Address or intersection (also can specify within mile range)
  2. Community area
  3. Ward
  4. Cook County District

The Advanced Search tool also allows the user to narrow results with the following filters: owner, site structure, services, and current operational state. Though the application of filters (Status = food growing, Site type = Urban Farm, Community Garden, Community Farm, Urban Agriculture Initiative), I significantly narrowed down the number of growing sites (from 871 to 288). From the excel file of 288 urban agricultural sites, I chose to include the first 110 growing sites as the sample for the second data-set.

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*Figure 1. Number of UA Sites by Community Area (includes different wards)*

The number of growing sites within different communities included in the second data-set varied from 19 to 1, as can be seen in Figure 1. In the sample of 110 growing sites, the community areas of West Town, Woodlawn, Humboldt Park, and Rogers Park were most represented.

Following the composition of the second data-set, I began text describing focused on collecting text that described the organization, its goals, methods, mission, vision, and history—content which Edwards and Davies identify as expressions of collective desire (2018). The aim of this search was to compile a database of text expressing the motivations of urban agricultural initiatives in Chicago.

Criteria were created to filter out irrelevant content and to ensure that the text was directly written by or on behalf of the growing site. The first criterion was *source*: only text that was written by the growing site and its members or written by a partner/parent organization was collected. Text that was written about the growing site by a journalist, volunteer, or visitor to the site was excluded for the same reason a historian might exclude secondary and tertiary sources. However, a quotation about the growing’s sites purpose made by a leader from the initiative would be considered if the individual was speaking on behalf of the growing site, and no other statement about the organization’s purpose could be found.

The second criterion was *type*: only formal articulations of purpose and mission by the growing site were included. Consequently, I did not include text from social media posts, blog posts, updates, or website descriptions that simply listed activities or gave updates about events. Even if a social media post contained information about the motivations and goals of the growing site, I did not include this text because this kind of content is often informal and posted by individuals rather than organizations.

While the criteria helped exclude some non-legitimate sources and information unrelated to collective desire, these two criteria were insufficient to filter the sheer information available online. The issues of “crafting” and “performing” are issues Davies et al. identify as ones researchers looking to study ICT technology might encounter during the process of collecting information for a database; the “handcrafted” process is “inevitable” in encountering the sheer quantity of information available online (2017, 516). This is necessary because new information and content on the internet is continually being generated, and the information available is constantly expanding. Moreover, while the criteria did exclude some sources of data, there was still an overwhelming amount of information that fit within the criteria.

The data collection process raised questions about how much text to include and what kind of content qualified or was given priority. Text from the “About Us” or “Who We Are” sections of Facebook or a growing site’s website was preferred, but both of these sources were available and didn’t have exactly the same content, then would both texts be collected, or was one prioritized over the other? Did a founding story function as an expression of motivation? These questions touch on how research methodologies “reflect the world that already exists” and “help to perform one” (Davies et al. 2017, 516), through the terms and frameworks that one employs. Davies et al.’s (2017) intended to focus on food sharing activities, so their databases and key terms focus on more informal food pathways. This is reflected by the inclusion of social media posts and visual data from pictures as a legitimate source to determine whether a site qualifies as a food sharing site. However, since this paper’s topic is concerned with the more formal expression of goals and motivations by organizations, I excluded social media posts and other informal or secondary information.

Compiling statements of collective desire will assist in understanding what the collective motivations of UA growing sites are and in discerning if UA motivations and food-growing and sharing activities would be enhanced by the digital food pathways. The process I used to create criteria and collect data was informed by the “crafting” and “performing” that Davies et al. identify as issues for researchers looking to study ICT technology (2017, 516). The authors emphasize that a “handcrafted” process was “inevitable” in encountering the sheer quantity of information available online, and that the process of crafting also connected and performed the digital world with the physical one.

**Case Study**

The data that informs my Chicago Honey Co-op Food Pathways diagram is derived from CHC’s websites and social media platforms; the database collected in the previous process also informed the development of the case study.

Indeed, a gap exists in food systems literature of methods that either map or diagram of food systems in a manner that integrates ecological, geographical, social and cultural processes and exchanges. Food diagrams from social sciences and food webs from ecosystem biology focus on actors within a system, while food mapping methods map physical space or places using GIS data. There is a need for a method of mapping food pathways that can integrate the hybrid spaces where food pathways are constantly assembling. Integrating food-sharing practices in the construction of food pathways diagram presents one solution in meeting this need, as the analysis is multi-dimensional and focuses on place and process. A diagram based on food sharing analysis would include sites and actors in a network, as well as multiple pathways of sharing and exchange. Using the food sharing framework and associated tables developed by Davies et al. (2017), I identified some of the food sharing pathways of the case study.

