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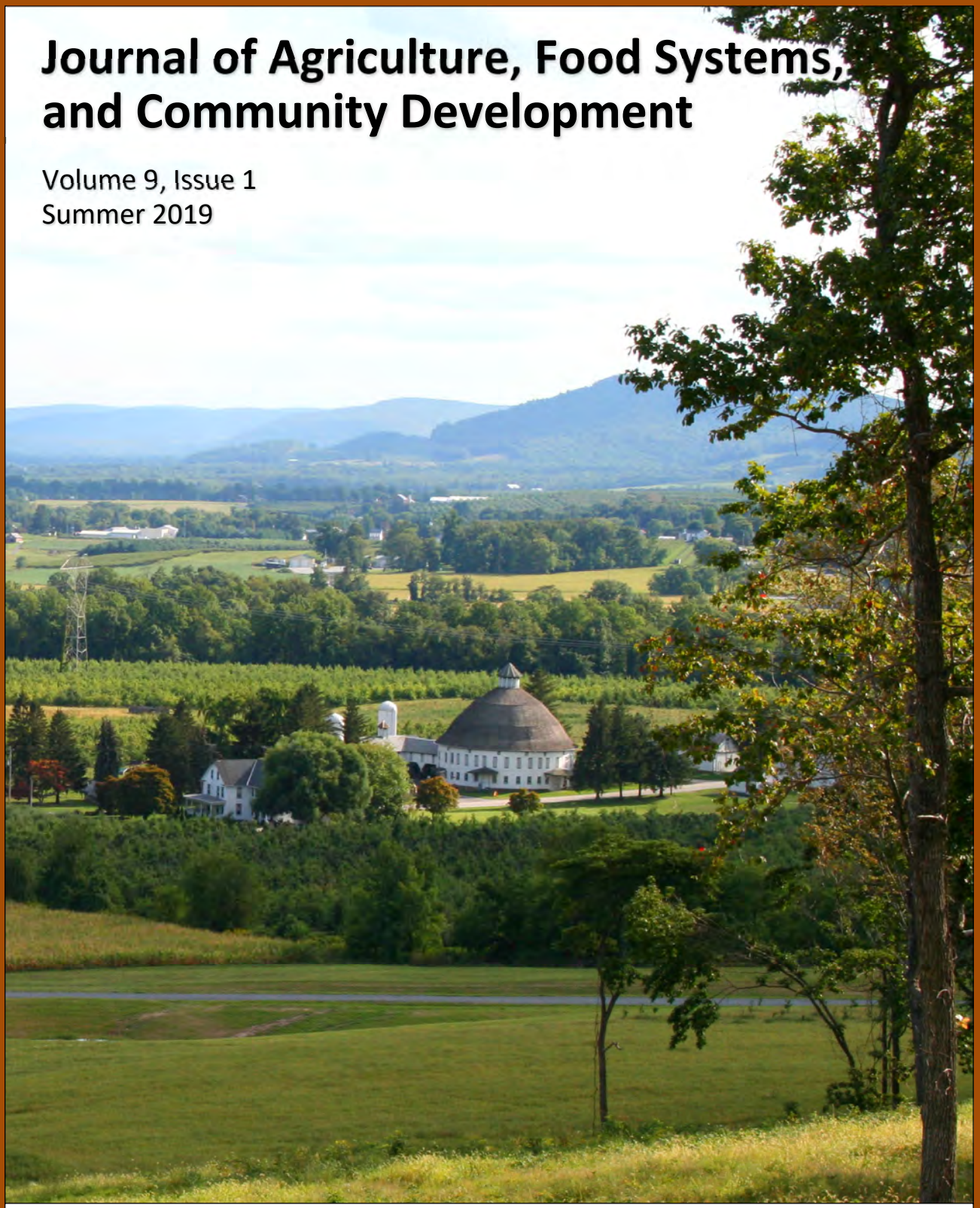

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Reviews

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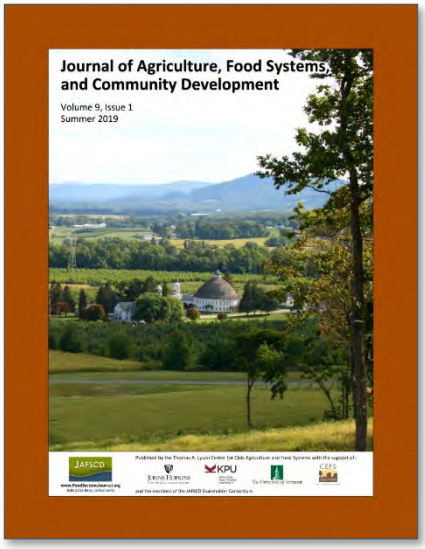
IN THIS ISSUE
DUNCAN HILCHEY

Open call papers



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In this summer issue of JAFSCD, we offer a smattering of data-driven papers and food systems policy analysis. Some of this work is still in progress, so we are publishing results in the form of briefs. We look forward to seeing expanded research on these preliminary findings!

John Ikerd and **Teresa Mares** lead off with their typically engrossing columns. Ikerd provides us his take on the Green New Deal, arguing that it's not a liberal or conservative idea, but an *American* one. Mares interviews colleagues who are trying to pick up the pieces in Puerto Rico after Hurricane Maria, and suggests that the neglect of the U.S. government may, in fact, be planting seeds of food sovereignty in the territory.

Next we have two pieces from USDA staffers: a viewpoint from recently retired **Debra Tropp** of the U.S. Department of Agriculture's Agricultural Market Service, who reflects on the dramatic changes in local food research during her tenure; and, coincidentally, a technical commentary from **Jeffrey O'Hara** and **Matthew Benson** explaining the reported decline in the number of direct-to-consumer farms and the analytical challenges of comparing data from the 2017 Census of Agriculture to that of previous years.

The first of our open-call papers is *Community-Based Food Waste Modeling and Planning Framework for Urban Regions,* by **Ning Ai** and **Junjun Zheng,** who find a challenging spatial mismatch between food waste producers and prospective users in Chicago.

Next up, **Jill Clark, Chaturia Rouse**, **Ashwini Sehgal**, **Mary Bailey**, **Bethany Bell**, **Stephanie Pike**, **Patricia Sharpe**, and **Darcy Freedman** explore what low-income consumers express they want and need in *A Food Hub to Address Healthy Food Access Gaps: Residents' Preferences.*

In *The Farmers Market Metrics Project: A Research Brief on Scalable Data Collection in the Minneapolis-St. Paul Metro,* **Hikaru Peterson** and **Joseph Nowak** present the preliminary results of their tool, FM360, to help

On our cover: The Historic Round Barn & Farm Market in Biglerville, Pennsylvania, is seen from South Mountain. This section of the mountain is known for its extensive fruit belt on the southeast face. The well-preserved structure captures the spirit of the traditional Appalachian agricultural landscape; round barns are increasingly rare. For details on this one, visit http://roundbarn.farm. *Photo copyright © 2007 by Duncan Hilchey.*

farmers markets measure their progress and impact.

Colleagues at Appalachian State University present their preliminary findings in a regional network of food banks and food pantries in *The North Carolina Food Pantry Organizational Capability and Mapping Study: Research Brief and Pilot Study,* by **Kyle Thompson**, **Margaret Sugg**, and **Margaret Barth**.

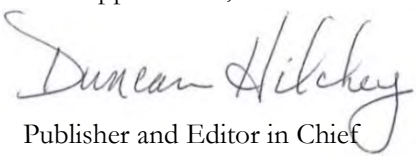
We wrap up our open-call papers in this issue with two papers addressing issues in the Global South. In *Farmers' Willingness to Pay for Establishing a Collective Postharvest Refrigeration Unit: Evidence from an Eastern Mediterranean Rural Community,* **Amani Maalouf** and **Ali Chalak** quantify and qualify farmers' interest in reducing food waste through shared refrigeration. And the impact of agroecology from post–civil war resettlement in El Salvador is documented through oral histories in *Roots of Resistance and Resilience: Agroecology Tactics for Resettlement* by **Matthew DelSesto** and **Megan Donovan.**

We wrap up the issue with a plethora of book reviews.

Lisa Chase reviews *Food and Agricultural Tourism: Theory and Best Practice,* by Susan L. Slocum and Kynda R. Curtis. **Mustafa Hasanov** reviews *The New Food Activism: Opposition, Cooperation, and Collective Action,* edited by Alison Alkon & Julie Guthman. **Yona Sipos** reviews *The Cooking Gene: A Journey Through African American Culinary History in the Old South,* by Michael W. Twitty. **Matthew Young** reviews *Food Justice and Narrative Ethics: Reading Stories for Ethical Awareness and Activism,* by Beth A. Dixon. **Michael Zastoupil** reviews the second edition of *Food Policy in the United States: An Introduction,* by Parke Wilde. **Sheila Fleischhacker** reviews *The Fault Lines of Farm Policy: A Legislative and Political History of the Farm Bill,* by Jonathan Coppess. **Nicholas Freudenberg** reviews *The Neoliberal Diet: Healthy Profits, Unhealthy People,* by Gerardo Otero. And, finally, **Andrea Woodward** reviews *Food Justice Now! Deepening the Roots of Social Struggle,* by Joshua Sbicca.

Thanks to all the contributors to this issue. JAFSCD exists to share the hard work and insights of researchers and practitioners with the Good Food community. For us at the Lyson Center it is an honor and privilege to do so.

With appreciation,



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THE ECONOMIC PAMPHLETEER
JOHN IKERD

A "Green New Deal" for farm and food policy

Published online May 14, 2019

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I made the case for a "new mandate for farm and food policy" in a 2015 *Economic Pamphleteer* column—concluding that "Food sovereignty is the logical public policy mandate to support agricultural sustainability and a sustainable future for humanity" (Ikerd, 2015, p. 13). The Green New Deal, a 2019 congressional resolution, now provides a logical framework for a policy mandate to secure food sovereignty (116th Congress, 2019).

The Green New Deal obviously will confront vigorous opposition. Already, claims have been made that it would decimate animal agriculture in order to mitigate climate change. It has also been widely characterized as socialism and a threat to democracy. Support and opposition likely will be divided along political party lines. They shouldn't be. The core values reflected in Green New Deal and in food sovereignty are Democratic, Republican, and America values.

The following quotes are excerpts from the 2019 Congressional Record of House Resolution

John Ikerd is professor emeritus of agricultural economics, University of Missouri, Columbia. He was raised on a small farm and received his BS, MS, and PhD degrees from the University of Missouri. He worked in the private industry prior to his 30-year academic career at North Carolina State University, Oklahoma State University, the University of Georgia, and the University of Missouri. Since retiring in 2000, he spends most of his time writing and speaking on issues of sustainability. Ikerd is author of six books and numerous professional papers, which are available at http://johnikerd.com and http://faculty.missouri.edu/ikerdj/

*Why an **Economic Pamphleteer?** Pamphlets historically were short, thoughtfully written opinion pieces and were at the center of every revolution in western history. I spent the first half of my academic career as a free-market, bottom-line agricultural economist. During the farm financial crisis of the 1980s, I became convinced that the economics I had been taught and was teaching wasn't working and wasn't going to work in the future—not for farmers, rural communities, consumers, or society in general. Hopefully my "pamphlets" will help spark the needed revolution in economic thinking.*

109 (116th Congress, 2019) and the 2007 Declaration of Food Sovereignty (Nyéléni, 2007).

The Green New Deal reframes sustainability in terms the rights of all people: *"It is the duty of the Federal Government to create a Green New Deal—(A) to achieve net-zero greenhouse gas emissions, fairly for all; (B) to create millions of good, high-wage jobs and ensure prosperity and economic security for all; (C) to invest in infrastructure and industry to sustainably meet the challenges of the 21st century; (D) to secure for all people for generations to come— (i) clean air and water; (ii) climate and community resiliency; (iii) healthy food; (iv) access to nature; and (v) a sustainable environment; and (E) to promote justice and equity by stopping current, preventing future, and repairing historic oppression"* (116th Congress, 2019, pp. 5–6).

The Green New Deal addresses the responsibilities of government not as separable ecological, social, and economic policies but as a single, inseparable policy mandate to secure the basic rights of all—of both current and future generations.

Food sovereignty also defines agri-food sustainability as a basic human right: *"the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems. … It defends the interests and inclusion of the next generation"* (Nyéléni, 2007, para. 3).

The Green New Deal supports sustainable family farms and local food systems: It *"will require the following goals and projects… " (G) working collaboratively with farmers and ranchers in the United States to remove pollution and greenhouse gas emissions from the agricultural sector as much as is technologically feasible, including— (i) by supporting family farming; (ii) by investing in sustainable farming and land use practices that increase soil health; and (iii) by building a more sustainable food system that ensures universal access to healthy food… (J)… restoring natural ecosystems through proven low-tech solutions that increase soil carbon storage…; (K) restoring and protecting threatened, endangered, and fragile ecosystems through locally appropriate and science-based projects that enhance biodiversity and support climate resiliency"* (116th Congress, 2019, pp. 8–10).

Animal agriculture is an essential dimension of sustainable agriculture—as I and many others consistently have explained. Animal agriculture also will play an essential role in mitigating climate change. The Green New Deal could mean the end of concentrated animal feeding operations (CAFOs), but not of animal agriculture.

Food sovereignty also supports family farms and local food systems. In addition to proclaiming the right of people to *"to define their own food and agriculture systems…"* it *"prioritises local and national economies and markets and empowers peasant and family farmer-driven agriculture, artisanal - fishing, pastoralist-led grazing, and food production, distribution and consumption based on environmental, social and economic sustainability"* (Nyéléni, 2007, para. 3).

The Green New Deal supports sustainable community development: *"A Green New Deal must be developed through transparent and inclusive consultation, collaboration, and partnership with frontline and vulnerable communities, labor unions, worker cooperatives, civil society groups, academia, and businesses"* (116th Congress, 2019, p. 10) through projects that *"(A)… ensures that the public receives appropriate ownership stakes and returns on investment, adequate capital,… technical expertise, supporting policies, and other forms of assistance;… (B) … takes into account the complete environmental and social costs and impacts of emissions through— (i) existing laws; (ii) new policies and programs; and (iii) ensuring that frontline and vulnerable communities shall not be adversely affected…"* (116th Congress, 2019, p. 11).

Food sovereignty also *"ensures that the rights to use and manage lands, territories, waters, seeds, livestock and biodiversity are in the hands of those of us who produce food"* (Nyéléni, 2007, para. 3).

Republicans historically have been advocates of the devolution of government or local control. "Republic" is defined as "a government in which supreme power resides in a body of citizens entitled to vote" (Republic, n.d.). The Green New Deal defends self-determination and local control.

The Green New Deal reclaims economic sovereignty by protecting individuals and communities from economic exploitation: by *"(K) enacting and enforcing trade rules, procurement standards, and border adjustments with strong labor and environmental protections … (L) ensuring that public lands, waters, and oceans are protected and that eminent domain is not abused; (M) obtaining the free, prior, and informed consent of indigenous peoples for all decisions that affect indigenous peoples … ; (N) ensuring a commercial environment where every*

businessperson is free from unfair competition and domination by domestic or international monopolies" (116th Congress, 2019, pp. 13–14).

Food sovereignty also *"offers a strategy to resist and dismantle the current corporate trade and food regime, and directions for food, farming, pastoral and fisheries systems determined by local producers and users. … It puts the aspirations and needs of those who produce, distribute and consume food at the heart of food systems and policies rather than the demands of markets and corporations"* (Nyéléni, 2007, para. 3).

The Green New Deal and Food Sovereignty both require the U.S. Government to give the basic human rights of real people priority over the economic rights of corporations.

The Green New Deal proclaims a new economic bill of rights: by *"(O) providing all people of the United States with— (i) high-quality health care; (ii) affordable, safe, and adequate housing; (iii) economic security; and (iv) clean water, clean air, healthy and affordable food, and access to nature"* (116th Congress, 2019, p. 14).

Food sovereignty *"promotes transparent trade that guarantees just incomes to all peoples as well as the rights of consumers to control their food and nutrition"* (Nyéléni, 2007, para. 3). It *"implies new social relations free of oppression and inequality between men and women, peoples, racial groups, social and economic classes and generations"* (Nyéléni, 2007, para. 3).

To claim that everyone has an equal right to everything of economic value could accurately be labeled as socialism. However, this is fundamentally different from the claim that everyone has an equal right to meet their *basic human needs* for clean air and water, healthy food, adequate housing, quality health care, and basic economic security.

The American Declaration of Independence proclaims, *"We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness."* In market economies, there no way to secure these rights without ensuring that the basic economic needs of all are met. The Declaration of Independence continues, *"That to secure these rights, Governments are instituted among Men."* The fundamental purpose of the U.S. was, and still is, to secure the unalienable rights of the people.

The Green New Deal provides an opportunity not only to proclaim Food Sovereignty as a new mandate for farm and food policy, but also to reclaim and recommit our government to its fundamental purpose of securing the rights of the people.

References

116th Congress. (2019). 1st Session. H. Res. 109. Recognizing the duty of the Federal Government to create a Green New Deal. Retrieved from https://www.congress.gov/116/bills/hres109/BILLS-116hres109ih.pdf

Ikerd, J. (2015). Food sovereignty: A new mandate for food and farm policy. *Journal of Agriculture, Food Systems, and Community Development, 5*(2), 11–14. https://doi.org/10.5304/jafscd.2015.052.004

Nyéléni. (2007). *Declaration of the Forum for Food Sovereignty, Nyéléni 2007*. Retrieved from http://nyeleni.org/spip.php?article290

Republic. (n.d.). *In* Merriam-Webster Dictionary. Retrieved from https://www.merriam-webster.com/dictionary/republic

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CULTIVATING *COMIDA:* PUSHING THE BORDERS OF FOOD, CULTURE, AND POLITICS

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What Maria exposed to us

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It has been nearly two years since Hurricane Maria unleased her fury on Puerto Rico, Dominica, and the U.S Virgin Islands in September 2017. Hurricane Maria caused an estimated US$94 billion in damages, with the majority of those damages reported in Puerto Rico (Mercy Corps, 2019). It is estimated that 2,975 Puerto Ricans lost their lives because of the hurricane, though the eventual death toll may have reached 4,000 (Mercy Corps, 2019). When Maria hit, the islands were still in recovery from Hurricane Irma, which had struck the north side of the main island just days before. The entirety of the archipelago, all 3.4 million residents, lost power after Maria, and it was estimated that Puerto Ricans, on average, went 84 days without power, 68 days without water, and 41 days without cellular phone service (Mercy Corps,

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Outside the classroom, Dr. Mares has led a number of community food projects. She is co-director of Huertas, a food security project for Latino/a dairy farmworkers connected to UVM Extension's Bridges to Health Program, and was previously co-director of the Food Justice Project for the Community Alliance for Global Justice in Seattle. She is devoted to experiential, transformative modes of teaching and has advised dozens of students who seek to make a difference in the contemporary food system. She can be reached at Teresa.Mares@uvm.edu.

2019). Overnight, Puerto Rico became disconnected from the outside world. Prior to the 2017 hurricanes, Puerto Rico was already grappling with widespread poverty and a crumbling infrastructure after years of disinvestment and structural adjustment.[1] These inequalities left Puerto Ricans with a host of challenges related to their wellbeing. For instance, according to the National Resources Defense Council, in 2015, 99.5% of Puerto Ricans were served by community water systems that violated the Safe Drinking Water Act (NRDC, 2017). Before Maria, 1.5 million Puerto Ricans were food insecure, with children experiencing food insecurity at a rate of 56%—triple the U.S. average (Bread for the World, 2019).