Within the social sciences, many relevant diagramming and mapping strategies have been developed to reveal the network and social relationships within food systems (Parker 2017; Albon 2007; Wilsey and Dover 2014). Previous studies have produced methods for creating diagrams that capture the social dynamics and relationships within an individual’s food system, while other studies present methods that map an individual’s food system through the lens of place. Because food systems involve agricultural production, diagrams that portray food pathways through a biological or ecological approach should also be considered. One well-known elementary diagramming approach from ecology is a food web (Tsing 1995, 123; Kosek, n.d.; Cox-Foster and vanEngelsdorp 2009, 40). Food webs are useful for understanding energy exchange, and many biological diagrams map the nutrient cycles in ecosystems and might be integrated with the insights from the study of urban metabolism. Because agriculture and the cultivation of food takes place in an ecosystem, food webs of interspecies relationships as well as abiotic nutrient cycles are important systems to include in diagramming food systems.

Previous studies and diagrams of food pathways influenced my diagramming approach. One case study creates an integrated “Fruit Paths” diagram, which might qualify as a map of food sharing because it decentralizes market-based food exchange. This case study traced and revealed “fruit paths” of local fruit growing in Tokyo through surveying land use and fruit consumption, and following social “networks rich in stories, relationships, skills, and knowledge” (Cabannes and Marocchino 2018). The resulting “Tokyo Fruit Paths (with Persimmon Focus)” diagram is not a cartographic map of land use and sale, but a visualization of the multivariate interactions, transformations and connections that happen on the levels of site, fruit, processing, and consumption (Miazzo 2013). The “Fruit Paths” map unveils the paths and process that food takes from cultivation to consumption within a city. This diagram is extremely thorough in mapping the paths that *food* travels, and unveils how the transformation of food occurs via site, process, and culture.

Food and the work of food producing are highly tangible and a sensational experience; meaning, nearly all the senses are engaged (Hayes-Conroy and Hayes-Conroy 2013). Visiting a UA growing site might involve all of the following: touching the soil, smelling compost, seeing earthworms, hearing the buzz of insects, and tasting food. Because the senses are engaged, and it is possible that traditional ethnographic methods might focus on the affective experience on the site. This would make in-person research methods less suited to the unveiling the connections and pathways that flow out of a UA site into the city. While the sensory experiences of food sharing cannot be studied using online-based research methods, a digital focus sheds light on intangible food routes that might not be visible at the physical growing location.

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Figure 2. “Tokyo Fruit Paths (with Persimmon Focus)” (Berthelsen, Braiterman, and Mantell 2013)

**Mapping Digital Food and Knowledge Pathways**

Within the social sciences, many relevant diagramming and mapping strategies have been developed to reveal the network and social relationships within food systems (Parker 2017; Albon 2007; Wilsey and Dover 2014). Some researchers developed a tool called “eco-maps” which illustrates how people and their kin are affected by factors in their environment (Parker 2017). This “eco-maps” method was adapted for the field of social psychology; one paper describes how a child’s food system was revealed through creation of a map with bubbles for actors and places with a key that indicates frequency, what is eaten, who it is eaten with, and where (Albon 2007). These two approaches are useful for unveiling social and environmental dynamics of an individual’s life as revealed through their food system, but are less useful for understanding food systems on a community level.

Another food mapping process method which strives to investigate collaborative food systems was a product of the collaboration between the authors and members of the Fond du Lac (FDL) Reservation community food systems (Wilsey and Dover 2014). Called “Personalized Food System Mapping”, the paper details an exercise that first asks individuals to first draw important places and then draw food and social places in their life, looking for overlapping spaces while also categorizing the places by importance, frequency, and money spent (Wilsey and Dover). This method presents a standardized approach to understanding an individual’s food system, ultimately more oriented towards illuminating personal food behaviors and spatially mapping important food-related and social spaces, and less oriented towards generating a map of the food system of a community. Because the method begins with the drawing of places, the data about a person’s food systems that is gathered from this exercise is restricted to the places the person draws. This is to say, a method that focus on place mapping cannot capture the social dynamics and food relationships explored by other mapping strategies (Albon 2007) (Parker 2017).

The scale of these online maps range from global to municipal. SHARECITY100 Database includes and displays food sharing initiatives at an international scale. Users can zoom into the map or search food sharing sites from cities across the globe, including Chicago. SHARECITY100 Database is the database originally compiled during the research of Davies et al (2017). At a national level, the American Community Garden Association’s website hosts Find-A-Garden and Submit-A-Garden to map community gardens..There are many more maps of urban agriculture initiatives at the level of the city. NeighborSpace’s website links to a Google Maps hosted map of the sites affiliated with the organization and “Urbs in Horto: Mapping 65 Community Gardens in Chicago” is an Curbed.com article that maps 65 community garden.

Understanding food systems at the scale of the city and a neighborhood are equally important in improving food access and security. A more holistic approach towards looking at food and the city is necessary (Cabannes and Marocchino 2018; Miazzo 2013). As such, there is a need for a tool to bridge the gap between quantitative and qualitative data, as well as an alternative way to present information beyond the listing of statistics and results. So, one alternative approach requires the development of a more sophisticated understanding of the problem. Problems of organized complexity are often understood through drawing diagrams, with the aim of producing something like a sociogram, and mapping social dynamics and inter-relationships to reveal a network.

# RESULTS

## **Results of CUAMP/Online Data Collection**

Seventy-five (75) or roughly three-fourths of growing sites from the sample of 110 yielded data of an appropriate type and source, as defined by the previous criteria. To do this, the name of the growing site was searched using Google’s search engine. If the name yielded no relevant results, the address listed on CUAMP was used to search for the site.

Of the thirty-five (35) growing sites for which data was not collected, five (5) of the sites were reported permanently closed. The reasons why no statements of collective desire were collected for the other thirty (30) growing sites varied. For some, no website or social media was found, while for others, the only information available was through a secondary source.

From applying the criteria described in methods, I found that expressions of collective desire were most often found on the following digital platforms:

* Website
  + Website of Garden/Farm/ UA Initiative
  + Neighborspace
* Social media
  + Facebook “About” or “Our Story” section
  + Instagram Bio
  + Twitter Bio

An unexpected finding from the database I compiled was that most, if not all entries highlighted the role of groups, businesses and individuals external to the growing site.

Ruby Garden is a garden hosted by the Chicago Parks District in the Rogers Park Neighborhood. It has a relatively active Facebook page and its own website.

For example, Ruby Garden’s statement of purpose, found on the “About” page of their website, makes visible their connection with other organizations and actors.

Ruby Garden attributes their access to water as a result of the “alderman and CPD assistance.” When describing the functions and physical attributes of their garden, they express thanks to the different groups who assisted them or gave them resources. These expressions of thanks made visible exchanges between different groups: four “food grade hoses” and gardener tools were “thanks to Parkways Foundation,” a storage chest was “from a past Gardenburger grant”. In addition, they acknowledge the support of Angelic Organic Learning Center, through funding by Heifer International. Clearly, there are many relationships that support the resources and operations of Ruby Garden.

Ruby Garden’s statement of purpose also highlighted the diverse backgrounds of their participants and gardeners, whose “*participants represent countries and traditions many of us locally have little knowledge of including Bhutan, Burundi, Cameroon, Togo, Eritrea, El Salvador and Gabon,”* which illuminated the presence of the global and the potential for intercultural exchange. Ruby Garden mentions how their physical site mediates intangible pathways through the sharing of “knowledge” and “joy of gardening,” as well as the tangible exchanges of “seeds, plants, and food.” Moreover, though not included in the database, additional exploration of their website revealed their interest in enhancing their resources with data and technology: “If you come across great online resources helpful for your fellow gardeners, or want to comment on any of these links, please let us know.  We'd love to create a strong local data center for the use of community gardeners.”

**CASE STUDY**

Started in 2004, Chicago Honey Co-op (CHC) is a nineteen-member agricultural cooperative registered with the State of Illinois. CHC is run as a cooperative, which means that the members share ownership and run the organization jointly. In 2014, CHC also expanded to include a 501c3 partner non-profit organization called Chicago Honey Co-op Training Center (CHC Training Center). CHC runs apiaries which they call “bee farms” and CHC Training Center focuses on beekeeping education (Chicago Honey Co-op 2019).

Chicago Honey Co-op has no physical storefront, although sometimes the small business sells at farmer’s markets. CHC Training Center’s website also explains that CHC Training Center is not a physical center. That said, CHC’s bee farms, as well the sites of hives which their beekeepers help manage, are spread widely across the city. CHC describes its own bee farms in terms of hives. Their “About Us” describes 20 hives at Schulze & Burch Biscuit Company (Bridgeport), 12 hives “near 51st and Racine” (Bridgeport), several hives on Christy Webber Landscaping’s green rooftop, 2 located at Patchwork Farms (Chicago Honey Co-op 2019). While three of these sites are the same as those identified by CUAMP, the bee farm with the most hives (20) at Schulze & Burch Biscuit Company in Bridgeport is not mapped. Despite being a “small business,” Chicago Honey Co-op also manages rooftop beehives for very large partner organizations (including Google’s 1K Fulton in the West Loop, Studio Gang Architects, Lurie Garden).