It is impossible to discuss Puerto Rico's economic system—past, present, or future—without talking about the islands' relationship with the United States. Due to stipulations in the Merchant Marine Act of 1920 (more commonly known as the Jones Act), 85% of food in Puerto Rico is imported (mostly from the U.S.), a figure that rose to 95% after Hurricane Maria (Ayala, 2017). Despite the immediate threats to food security and an outpouring of international support, the United States did not immediately waive the Jones Act, doing so more than a week after the hurricane hit and only for a period of 10 days—and only after Puerto Rico Governor Rosselló made a formal request. The Jones Act, a clear manifestation of the colonial relationship between the United States and Puerto Rico, limits the islands' autonomy and sovereignty over not only their food system, but their entire economy. The ongoing consequences of Operation Bootstrap also limit the islands' autonomy. Begun in 1947, Operation Bootstrap encompassed a series of economic projects led by the U.S. federal government and the Puerto Rico Industrial Development Company, encouraging Puerto Ricans to move away from the agrarian traditions that had sustained them for years and into light manufacturing and white-collar work, particularly in the pharmaceutical sector. As a result of these large-scale trade and development policies, and from the pressures to grow mainly export crops such as coffee and sugar, Puerto Rican farmers have long struggled to sustain small-scale agricultural livelihoods.

The Jones Act, a clear manifestation of the colonial relationship between the U.S. and Puerto Rico, limits the islands' autonomy and sovereignty over not only their food system, but their entire economy.

Recently I spoke with two experts about the impact of Hurricane Maria on the Puerto Rican food system: María Elena Rodríguez, the founder and owner of Cosecha Caribe, a small business specializing in raw and fermented value-added, artisanal foods based in Carolina, Puerto Rico; and Luis Alexis Rodríguez Cruz, a doctoral student in food systems at the University of Vermont, who is currently studying the experiences of farmers, particularly agroecological farmers, in Puerto Rico. María Elena and Luis share a commitment to strengthening Puerto Rico's food system, and both see their futures intertwined with the rebuilding of the islands. In my interviews with these two inspiring individuals, one thing became abundantly clear: for Puerto Ricans, there is a definitive dichotomy of Before Maria and After Maria. While the storm laid bare a painful history of colonial ties with the U.S. and decades of disinvestment and neglect, it also revealed a transformative opening for building resiliency and sovereignty into the heart of the islands' food and farming future. The transformation and revitalization of Puerto Rico's local food system—while temporarily derailed by the hurricane—is poised to bring new forms of local control and connection to food on the islands.

Although she was raised in Florida and lived

[1] Structural adjustment refers to the delivery and administration of loans to states or regions in economic crisis, often loaned by institutions like the World Bank or International Monetary Fund. These loans are given on the condition of economic reforms. Structural adjustment is widely critiqued as a mechanism that deepens poverty and increases dependency.

many years on the West Coast of the mainland, María Elena Rodríguez was living on Puerto Rico during Hurricane Maria. Joining her family in Puerto Rico after becoming deeply involved in food justice work and receiving her undergraduate and graduate degrees (the latter a master's degree in community development at UC Davis), María Elena quickly became involved in the recovery efforts. In her view, the most immediate challenge following the hurricane was the physical destruction of farms across the islands, and the lack of funding and other resources to rebuild those farms. While money supposedly began to flow into Puerto Rico following the hurricane, as María Elena explained, "no one seems to know where that money is ending up." Most farms she worked with during the recovery efforts received little if any financial support, adding to a generalized sense of shock and sadness as people who saw their entire livelihoods destroyed overnight. While some farmers abandoned their land and joined the mass exodus of Puerto Ricans moving to the U.S. (a population drop forecast as 14% (Agence France Presse 2017), María Elena also emphasized the deep resilience she observed as farmers and other stakeholders in the food system began to "pivot" in the wake of the hurricane.

As a food justice activist and farmers market vendor herself, María Elena participated in this practice of pivoting, alongside farmers, restaurant owners, and other food system players scrambling to figure out what they could do with what remained. With the hurricanes "throwing a wrench" in people's plans, business models were shifted, farms were relocated, community networks were engaged, and new solidarities were built. Projects like Visit Rico and the grassroots Queer-led Guagua Solidaria (originally part of El Departmento de la Comida) sprang into action, with Visit Rico raising US$450,000 in the weeks following the hurricane (despite the lack of reliable phone or internet service) and Guagua Solidaria sending its outfitted van out to its network of farms to assist in cleaning and rebuilding efforts. In our conversation, María Elena emphasized that community projects like these were successful because they were already working "on the ground" in the food system prior to the hurricane and were able to quickly mobilize their networks afterwards. Their staff also took the time to really listen to farmers about what they needed to rebuild and mobilized resources directly into farmers' hands.

Prior to Hurricane Maria, there was an emergent and vibrant food movement unfolding in Puerto Rico, although as María Elena explained, this movement was largely an alternative movement to the mainstream and motivated by resistance to GMO crops, given the heavy presence of agricultural corporations like Monsanto on the islands. Since the hurricane, there has been a convergence of people who have been engaged in food justice and food sovereignty work, a convergence that, according to María Elena, has gained traction, and thus, a broader audience. As millions of Puerto Ricans confronted food shortages, there was—in some sense—a leveling mechanism at play that reminded the archipelago of its collective dependencies and vulnerabilities. She explained, "what I see now is that there is a lot of awareness to the fragility of a food system that imports more than 80 to 90% of the food that we consume. . . . That experience really woke up a lot of people to the need to pay attention and the need to buy locally and support local farmers and think about renewable energy." For María Elena, who plans to purchase a farm soon to support her business and put into practice her training in agroecology, this broadening of the food movement cannot come soon enough.

Luis Rodríguez Cruz was just beginning his first year as a doctoral student in Vermont when Hurricane Maria devastated his homeland. While completing his M.S. in food science and technology at the University of Puerto Rico, Luis had developed a deep knowledge of the islands' food system, particularly about the lives of small-scale commercial fisherfolks. It only made sense, then, that one of his first research projects as a doctoral student would be to examine the impacts of Maria on the islands' food system. With support from his doctoral advisor, Meredith Niles, Luis carried out a mixed-methods study in collaboration with the Extension Service of the University of Puerto Rico (Rodríguez Cruz & Niles, 2018). For this study, Extension agents surveyed 405 farmers on the obstacles they face toward recovery, their losses

due to Maria, opinions on policies, and other issues pertinent to their livelihoods. This study demonstrated that one of the biggest issues confronting farmers in the wake of Maria was food insecurity. The month that Hurricane Maria hit the islands, 42% of farmers surveyed were struggling to access food or were experiencing food shortages. This incidence of food insecurity rose to 59% one month after the hurricane before it began to slowly decline. Before Maria, less than 1% of farmers reported food insecurity (Rodríguez Cruz & Niles, 2018). As Luis noted in our interview, these issues of food access were not limited to farmers, as all Puerto Ricans faced the consequences of roadblocks, gas shortages, and closed ports following the hurricane.

According to the same study, 43% of farmers surveyed reported a total loss of their farming operation, and 43% experienced significant loss. Nearly half (49%) reported that one of the main challenges they experienced after the hurricane was a lack of governmental aid and/or delays in receiving insurance settlements to rebuild. During our conversation, and echoing what María Elena observed, Luis was quick to point out that farmers turned to their own networks of mutual aid and support in the absence of support and funding, "knowing they cannot depend on these institutions that did not provide after the hurricane." He came to this observation both through anecdotes and from research conducted by Nayla Bezares and Alyssa Melendez (2019). Many Puerto Rican farmers are becoming more integrated into their communities now, particularly younger farmers and those farming in some of the more distant mountain villages. Luis also noted that one impact of the hurricane is a new and more vocal conversation among food system stakeholders about the relationship between Puerto Rico and the U.S., given that Puerto Rico has little control over its trade policies and that the austerity measures imposed by the United States are not well attuned to the local context. Sixty-six percent of farmers surveyed by Luis and his colleagues agreed that the Jones Act negatively affected Puerto Rico's food security and were not in support of the law. The majority (81%) also felt that food imports in Puerto Rico presented an obstacle for local farmers to increase their access to the Puerto Rican market.

In my interview with him, Luis offered similar observations about the movement for food sovereignty in Puerto Rico, emphasizing that discussions of food sovereignty are more common among farmers who are not "as closely related to the Department of Agriculture or conventional ways of growing." With an interest and training in agroecology, Luis sees that farmers in Puerto Rico who are drawn to agroecology and sustainable ways of farming, and particularly younger farmers, are devoting serious thought and effort to building more power and control over the food system and producing food for their own communities. Intertwined with these efforts is a desire for autonomy and freedom from ongoing dependence on U.S. imports. Through his doctoral research, Luis plans to work with farmers to build capacities for transformative change to be more resilient and resistant to climate change. After he completes his Ph.D., Luis plans to return to Puerto Rico and continue farming a piece of land that has been in his family for decades, and hopefully, continue with his applied research efforts. He expressed, "I think I feel a responsibility to contribute to my society, to my home, to my community. I am where I am mainly because of the University of Puerto Rico, which is paid for by Puerto Ricans." While the challenges confronting Puerto Rico and its residents are very real, there is also a real potential for building a more sustainable and locally controlled food system, especially if Luis and María Elena have anything to do with it.

One of the biggest issues confronting farmers in the wake of Maria was food insecurity. The month that Hurricane Maria hit the islands, 42% of farmers surveyed were struggling to access food. Before Maria, less than 1% of farmers reported food insecurity.

References

Agence France Presse (2017, November 6). Puerto Rico population to drop 14% after hurricane. Retrieved from https://www.yahoo.com/news/puerto-rico-population-drop-14-hurricane-001954834.html

Ayala, H. (2017, December 8). How Puerto Rico's food industry is picking up the pieces after Hurricane Maria [Blog post]. Retrieved from https://www.eater.com/2017/12/8/16739310/puerto-rico-restaurant-industry-farmers-hurricane-maria

Bezares, N., & Melendez, A. (2019). *Resilience and recovery among farmers in Puerto Rico's Mercardos Agricolas after Hurricane Maria* [Research poster]. Retrieved from https://environment.tufts.edu/wp-content/uploads/Nayla-Bezares-and-Alyssa-Melendez_TIE-Poster_Final.pdf

Bread for the World. (2019, March 1). *Fact sheet: Hunger and poverty in Puerto Rico* [Issue brief]. Retrieved from https://www.bread.org/library/fact-sheet-hunger-and-poverty-puerto-rico

Mercy Corps. (2019, June 27). *Quick facts: Hurricane Maria's effect on Puerto Rico.* Retrieved from https://www.mercycorps.org/articles/united-states/hurricane-maria-puerto-rico

National Resources Defense Council. (2017, May 10). *Threats on tap: Drinking water violations in Puerto Rico* [Issue brief]. Retrieved from https://www.nrdc.org/resources/threats-tap-drinking-water-violations-puerto-rico

Rodríguez Cruz, L., & Niles, M. (2018). *Hurricane Maria's impacts on Puerto Rican farmers: Experience, challenges, and perceptions* [Technical report]. Retrieved from https://www.researchgate.net/publication/333204111_Hurricane_Maria's_Impacts_on_Puerto_Rican_Farmers_Experience_Challenges_and_Perceptions

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VIEWPOINT

From anecdote to formal evaluation: Reflections from more than two decades on the local food research trail at USDA

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Introduction

In the waning days of my career at the U.S. Department of Agriculture (USDA), the editors of this journal encouraged me to share some reflections about the evolution of local food research and data collection during the past two decades, and I am deeply appreciative for the opportunity. It has been my great fortune to have witnessed the extraordinary transformation of the local food sector firsthand since the mid-1990s. What started out as a minor assignment to oversee a single—and eventually unsuccessful—cooperative research agreement on school food procurement with the Georgia Department of Agriculture in 1995 ended up piquing my interest about the opportunity for growth in local food sales within institutional and commercial food service, as well as retail channels. This subject has remained the primary focus of my professional life and a subject of vast curiosity for me ever since. For someone like me, who has been

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immersed in the world of local food systems for more than 20 years, it is staggering—and gratifying—to consider both the profound changes in research and data availability that have occurred over the course of my career, and the multiplicity of ways that relevant evidence and data can now be employed to guide business and community development through local food system expansion. My intent in this article is to briefly examine the chronological history of local food research at USDA as I experienced it "in the trenches," and observe the combination of Congressional mandate, political influence, personal curiosity, and, sometimes, pure serendipity that permitted this body of work to emerge.

It should be noted that my personal experiences and observations are strongly shaped by my career-long affiliation with USDA's Agricultural Marketing Service (AMS), an agency that has been mandated by Congress since 1946 to promote efficiency in the U.S. food marketing system and help producers attain a greater share of consumer food expenditures.[1] Therefore, while I acknowledge the many health, equity, and environmental benefits that may be achieved through local food system development and expansion, I am deliberately confining the bulk of my remarks to the economic contributions of local food systems from a producer standpoint, and USDA's important role in bringing such data and information to light.

The Early Days: USDA and Local Food, 1995–2000

During the first few years that I was engaged in studying local procurement trends, USDA regarded the local food sector as a niche contributor to the U.S. food economy, and one that was primarily of interest to small-scale farmers and their customers. Consumers of local food were largely perceived as core patrons of farmers market and community supported agriculture (CSA) who were partially motivated by emerging research pointing to the environmental superiority of purchasing food closer to its place of origin (Pirog, Van Pelt, Enshayan, & Cook, 2001), and who relied on direct marketing outlets as sources of high-quality organic or sustainably produced fresh foods at a time when such foods were not always available from mainstream retail outlets (Organic Trade Association & GRO Organic Core Committee, 2015). The minimal importance accorded to the economic contribution of local food to the U.S. food economy was exemplified by the fact that, even as late as 2007, the Census of Agriculture only included two questions about local food sales—both strictly pertaining to direct-to-consumer marketing channels. It should be noted that each of these questions was worded in a way that circumscribed the ability of researchers to fully gauge the economic significance of these marketing outlets. One of the survey questions asked producers to report the value of agricultural products "sold directly to individuals for human consumption," including at direct-to-consumer retail outlets such as "roadside stands, farmers markets and pick your own, etc." (explicitly excluding such high-value processed foods such as "jams, sausages and hams," and non-edible products such as cut flowers and nursery plants (USDA NASS, 2007, p. 81). The other question asked producers to report whether they marketed any of their agricultural products through a CSA "arrangement," which yielded an unexpectedly high number of affirmative responses (over 12,000) but failed to yield clear understanding about the actual role played by CSAs in moving agricultural products from farmers to consumers (Robyn Van En Center Staff, 2009).

In line with the prevailing assumption at the time that direct-to-consumer and local food sales remained a niche market with limited economic importance, during the late 1990s and early 2000s, the handful of career civil servants at USDA who worked on local food systems typically focused on a single aspect of local food marketing (primarily direct-to-consumer transactions) and on providing technical assistance and capacity-building services

[1] Agricultural Marketing Act of 1946, Sec. 203. 7 U.S.C. 1622. The original text reads: "to foster and assist in the development and establishment of more efficient marketing methods…for the purpose of bringing about more efficient and orderly marketing, and reducing the price spread between the producer and the consumer." See https://www.ams.usda.gov/sites/default/files/media/Agricultural_Marketing_Act_Of_1946%5B1%5D.pdf

rather than data collection and analysis. These USDA civil servants operated almost entirely within separate organizational silos and rarely engaged in interagency partnerships or coordination unless it was directly mandated by political appointees (as was the case with early farm-to-school programming at USDA during the Clinton Administration). By and large, dedicated funding for local food systems activities did not exist, although cooperative research and grant authorities were often employed to carry out local food research or demonstration projects to the extent that such activities were eligible for support.

Much of the existing local food work at USDA at the time was concentrated at Agricultural Marketing Service (AMS), which was assigned the primary responsibility of carrying out the unfunded mandates outlined in the 1976 Farmer to Consumer Direct Marketing Act. The act directs the Secretary of Agriculture to "promote, through *appropriate means and on an economically sustainable basis,* the development and expansion of direct marketing of agricultural commodities from farmers to consumers" (emphasis added; Public Law 94-463, 94th Congress, H.R. 10339, "Purpose"). To accomplish this objective, USDA was instructed to "initiate and coordinate a program designed to facilitate direct marketing . . . for the mutual benefit of consumers and farmers" (Public Law 94-463, 94th Congress, H.R. 10339, "Purpose"). In the first several years following the enactment of the act, members of what was then known as the AMS Wholesale Market Development program attempted to fulfill this Congressional request largely by offering its existing services in site assessment and facility design to farmers market clients and their supporters. By the time I arrived at AMS in the summer of 1992, the USDA was also beginning to develop its internal capacity in market research and marketing-related technical assistance, hiring several employees to support new initiatives in direct-to-consumer market research and information sharing. Among the new initiatives launched in the mid-1990s was the initial publication (in hard copy) of the National Farmers Market Directory, the introduction of a pilot farmers market at USDA headquarters in Washington, D.C., both in 1994, and the temporary launch of a public-facing periodic newsletter aimed at letting practitioners in the reemerging farmers market and direct-to-consumer sector learn about the available market information and resources in the pre-Internet era. Much of this work was initiated rather informally, relying heavily on existing USDA relationships with state government and nonprofit organization personnel to compile the most reliable national list of active farmers markets available, as well as information about relevant training and resources. Given the comparatively large share of younger businesses in the reemerging U.S. farmers market industry at the time,[2] it is not surprising that AMS focused its attention on offering technical assistance services for start-up markets and baseline research on market structure and practice.

Farm-to-School Pilot Projects Spark an Early AMS Embrace of a Broader Local Food Research Agenda

One of the most important influences on the development of local food research within the USDA was AMS's support of a couple of very early farm-to-school pilot projects in Southeastern states. These included one project that eventually became a nationally renowned farm-to-school marketing success story: the revival of the New North Florida Cooperative in Marianna, Florida. A chance meeting between AMS Associate Administrator (and former University of Florida professor) Kenneth Clayton and Glyen Holmes, a Florida-based outreach coordinator for the Natural Resources Conservation Service, led AMS to support a cooperative research agreement with the New North Florida Cooperative (NNFC) in 1996. This agreement aimed to explore market opportunities in school food service for a vegetable cooperative composed of small-scale African American farmers. Project partners included Holmes, J'Amy Peterson of the Gadsden County (Florida) School District, and Vonda Richardson, extension specialist at Florida A&M University. After a few false

[2] National surveys of farmers market managers conducted by AMS economists in 2000 and 2005 indicated that nearly 30 percent of all survey respondents operated markets that had been in business five years or fewer.

starts, the cooperative found success in selling chopped, bagged collard greens to the school food service program, whose staff appreciated receiving fresh, culturally appropriate product that did not require further processing and could easily be included in school menus. By 2000, Holmes proved to be so successful in selling the cooperative's collard green product to school systems in the Southeast that he left his position at USDA to focus his energy entirely on working with the NNFC.

While it is unlikely that support for local food markets per se was the impetus behind AMS's support of this early farm-to-school project—a combination of White House emphasis on improving school food quality, AMS's historic interest and involvement in food procurement, and the USDA's rising focus on small farm and minority farmers' access to resources probably explain the rationale[3]—the engagement of AMS marketing personnel in these early farm-to-school marketing projects had significant and long-lasting ripple effects. One such effect was encouraging eligible state agencies and land-grant institutions interested in exploring farm-to-school and other direct-to-consumer marketing prospects to consider applying for funds from AMS's single grant program that existed at the time, the Federal-State Marketing Improvement Program (FSMIP), which had a very broad scope of eligible market research activities.[4] As a result, FSMIP became responsible for funding a number of early local food studies and demonstration projects before 2001, including:

- Massachusetts: US$20,250 to assess consumer demand for locally produced foods and specialty products through development of an indoor farmers market in Boston.
- New Mexico: US$27,000 to the New Mexico Department of Agriculture to conduct a farm-to-school pilot project involving three public schools and a newly formed cooperative of small-scale Hispanic farmers.
- Oklahoma: US$80,000 to examine marketing practices at current and former farmers markets in Oklahoma and evaluate the economic and non-economic factors that appeared to impede or contribute to the financial success of farmers market operations.
- Pennsylvania: US$60,750 to the Pennsylvania Department of Agriculture, in cooperation with the Center City Proprietors Foundation, to assist successful small-scale food processors in developing marketing strategies for moving their products into local retail channels.

Furthermore, because of our prior engagement with farm-to-school marketing issues, a few of us AMS employees were eventually deployed as departmental-level points of contact for questions and briefings about farm-to-school marketing and local food marketing prospects in general. In my particular case, my initial involvement with a pilot farm-to-school marketing project led to my being assigned to a departmental-wide farm-to-school task force in 1999 and my involvement in organizing the first-ever USDA farm-to-school training workshop in Georgetown, Kentucky, in 2000, in partnership with representatives from the Kentucky Department of Agriculture, University of Kentucky Extension, and members of the Food and Nutrition Service (FNS) public affairs team. I later served as primary author of the proceedings

[3] It is useful to note that 1996 timing of the cooperative research agreement with NNFC coincided with an important new USDA-wide initiative related to school food procurement. In August 1995, an agreement was designed by administrators of the USDA Food and Nutrition Service (FNS), AMS, and the Department of Defense's (DoD) Defense Personnel Support Center to take advantage of DoD's buying power and logistical capacity in supplying produce to military bases by using the same mechanisms to provide more fresh fruit and vegetable products to schools. The report "Small Farms/School Meals Town Hall Meetings," issued by FNS in 2000, makes the connection between the DoD partnership and farm-to-school programs explicit.
See https://fns-prod.azureedge.net/sites/default/files/small.pdf

[4] The other existing USDA funding stream that was used for local-oriented marketing projects at the time was the NIFA Community Food Security grant program, established in 1996. Unlike FSMIP, however, eligible projects were required to meet the needs of low-income people by increasing their access to fresher, more nutritious food supplies.

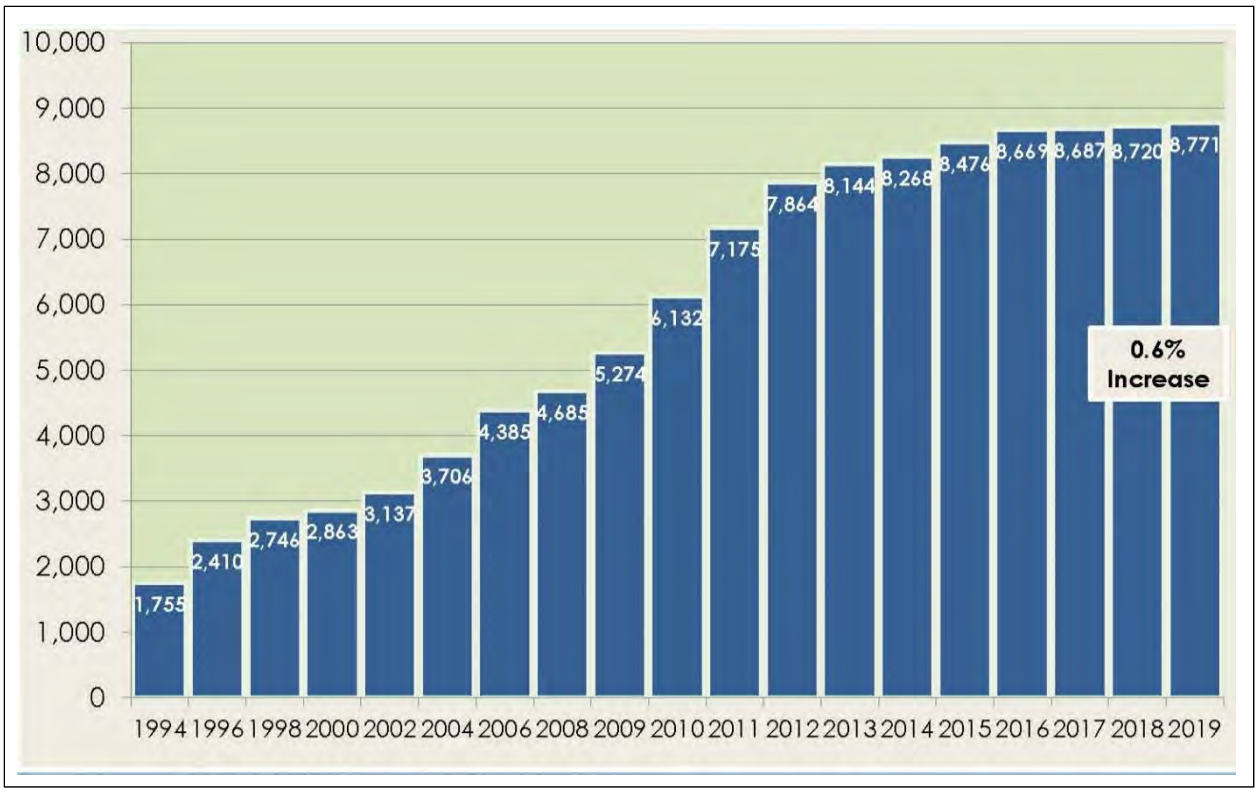
document developed from that workshop, which was published by AMS in December 2000 and set the stage for my lifelong professional interest in helping producers use local origin as a strategy for successful differentiation in the marketplace (Tropp & Olowolayemo, 2000).

Maturation of USDA Local Food Marketing Research, 2000-2007

During this time, AMS Marketing Services increased its involvement with capturing baseline farmers market data and providing direction about direct-to-consumer marketing research and technical assistance needs in partnership with industry representatives, while initiating preliminary research on wholesale buyer interests in procuring local food. Among the major developments that occurred during this time were:

- An apparent rapid growth in farmers markets, as indicated by voluntary submissions of listings to the National Farmers Market Directory[5] (Figure 1);
- Growing interest in the impact of these market establishments on local business development and community quality of life;
- The initiation of national surveys of the farmers market industry;
- The first Congressional authorization of funding for a grant program specifically dedicated to the development and expansion of farmers markets (the Farmers Market Promotion Program [FMPP]);
- Formal efforts by AMS to create a listening forum for representatives of the emerging farmers market community that would guide future program direction; and
- AMS's initial leap into research on local food procurement by commercial food service.

Figure 1. USDA National Count of National Farmers Market Directory Listings, 1994–2019



Source: U.S. Department of Agriculture, Agricultural Marketing Service, Marketing Services Division (n.d.).

[5] https://www.ams.usda.gov/local-food-directories/farmersmarkets

As the numbers of farmers markets reported to USDA began to rise steeply—more than doubling between 1996 and 2006 (Figure 1)—AMS experienced an upsurge of interest from state and local governments and community planners about the role of farmers markets in stimulating local economic activity. Agency personnel responded to the growing number of inquiries in a few different ways. To obtain additional insight about the state and economic contribution of the farmers market industry, AMS hired a former state USDA National Agricultural Statistics Service (NASS) statistician to carry out its first national survey of farmers markets activities during the 2000 market year to establish a baseline profile of the sector (Ragland & Tropp, 2009). This was followed up by a national survey of farmers market managers in about the 2005 market year by another AMS staff economist (Payne, 2002).

Accentuating AMS's interest in providing research and technical assistance services to farmer market managers, planners, and vendors was the final Congressional decision to appropriate funding for the FMPP at an initial funding level of US$1 million per year, four years after its original enactment in the 2002 farm bill. The purpose of the FMPP program, then and now, is to competitively award grants that help increase consumption of and access to locally produced agricultural products and develop new market opportunities for farm and ranch operations participating in direct farmer-to-consumer marketing outlets (e.g., farmers markets, CSAs, roadside stands).

Facing greater public scrutiny of USDA resources targeted toward farmers market growth and expansion in the wake of this funding authorization, the AMS associate administrator at the time, Dr. Kenneth Clayton, directed the Marketing Services program in 2007 to organize a national summit for key representatives of the U.S. farmers market sector to solicit direct feedback from industry members about their core priorities and use this input to guide future program direction and resource allocation. Seventy-five individuals from across the nation attended this gathering, held in Baltimore in March 2007, representing 31 states and the District of Columbia, and a diverse array of connections to the farmers market industry (Figure 2).

To develop a national consensus about farmers market priorities, the summit was intentionally designed to promote a high level of attendee participation and interaction. Attendees worked in small assigned teams, representing diverse industry perspectives, to identify the priority needs of the farmers market sector and discuss how available resources could be brought to bear to realize desired outcomes. From a research perspective, the proceedings document assembled from highlights of discussions at the USDA National Farmers Market Summit, released in March 2008 (Tropp & Barham, 2008), represented one of the first, if not *the* first, "roadmap" for direct-marketing research priorities tacitly endorsed by USDA. In that capacity, they provided broad-based direction to industry practitioners and market observers about potentially fruitful directions for research activity.

Figure 2. Stakeholder Affiliations at USDA National Farmers Market Summit, March 2007

Farmers Market Representatives	
State Farmers Market Associations	13
Farmers Market Managers and Farmers	12
Subtotal	**25**
Community Partners	
Local Nongovernmental Organizations (NGOs)	6
State Departments of Agriculture	7
University and Extension	6
Departments of Community Development, City Planning, Health	7
Subtotal	**26**
National Resource Providers	
Federal Agencies	13
National NGOs	9
Private Foundations	2
Subtotal	**24**
Total Participants	**75**

In addition to setting the foundation and direction for much of the subsequent work at USDA on direct-to-consumer marketing channels, AMS Marketing Services was also responsible for initiating some of the USDA's earliest work on intermediated sales of local food to wholesale buyers. Through our early immersion in farm-to-school marketing issues, our program became acutely aware of the barriers and constraints facing smaller-scale producers who wanted access to wholesale market channels—and the potential financial benefits awaiting producers who could make that transition. We were also similarly aware of the limited revenue potential offered by many direct-to-consumer farm marketing outlets, as indicated by both anecdotal evidence and our early national surveys of farmers market managers.

Consequently, as I moved into management, I actively sought ways to integrate business-to-business services into our marketing program portfolio. The first opportunity arose when I served as acting staff officer for AMS's Federal-State Marketing Improvement Program for approximately eight months in 2000–2001, and stumbled across a FSMIP-funded study that correlated food service market share and fresh meat sales to the financial profitability of meat processing firms in Texas (Siebert, Nayga, & Thelen, 2000). Intrigued by the findings, I successfully pitched a follow-up research idea to the authors of this study, which led to our collaboration and AMS's publication of *Expanding Commercial Food Service Sales by Small Meat Processing Firms* (Tropp, Siebert, Nayga, Thelen, & Kim, 2004), which explored the motivations among restaurant chefs and food service staff to purchase meat products close to the point of origin, as well as some of the logistical, marketing, and perceptual barriers that prevented more local transactions from occurring.The revelations that emerged from this study eventually paved the way toward AMS's involvement in research on identity preservation in the food supply chain, and toward interest in exploring how load consolidation and aggregation could be employed to yield greater efficiency and market access for local food suppliers—issues discussed further in later sections of this article.

Local Food Enters the U.S. Cultural Mainstream, 2008–2013

During 2008 to 2013, the volume of publicly available information and data on local food systems expanded substantially, reflecting a confluence of market demand factors, political will, and programmatic changes at the federal level that reinvigorated formal support for this sector of the agricultural economy. Some key markers of how deeply local food issues had permeated mainstream U.S. culture by 2008 are illustrated by the following examples:

- Michael Pollan's *The Omnivore's Dilemma: A Natural History of Four Meals* (published in 2006) remained on the New York Times best seller list for more than two years.
- The March 12, 2007, cover of *Time* magazine featured the slogan "Forget Organic, Eat Local."
- "Locavore" was designated the word of the year in late 2007 by the Oxford University Press.
- The consulting firm Packaged Facts estimated that local food demand in the U.S. reached US$5 billion per year in 2008.
- The number one "hot" trend among restaurant chefs at the beginning of 2009 was identified as locally sourced produce.

In the face of growing public awareness of and interest in local food system development, Congress substantially increased the amount of targeted funding available for direct-to-consumer marketing activities in the 2008 farm bill, lifting the initial authorization of funding for the Farmers Market Promotion Program from US$1 million of discretionary funding annually to US$33 million in mandatory funding over five years. This dramatic infusion of funding within a short time period—moving from US$3 million annually in 2008 to US$10 million annually by 2011—greatly heightened the capacity of USDA to act in service of the local food and direct farm marketing sectors.

At the same time, AMS market research analysts were beginning to tell a compelling story about the economic potential offered by local food system expansion:

- Evidence from AMS's *2006 National Survey of Farmers Market Managers* suggested that U.S. farmers markets conservatively accounted for US$1 billion in annual sales revenue (Ragland & Tropp, 2009).
- Excerpts of 2007 Agriculture Census data compiled by AMS researchers in 2009 revealed that the pace of growth for direct-to-consumer sales of agricultural products far exceeded the pace of growth for agricultural sales in general (Diamond & Soto, 2009).

Meanwhile, AMS Marketing Services continued to explore identity preservation in food supply chains as a strategy for moving product beyond commodified markets. An assignment from USDA leadership to work in partnership with the Upper Great Plains Institute at North Dakota State University on identity-preservation issues for grain shipments led the program to develop a series of linked "supply chain basics" modules aimed at helping small and midsized agricultural producers and processors understand the logistical, inventory management, and market requirements associated with differentiated agricultural marketing practices. Titles in the series include:

- *Technology: How Much, How Soon?* (July 2007)[6]
- *Niche Agricultural Marketing: The Logistics* (September 2007)[7]
- *Supply Chain Basics: Tracking Trucks With GPS* (January 2008)[8]
- *The Dynamics of Change in the U.S. Food Marketing Environment* (July 2008)[9]

During the 2008 fiscal year, Marketing Services partnered with the California-based nonprofit Roots of Change and several early adopters in local food marketing to carry out the West Coast Direct Marketing Summit[10] in June 2009, the first USDA-sponsored conference that specifically identified and addressed distribution and infrastructural barriers to the movement of local food, drawing AMS further into explorations of scale-appropriate aggregation as a market-access solution.

Around this time, the new Obama Administration prioritized a focus on local and regional food systems, in which these were eventually regarded as one of four central "pillars" of agriculture and rural economic development at the USDA (USDA Office of Communications, n.d.). The primary vehicle for this focus was the establishment in May 2009 of the departmentwide Know Your Farmer, Know Your Food (KYF2) initiative by then Deputy Secretary Kathleen Merrigan, who was well known as a champion of small-scale and sustainable agriculture from her many years of affiliation with federal regulation of organic agriculture.[11] Coordinated by a rotating internal leadership team composed of both political appointees and career employees, the KYF2 task force, presided over by the deputy secretary, held meetings of the entire task force membership every two weeks to foster routine information exchange across organizational silos, identify programmatic needs and bottlenecks, and develop creative solutions that would both align with regulatory and policy requirements and increase local and regional food system practitioners' access to federal resources. In addition, several KYF2 subcommittees of specialists from across USDA met regularly to address critical challenges and bottlenecks related to the themes of program awareness and access, data gathering and gap analysis, local meat processing, and aggregation and distribution. A centralized landing page[12] was created to provide the public with an overview of USDA's local and regional food work in seven

[6] See the report at https://www.ams.usda.gov/sites/default/files/media/SupplyChainTechnology.pdf
[7] See the report at https://www.ams.usda.gov/sites/default/files/media/SupplyChainNicheMarketing.pdf
[8] See the report at http://dx.doi.org/10.9752/MS032.01-2008
[9] See the report at https://www.ams.usda.gov/sites/default/files/media/SupplyChainDynamicsOfChange.pdf
[10] See more about the summit at https://civileats.com/2009/07/10/roots-of-change-breaks-ground-with-sustainable-food-summit/
[11] Prior to Dr. Merrigan's appointment at USDA Deputy Secretary, she had served as AMS administrator under the Clinton Administration, where she played a key role in overseeing the promulgation of the federal rule that created the USDA National Organic Program. She also helped write the original 1990 Organic Food Production Act as a member of Senator Leahy's staff.
[12] https://www.usda.gov/sites/default/files/documents/KYFCompass.pdf

thematic sections, which included links to related resources and case study illustrations of relevant USDA-funded projects.

As might have been expected, the creation of the KYF2 task force and the repositioning of local food issues as key priority issues for USDA leadership led to a profusion of new data gathering and research activities within the Department. These included:

- Development and release of two ERS reports on local/regional food systems in spring 2010, Comparing the Structure, Size, and Performance of Local and Mainstream Food Supply Chains[13] and Local Food Systems: Concepts, Impacts, and Issues[14];
- Inclusion of a question regarding locally branded food sales to institutions in the 2011 ERS Agricultural Resource Management Survey (ARMS);
- Inclusion of a new survey question in the 2012 Census of Agriculture that, for the first time, addressed direct sales of fresh food by farmers to wholesale buyers (e.g., retailers, restaurants, food service institutions), which allowed for greater precision in analyzing the nature of local food transactions;
- A redesign of the ARMS sample design procedure in 2013 that attempted to boost response rates from small and medium-size operators (and thereby capture a greater number of farms involved in local/regional food marketing); and
- The creation of a centralized portal[15] for local food data and information about federally funded local food investments in alignment with the Administration's emphasis on data transparency.

While nearly all USDA agencies participated in the KYF2 task force to some degree, AMS's long-standing involvement in local food research and technical assistance, as well as Dr. Merrigan's deep knowledge of AMS programs from her prior stint as AMS administrator, virtually ensured that AMS had an important place on the KYF2 table.[16] AMS Marketing Services's contributions to local food research literature during this time, aided and abetted by the interagency networks forged through KYF2, had three major foci, reflecting AMS's comparative expertise in local food market infrastructure/supply chain management and the collection and reporting of public-facing industry data:

- **Developing more substantive analysis and technical guidance for the maturing farmers market industry,** exemplified by the release of *Supplemental Nutrition Assistance Program at Farmers Markets: A How-To Handbook*[17] in June 2010, co-authored by AMS Marketing Services, FNS, and the nonprofit Project for Public Spaces;
- **Pioneering research in local/regional food aggregation** to help smaller-scale producers access wholesale marketing channels, exemplified by the 2012 release of *Moving Food Along the Value Chain: Innovations in Regional Food Distribution*[18] and the *Regional Food Hub Resource Guide*[19]; and
- **Deploying technology to improve data transparency and public awareness and patronage of our farmers market directory database**. These developments included the launch of a Foursquare farmers market "check-in" promotion with CNN's Eatocracy website (Gould, 2016), and the integration of geographic coordinates and mapping functions into the National Farmers Market Directory in late

[13] https://www.ers.usda.gov/webdocs/publications/46405/7028_err99_reportsummary_1_.pdf?v=41056
[14] https://www.ers.usda.gov/webdocs/publications/46393/7054_err97_1_.pdf?v=0
[15] https://www.ams.usda.gov/local-food-sector/compass-map
[16] I served as the first presenter at the "soft launch" of the KYF2 task force in May 2009, sharing my program's knowledge to date about the pros and cons of farm-to-school marketing from a producer perspective.
[17] https://www.mass.gov/files/documents/2016/08/vh/usda-howto-fm-ebt.pdf
[18] https://www.ams.usda.gov/sites/default/files/media/MovingFoodAlongValueChain.pdf
[19] https://www.ams.usda.gov/sites/default/files/media/Regional%20Food%20Hub%20Resource%20Guide.pdf

2010, which allowed computer programmers to use the integrated dataset to support their own application programming interface (API) spinoffs. In 2013, USDA also used data from the National Farmers Market Directory to support its first federally developed API (Stanziani, 2013) as part of the Obama Administration's Digital Government Strategy to improve data transparency and public access to government data (Sinai & Van Dyck, 2013).