|  |  |
| --- | --- |
| FOOD SHARING |  |
| Case study initiative | CHC and CHC Training Center |
| Site of sharing | Bee farms (apiaries)   * 20 hives at Schulze & Burch Biscuit Company (Bridgeport) * 12 hives “near 51st and Racine” aka Testa Produce (Bridgeport), * 2 hives located at Patchwork Farms * several hives on Christy Webber Landscaping’s green rooftop   Hives managed by CHC  Classes |
| Participating institution | * preSERVE garden (partnership with North Lawndale, Greening Committee, NeighborSpace, Slow Food Chicago and Chicago Honey Co-op) * Businesses - Google’s 1K Fulton, Studio Gang Archictect, Lurie Garden |
| Participating individual | Members   * Students * Staff/Employees at other participating institutions * Customers |
| Motivations for participating | * Educating others about beekeeping and making honey |
| Flows of finance/resources food | Value added products   * Honey (ICT) * Beeswax * Funding from Slow Food Chicago |
| Flows of knowledge/skills | Knowledge and skills   * beekeeping classes * managing sites * “+Bees and Beekeeping” page on website with “Beekeeping Resources” (ICT) |

*Table 2. CHC and CHC Training Center’s food sharing activities using the key from Edwards and Davies (2017) sketch maps.*

Table 2 shows the food sharing activities that CHC participates in according to the food sharing typology created by Davies et al. (2018), displays the information needed to construct the sketch diagram of the food sharing pathways of CHC, which I then used to construct Figure 3. A close up of a map

Description automatically generated

*Figure 3. Diagram of Chicago Honey Co-op’s Food Pathways*

CHC maintains an active online presence on social media sites Facebook, Twitter and Instagram. This is where their followers can find updates on where to find them. Their website also identifies a reason why beekeeping is a form of urban agriculture and is particularly important in this historical moment. The sketch diagram of Chicago Honey Co-op and its associated CHC Training Center demonstrates the connections and the pathways of its food sharing activities.

# DISCUSSION

## **Collective Desire**

The process of compiling the database and drawing the diagram were mutually informative: researching other UA initiatives informed the creation of the Chicago Honey Co-op Food Pathways Diagram. For example, an unexpected finding was that most UA initiatives expressions of collective desire explicitly referred to connections and partnerships with outside groups. This indicated that the work and activities of UA initiatives is intrinsically connected to multiple scales, as the UA organizations from the sample mentioned partnerships with different organizations and businesses, a desire to share with members of the community, and impact on the local environment and food system.

From the statements of collective desire collected from a sample of UA initiatives in Chicago, the organizational motivations for growing food in the city were brought to light. These statements of purposes not only expressed the goals of the initiatives, but also described how their activities and goals were achieved through collaboration with the range of actors. It was evident that UA initiatives are motivated by linking participation in the garden or farm to food insecurity and environmental access from how many groups mention “sustainability” or directly reference their impact on the environment. Also, if technology is used in a way that enhances, rather than replaces existing pathways, digital technology could be useful for UA to increase their visibility to the local community and assist them in addressing some of the causes mentioned. Understanding individual motivations is still important, but it is equally important to understand organizational motivation. An organization’s statement goals reflect a different story and contain different information than would be expressed by an individual. This is because a mission statement reflects “collective desire” rather than individual desire and as such, it is more likely to be crafted through a collaborative process that involves multiple people. If we don’t understand the group motivation and narrative, we can’t understand how to motivate people and groups to participate in their local food systems.

The members of the CHC collective are “beekeepers, others just want to support what we do.” They identify their main goals as “keeping bees, harvesting honey and taking it to farmers markets, we practice and advocate for sustainable agriculture, and awareness of the natural environment.” In addition, CHC notes “beekeeping has become more and more popular but also more and more challenging” (Chicago Honey Co-op 2019). While this statement is general, it also illustrates two phenomena: first, it suggests that a growing number of people want to participate in urban beekeeping, and then, it points out that beekeeping has become “more and more challenging.” CHC explains that “We lose many hives over the Winter and have to replace them each Spring.” Though this explanation seems to simply observe that the CHC loses hives and needs to acquire new hives in the spring, it also alludes to how beekeeping and honey production has been influenced by the effects of Colony Collapse Disorder.