Building on Established Foundations, 2014–2016

This time period was characterized by an expansion of existing local food grant authorities, the creation of new, dedicated funding streams for farmers market purchases, and an emerging interest in gauging the economic impact of local food investments. This reflected both the increased availability of data on the local food marketing environment and a growing interest among community and regional planners and economic development officials in considering food and agriculture as a critical element of their strategies. Major developments included:

- **Augmentation of existing local food grant authorities and creation of new dedicated funding streams.** The 2014 farm bill created the Local Food Promotion Program (LFPP) in FY 2014 to complement the existing work of FMPP, authorizing US$30 million in annual funding to support the administration of both grant programs. In addition, FY 2014 saw the launch of the Food Insecurity Nutrition Incentives (FINI) program within USDA's Food and Nutrition Service, which aimed to increase fruit and vegetable purchases by low-income recipients of SNAP benefits by providing incentives at the point of purchase;
- **Creation of three additional national local food directories**[20] by AMS Marketing Services in 2014, signaling the program's growing interest in tracking industry practices and trends beyond farmers markets;
- **The launch of new price reports**[21] by AMS Market News that publish price data for key locally grown and raised, organic, or sustainably grown and raised food products sold through a variety of direct-to-consumer, wholesale, institutional, and retail outlets. This includes direct-to-consumer sales of meat cuts from grass-fed and pasture-fed animals, and selected produce, meat, seafood, dairy items, and eggs at farmers markets, auction markets, farm-to-school transactions and retail outlets across the country;
- The decision by NASS to carry out the **2015 National Local Food Marketing Practices survey**,[22] published in December 2016, which provided unprecedented coverage and delineation of sales of food identified as locally grown and raised and was marketed through both direct and intermediated channels to wholesale buyers; and
- Publication in March 2016 of **The Economics of Local Food Systems: A Toolkit to Guide Community Discussions, Assessments and Choices**[23] (referred to as the Toolkit), which was sponsored by AMS to help community stakeholders evaluate the economic impact of investing in local and regional food systems more reliably by introducing them to relevant case studies, best practices, and useful resources. The toolkit was subsequently embraced by thousands of practitioners across the country as a vital resource in guiding their community assessment process. Through the collective efforts of the report's dozen contributing authors, reviewers, and other organizational

[20] https://www.ams.usda.gov/services/local-regional/food-directories
[21] https://www.ams.usda.gov/market-news/local-regional-food
[22] https://www.nass.usda.gov/Surveys/Guide_to_NASS_Surveys/Local_Food/
[23] https://www.ams.usda.gov/publications/content/economics-local-food-systems-toolkit-guide-community-discussions-assessments

partners, more than 20 national and regional training workshops and webinars were offered between 2016 and 2018. Financial support for these resources came primarily from AMS, including several that targeted underserved populations to help local planners, policy-makers, and interested residents better prepare to undertake various aspects of this assessment work in their own communities.

Taking Stock and Spreading the Word, 2017–Present

During the past couple of years, AMS Marketing Services has plunged further into reviewing the current "state of play" in local food research and sharing these observations with senior leadership, industry participants, market observers, and other community stakeholders. Given the massive accumulation of research, data, and performance reports that had occurred since the passage of the 2008 farm bill—including the results of 980 funded grants in the case of the Farmers Market Promotion Program alone—it seemed an appropriate time to assess what lessons had been learned from recent research and technical assistance in the local/regional food sector, examine ongoing barriers to success, and identify which steps should be taken to make our grant, research, and technical assistance programs more effective in reaching desired goals. This body of activity has consisted of three primary components:

- **Publication of formal progress reports and peer-reviewed journal articles,** which included the development and release of the 10-year progress report for the Farmers Market Promotion Program (USDA Agricultural Marketing Services, 2017) and an article by AMS Marketing Service personnel entitled "The Impacts of the Farmers Market and Local Food Promotion Programs" in the journal *Community Development* (O'Hara & Coleman, 2017).
- **Organization of national conferences** to share research results and learnings from project implementation, which included AMS's organization and sponsorship of the Local Food Impact Summit in April 2017 and the National Direct Agricultural Marketing Summit in September 2018. A follow-up summit will take place in Rosemont, Illinois, October 7–9, 2019.
- **Establishment of cooperative research agreements** with land-grant institutions to undertake formal evaluations of AMS grant programs (or subsets of these programs) to:
    - Better understand and categorize the types of outcomes that are being achieved as a result of federal investments;
    - Consider the adequacy and reliability of current metrics and reporting requirements in capturing the full dimension of progress achieved; and
    - Gain greater insights about the types of interventions that seem to lead to the most profitable or beneficial outcomes.

To this end, AMS grant and marketing program managers have established cooperative research agreements with evaluation and subject matter experts at Auburn University, Kansas State University, and Oregon State University within the past couple of years to carry out extensive impact assessments of the agency's competitively awarded grants programs (specifically, the Federal-State Marketing Improvement Program, the Farmers Market and Local Food Promotion Program, and the subset of AMS grants provided to facilitate local and regional meat processing activities).

Other areas of inquiry that are ripe for development—and are beginning to attract the attention of USDA career staff—involve an attempt to streamline and achieve greater alignment in measurements and reporting requirements across multiple grant programs, at least in key areas of overlapping interest. For example, the USDA coordinator for local and regional food issues, housed within AMS, has created a departmentwide working group to examine opportunities for consolidating grant program objectives and data-gathering requirements across program and agency lines. The combination of these activities, which aim to better identify key indicators of impact and design reporting requirements that match the capacity of

grant recipients to provide accurate data to a greater extent, can be expected to:

- **Foster more accurate reporting by project cooperators**, which would yield better data integrity and, over the longer term, more accurate evaluation of program effectiveness;
- **Allow for easier quantification of the aggregate impact of multiple federal grant programs** on core measures of progress; and
- **Help USDA—and interested stakeholders—better understand the levers and influences** that exert the greatest contribution to successful grant outcomes.

What Are We Learning?

One of the major lessons that emerged during recent conference discussions was the realization that emerging analysis of newly available datasets may change our perceptions about the relative economic competitiveness and impact of local/regional food businesses. For example, an analysis of the most recently available Census of Agriculture data by USDA's Economic Research Service indicated that the survival rate for farms participating in direct-to-consumer markets was greater than the survival rate of other farms. Other research studies by land-grant universities, as illustrated on the localfoodeconomics.com website funded by AMS and NIFA and managed by Colorado State University, indicate that suppliers to local/regional food markets may have a disproportionately positive impact on local job creation and economic multiplier effects compared to other food suppliers, based on their relatively high dependence on labor and levels of indirect and induced spending.

Furthermore, we also learned that we need to strengthen and increase the frequency of our communication with community stakeholders by:

- **Promptly sharing data analysis** with survey respondents to lessen survey fatigue and suspicion, develop trust, and ensure that respondents can make practical use of the results;
- **Engaging with community stakeholders about appropriate indicators of success** rather than making assumptions about what these indicators should look like. Following this protocol may require agencies to modify their current metrics; however, this will likely result in greater buy-in and responsiveness among the organizations being asked to report data. For example, in addition to asking how many jobs are created in a particular service area, agencies (based on feedback we received from conference attendees) may also want to ask how much these new employees are being paid; and
- **Striving to understand the community capital formation aspects of local/regional food system development** rather than focusing on financial returns alone. Such measurements could attempt to capture such social, human, and intellectual capital dynamics as workforce preparation, skill development and mastery, attainment of relevant credentials and certifications, changes in awareness and behavior, organizational capacity, and development of supply chain networks. New methods of inquiry, such as social network analysis, can also help us obtain greater clarity on how well we are meeting this goal by giving us tools to measure such progress on a quantitative basis.

Our growing understanding of the important role of community engagement has also led AMS Marketing Services to embrace new opportunities for direct community intervention. With the encouragement of senior leadership, under both the Obama and Trump administrations, AMS Marketing Services was able to increase its financial and technical support of the Local Food, Local Places (LFLP) interagency initiative[24] housed within the U.S. Environmental Protection Agency. Managed by a task force comprising representatives from EPA's Office of Community

[24] https://www.epa.gov/smartgrowth/local-foods-local-places

Revitalization, USDA's Agricultural Marketing Service and Rural Development agencies, the Centers for Disease Control and Prevention, the Delta Regional Authority (DRA) and, as of 2018, the Northern Border Regional Commission, the LFLP initiative supports locally led, community driven efforts to protect air and water quality, preserve open space and farmland, boost economic opportunities for local farmers and businesses, improve access to fresh local food, and promote childhood wellness. This support is provided through competitively awarded technical assistance workshops that take place at a site chosen by the applicant, where federal subject matter experts, community stakeholders and, often, professional facilitators meet for two days to jumpstart the development of a community's local food system action plan. Preliminary and follow-up conference calls with members of the community's core organizing team help ensure that the targeted community is prepared to take full advantage of available technical assistance, both during the intensive on-site workshop and through extended connections with federal service providers. In selecting deserving communities, special consideration is given to lower-capacity communities that are in the early stages of developing local food enterprises.

At the request of senior agency leadership, AMS Marketing Services staff began its involvement with the LFLP task force in the spring of 2015, quickly recognizing that they could make an important contribution to the success of these workshops by offering expertise and insights on farm market operations and practices, food facility design and management, and local food aggregation/supply chain logistics. Since that time, AMS Marketing Services has become a linchpin of the initiative by providing funding to sustain its operation since 2016, helping to organize and participating in the majority of technical assistance workshops offered per year, serving as reviewers of submitted applications, and sharing responsibility for facilitating workshops and delivering presentations alongside EPA personnel and external contractors in locations where their subject matter expertise is most relevant. In fact, the emergent leadership of AMS Marketing Services has enabled EPA to reduce its dependence on professional facilitation, allowing the agency to extend its limited funding resources to a wider range of eligible communities. Between 2015 and 2018, LFLP awarded and implemented 93 workshops, ranging between 16 and 27 per year based on the level of partner agency contributions and opportunities for substituting agency personnel for hired external facilitators.

Parting Thoughts

While the path has not always been straightforward, USDA, and most notably AMS, have unquestionably played a key role in elevating the national discussion about local food systems and accelerating the move toward developing a robust body of related data, research, and practical resources. This has been accomplished through a variety of techniques, such as collecting and reporting data that unveil the structure of the local food system on an increasingly granular level, documenting best practices and business models associated with marketing success, and disseminating lessons learned through a variety of channels (e.g., reports, conferences, webinars, in-person trainings) so that practitioners and market observers can make effective use of the information. To USDA's credit, these initiatives have often included the participation of multiple federal agencies, allowing these initiatives to benefit from a broad array of interdisciplinary perspectives and provide insights designed to meet the specific needs of targeted stakeholder groups. In addition, AMS's support of work that facilitates the adoption of reliable and compatible economic impact assessment methods, such as the Toolkit and the agency's call for papers for the special issue of JAFSCD, have helped build the economic argument for local food investments and made gathering economic evidence more accessible to planners and community stakeholders.

One way of gauging just how far USDA has come in advancing key local food research objectives is by reviewing some of the aspirational goals mentioned by attendees of the first National Farmers Market Summit in 2007 and noting how many of them have been at least partially addressed in the ensuing 10 years with the help of USDA involvement or support. Posted below is the list of "recommended strategies" for research mentioned

by attendees of the 2007 Summit. From this entire list, the goals that have been met or partially fulfilled appear in bold type, with examples of relevant accomplishments in the footnotes. As one can see, the vast majority of desired action steps mentioned in the Summit proceedings report have already been addressed by USDA to some degree:

- **Establishment of an open-source, online site** to share pertinent resources and facilitate more effective communication among farmers market vendors, managers, community development practitioners, researchers, funders, and other stakeholders.[25]
- **Research institutes should play a key role** in setting up accessible, user-friendly online clearinghouses of farmers market data, tools, and best practices, as well as providing farmers market advocates with the kind of information needed to push for policy and regulatory reform.[26]
- **Documenting successful farmers markets**, particularly farmers markets serving low-income areas.[27]
- **Collecting local, regional, and national data on consumer and market trends.**[28]
- Conducting studies of the effectiveness of farmers market advertising and promotion.
- **Adding new direct marketing questions to the USDA NASS Census of Agriculture.**[29]
- **Assessments of the economic impacts of farmers markets** on vendors and community.[30]
- Conducting applied research and developing practical tools, such as business management programs and professional development training programs.
- **Guidance related to infrastructural and operational improvements at farmers markets.**[31]
- **Providing consistent information about the use of new technologies,** such as electronic benefits transfer (EBT), to enhance access to farmers markets (USDA Agricultural Marketing Services, USDA Food and Nutrition Service, & Project for Public Spaces, 2010).
- **Seeking partnerships with nontraditional organizations** who may share mutual areas of interest related to farmers markets, local foods, sustainable agriculture, and community food security, such as the U.S. Environmental Protection Agency, the U.S. Department of Health and Human Services, military branches, the National Science Foundation, and various community-based organizations that may

[25] Such as the AMS-supported, CSU-hosted https://www.localfoodeconomics.com website platform and listserv, and the eXtension interest group Community, Local and Regional Food Systems (https://articles.extension.org/community_and_regional_food_systems).

[26] *Ibid.*

[27] A recent example is the May 2018 AMS cooperative research report with the University of Wisconsin, *Potential Demand for Local Fresh Produce by Mobile Markets.* See https://www.ams.usda.gov/publications/content/potential-demand-local-fresh-produce-mobile-markets

[28] Examples include AMS's periodic national surveys of farmers market managers, the April 2017 cooperative research report *Community Supported Agriculture: New Models for Changing Markets* (see https://www.ams.usda.gov/sites/default/files/media/CSANewModelsforChangingMarketsb.pdf), and a current memorandum of understanding between AMS and NASS to administer a national farmers market manager survey in FY 2019.

[29] Key advances here include a new direct marketing question in the FY 2012 Census form and the publication of the *NASS Local Food Marketing Practices Survey* in December 2016. See https://www.nass.usda.gov/Surveys/Guide_to_NASS_Surveys/Local_Food/

[30] Examples include AMS's analysis of farmers market performance indicators (see the AMS presentation from March 2018 NY Federation of Farmers Markets webinar at http://www.nyfarmersmarket.com/wp-content/uploads/Carlos-and-Debra-NY-FM-Fed-Meeting-2017-keynote-03.14.18-FINAL.pptx) and AMS collaboration on *The Economics of Local Food Systems: A Toolkit to Guide Community Discussions, Assessments and Choices* (released in February 2016; see https://www.ams.usda.gov/publications/content/economics-local-food-systems-toolkit-guide-community-discussions-assessments).

[31] Examples include the February 2015 AMS report *Building a Food Hub from the Ground Up: A Facility Design Case Study of Tuscarora Organic Growers* (see https://www.ams.usda.gov/publications/content/building-food-hub-ground-facility-design-case-study-tuscarora-organic-growers) and an expansion of architectural design services offered by the AMS Marketing Services Division staff architect.

not typically work in the agricultural arena.[32]

- **Better document the economic, social, environmental, and health benefits of farmers markets** through research and analysis.[33]
- **Develop science-based theories, practices, and procedures about farmers markets, derived from empirical observations, tests, experiments, and measurable evidence that:**
  - Convey practical information to vendors and market managers,[34] and
  - Are accessible, user-friendly concepts that can be used to persuade decision-makers about farmers market policies.[35]

Nevertheless, much work remains in plumbing the depths of local food systems analysis, even from the narrow perspective of understanding potential producer benefits from local food market transactions. NASS has only very recently begun to capture and report data at a granular-enough level to allow for a more holistic understanding of the local food supply chain in both direct-to-consumer and intermediated marketing channels, even though the latter currently accounts for a growing (and significant majority) share of local food sales.[36] For example, the release of the 2017 Census of Agriculture in April 2019 marked the first time that a census of agriculture has featured data delineating the value of locally or regionally branded farm products sold for human consumption

[32] Includes USDA's collaboration with the Federal Reserve on *Harvesting Opportunity: The Power of Regional Food System Investments to Transform Communities* (August 2017; see https://www.stlouisfed.org/community-development/publications/harvesting-opportunity) and the November 2015 AMS report on *Farmers Markets at Military Installations,* developed in partnership with the U.S. Department of Defense (see https://www.ams.usda.gov/publications/content/guide-farmers-markets-military-installations).

[33] USDA has carried out quite a bit of work to date on the economic benefit question. Key products include the 2015 NASS Local Food Marketing Practices survey and the 2017 Census of Agriculture, which provide data specific to marketing channels on direct to consumer sales of farm products. Additional examples include AMS's analysis of farmers market performance indicators and economic multipliers mentioned in footnote 30. A memorandum of understanding is also underway between AMS and NASS to support the next national survey of farmers market managers in 2020, which can be expected to yield additional information on market performance and its relationship to specific market practice. On the other benefit questions—social, environmental, health—I would submit that the *assessment* of market benefits by USDA has been less comprehensive, although extensive resources have been devoted to creating information portals and facilitating research on social and environmental barriers to obtaining fresh food, including the use and patronage of farmers markets. These include development of the *ERS Food Access Research Atlas* (see https://www.ers.usda.gov/data-products/food-access-research-atlas/); the *ERS Food Environment Atlas* (see https://www.ers.usda.gov/data-products/food-environment-atlas/); sponsorship by FNS of three national research projects on nutrition assistance at farmers markets (*Understanding Current Operations* [see https://fns-prod.azureedge.net/sites/default/files/FarmersMarketsOps.pdf]; *Understanding Shopping Patterns* (see https://www.fns.usda.gov/snap/nutrition-assistance-farmers-markets-understanding-shopping-patterns-snap-participants), and the *Farmers Market Incentive Provider Study* (see https://fns-prod.azureedge.net/sites/default/files/FarmersMarketIncentiveProvider.pdf); and the administration by FNS of Farmers Market Support Grants (see https://www.fns.usda.gov/pressrelease/2016/fns-001316) and the Gus Schumacher Nutrition Incentive Program (formerly known as the Food Insecurity Nutrition Incentive Program; see https://nifa.usda.gov/sites/default/files/rfa/20190423-fy-2019-gus-schumacher-incentive-program-rfa.pdf).

[34] A preliminary example of such work is the AMS report *Results of Dot Survey, USDA Outdoor Farmers Market Washington, DC,* (September 2011; https://www.ams.usda.gov/publications/content/results-dot-survey-usda-outdoor-farmers-market-washington-dc). Presentations on sharing lessons learned from market data collection efforts made up a significant portion of the training material at the 2018 National Direct Marketing Summit and continue to feature prominently in the latest 2019 round of AMS technical assistance offered by the FMPP/LFPP program to farmers market managers and other farmers market personnel.

[35] While not strictly farmers market–related, the benchmark section of the www.localfoodeconomics.com website, funded by AMS Marketing Services and maintained by Colorado State University, provides an early window into understanding the differences between local food farms and other farms in terms of structure and economic impact.

[36] According to the 2017 Census of Agriculture, sales of locally branded or marketed food through wholesale or intermediated channels in 2017 exceeded US$9 billion, compared to less than US$3 billion in local food sold through direct to consumer channels. The 2015 NASS Local Food Marketing Practices survey (https://www.nass.usda.gov/Surveys/Guide_to_NASS_Surveys/Local_Food/index.php) represented the first-ever survey conducted by USDA's National Agricultural Statistics Service to produce benchmark data about local food marketing practices delineated by marketing channel (e.g., farmers markets, CSAs, restaurants, roadside stands, food hubs).

through wholesale or intermediated marketing channels.[37] It was also the first census of agriculture to incorporate value-added products into the total sales volume of locally or regionally marketed food. This means that, although it likely provides a more accurate measure of local food sales volumes on a national level than we have seen to date, it still remains imperfect, as non-edible farm products commonly sold at farmers markets and roadside stands, such as ornamental crops, are still excluded from the measure. So even from the basic level of sector trend and impact analysis alone, there seems to remain considerable room for improvement and additional refinement.

The other area of food systems that merits further analysis is the rapid evolution of delivery and distribution system for local food. With the growing popularity of hybrid business models that transcend traditional local food system silos (e.g., subscription agriculture or CSA models that use farmers markets as recruitment and delivery points), it becomes even more imperative that future research activities capture data elements that allow research to understand the potential implications of such future shifts and synergies in market practice on firm and producer profitability to a greater degree. As members of Millennial and Generation Z come of age and increase their relative purchasing power, undoubtedly they will exert even greater influence on local food demand than they already presently do. This suggests that the time may be ripe for conducting more comprehensive analyses that seek to connect generational behavior patterns (e.g., time devoted to cooking at home, desire for convenience, interest in nutrition and product transparency, perceived value) to local food purchasing habits and store format choices. Lastly, the "last mile" distribution question remains a difficult nut to crack, resulting, as we have seen, in the consolidation, acquisition, and, occasionally, closing of various firms that have attempted to provide home delivery of local foods.[38] It may be time for a fresh look at how local food hubs might be able to better leverage their transportation and distribution functions in partnership with other hubs or in partnership with traditional wholesale operators and distributors.

My Personal Postscript, Or Life Beyond the USDA Gates

Before leaving the USDA at the end of January 2019, I was frankly too busy to think much about my potential future contributions to the local food sector, even though one of my motivations for leaving was the hope that it would free me up to become more involved in community development activities. However, over the past few years, largely as a result of working on the economic impact assessment Toolkit on local food systems and the LFLP initiative, I found myself gravitating toward work that involved a community development dimension, where I could share my knowledge of local food market business models and federal programs with a grassroots audience in order to help them achieve their desired development goals.

In partial preparation for my eventual retirement from USDA, I pursued an open position on my local (Montgomery County, Maryland) food policy council three years ago, and while my application did not lead to my appointment on the council, I ended up being invited to join the its food economy working group, which has proven to be an excellent fit for my knowledge and talents. Very recently I was nominated by the county office of agriculture and appointed by the Montgomery County Council to serve a limited-term appointment as a nonfarmer representative on the county's agricultural advisory committee, which serves as a liaison between county government and the agricultural sector, coordinates the provision of local government services in rural areas of the county, and provides input and recommendations on rural

[37] The 2015 Local Food Marketing Practices Survey, published in December 2016, used a somewhat similar framework for capturing and presenting data based on a nationally representative sample of approximately 44,000 respondents.

[38] Examples include the merger and eventual closure of Relay Foods and Door to Door Organics (see https://www.dailyprogress.com/news/local/door-to-door-organics-closes-a-year-after-acquiring-relay/article_ba90b4de-ce46-11e7-b337-f328459d1fb0.html), and the consolidation of Good Eggs (see https://www.fastcompany.com/40554143/how-good-eggs-came-back-from-the-brink-and-plans-take-on-amazon).

and agricultural issues.

To my surprise and delight, I have received great encouragement from many corners of the local food world since announcing my retirement at the end of January 2019, renewing my connections with old friends and colleagues and making new friends along the way. In this vein, I need to give special recognition to Rose Hayden-Smith and Angie Tagtow, who very generously invited me (at a reduced registration rate) to attend the November 2018 meeting of the Kellogg Foundation Leadership Alliance, where I found great fellowship, encouragement for following my career instincts, and guidance on next step strategies. I was also fortunate enough to receive an invitation to keynote the Northeast Indiana Local Food Network's annual forum in Ft. Wayne, Indiana, in March 2019, thanks to an endorsement by local community advocate (and former National Sustainable Agriculture Coalition grassroots intern) Stephanie Henry and with support from Northeast Indiana Local Food Network Executive Director Janet Katz.

Through the networking opportunities offered by the forum and other local food–related gatherings in the D.C. area, I have continued to provide technical guidance to a wide variety of local food system stakeholders on issues ranging from food hub logistics and the federal grant application process to the economic and food system contributions of urban agriculture. I am particularly proud of the fact that I am involved in two activities that seek to boost food system resilience through regional approaches. These include being part of a task force working to enhance the visibility and capacity of the Midwest Sustainable Agriculture Working Group (Midwest SAWG),[39] so that it can assume a role similar to those currently occupied by the Southern and Northeast SAWGs. I am an invited contributor to the food distribution section of a planned update of Northeast SAWG's *It Takes a Region* report.[40] Meanwhile, with the encouragement of NSAC's Wes King and Juli Obudzinski, I submitted an application in March to be considered for an appointment to the NASS Advisory Committee on Agriculture Statistics, so time will tell whether I will have the chance to exert any future influence on national policy as well. Given the relatively short amount of time I've been "retired," my thoughts about where best to focus my attention continue to evolve, but I firmly believe that I will continue to be a presence in the local food scene for some time to come, even if it's in a somewhat different capacity.

References

Diamond, A., & Soto, R. (2009). *Facts on Direct-to-consumer Food Marketing: Incorporating Data from the 2007 Census of Agriculture*. Washington, D.C.: U.S. Department of Agriculture, Agricultural Marketing Service. https://doi.org/10.9752/MS035.05-2009

Gould, D. (2016, August 07). CNN & Foursquare collaborate to promote healthy eating. Retrieved from https://foodtechconnect.com/2010/09/29/cnn-foursquare-collaborate-to-promote-healthy-eating/

O'Hara, J. K., & Coleman, C. (2017). The Impacts of the Farmers Market and Local Food Promotion programs. *Community Development*, *48*(5), 681–696. https://doi.org/10.1080/15575330.2017.1350729

Organic Trade Association & GRO Organic Core Committee. (2015). *R&P Program Application Industry Overview* [Application to USDA AMS Research and Promotion Program]. Retrieved from https://www.ams.usda.gov/sites/default/files/media/OTAOrganicCheckoffApplicationUSDA_Combined.pdf

Payne, T. (2002). U.S. farmers' markets 2000: A study of emerging trends. *Journal of Food Distribution Research, 33*(1), 173–175. Retrieved from https://ageconsearch.umn.edu/record/27625/files/33010173.pdf

Pirog, R. S., Van Pelt, T., Enshayan, K., & Cook, E. (2001). Food, fuel, and freeways: An Iowa Perspective on how Far Food Travels, Fuel Usage, and Greenhouse Gas Emissions. Ames, Iowa: Leopold Center for Sustainable Agriculture. Retrieved from https://lib.dr.iastate.edu/leopold_pubspapers/3

[39] https://www.midwestsawg.com/

[40] https://api.ning.com/files/nRTEesYytUshUdiU-IEPLW6lFFE3Zgcz44LFacsKlo5K6P0X43KSuSZOkwFHiTQF6a0t5O9mAXuWNb0HbP7GZjgKVUkE7gVY/NESAWGRegionalFoodSystemFINALSept2010.pdf

Ragland, E., & Tropp, D. (2009, May). *USDA national farmers market manager survey, 2006*. Washington, D.C.: U.S. Department of Agriculture. https://doi.org/10.9752/MS037.05-2009

Robyn Van En Center Staff. (2009, April 16). 2007 Census of Agriculture Results. Retrieved from https://csacenter.blogspot.com/2009/04/2007-census-of-agriculture-results.html

Siebert, J. W., Nayga, R. M., & Thelen, G. C. (2000, March). Enhancing the financial and marketing performance of firms in the smoked and processed meat industry. *Journal of Food Distribution Research,* 31(1), 1-6.

Sinai, N., & Van Dyck, H. (2013, May 23). *Agency spotlight: Making mobile government a reality* [Blog post]. Retrieved from the archive site of the Obama Administration White House: https://obamawhitehouse.archives.gov/blog/2013/05/23/agency-spotlight-making-mobile-government-reality

Stanziani, P. (2013, May 15). USDA announces new API for the National Farmers Market Directory. Retrieved from https://www.ams.usda.gov/press-release/usda-announces-new-api-national-farmers-market-directory

Tropp, D., & Barham, J. (2008, March). *National Farmers Market summit proceedings report*. Washington, D.C.: U.S. Department of Agriculture, Agricultural Marketing Service. https://doi.org/10.9752/MS030.03-2008

Tropp, D., & Olowolayemo, S. (2000, December). *How Local Farmers and School Food Service Buyers Are Building Alliances: Lessons Learned from the USDA Small Farm/School Meals Workshop, May 1, 2000*. Retrieved from the U.S. Department of Agriculture, National Agricultural Library website: https://naldc.nal.usda.gov/download/38355/PDF

Tropp, D., Siebert J. W., Nayga R. M., Thelen, G., & Kim, S. Y. (2004, March). *Enhancing Commercial Food Service Sales by Small Meat Processing Firms*. Retrieved from the U.S. Department of Agriculture, Agricultural Marketing Service website: https://naldc.nal.usda.gov/download/38382/PDF

U.S. Department of Agriculture, Agricultural Marketing Service [USDA AMS]. (2017, January). *Farmers Market Promotion Program: 2016 report*. Retrieved from https://www.ams.usda.gov/sites/default/files/media/FMPP2016Report.pdf

USDA AMS, Marketing Services Division. (n.d.). *National count of farmers market directory listings, 1994–2019* [Chart]. https://www.ams.usda.gov/services/local-regional/farmers-markets-and-direct-consumer-marketing

USDA AMS, USDA Food and Nutrition Service, & Project for Public Spaces, Inc. (2010, June). *Supplemental Nutrition Assistance Program (SNAP) at Farmers Markets: A How-to Handbook*. Retrieved from https://www.mass.gov/files/documents/2016/08/vh/usda-howto-fm-ebt.pdf

USDA, National Agricultural Statistics Services [USDA NASS]. (2007, November). *2007 Census of Agriculture report form guide*. Retrieved from https://www.nass.usda.gov/AgCensus/Report_Form_and_Instructions/2007_Report_Form/2007_RFG.pdf

USDA Office of Communications. (n.d.). *Factsheet: The four pillars of agriculture and rural economic development* [Press release]. Retrieved from https://www.usda.gov/media/press-releases/2015/05/20/may-20-2015-secretary-vilsack-spoke-delegations-34-countries-part

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COMMENTARY

Where have all the direct-marketing farms gone? Patterns revealed from the 2017 Census of Agriculture

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Abstract

Food system researchers and practitioners have used the U.S. Census of Agriculture historically as a bellwether to measure changes in the direct-marketing sector. The U.S. Department of Agriculture has made considerable improvements in measuring this sector in recent years, which formed the basis for the phrasing of the 2017 Census of Agriculture direct-marketing questions. While the new questions make it challenging to infer direct-marketing trends between 2012 and 2017, the 2017 Census of Agriculture data nonetheless reveals a considerable decline in the number of farms selling directly to consumers and wholesalers in the U.S. We discuss possible explanations for this decline and implications for the direct-marketing sector.

Keywords

Local Foods, Census of Agriculture, Direct-to-Consumer Agricultural Sales

Introduction

A principle use of U.S. Census of Agriculture data is to ascertain farm-sector trends. The 2017 Census of Agriculture provides greater insight into direct marketing than historical estimates and reflects improvements that the U.S. Department of Agriculture (USDA) has made in measuring the sector. Hereafter, we refer to "direct-marketing" activity generically to include "direct-to-consumer" transactions (e.g., farm sales at farmers markets) and "direct wholesale" transactions (e.g., farm sales to restaurants). Measuring changes in market conditions over time is valuable for several reasons, since

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it can inform where policy support may have been most impactful and emerging market opportunities for farms. However, the change in direct-marketing questions between the 2012 and 2017 surveys makes it impossible to compare trends in market sales. Despite these changes, examining trends in the number of farms doing direct marketing is still possible. In this commentary, we demonstrate that the 2017 Census of Agriculture reveals a considerable decline in the number of farms selling directly to consumers and wholesalers in the U.S. relative to 2012. We discuss where these changes are most pronounced, as well as possible reasons for and implications of these trends.

Census of Agriculture and Direct Marketing: Methodological Issues

Census of Agriculture: 1978–2012

The Census of Agriculture is administered by the USDA every five years. The objective of the Census of Agriculture is to survey all places in which US$1,000 worth of agricultural products were potentially produced and sold. In 2017, USDA estimated that there were about three million potential farms. Of these, 72% completed the census forms. Thus, the Census of Agriculture provides unique insights into the U.S. farm economy that are not available through other sources.

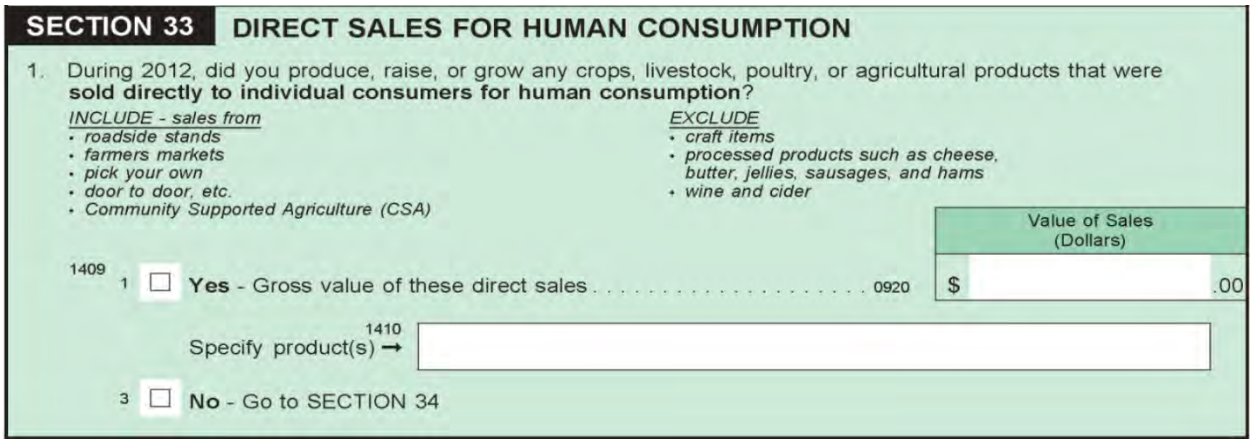
Beginning with the 1978 Census of Agriculture, farms were instructed to report sales of edible products at direct-to-consumer (DTC) agricultural outlets (Figure 1). DTC sales are those occurring via roadside stands; farmers markets; community supported agriculture (CSA) programs; on-farm stores; and, in more recent years, online marketplaces. Farms were instructed to report only direct sales of unprocessed farm products like fresh fruit, fresh vegetables, milk, and eggs. They were instructed to exclude sales of non-edible products (like craft items), resold products, farm products produced off-farm, and sales of value-added products that were processed on-farm. This phrasing implies that sales of, for instance, meat, cider, wine, cheese, butter, jelly, jam, and salsa were not to be reported in the DTC sales estimate. This was the only direct-marketing sales question included in the Census of Agriculture through 2012.

Evidence collected from other USDA surveys suggested that direct-marketing sales were occurring predominately via direct wholesale market channels (Low et al., 2015; Low & Vogel, 2011). To generate more information about the use of direct wholesale channels, a yes/no question was added to the 2012 Census of Agriculture that asked farms if they marketed products directly to retailers that in turn sell directly to consumers.

Local Food Marketing Practices Survey: 2015

USDA administered the first-ever Local Food Marketing Practices Survey (LFMPS) in 2016 (to collect 2015 data) to solicit detailed information about market channels used by direct-marketing farmers (USDA NASS, 2019a). The LFMPS was the first USDA survey to collect sales data of value-added agricultural products that were

Figure 1. 2012 Census of Agriculture Questions


SECTION 33 DIRECT SALES FOR HUMAN CONSUMPTION

1. During 2012, did you produce, raise, or grow any crops, livestock, poultry, or agricultural products that were **sold directly to individual consumers for human consumption?**

INCLUDE - sales from
- roadside stands
- farmers markets
- pick your own
- door to door, etc.
- Community Supported Agriculture (CSA)

EXCLUDE
- craft items
- processed products such as cheese, butter, jellies, sausages, and hams
- wine and cider

Value of Sales (Dollars)

1409 1 ☐ **Yes** - Gross value of these direct sales . . . . . 0920 $ .00

Specify product(s) → 1410

3 ☐ **No** - Go to SECTION 34

processed on-farm and direct sales by farms to retail establishments, institutions, and other local intermediary businesses like food hubs. Even though the LFMPS contains the phrase "local" in the title, there are no geographic restrictions on sales. In particular, the DTC sales estimate includes online sales by farmers, which conceivably can occur across any distance.

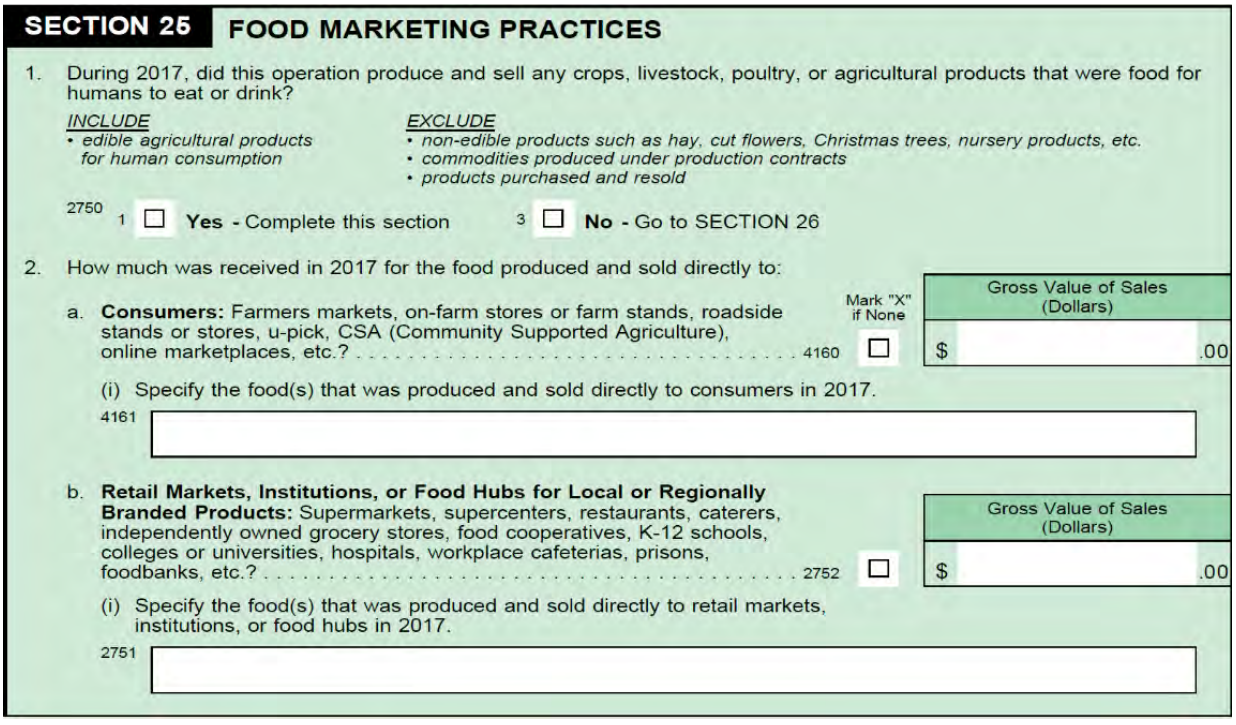
We compare the methodologies between Census of Agriculture and LFMPS, since the Census of Agriculture's direct-marketing questions were changed between 2012 and 2017 based on the LFMPS's design. However, comparing data between the Census of Agriculture and LFMPS must be undertaken cautiously due to the different ways they were administered. While the former is a census of all known farms, the latter is a sample of direct-marketing farms. USDA used responses from approximately 5,700 farms to generate aggregate LFMPS 2015 sales estimates (O'Hara & Lin, 2019). Since this was the first time USDA administered the LFMPS, the list of potential respondents may have been incomplete. While Census of Agriculture data is publicly available at the county level, USDA only released state-level estimates from the LFMPS for 30 states; it did not disclose data at the county level due to both a lack of data and privacy concerns.

Census of Agriculture: 2017

Questions in the 2017 Census of Agriculture regarding direct marketing were designed to mimic the more comprehensive questions in the LFMPS. This rephrasing of the pre-existing questions restricts the ability of stakeholders to evaluate trends in direct-marketing activity between 2012 and 2017. However, the 2017 data represents a far more comprehensive estimate of the sector. While the new questions introduce a one-time transition that complicates the ability to infer trends between 2017 and previous years, these changes will provide more information and likely improve the capability of stakeholders to analyze direct-marketing trends in future years.

The 2017 DTC sales question was reworded so that farms reported the aggregated sales of both unprocessed farm products (such as fresh fruits and vegetables) and value-added products processed on-farm (such as cider and jelly) (see Figure 2). This means that the DTC sales estimates

Figure 2. 2017 Census of Agriculture Questions



SECTION 25 FOOD MARKETING PRACTICES

1. During 2017, did this operation produce and sell any crops, livestock, poultry, or agricultural products that were food for humans to eat or drink?