On CHC’s website, the tab “Where to Find Us” can be read as a question that is useful for investigating CHC’s food pathways. The practical answer to the question is that Chicago Honey Co-op has no physical storefront and CHC Training Center is not a physical center. While the majority of the cooperative’s bee farms are located in Back of the Yards and Bridgeport—former meatpacking neighborhoods used to be located—it would also be inaccurate to say that CHC is located in Bridgeport. So, where can we find Chicago Honey Co-op, if not at its bee farms?

Though CHC might consist of physical sites where its bee farms are located, CHC can also be found through the pathways and partnerships of its other food sharing activities. This includes other physical sites where beekeepers manage hives and the seasonal farmers markets where honey is sold. It also includes sites in cyberspace because it has an active presence on websites and social media accounts on Instagram, Facebook, and Twitter. These digital pathways might be used for example, to alert their followers to new beekeeping events or classes, or tell them that they will be selling honey at an upcoming farmers market.

The patchwork of sites and multiple spaces of physical and digital interaction. Chicago Honey Co-op food pathways demonstrate collaboration with a range of actors and organizations. CHC has no single official location, and the sites that it does occupy are located on the physical sites of other UA initiatives. An example of this is the “preSERVE garden” which is the result of collaboration “between the North Lawndale Greening Committee, NeighborSpace, Slow Food Chicago and Chicago Honey Co-op.”

The diversity of relationships and spheres of influence mediated through Chicago Honey Co-op emerges in the food pathways diagram. The diagram is not meant to be a complete or exhaustive representation of all of the pathways, actors, exchanges, and practices that CHC engages. Rather, the purpose of the CHC Food Pathways Diagram is to render visible a general picture of the tangible connections and intangible pathways facilitated by CHC. In addition, it integrates traditional elements of the food system (food sales, growing sites) with non-transactional elements like the sharing of knowledge and collective motivation. The arrows on the top and side represent increasing and decreasing tangibility.

Moreover, the flows between actors and audiences is dependent, or relational to, where and how they are mediated. An example of this relationality manifests through comparing two potential pathways of interaction at CHC. Consider the experience of an individual who has taken a beekeeping classes versus the experience of a person who buys honey from CHC’s online store. For example, an individual from a beekeeping class might gain the skills shared in one of CHC’s classes and go on to continue beekeeping. This was true in the case of the founder of another Chicago-based beekeeping company, Bike A Bees, whose founder Jana Kinsman was “bitten by the beekeeping bug” following a Chicago Honey Co-op Class in 2011 (Silets 2019). As such, Chicago Honey Co-op’s food sharing activities has helped launch other beekeeping leaders and companies into action.

While many UA organizations also have an ICT presence, whether it be their own website or Facebook page, CHC is unique because its online profiles do not map onto a single, stationary site. Instead, CHC may be found assembling through relations and flows food sharing. CHC’s food sharing activities not only forge connections between the cooperative and other organizations, but the production of honey also blurs the line between nature and human, organic and inorganic. CHC’s reach is not only through reaching people through selling honey, education, social media, but also through the bees themselves. The places and pathways across the city where honeybees pollinate adds another dimension to the CHC’s pathways. Honeybees dwell at the hives that CHC provides or manages, however, the bees fly miles around the city providing essential pollination services at other sites. Thus, its reach spreads across the hybrid city through its participation in the energy flows of the city ecosystem, and well as the economic system. As Figure 3 shows, while honeybee pollination might seem to serve a purely local and biological purpose, it also contributes to pollinator work overall.

While beekeeping only provides hives for honeybees, the hives also take place at growing sites that not only add green space to the city, but also are involved in local food production. A paper entitled “The city as a refuge for insect pollinators” suggests that the diversity of vegetation and the lack of pesticides makes urban sites, which would include food growing urban and community farms, ideal for insects (Hall et al. 2017).

Figure. 3 also shows how one individual might participate in both CHC’s food sharing practices and business. On the “Resources” tab on the CHC website, there is a link to a public Google Doc entitled “Recommended Best Practices for Urban Beekeepers”, which provides prospective beekeepers with general information about urban apiculture. In addition, the page host links to books, local stores which carry apiculture equipment, and other resources that would be helpful for beginning beekeepers.

CHC’s beekeeping reveals the interconnected inputs and actors in the food system. Because of the lack of a public sedentary physical location, it seems that Chicago Honey Co-op relies on ICT to keep its community updated. Moreover, the educational arm of its training center allows a formalized sharing of knowledge and skills about beekeeping. Ultimately, beekeeping in the city functions as a key site for repairing the rift between producer and consumer, local food system and global food supply. Urban agriculture helps bridge the disconnect between urban dwellers and nature, and CHC’s food pathways also bridges the disconnection between humans and animals and nature. Urbanization, human intensification of agriculture and pesticide use have accelerated the decline of wild bee populations and biodiversity as well as the decline of honeybee populations. Moreover, as urbanization continues, the role pollination plays in agriculture is essential to examine with regards to the challenge of feeding people in cities. In the case of Chicago Honey Co-op, the diagram shows that connections and flows of energy and work involved in beekeeping are also intertwined with many other organizations.