INCLUDE
- *edible agricultural products for human consumption*

EXCLUDE
- *non-edible products such as hay, cut flowers, Christmas trees, nursery products, etc.*
- *commodities produced under production contracts*
- *products purchased and resold*

2750 1 ☐ **Yes** - Complete this section 3 ☐ **No** - Go to SECTION 26

2. How much was received in 2017 for the food produced and sold directly to:

a. **Consumers:** Farmers markets, on-farm stores or farm stands, roadside stands or stores, u-pick, CSA (Community Supported Agriculture), online marketplaces, etc.? . . . 4160 ☐ Mark "X" if None — Gross Value of Sales (Dollars) $ .00

(i) Specify the food(s) that was produced and sold directly to consumers in 2017.
4161

b. **Retail Markets, Institutions, or Food Hubs for Local or Regionally Branded Products:** Supermarkets, supercenters, restaurants, caterers, independently owned grocery stores, food cooperatives, K-12 schools, colleges or universities, hospitals, workplace cafeterias, prisons, foodbanks, etc.? . . . 2752 ☐ Gross Value of Sales (Dollars) $ .00

(i) Specify the food(s) that was produced and sold directly to retail markets, institutions, or food hubs in 2017.
2751

Table 1. Summary Table of Direct-marketing Questions in the Census of Agriculture in 2012 and 2017

Market Channel		2012	2017
Consumers	Market channel examples provided	Roadside stands, farmers markets, pick your own, door-to-door, CSA	Roadside stands or stores, farmers markets, on-farm stores or farm stands, CSA, online marketplaces
	Report gross value of sales	Yes	Yes
	Include On-Farm Processed Products	No	Yes
Direct Wholesale	Definition	Market products directly to retail outlets that in turn sell directly to consumers	Sales to retail markets, institutions, or food hubs for local or regionally branded products
	Market channel examples provided	Restaurants, grocery stores, schools, hospitals, or other businesses	Supermarkets, supercenters, restaurants, caterers, independently owned grocery stores, food cooperatives, K-12 schools, colleges or universities, hospitals, work-place cafeterias, prisons, foodbanks
	Report gross value of sales	No	Yes
	Include on-farm processed products	N.A.	Yes

Note: Farmers are instructed to only report sales of edible agricultural products produced on-farm.
This excludes non-edible products, products bought and resold, and products not grown/raised on operation.

in the 2017 Census of Agriculture are not comparable to DTC sales data from previous versions of the Census of Agriculture. Also, a new question was inserted into the 2017 Census of Agriculture asking farms to report sales they made to retail markets, institutions, or food hubs of locally or regionally branded products. (The question did not define what constituted a "branded" product.)

Despite these changes to the questions regarding sales, trends between 2012 and 2017 in the number of direct-marketing farms can be still inferred because the count for both DTC farms and direct wholesale farms in the 2017 Census of Agriculture is more expansive. First, DTC farms that undertook value-added production exclusively and did not make any sales of unprocessed farm products would not have been counted in the 2012 Census of Agriculture, but they would be counted in 2017. Second, in 2012, the phrasing of the direct wholesale question suggests that sales through locally oriented distributors, like food hubs, should not be included. This is because consumers are unlikely to make purchases directly from food hubs. In 2017, direct wholesale farms were asked to include food hub sales provided that the product was locally or regionally branded. We summarize these changes in the Table 1.

If there were a greater number of direct-marketing farms in 2017 than in 2012, then it would be unclear if the change was attributable to changes in the phrasing of the question or overall sector trends. However, if there were fewer direct-marketing farms in 2017 than in 2012, we could conclude a decline had occurred because the phrasing of questions was less restrictive in 2017.

Direct-marketing Farm Trends

We show in Table 2 that DTC sales of unprocessed products approximately doubled in the U.S. between 1992 and 2007 from US$706 million to US$1.4 billion (in 2017 U.S. dollars). Similarly, the number of DTC farms rose by over 50 percent between 1992 and 2007 (from 86,432 to 136,817). DTC sales plateaued between 2007 and 2012. The 2015 LFMPS revealed that value-added products accounted for 47% of total DTC sales. Aggregate DTC sales appear to have declined by 10% between 2015 (US$3.1 billion) and 2017 (US$2.8 billion), although this interpretation is subject to the caveat we mentioned earlier regarding comparing LFMPS and Census of Agriculture data.

Table 2. Direct-to-Consumer (DTC) Farms and Sales for Commodities and Value-added Products, 1992–2017

		DTC Farms			DTC Sales (billion 2017 USD)		
Year	Survey	Unprocessed Products	Processed Products	Processed and Unprocessed	Unprocessed Products	Processed Products	Processed and Unprocessed
1992	Ag. Census	86,432			$0.7		
1997	Ag. Census	93,140			$0.9		
2002	Ag. Census	116,733			$1.1		
2007	Ag. Census	136,817			$1.4		
2012	Ag. Census	144,530			$1.4		
2015	LFMPS	58,560	74,738	114,801	$1.7	$1.5	$3.1
2017	Ag. Census			130,056			$2.8

The number of DTC farms decreased from 144,530 in 2012 to 130,056 in 2017, even though the 2017 estimate includes farms exclusively selling value-added products. This suggests that the decline in DTC farms during this period was at least 10%. In Table 3, we present state-level results for 20 states with the greatest number of DTC farms in 2017. There was a decline of at least 3,000 DTC farms in the West Coast states of California, Oregon, and Washington. There was likewise a decline of at least 1,800 DTC farms in the mid-Atlantic states of New York and Pennsylvania. The combination of these states represents two of the most prominent regions of the country for DTC marketing (Low et al., 2015). Only four of the 20 states that had the greatest number of DTC farms in 2012 did not experience an unambiguous decline in DTC farms between 2012 and 2017. Three of these states are in a contiguous region of the Southeast (Kentucky, Virginia, and Tennessee).

Table 3. Change in Number of Direct-to-Consumer (DTC) Farms, 2012 to 2017, for the 20 States with the Highest Number of DTC Farms in 2012

State	2012	2017	Change	% Change	2012 Rank
Texas	7,954	7,667	–287	–4%	2
California	8,588	7,623	–965	–11%	1
Pennsylvania	7,577	6,403	–1,174	–15%	3
Ohio	6,612	6,130	–482	–7%	5
Oregon	6,680	5,720	–960	–14%	4
New York	6,342	5,697	–645	–10%	6
Michigan	6,243	5,669	–574	–9%	7
Wisconsin	5,848	5,088	–760	–13%	8
Washington	5,640	4,503	–1,137	–20%	9
North Carolina	4,475	4,058	–417	–9%	10
Kentucky	3,438	3,782	344	10%	17
Tennessee	3,679	3,773	94	3%	13
Missouri	4,096	3,640	–456	–11%	12
Virginia	3,581	3,586	5	0%	15
Minnesota	4,213	3,533	–680	–16%	11
Florida	3,480	3,440	–40	–1%	16
Indiana	3,673	3,235	–438	–12%	14
Colorado	2,896	2,987	91	3%	20
Illinois	2,981	2,628	–353	–12%	18
Iowa	2,964	2,575	–389	–13%	19
Total	144,530	130,056	–14,474	–10%	

Question phrasing varied between 2012 and 2017.

Each state has a statistically significant difference at the 0.01 level except Virginia.

The reduction in direct wholesale farms from 49,043 in 2012 to 28,958 in 2017 was more pronounced than the decline in DTC farms (Table 4). Since the 2017 question was broader, this represents a decline of at least 41%. The decline of at least 81% in Texas is particularly pronounced, since in 2012 the state had the second-highest number of direct wholesale farms in the

U.S. Of the 20 states in the U.S. with the most direct wholesale farms, only two (California and Florida) may have experienced declines of less than 20%.

In Figure 3, we show that the proportion of smaller-sized farms engaged in DTC marketing was greater in 2017 than in 2012. In 2017, 30% of DTC farms had a size of fewer than 10 acres (4 hectares). In 2012, 23% of DTC farms were this small. Similarly, there was a greater number of smaller-sized DTC farms in 2017 than in 2012. This figure suggests that the decline in DTC farms during this period was driven by a reduction in larger farms.

Table 4. Change in Number of Direct Wholesale Farms, 2012 to 2017, for the 20 States with the Highest Number of Direct Wholesale Farms in 2012

State	2012	2017	Change	% Change	2012 Rank
California	4,432	4,301	−131	−3%	1
New York	2,533	1,587	−946	−37%	3
Pennsylvania	2,379	1,443	−936	−39%	4
Wisconsin	1,719	1,153	−566	−33%	9
Washington	1,654	1,142	−512	−31%	10
Oregon	1,898	1,040	−858	−45%	6
Michigan	1,637	1,029	−608	−37%	11
Florida	1,187	982	−205	−17%	14
Ohio	1,802	962	−840	−47%	7
North Carolina	2,201	925	−1,276	−58%	5
Hawaii	1,260	878	−382	−30%	13
Virginia	1,769	828	−941	−53%	8
Maine	1,074	795	−279	−26%	17
Vermont	1,174	737	−437	−37%	15
Missouri	923	699	−224	−24%	21
Minnesota	974	637	−337	−35%	20
Kentucky	1,341	615	−726	−54%	12
Texas	2,927	569	−2,358	−81%	2
Massachusetts	1,035	567	−468	−45%	18
Iowa	914	558	−356	−39%	22
Total	49,043	28,958	−20,085	−41%	

Question phrasing varied between 2012 and 2017.

Each state has a statistically significant difference at the 0.01 level.

While it is possible that some larger DTC farms decided to make direct-marketing sales exclusively through direct wholesale channels, the corresponding decline in direct wholesale farms indicates that in the aggregate this is unlikely to be the sole explanation. Crop prices were relatively lower in 2017 than in 2012, and as a result, it would not necessarily have been advantageous for direct-marketing farms to have begun producing commodity crops like corn and soybeans during this period (USDA NASS, 2019b). We cannot compare changes in the size distribution of direct wholesale farms between 2012 and 2017 because this information was not reported in the 2012 Census of Agriculture.

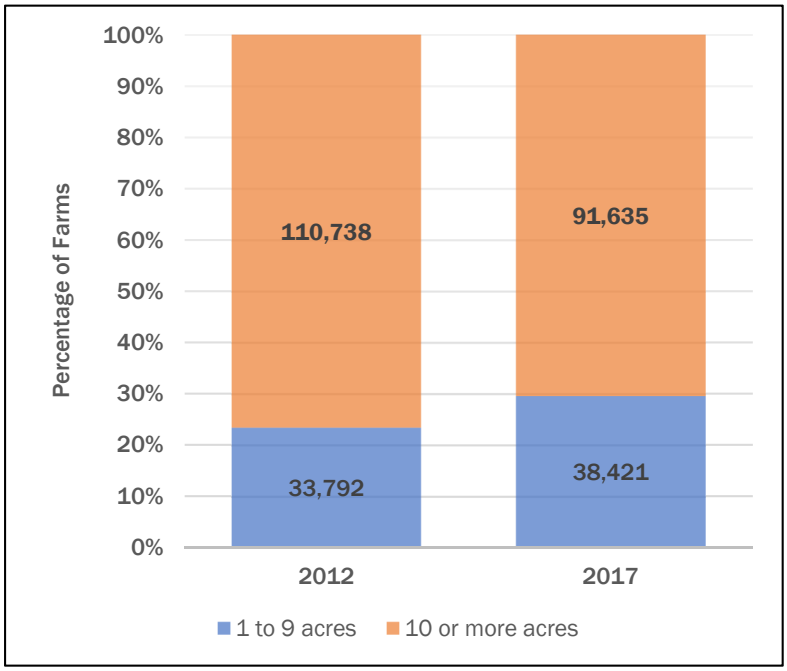
Discussion and Conclusions

Data from the Census of Agriculture reveals there was an unambiguous decline in the number of direct-marketing farms between 2012 and 2017. Since the phrasing of the questions in the Census of Agriculture was broader in 2017 than in 2012, only a lower limit on the decline between 2012 and 2017 is known. The different questions further imply it is challenging to investigate the causes of the decline with the data. One factor that could have contributed to a national-level decline in direct-marketing farms is an increase in online shopping. If online purchases had an adverse impact on brick-and-mortar retailers, retailers may have been less inclined to have made purchases from nearby farms, which in turn could decrease the number of direct wholesale farms. Online purchasing could similarly have adversely affected DTC producers. Since direct marketing is particularly advantageous to farms near cities (e.g., O'Hara & Lin, 2019), development pressures associated with urban expansion like sprawl or increased land prices could have been disadvantageous to direct-marketing farms in urban areas.

Practitioners and researchers with highly informed views of their own direct market conditions may be able to undertake more in-depth

Figure 3. Comparison in the Size of Farms Selling Direct to Consumer (DTC) in 2012 and 2017 Censuses of Agriculture

The number of DTC farms in each category appears on each section of the chart.



Source: U.S. Department of Agriculture, National Agricultural Statistics Service, 2019c.
Note: 1 acre=0.4 hectare

studies that can identify causes behind this trend. Additionally, organizations administering technical assistance programs geared toward direct-marketing farmers may want to examine their activities to see which ones are most effective at mitigating this decline in the number of farms doing direct marketing.

References

Low, S. A., Adalja, A., Beaulieu, E., Key, N., Martinez, S., Melton, A., . . . Jablonski, B. B. R. (2015). *Trends in U.S. local and regional food systems: A report to Congress* (Administrative Publication No. AP-068). Washington, D.C.: U.S. Department of Agriculture, Economic Research Service. Retrieved from https://www.ers.usda.gov/publications/pub-details/?pubid=42807

Low, S. A., & Vogel, S. (2011). *Direct and intermediated marketing of local foods in the United States* (Economic Research Report No. 128). Washington, D.C.: U.S. Department of Agriculture, Economic Research Service. Retrieved from https://www.ers.usda.gov/webdocs/publications/44924/8276_err128_2_.pdf

O'Hara, J. K., & Lin, J. (2019). Population density and local food market channels. *Applied Economic Perspectives and Policy,* ppy040. https://doi.org/10.1093/aepp/ppy040

U.S. Department of Agriculture, National Agricultural Statistics Service (USDA NASS). (2019a). Local food marketing practices survey. Retrieved May 9, 2019, from https://www.nass.usda.gov/Publications/AgCensus/2012/Online_Resources/Local_Food/index.php

USDA NASS. (2019b). Prices paid and received: Crop farm index by month, US [Chart]. Retrieved May 14, 2019, from https://www.nass.usda.gov/Charts_and_Maps/Agricultural_Prices/cropfarm.php

USDA NASS. (2019c). Census of Agriculture. Retrieved August 19, 2019, from https://www.nass.usda.gov/AgCensus/

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Community-based food waste modeling and planning framework for urban regions

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Abstract

Food waste management (FWM) is a growing challenge in urban regions. Despite increasing concerns about the ensuing environmental pressure, economic inefficiency, and social disparity, quantitative studies of FWM are still limited. This study proposes a scalable model of food waste generation and community-based planning framework that aims to provide data references and policy strategies that help transform urban challenges of FWM into opportunities. In contrast to the existing tools and programs that only focus on large generators (e.g., supermarkets), this study proposes an inclusive approach that also includes small generators (e.g., convenience stores and restaurants) and pairs food waste generators with local users for food reuse and recovery. The generic model was implemented in a case study in Chicago, where residents were found to generate nearly twice as much food waste as businesses on an annual basis. The Chicago case study also demonstrates the spatial mismatch between food waste generators and potential users, suggesting the need of system-wide coordination and planning as well as the inventory modeling at the community level.

Keywords

Food Waste; Material Flow Analysis; Sustainable Communities; Urban Sustainability; Waste Management

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Note

One tonne is equivalent to 1,000 kilograms, or 1.102 short tons (as commonly used in the U.S.).

Introduction

Urban food system planning has drawn increasing attention from researchers, policy-makers, and the public. One in seven people in the U.S., or about 42 million Americans, are food insecure (Feeding America, 2017). Meanwhile, 47.5 million tonnes of food, most of which are actually edible, are discarded each year and end up in landfills (Hoover, 2017; U.S. EPA, 2016a). Only 5% of discarded food is composted and just 1% is reused for human consumption (U.S. EPA, 2016a, 2016b). Disposing food discards in landfills not only constitutes an environmental burden, but also limits the recycling of nutrients, such as phosphorous, which is essential for food production and human growth but only exists in finite amounts on Earth (Abdulla, Martin, Gooch, & Jovel, 2016; Baccini & Brunner, 2012; Cordell, Drangert, & White, 2009; Elser & Bennett, 2011).

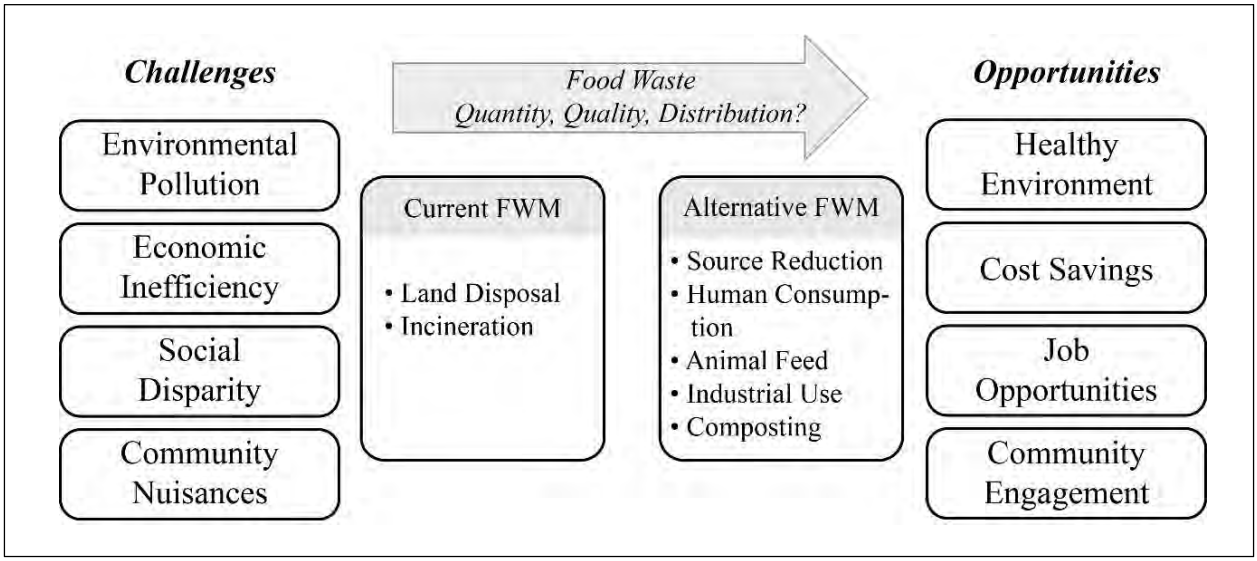
The hierarchy of food waste management (FWM) suggests that priority should be given to waste management options with higher-end values in the order of source reduction, human consumption, animal feed, industrial uses, and composting (U.S. EPA, 2012b). Preferable end products can include recovered food for human use, animal feed, soil amendments from composting, and biofuel from anaerobic digestion (Girotto, Alibardi, & Cossu, 2015; Levkoe & Wakefield, 2011; Thyberg & Tonjes, 2016; U.S. EPA, 2012a). Landfilling is the least preferable solution and yet the most commonly employed (U.S. EPA, 2012b).

Existing practices of FWM clearly contribute to economic inefficiency, environmental pressure, and social disparity along the food value chain (Miller et al., 2016). From the perspective of policy making and infrastructure planning, sustainable FWM faces several major barriers. Essentially, uncertainties in food discard volume and quality, in addition to compliance with perceived food safety and public health regulations, contribute to the high cost of planning, handling, and recovery. In addition, emerging FWM regulations and tools have only focused on large generators, such as manufacturers and wholesalers. Small-scale generators (e.g., residents and restaurants), while making up 84% of total food waste disposal in the U.S. (Business for Social Responsibility [BSR], 2013), are largely unregulated.

Another important gap is the connections between food waste generation and food scrap uses. Composting is often the sole focus of existing food waste diversion programs, but in many cases zoning restrictions and inadequate infrastructure do not support composting activities. Therefore, food waste is co-mingled with other types of municipal solid waste (MSW) and sent to large, remote disposal facilities. As for the strategy of recovering food for the highest potential (i.e., human consumption), a growing number of companies and organizations, such as Feeding America, Spoiler Alert, Zero Percent, Copia (formerly Feeding Forward), Community Plates, and Food Cowboy, have launched programs and technology platforms over the past few years that connect the sellers or donors of surplus food with local partners and food banks. However, the scale of these program remains small; further, citywide or centralized systems that match the excess food with potential uses are lacking. Given the uncertainties about the volume of surplus food at individual locations, decentralized operations present challenges for inefficiencies in collection, drop-off, delivery trips, and, potentially, the reliability and long-term viability of program implementation.