**Implications**

Diagramming urban agricultural initiatives demonstrates how individuals, groups, are connected via digital and physical food pathways. Shedding light on these food routes has potential for addressing urban food insecurity, building food system resilience and decreasing impact on the environment. Urban agriculture, especially apiculture, is an example of thinking at a global level and acting at local level (Vitrousek et al. 1996, 477).

Though technology has enabled the dominance of industrial agricultural and delocalization of the global food system, its pathways can also be used to facilitate urban agriculture and relocalization of the food system. This is not to say that cities should aim to rely totally or completely on local food systems (Ackerman-Leist 2013), however strengthening more local or regional food supply chains will build pathways that cities can fall back on in the event of shocks to more global food supply chains. In addition to efforts in the current COVID-19 crisis, disruptions to the global supply chain and the closing of borders have interrupted normal food pathways, which will likely increase as the effects of climate change emerge.

Moore explains the use of nature as sink, the production of negative value, and the superweed effect in his essay “Cheap Food and Bad Climate: From Surplus Value to Negative Value in the Capitalist World-Ecology”. The use of nature as sink refers to using nature as a catch-all for waste and agricultural byproducts, which have started to rebound and accumulate. One way to lessen the impact of the agricultural sector is to promote practices that increase efficiency (Aschermann-Witzel 2015). Increasing efficiency in this system would require minimizing losses and waste. The most obvious source of inefficiency and losses in the agricultural system is food waste. Though losses in the food supply chain occur at many points, wastage of food at the household level is a big contributor. As reported by Schanes et al., households are the biggest contributors to food waste compared to any other point on the food supply chain in industrialized nations like the U.S. (Schanes et al., 2018, 978).

In addition, assessing these digital food pathways can help minimize food waste by facilitating food sharing. This would look like connecting groups with a food surplus (that would otherwise be wasted) with food-insecure households, which could be done through developing digital platforms. This paper adds to a broader conversation about food pathways, by adding a food pathways perspective that incorporates food pathways that are mediated by ICT. In addition, the experimental methodology of this paper also adds to the literature about online-based research methods. While online based research methods might not provide sufficient data for some topics, an increasing digitally-mediated world presents a growing need for experimental and creative methods for conducting research online. This paper diverges from previous studies because it relies on exclusively online research methodologies for data collection.

Edwards and Davies propose that diagramming food sharing ecosystems can be used to assess and demonstrate the possibilities of vertical and horizontal connection within food systems (Edwards and Davies 2018). Though the topic of this paper is obviously relevant to urban agriculture practitioners and scholars, it might also provide insight to a variety of audiences considering the multidisciplinary and interconnected world that urban agriculture reaches into. Thus, there is a need to update the past literature to account for these changes. Moreover, this also a need for methods and frameworks that can be used by a variety of actors to identify local food pathways that can be strengthened.

The methods of this paper can be applied to evaluate which UA agricultural organizations have an interest in expanding accessibility to their food resources via digital technology. In addition, the diagramming process might help reveal streams of food related waste and opportunities for circular economy approaches, in addition to opportunities to improve the efficiency and monitoring of farming within cities. Further research might investigate other food pathways systems in Chicago: investigate how food is being produced and consumed, what kind of food systems and relationships exist, what needs there might be to fulfill, and what might be able to fulfill it but is not connected yet.

# CONCLUSION

In order to understand the food pathways of local and urban food systems, this study traces the digital flows of product and content that might not be visible at the physical growing location, distribution center, or site of delivery. This paper hopes to make visible the intangible pathways of food exchange and sharing in the city that take shape as cultural values and knowledge from consumer interactions with the digital world. In the database of “collective desire” I collected, most statements revealed the complexity of food pathways in which the organization participates and latent energy for transforming the food system. The organization will usually describe how its activities and services meet the needs of individuals; however, it will also describe how and what role the organization plays in its local community. Moreover, the organization often expresses its connections with multiple actors and sites. Thus, statements of collective desire are helpful for understanding the intangible food pathways of urban food systems. This can provide further insight through the process of diagramming.