Such challenges in urban areas can be particularly significant given the high density of urban development and large volume of food generation. What is underappreciated, however, is the advantages of density and diversity in urban regions that may help transform these challenges into opportunities in terms of FWM (Figure 1). For example, the prospect of economies of scale in food scrap collection can lead to cost savings. Additionally, urban areas with extensive and diverse businesses (e.g., restaurants, shops, medical centers, and universities) have significant opportunities for alternative FWM strategies (Brinkley, Birch, & Keating, 2016; Evans-Cowley & Arroyo-Rodríguez, 2016; Schupp, Getts, & Otten, 2018). Recovering, recirculating, and reusing waste discards can create new job opportunities and foster community

Figure 1. Challenges and Opportunities of Food Waste Management (FWM)



engagement while achieving environmental benefits (Ai & Leigh, 2017).

Our study directly addresses the unique challenges and opportunities of urban FWM by focusing on four research objectives. First, we aim to develop a generic FWM model that can be adapted to various regions by incorporating community-specific characteristics, such as mixed types of waste generators, demographics, and existing infrastructure related to food donation and landfill diversion. We believe that better measurement of food waste leads to better design of FWM policies and a better understanding that "one size cannot fit all." Instead of referring to the national or state-level average when there are waste data constraints, we aim to demonstrate the opportunities for refining food waste estimates and developing place-based strategies. Second, we aim to capture small waste generators in both food waste volume (FWV) estimates and policy design to facilitate their involvement in food recovery programs that are commonly hindered by data constraints and concerns about economies of scale. Third, we aim to foster local alliances and develop community-based solutions for connecting food waste generators and potential users. Beyond the decentralized programs and platforms discussed above, we aim to provide spatial reference to facilitate system-wide planning and to improve the efficiency of food recovery and recycling. Fourth, and broadly speaking, we aim to add empirical reference to community-based and life-cycle approaches to FWM that are intrinsically connected to food system planning, The following sections in this paper will review the relevant literature, discuss our scalable FWM model for local planning, and provide a case illustration in Chicago.

It is important to note that the scope of this study is largely limited to food discarded by residential, commercial, and institutional sectors. The industrial and wholesale sectors are excluded mainly for two reasons. First, industrial waste is regulated and managed differently from MSW. Its waste planning and collection processes are different; most food producers and wholesalers have established their own logistics chains that include waste management. Second, to reduce landfill disposal costs, the diversion rate of food residuals in industrial sectors is much higher than in other sectors (BSR, 2012). It is the non-industrial sectors that present the highest potential of landfill diversion and thus are focus of this study.

Review of Existing Studies on Food Waste Volume Estimates

The most fundamental information about food waste, including generation quantity (e.g., weights or bulks), quality (e.g., spoiled or recoverable),

composition (e.g., water content, energy intensity, and perishable ingredients), and spatial location, is not commonly collected at the source. Consequently, FWV is often estimated using parameters from periodic, small-sample surveys. The U.S. Environmental Protection Agency (U.S. EPA) estimated the national aggregated food waste generation from households and businesses based on a range of survey results from individual states (U.S. EPA, 2014a, 2014b, 2016b). The estimates by Business for Social Responsibility (BSR), a nonprofit organization, also included industries and their recycled food waste before final user consumption (BSR, 2012, 2013, 2014). However, these aggregated data have limited ability to provide local references (e.g., for a city or community) due to heterogeneous conditions. Although MSW characterization studies in some regions include waste audit data for FWV (e.g., CDM, 2010b; IWMB, 2009), inconsistencies in waste definitions, performance indicators (e.g., recycling, recovery, and diversion), and measurement metrics (e.g., per capita or per employee) present a challenge for comparative studies and prevent direct references across jurisdictions. This section reviews these discrepancies as well as common approaches to FWV estimates in a wide range of surveys, numerical studies, and applied tools.

Definition of Food Waste

Several terms have been adopted in the context of food waste studies, such as food loss, food scraps, and food discards. While these terms are used interchangeably at times, distinctions have been made, particularly between "food loss" and "food waste." Food loss refers to unconsumed, edible food lost throughout the food supply chain, including production, handling, storage, processing, packaging, distribution, and consumption (Buzby, Farah-Wells, & Hyman, 2014). Food waste, when narrowly defined, refers to the food loss in the distribution and consumption stages, such as leftover discards by consumers and commodity discards by retailers due to undesirable looks or expiration (BSR, 2012, 2013; FAO, 2013; WRAP, 2013). In other words, food waste approximates to food discards and is only part of food loss.

Food waste and food loss can also be measured differently. For example, the U.S. Department of Agriculture (USDA) estimates food loss by focusing on the supply data, or so-called Loss-Adjusted Food Availability (LAFA). For food waste or discards, the U.S. EPA and other organizations (e.g., BSR and ReFED) focus on the consumption side and adopt sectoral adjusted generation factors that are inferred from waste characterization studies.

Another relevant term is "recoverable" food, which we refer to as food discards and surpluses that are still suitable and safe for human consumption. We differentiate recoverable food in our study because it highlights potential opportunities for strategic FWM to achieve even greater benefits than composting and other methods along the FWM hierarchy.

Food Waste Generation and Diversion Rates

As waste auditing is costly and is not required, local FWV often needs to be estimated assuming a uniform generation rate per person, per meal served, per employee, per square footage of the establishment, or simply for each average-sized establishment in a specific sector. Table 1 summarizes the reported food waste generation, landfill diversion, and disposal rates in the existing literature by generator type (i.e., residential, commercial, and institutional) in various regions.

Residential FWV is typically estimated on a per-capita or per-household basis, although anecdotal studies suggest that the generation rate does vary by demographic characteristics. For example, studies have found that Hispanic households have lower rates than non-Hispanics; lower income households have lower rates than higher income households (Jones, 2004). Younger people and families with children under 18 reported more food discards (Neff, Spiker, & Truant, 2015). Household size can matter as well; the waste characterization study in Chicago found that a single-family household on average almost doubled the FWV of a multifamily household (CDM, 2010b).

Commercial FWV can be estimated on the basis of employment, establishment size, food products, or sale values (BSR, 2013, 2014; Gustavsson, Cederberg, Sonesson, Otterdijk, &

Table 1. Review on Food Waste Parameters by Generator Type

Generator Type	Generation Rate (Per Unit-Year)	Diversion (DIV), Donation (DON), and/or Recycling (REC) Rates (% or Per Unit-Year)	Disposal Rate (Per Unit-Year)
	Commercial		
Supermarket/ Grocery Store/ Food Store	**Employee:** 1,360 kg (DLI, 2002; Mercer, 2013; ReFED, 2016); 240 kg for Retail, and 2,100 kg for Food Store (CCG, 2006); 454 kg for Supercenter, and 10 Tonnes for Wholesale (ReFED, 2016)	DIV 0.5% (11 kg) for Retail, and DIV 35.2% (740 kg) for Food Store (CCG, 2006); DON 17-35% for Grocery Retail, and DIV 42% for Wholesale (ReFED, 2016)	1,360 kg (CCG, 2006)
	Store: 20 Tonnes (Jones, 2004); 40 Tonnes (Griffin, Sobal, & Lyson, 2008); 35-92 Tonnes (Mercer, 2013); 54-490 Tonnes (U.S. EPA, 2009)	DON 26.3% and REC 58.9% (Griffin et al., 2008); DIV 78 Tonnes (LASAN, 2013)	6 Tonnes (Griffin et al., 2008)
	Other: 4.53 kg/Thousand-Dollar-Sales (BSR, 2014); 1.1-3.4 Tonnes/Thousand m^2 for Shopping Mall (CCG, 2006)	DIV 10-80%, DON 13.2%, and REC 29.3% (BSR 2014); DIV 0-0.2% (CCG, 2006)	
Convenience Store/Small Grocery Store	**Store:** 8,600 kg (Jones, 2004)		621 kg for Convenience Store and 1,539 kg for Small Grocery Store (Griffin et al., 2008)
Lodging and Hotels	**Employee:** 680 kg (Mercer, 2013; ReFED, 2016); 900 kg (CCG, 2006)	DIV 35.2% (CCG, 2006); REC 70-80% (CalRecycle, 2015; LASAN, 2013)	645 kg (CCG, 2006)
	Store: 51 Tonnes (Mercer, 2013; ReFED, 2016); 109-327 Tonnes (U.S. EPA, 2009)	163-218 Tonnes (CalRecycle, 2015; LASAN, 2013)	4 Tonnes (Griffin et al., 2008)
	Other: 0.45-0.68 kg/Meal (U.S. EPA, 2009); 156 kg/Guest-Year (DLI, 2002)		
Special Event	**Visitor-Day:** 0.18-0.20 kg (CCG, 2006; DLI, 2002) **Other:** 0.45 kg/Meal or 0.27 kg/Seat-Day (DLI, 2002, RecyclingWorks, 2015)	DIV 1.7 % (CCG, 2006) DIV 90% (NERC, 2010)	
Full Service Restaurant	**Store:** 5,521 Kg (Griffin et al., 2008); 11-34 Tonnes (EFWN, 2011); 15-30 Tonnes (Mercer, 2013); 23 Tonnes (Jones, 2004); 54-218 Tonnes (U.S. EPA, 2009)	DON 0.32% (Griffin et al., 2008); REC 33 Tonnes (LASAN, 2013)	5,500 Kg (Griffin et al., 2008)
	Other: 0.22-0.68 Kg/Meal (DLI, 2002; Mercer, 2013; ReFED, 2016; U.S. EPA, 2009); 15 Kg/Thousand-Dollar (BSR, 2014)	DIV 10-60%, DON 1.4%, and REC 14.3% (BSR, 2014)	
Quick Service Restaurant/ Cafeteria/ Catering Halls	**Employee:** 1,000 Kg (Mercer, 2013; ReFED, 2016); 1,130 Kg (CCG, 2006);	DIV 13.5% (CCG, 2006)	994 Kg (CCG, 2006)
	Store: 12-18 Tonnes (ReFED, 2016); 69 Tonnes (Jones, 2004); 87-326 Tonnes (U.S. EPA, 2009);		6-7 Tonnes (Griffin et al., 2008)
Large/Corporate Offices	**Store:** 87-152 Tonnes (U.S. EPA, 2009) **Other:** 0.22-0.34 Kg/Meal (U.S. EPA, 2009); 1,668 Kg/ Thousand m^2 (CCG, 2006)		

continued

Table 1. Review on Food Waste Parameters by Generator Type *(continued)*

Generator Type	Generation Rate (Per Unit-Year)	Diversion (DIV), Donation (DON), and/or Recycling (REC) Rates (% or Per Unit-Year)	Disposal Rate (Per Unit-Year)
	Residential		
	Household: 212 Kg (Jones, 2004); 215 Kg (U.S. EPA, 2009); 143 Kg for Multi-Family, and 298 Kg for Single-Family (CDM, 2010b)	REC 41-93 Kg or from 2-5% to 36-46 % (KCI, 2012); REC 46-80 Kg (DSNY, 2015a, 2015b); REC 165-220 Kg (Freeman & Skumatz, 2010)	
	Person: 52 Kg (Griffin et al., 2008); 59 Kg (U.S. EPA, 2014a); 109 Kg (Jones, 2004)	REC 2.4% (Griffin et al., 2008)	
	Institutional		
Overall	**Store:** 54-327 Tonnes (U.S. EPA, 2009) **Other:** 0.34-0.45 Kg/Meal (U.S. EPA, 2009)		
Elementary and Secondary Schools	**Student:** 11 Kg (Mercer, 2013); 41 kg (DLI, 2002; Griffin et al., 2008; RecyclingWorks, 2015) **Employee:** 254 Kg (ReFED, 2016; Smith, Shiralipour, & Kessler, 1998) **Other:** 0.23 Kg/Meal (DLI, 2002, Griffin et al., 2008); 0.10 (Off-site) to 0.25 (On-site) Kg/Meal (SERA, 2014)	REC 10-25 Tonnes/School (CalRecycle, 2015; LASAN, 2013; SFRP, 2000) REC from 18%-47% to 56%-75% (DSNY, 2015a, 2015b)	
Colleges and Universities	**Student:** 17-64 Kg (RecyclingWorks, 2015); 34-59 Kg (Griffin et al., 2008) **Employee:** 708 Kg (CCG, 2006) **Other:** 0.16 Kg/Meal (DLI, 2002; RecyclingWorks, 2015)	DON 0.5% and REC 22%-50% (Griffin et al., 2008) DIV 8.16 Kg/Person (LASAN, 2013)	
Correctional Facilities	**Person:** 163 Kg (ReFED, 2016); 166 kg (DLI, 2002; Griffin et al., 2008)		
Hospital	**Bed:** 566 Kg (DLI, 2002; Griffin et al., 2008; RecyclingWorks, 2015); 680-1,225 Kg (Mercer, 2013) **Site:** 9-152 Tonnes (U.S. EPA, 2009) **Other:** 0.23-0.45 Kg/Meal (RecyclingWorks, 2015; U.S. EPA, 2009)		
Nursing Homes	**Bed:** 298-331 Kg (DLI 2002; Griffin et al., 2008; Mercer, 2013; ReFED, 2016) **Site:** 33-98 Tonnes (U.S. EPA, 2009) **Other:** 0.27-0.50 Kg/Meal (Griffin et al., 2008; Mercer, 2013; RecyclingWorks, 2015; ReFED, 2016); 0.34-0.45 Kg/Meal (U.S. EPA, 2009)		

Meybeck, 2011; Parfitt, Barthel, & Macnaughton, 2010). Understandably, the generation rates vary considerably within this broadly defined sector. Thus, some studies separate food retail sale stores (e.g., grocery store, supermarket and convenience stores) from food service establishments (e.g., restaurants or hotels). For special events, FWV can be estimated based on the number of visitors, seats, or meals (CCG, 2006; DLI, 2002; RecyclingWorks, 2015). In particular, studies have consistently found that the food discard ratio of small generators (e.g., convenience stores) is much higher than generators in supermarkets, mostly due to their limited flows (CCG, 2006; Griffin, Sobal, & Lyson, 2008; Gruber, Holweg, & Teller, 2016). Therefore, alternative approaches to FWM in small

businesses present significant opportunities for food waste diversion from landfills.

Institutional food waste generators include schools, universities and colleges, hospitals, nursing homes, and correctional facilities. FWV from these facilities is often estimated per capita or bed. On a per-capita basis, universities or colleges with on-campus housing are considered to generate more food waste than those without dorms (Griffin et al., 2008; RecyclingWorks, 2015).

Major gaps are present in landfill diversion and recycling statistics, in terms of both definition clarity and data availability. The statistics related to diversion tend to leave out food donation, and focus on food waste reused for human and/or animal consumption, recycled for compost, or recovered for biogas. Existing programs suggest that the food waste diversion rates are generally low, especially for household discards (DSNY, 2015a, 2015b; KCI, 2012). Institutions tend to achieve the highest diversion rates (about 50%) (CalRecycle, 2015; DSNY, 2015a, 2015b; LASAN, 2013; SFRP, 2000). As presented in Table 1, food waste generation and diversion rates vary greatly by sector and region, which demonstrates the need for community-specific and sector-specific estimates.

Existing Tools of FWM

At the facility and regional level, multiple tools have been developed to facilitate FWM, such as the U.S. EPA Food Waste Management Cost Calculator, Food Waste Biogas Economic Model, and the continuously updated Waste Reduction Model (WARM) (U.S. EPA, 2009, 2010, 2016c). These tools can be used by individual waste generators to conduct a cost-benefit analysis or by local government and organizations to quantify the connection between waste management methods and greenhouse gas emissions. However, these tools have focused on a region-wide estimate based on fixed parameters; they have also focused on single facilities in the category of medium or large food waste generators. However, small food waste generators, such as residential or small commercial sites, are typically excluded.

There has also been some limited use of geographic information systems (GIS) to map the spatial distribution of food waste generators, such as those in the states of Connecticut, Massachusetts, Pennsylvania, and Virginia (DLI, 2002; DLI & AGC, 2001; DuPage County, 2012; VANR, 2014). Those tools, however, are also limited to medium and large generators. Moreover, those tools typically rely on self-reported data from businesses or from private consulting firms, such as Dun and Bradstreet. Therefore, the public has limited access to data sources for regular updates (U.S. EPA, 2012c).

By excluding small generators, the existing tools do not seem to address the full scope of food waste. This limitation hinders potential collaborations among generators within their surrounding communities. Robust references at refined geographical scales are largely lacking, which presents a major challenge for food scrap collection and recovery. More importantly, food waste generators and food banks (as an example of potential users) are often examined separately. To achieve efficient and effective FWM through economies of scale, it is important to set up various levels of collaboration among different waste generators in a community.

Integrated Model of Community-Level Food Waste Management

To help fill the data gap and planning references for local FWM, we propose a scalable model for FWV estimates and FWM program development. The model is designed to be adaptable in specific communities (e.g., ZIP Codes or city neighborhoods) as well as cities and counties. The quantitative analysis in this study will adopt the material flow analysis approach and focus on retail and consumer food discards—i.e., "food waste" as defined above. For the aforementioned reasons explained in the first section, industrial generators are not included in the numerical analysis. The generic model entails the eight steps as follows.

(1) Characterize Waste Generators. The categorization of waste generators can be contingent upon local and regional FWM practices, pertinent programs and regulations, and data availability. It is common to adopt three general categories—e.g., residential, commercial, and institutional. Specific subcategories (as shown in Table 1) may vary by

community and region. They need to be identified, differentiated, and modeled, especially when large variations of FWV within the subcategory are expected. The adoption of publicly accessible data sets, such as those from national statistical institutions (e.g., the American Community Survey or ZIP Code Business Pattern from the U.S. Census Bureau), state and county agencies (e.g., department of health), and municipalities (e.g., the city of Chicago data portal), enables the model implementation of FWV modeling over time and comparison across communities.

(2) Determining a Geographic Unit of Analysis. The choice of the unit of analysis of FWM can depend on both the research purpose and data availability, although the results from disaggregated results can always be aggregated. FWV estimates of individual buildings, businesses, or households allows for advanced programming, such as routing optimization for collection and donation pick-ups. However, existing data may not always support such a detailed analysis. In addition, FWV from individual generators may vary over time (e.g., weekdays vs. weekends). Aggregated results at an intermediate level (e.g., communities or ZIP Codes) as a lump sum can help control the relative uncertainties in individual behaviors and still be appropriate for logistics planning.

(3) Select a Causal Parameter for Generation Rates Estimates. The unit generation rates (e.g., per capita, household, or employee), when coupled with local characteristics, provide a potential opportunity to refine estimates of discarded materials (Leigh et al., 2007). Theoretically, the parameter should be the primary factor that minimizes the variation in FWV estimates within the specific generator group (e.g., meals served for fast food restaurants; number of people for residential discards). In practice, the determination of a unit can be largely constrained by data availability. For example, data about employment and establishment size can be more commonly available than meals served or sale receipts at each establishment.

(4) Model Total FWV. With food discard rates and generator information in each subcategory, the total volume of food discards can be modeled mathematically as illustrated in Equation (1). When local or regional waste characterization data are available, the estimates can potentially be validated. Given uncertainties in FWV, a sensitivity analysis is also needed. Examples of data validation and sensitivity analysis will be provided in Section 4.

$$V_{Waste} = \sum_{i=1}^{3} \sum_{j=1}^{C_i} f_{ij}\,(V_1, V_2, \ldots, V_m) \times N_{ij} \quad (1)$$

Where,

V_{waste}: Food waste generation (by weight);
i: Generator type (i=1 Residential; i=2 Commercial; i=3 Institutional);
j: Sub-categories of each generator type, such as SF and MF of residential generators (detailed categories in Table 1);
C_i: Number of sub-categories of generator type i;
f_{ij} (): Food waste generation rate for sub-category j of generator type i;
N_{ij}: Number of units (e.g., employees or establishments) in sub-category j of category i;
V_1 , V_2, …, V_m: causal factors of food waste generation;

(5) Estimate Recoverable FWV. Building upon Equation (1), Equation (2) calculates the FWV that is potentially recoverable or reusable by waste generator type. Adopting a recovery rate based on the reported data of existing and emerging practices (as in Table 1) can lead to a benchmark of recovery potential. A region may also have set its diversion goals that include a targeting recovery rate.

$$V_{Potential} = \sum_{i=1}^{3} \sum_{j=1}^{C_i} g_{ij}\,(R_1, R_2, \ldots, R_m) \times V_{waste\ ij} \quad (2)$$

Where,

$V_{potential}$: Food waste recovery potential volume (by weight);
i: Generator type (i=1 Residential; i=2 Commercial; i=3 Institutional);
j: Sub-categories of each generator type, such as SF and MF of residential generators (detailed categories in Table 1);
C_i: Number of sub-categories of generator type i;
g_{ij} (): Food waste recovery rate for sub-category j of

business category i;
R_1 , R_2, …, R_m: causal factors of food waste recovery;
V_{waste}: Food waste generation (by weight).