This paper visualizes the food pathways or ecosystem of one urban agriculture and food sharing site, Chicago Honey Co-op. Tracing the food paths of the CHC through the internet sources allows the diversity of relationships and spheres of influence to emerge. Drawing food pathways helped visualize connections and exchanges between human and environment, humans and non-humans, and material and digital. Adapting this mapping process to assess the relationships of the food system, unveils the structure and impact of the urban agriculture system as mediated through ICT. Diagramming Chicago Honey Co-op’s food pathways demonstrates the possibilities for future connection and food sharing and ultimately, for understanding of how food, people, and resources are connected in urban areas. Understanding the food pathways and resources shared through urban agriculture helps us understand how to tackle the food insecurity within communities and also build resilience.

**Bibliography**

Ackerman-Leist, Philip. 2013. *Rebuilding the Foodshed: How to Create Local, Sustainable, and Secure Food Systems*. The Community Resilience Guide Series. Santa Rosa, Calif. : White River Junction, Vt: Post Carbon Institute ; Chelsea Green Pub.

Albon, Deborah. 2007. “Exploring Food and Eating Patterns Using Food‐maps.” *Nutrition & Food Science* 37 (4): 254–59. https://doi.org/10.1108/00346650710774622.

Alexander, Steve K. 1982. “Food Web Analysis: An Ecosystem Approach.” *The American Biology Teacher* 44 (3): 4.

Balázs, Bálint. 2016. “Food Self-Provisioning – the Role of Non-Market Exchanges in Sustainable Food Supply.” In , 73–78. Rome: Food and Agriculture Organization of the United Nations (FAO).

Barthel, Stephan, John Parker, and Henrik Ernstson. 2015. “Food and Green Space in Cities: A Resilience Lens on Gardens and Urban Environmental Movements.” *Urban Studies* 52 (7): 1321–38. https://doi.org/10.1177/0042098012472744.

Berthelsen, Chris, Jared Braiterman, and Jess Mantell. 2013. “Tokyo, a Fruitful City.” In *Farming the City: Food as a Tool for Today’s Urbanization*, by Francesca Miazzo and Mark Minkjan, 94–101. Amsterdam: Valiz/Trancity.

Bottemiller Evich, Helena. 2020. “USDA Let Millions of Pounds of Food Rot While Food-Bank Demand Soared.” *Politco*, April 26, 2020. https://www.politico.com/news/2020/04/26/food-banks-coronavirus-agriculture-usda-207215.

Cabannes, Yves, and Cecilia Marocchino, eds. 2018. *Integrating Food into Urban Planning*. UCL Press. https://doi.org/10.2307/j.ctv513dv1.

Chicago Honey Co-op. 2019. “About Us.” Chicago Honey Co-Op. 2019. https://www.chicagohoneycoop.com/about-us.

Conner, David S., Adam D. Montri, Dru N. Montri, and Michael W. Hamm. 2009. “Consumer Demand for Local Produce at Extended Season Farmers’ Markets: Guiding Farmer Marketing Strategies.” *Renewable Agriculture and Food Systems* 24 (4): 251–59. https://doi.org/10.1017/S1742170509990044.

Cox-Foster, Diana, and Dennis vanEngelsdorp. 2009. “Saving the Honeybee.” *Scientific American* 300 (4): 40–47. https://doi.org/10.1038/scientificamerican0409-40.

Cronon, William. 1992. *Nature’s Metropolis: Chicago and the Great West*. 3. print. New York: Norton.

Davies, Anna R, Ferne Edwards, Brigida Marovelli, Oona Morrow, Monika Rut, and Marion Weymes. 2017. “Creative Construction: Crafting, Negotiating and Performing Urban Food Sharing Landscapes.” *Area* 49 (4): 510–18. https://doi.org/10.1111/area.12340.

Edwards, Ferne, and Anna R. Davies. 2018. “Connective Consumptions: Mapping Melbourne’s Food Sharing Ecosystem.” *Urban Policy and Research* 36 (4): 476–95. https://doi.org/10.1080/08111146.2018.1476231.

Ellen MacArthur Foundation. 2019. “Cities and Circular Economy for Food.”

Elmqvist, Thomas. 2014. “Urban Resilience Thinking.” *Solutions* 5 (5): 26–30.

Feagan, Robert. 2007. “The Place of Food: Mapping out the ‘Local’ in Local Food Systems.” *Progress in Human Geography* 31 (1): 23–42. https://doi.org/10.1177/0309132507073527.

Fikes, David, David Emerson Feit, and Steve Markenson. 2020. “U.S. Grocery Shopper Trends: The Impact of COVID-19.” Webinar, The Food Industry Association, May 7.

Gandy, Matthew. 2009. “Cyborg Urbanization: Complexity and Monstrosity in the Contemporary City.” *International Journal of Urban and Regional Research* 29 (1): 26–49.

Grewal, Sharanbir S., and Parwinder S. Grewal. 2012. “Can Cities Become Self-Reliant in Food?” *Cities* 29 (1): 1–11. https://doi.org/10.1016/j.cities.2011.06.003.

Hall, Damon M., Gerardo R. Camilo, Rebecca K. Tonietto, Jeff Ollerton, Karin Ahrné, Mike Arduser, John S. Ascher, et al. 2017. “The City as a Refuge for Insect Pollinators: Insect Pollinators.” *Conservation Biology* 31 (1): 24–29. https://doi.org/10.1111/cobi.12840.

Hamm, Michael W., and Anne C. Bellows. 2003. “Community Food Security and Nutrition Educators.” *Journal of Nutrition Education and Behavior* 35 (1): 37–43. https://doi.org/10.1016/S1499-4046(06)60325-4.

Harvey, David. 1996. *Justice, Nature and the Geography of Difference*. Oxford.

Hayes-Conroy, Jessica, and Allison Hayes-Conroy. 2013. “Veggies and Visceralities: A Political Ecology of Food and Feeling.” *Emotion, Space and Society* 6 (February): 81–90. https://doi.org/10.1016/j.emospa.2011.11.003.

Heslin, Alison, Michael J. Puma, Philippe Marchand, Joel A. Carr, Jampel Dell’Angelo, Paolo D’Odorico, Jessica A. Gephart, et al. 2020. “Simulating the Cascading Effects of an Extreme Agricultural Production Shock: Global Implications of a Contemporary US Dust Bowl Event.” *Frontiers in Sustainable Food Systems* 4 (March): 26. https://doi.org/10.3389/fsufs.2020.00026.

Jacobs, Jane. 1992. *The Death and Life of Great American Cities*. Vintage Books ed. New York: Vintage Books.

Kalfagianni, Agni, and Sophia Skordili. 2018. *Localizing Global Food*. Edited by Agni Kalfagianni and Sophia Skordili. 1st ed. Abingdon, Oxon ; New York, NY : Routledge, 2019.: Routledge. https://doi.org/10.4324/9780429449284.

Kraft Heinz. 2020. “Kraft Heinz Commits $12 Million Globally in Support of Communities Impacted By COVID-19 Outbreak.” Kraft Heinz. March 20, 2020. https://news.kraftheinzcompany.com/press-release/financial/kraft-heinz-commits-12-million-globally-support-communities-impacted-covid-1.

“LIVE STREAM: ‘Avoiding a Looming Food Crisis.’” 2020. The Chicago Council on Global Affairs. April 24, 2020. https://www.thechicagocouncil.org/event/live-stream-avoiding-looming-food-crisis.

Miazzo, Francesca, ed. 2013. *Farming the City: Food as a Tool for Today’s Urbanisation*. Haarlem: CITIES Trancity-Valiz.

National Honey Bee Health Stakeholder Conference Steering Committee. 2012. “Report on the National Stakeholders Conferenceon Honey Bee Health.” Alexandria, VA.

Parker, Jonathan. 2017. *Social Work Practice: Assessment, Planning, Intervention and Review*. 5th edition. Thousand Oaks, CA: Sage.

Silets, Alexandra. 2019. “Business Is Buzzing This Summer for a Chicago Beekeeper on Wheels.” News. Wttw.Com. September 16, 2019. https://news.wttw.com/2019/08/07/business-buzzing-summer-chicago-beekeeper-wheels.

Stiglitz, Joseph, and Larry Elliot. 2020. Top economist: US coronavirus response is like “third world” country. https://www.theguardian.com/business/2020/apr/22/top-economist-us-coronavirus-response-like-third-world-country-joseph-stiglitz-donald-trump.

Tsing, Anna Lowenhaupt. 1995. “Empowering Nature, or: Some Gleanings in Bee Culture.” In *Naturalizing Power: Essays in Feminist Cultural Analysis*, edited by Sylvia Yanagisako and Carol Delaney, 113–43. New York, NY: Routledge.

Tyson. 2020. “A Delicate Balance: Feeding the Nation and Keeping Our Employees Health.” *The Washington Post*, April 26, 2020.

Wilsey, David, and Sally Dover. 2014. “Personal Food System Mapping.” *Journal of Extension* 52 (6): 5.

1. 40% of cropland is located in the peri-urban area (within 20km) of cities (Ellen MacArthur Foundation 2020, 10) [↑](#footnote-ref-1)
2. The reliance on a non-native pollinator species also indicates that almond trees are non-native to North America, and almond farms are a form of “dismbedded” agricultural production. [↑](#footnote-ref-2)