(6) Identify Potential Demand for Recoverable Food Discards. An inventory of potential demand for food discards, corresponding to the FWM hierarchy (e.g., food banks, soup kitchens, farms, and composting facilities), should be investigated in the proximity of food waste generation. Data can be typically obtained from public agencies and nonprofit organizations, such as Feeding America (a national network of food banks). When food recovery networks are further developed, the inventory of potential demand can also include food processing facilities and other commercial enterprises. These are enterprises that can process recoverable food into value-added products through creative recipe research and development, as demonstrated in the pilot program in Philadelphia (O'Donnell, Deutsch, Yungmann, Zeitz, & Katz, 2015).

(7) Spatially Match Food Discards and FW Recovery Options. Communities are likely to either have high donation potential or desire more supply at the food banks. Pairing up the surplus and shortage areas that are in closest proximity to each other provides a local solution that reduces the transportation distance while helping to address the community's disparities in food security. This final step employs a GIS analysis to connect the potential "demand" in response to the "supply" derived from Equation (2). Subsequently, planners can identify areas that tend to generate a large FWV but do not have food diversion facilities. Such areas may need new infrastructure for food donation, composting, drop off, or mobile services for food scrap collection. Likewise, existing locations of food recovery centers (e.g., food banks) can identify potential partners (e.g., institutions and community centers) for food pick-ups.

To identify such a mismatch, this study proposes a food waste Supply-Demand Index (SDI), which is calculated as the difference between the Food Supply Index and the Food Demand Index. The Food Supply Index is calculated by the percentile value (0 to 1) of food donation potential density in a given community. The Food Demand Index is calculated by the percentile value of food bank density in a given community. The frequency distribution of SDI values across neighborhoods or communities can provide references for the determination of SDI threshold values. For example, by referring to the histogram (Appendix), it would make sense to determine the SDI threshold values to be ± 0.25. In other words, if the SDI is larger than 0.25, we assume that food discard volume is higher than the demand from food banks, and so the area is categorized as the "Surplus." Likewise, if the SDI is lower than -0.25, we assume that the area needs more food donations and thus it is categorize as the "Shortage."

Case Implementation in Chicago

The city of Chicago hosts 2.7 million residents, 1.45 million jobs, and 78,000 business establishments (U.S. Census Bureau, 2012) that all contribute to food waste generation. According to the Chicago Waste Characterization and Diversion study, only 2% of food waste is currently recovered; 498,800 tonnes of food waste end up in landfills each year (CDM, 2010a). The Illinois Food Scrap Coalition (IFSC) found several challenges to food waste diversion from landfills in the Chicago area, including insufficient education, the cheap landfill cost, missing demand and end market, a lack of infrastructure, and the unstable quality of food waste (IFSC, 2015). Meanwhile, the enactment of Illinois Senate Bill 99 in 2009 has simplified permit applications for composting facilities, which are not licensed currently to accept food waste. Small start-up programs for alternative FWM have been rapidly developing within the region, including vertical farms and biogas production that utilize food waste. There are also more than 300 food banks within the city boundaries. Therefore, we determined that implementing our FWM model in Chicago may lead to a timely and relevant reference for planning.

Data Inputs

To determine the quantity and spatial distribution of FWV, we first developed an inventory for all buildings that may generate food waste. Table 2 below shows the citywide summary statistics for

each generator or building type. Table 2 also shows the data parameters that were adopted for FWV estimates, which are intended to be relatively lower compared to existing and emerging practices. Conservative estimates were developed to make sure potential environmental benefits from landfill diversion and food recovery would not be exaggerated. We used the parameters in Table 2 for estimating FWV at the establishment and household level and then aggregated the results for community- and city-level discussions.

Results of FWV Estimates

As a conservative estimate derived from Equation (1), the city of Chicago generates 409,400 tonnes of food scraps a year. About 242,700 tonnes of food discards come from residences, 133,000 tonnes from businesses, and 33,700 tonnes from

Table 2. Chicago FW Generator Summary and Modeling Parameters

	No. of Establishments	Unit of Analysis for FWV Estimates	Total No. of Units	Generation Rate	Donation Potential
Residential [a]					
Single Family	—	Housing Unit	618,361	298 Kg/Unit-Year	DON: 1.4%
Multifamily	—	Housing Unit	408,988	143 Kg/Unit-Year	
Commercial [b]					
Supermarkets, department stores and large food retail sales (FOSAL1)	622	Employee	25,773	1,360 Kg/Employee-Year	DON: 18%
Convenience stores, small grocery stores, gas stations, and other food retail sales (FOSAL2)	1,595	Employee	4,253	1,360 Kg/Employee-Year	
Hotels (FOSVC1)	97	Employee	776	1,020 Kg/Employee-Year	DON: 1.4%
Full service restaurants, fine dining places and similar food service retailers (FOSVC2)	2,135	Employee	37,171	1,020 Kg/Employee-Year	
Limit service restaurants, fast food restaurants, and similar food service retails (FOSVC3)	2,363	Employee	19,369	1,020 Kg/Employee-Year	
Cafeteria, coffee shop and other food service retails (FOSVC4)	1,582	Employee	11,810	1020 Kg/Employee-Year	
Office building (OFFICE)	157	Thousand m^2	12,983	1,668 Kg/Thousand m^2-Year	
Institution					
Private/public primary/secondary schools (SCH) [c]	1,033	Student	478,247	28.6 Kg/Student-Year	DON: 1.4%
University with on-campus housing (UNIV1) [d]	23	Student	137,461	52.2 Kg/Student-Year	
University without on-campus housing (UNIV2) [d]	59	Student	113,693	17.2 Kg/Student-Year	
Hospitals (HOSP) [e]	38	Bed	10,080	566 Kg/Bed-Year	
Nursing Facilities (NSG) [f]	120	Bed	17,321	298 Kg/Bed-Year	

Data sources: [a] The numbers of single- and multifamily households are from U.S. Census Bureau American Community Survey (ACS) 5-year estimates (2008–2013); [b] the data for commercial subcategories are from business license database and food inspection database provided by the city of Chicago; subcontract services are excluded due to data constraints; [c] the data for K-12 schools, including private and public primary schools and secondary schools in Chicago, are from the city of Chicago data portal; [d] the data for universities and colleges are from National Center for Education Statistics, including location, student enrollment, and campus housing; [e] the data for hospitals (e.g. location and number of licensed beds) are from Illinois Health Facilities and Services Review Board; [f] the data for nursing facilities (e.g., location and number of licensed beds) are from the Illinois Department of Public Health (IDPH).

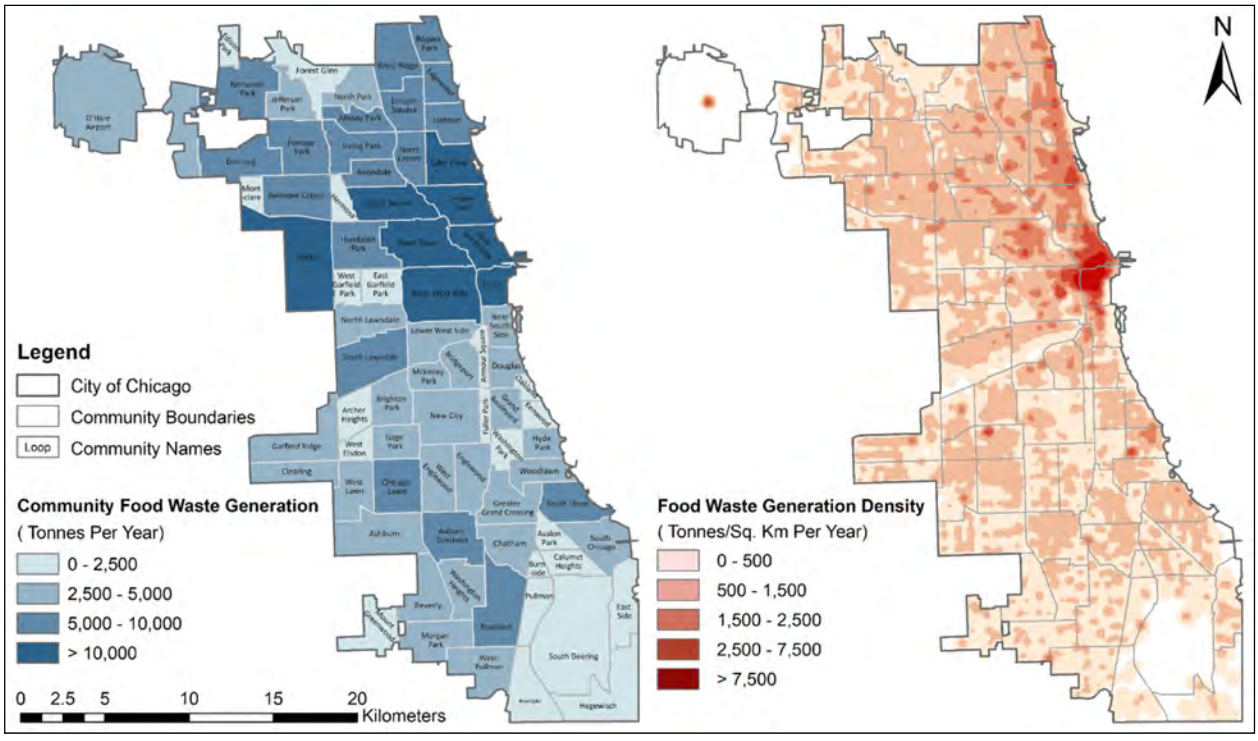
institutions. The FWV from residents is nearly double that of businesses, demonstrating the need to include households in food waste reduction efforts.

There are 77 communities in Chicago; on average, a community hosts 35,200 people (CMAP, 2017). At the community level, FWV ranges widely from 252 tonnes to 32,120 tonnes. Three communities (the Loop, Near North Side, and Near West Side) generated 20,000 tonnes or greater of food waste annually. Five additional communities generate more than 10,000 tonnes and are clustered in the north and center of the city. Overall, the communities in the north of the city generate greater FWV than the communities in the south, which corresponds to the spatial disparities of economic conditions (Figure 2, left). In total, 27 out of 77 communities generate more than 5,000 tonnes per year, which would require one truck every day to separately collect all the food scraps. Notably, the waste composition from the three types of generators varies, even when communities generate similar FWV. Because the recovery potential varies by sector (e.g., higher in businesses than residence), preferable FWM methods may vary across communities.

In terms of density, the central business district (CBD), not surprisingly, shows the highest FWV, at over 7,500 kg/ km^2 (Figure 2). Areas along the northern coast and the Chicago O'Hare international airport also present a high density of FWV. The north side of the city includes more communities with high-density FWV than the south. But the south does have a few "hot spots," which could be preferable locations for drop-off centers or arranged pick-up service, especially when an extensive curbside program is not available. FWV Result Validation

There are no other studies or statistics of FWV available at the community level. When aggregated to the city level, our results can be validated by the waste audit data documented in the Chicago Waste Characterization and Diversion study (CDM, 2010a; 2010b). Comparison by each sector and generator type is not straightforward, however, due to inconsistencies in the sector and generator classification. Table 3 presents a cross-walk of the generator categories. Generally speaking, the FWV

Figure 2. Food Waste Generation in Chicago Communities



estimates resulting from our study show a comparable magnitude at the city level in comparison to the city's reported findings. As expected, our study presents slightly lower estimates, given that we have adopted a conservative generation rate.

Sensitivity Analysis

To address uncertainties in food waste generation rates of individual generators (e.g., weekdays vs. weekends), we have employed the Monte Carlo (MC) simulation method for a sensitivity analysis. In total, 200 interactions of MC simulation were computed to obtain the statistics at three uncertainty levels and for three FWV rates—i.e., ±20%, ±30%, and ±50% of average generation rates and donation potential. For example, at ±20% variation of the generation rate, input parameters vary randomly from 80% to 120% of the average generation rates in the MC simulation. The coefficient of variance (CV), the ratio of standard deviation (σ) to the mean (μ), is calculated to measure the impact of uncertainties on total FWV (Equation 3). The greater the uncertainty level is, the greater the CVs can be.

$$CV = \frac{\sigma}{\mu} \quad (3)$$

At ±20% variation of citywide generation rates, the CV is 0.18%. At ±50% variation on individual generation rates—that is, if individuals generate from 50% to 150% of the average rate—it yields 2.47% variance in citywide food waste generation. The CVs for donation volume seem to be even smaller than that of the total generation volume. The MC simulation suggests that variations among individual generation rates have negligible impacts on the total FWV at the city level, and thus they also have negligible impact on the donation potential.

Similar MC simulations were also run at the community level. The CVs can be up to 18.88% at the uncertainty level of ±50% of the average generation rates. Understandably, communities with fewer generators or smaller FWV yield higher CVs. But in general, the average CVs are 1.99% at ±20% variation, 2.98% at ±30% variation, and 5.09% at ±50% variation. These findings suggest that a community could be an appropriate unit for FWM, where the uncertainties in FWV are manageable and economies of scale of FWM are attainable.

Matching Demand and Supply

The FWM hierarchy suggests reuse as the most desirable approach. Therefore, this study focuses on food donations and food banks as examples of "supply" and "demand," respectively. Additionally, this study takes advantage of point-level FWV estimates when mapping the spatial pattern of supply and demand. The same approach can be applied for other linkages, such as food scrap clusters with local composting facilities or urban community gardens.

Derived from Equation (2), at least 12,900 tonnes of food discards by Chicagoans are recoverable for human use per year. Understandably, the majority of recoverable food (69.45%) is derived from the commercial sector. Households, while individually showing a relatively low recovery rate, in aggregated terms account for about one-fourth of total donation potential. Institutions account for 3.62% of total food waste donation. For individual communities, the donation potential ranges widely from 6 tonnes to 790 tonnes annually, with an average volume of 160 tonnes.

Given that the geographic size of any individual community is rather large and varies across the city, understanding the absolute tonnage of FWV is not enough. The density map shown in Figure 3 can help identify specific locations for efficient pick-ups of recoverable food, such as those with the highest potential donation density at over 250 tonnes per km^2.

Clearly the locations with a high density of recoverable food do not match the demand for food donation—e.g., food banks (indicated by yellow dots in Figure 3). The results of the SDI in Chicago are presented in Figure 4. Generally, the food surplus communities cluster in the central and northern part of city, as well as along the south branch of the Chicago River. The food shortage communities cluster in the west side of the city and the northern part. The map provides empirical evidence of community disparities, which can be addressed by citywide coordination efforts. For example, once the generation origin and volume of food discards are identified, an appropriate

collection method can be implemented to facilitate food scrap recycling from small generators, such as curbside programs, co-collection of food waste and yard waste, drop-off centers, or kitchen pails.

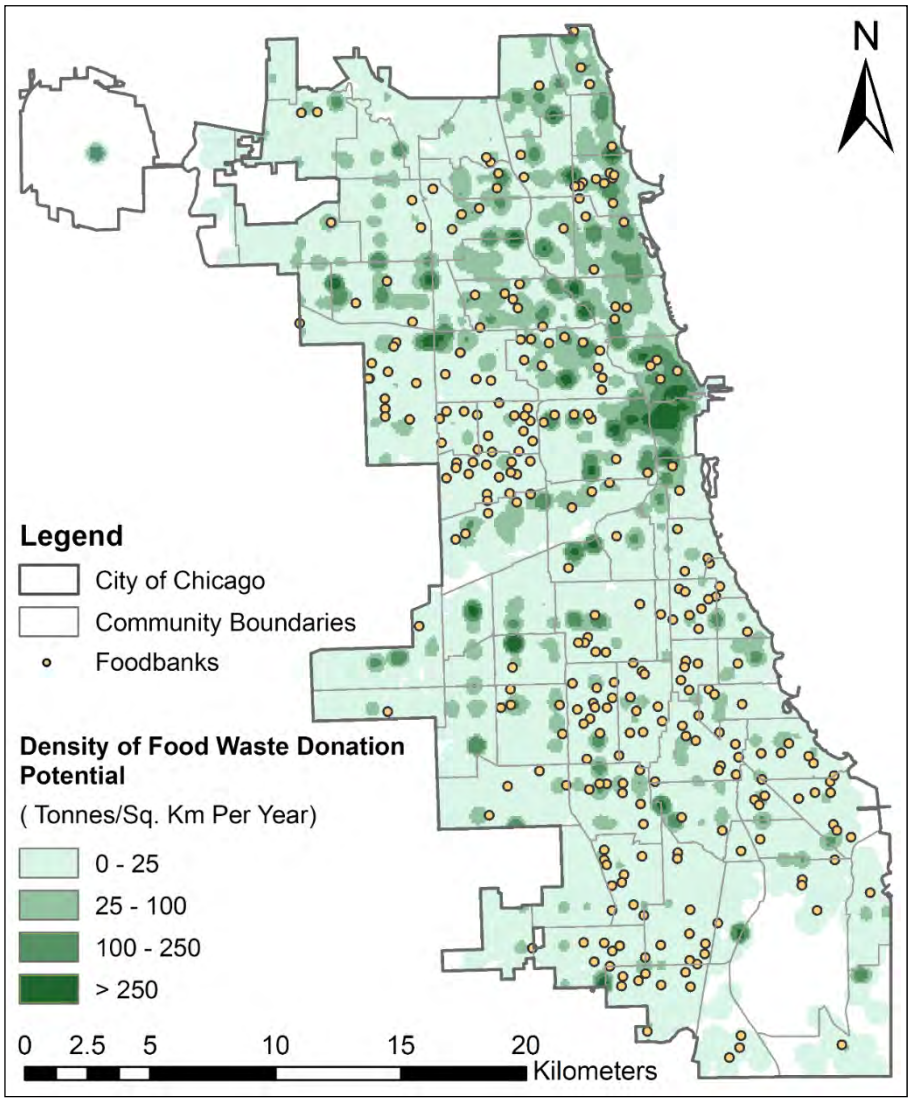
Conclusion and Discussions

Despite the increasing attention to the food waste challenge, quantitative studies of FWM are still limited, especially at the community level. This study proposes an FWM modeling and planning framework that aims to provide data references and policy insights into community-level FWM. The case implementation in Chicago demonstrates the potential opportunities for urban planners to promote the efficiency, effectiveness, and equity goals surrounding FWM. Notably, in regards to food waste, and waste in general, people tend to adhere to an "out of sight, out of mind" mentality. The system modeling and planning framework in this study could increase the visibility of food waste challenges that could be integrated with other food system planning programs (e.g., those related to food insecurity, food dessert, and nutrient loss), and helping to close the loop of food systems.

FWM necessitates a thorough understanding of waste origin and volume, which is only periodically recorded through the waste auditing process in some regions. This study demonstrated the feasibility of producing reasonably accurate estimates of FWV by employing publicly accessible data sets. The FWV model also allows communities to incorporate their unique characteristics and enables comparison across different regions with a relatively consistent approach.

Further, the sensitivity analysis in the Chicago case implementation suggests that the uncertainties of FWV estimates can be manageable at a relatively small geographical scale. The refined volume estimates, as discussed in this study, can provide critical information to help improve the performance of FWM. For example, planning can focus on the communities that present the highest food donation potential as pilot locations. Planning can also

Figure 3. Spatial Distribution of Food Waste Donation Potential and Its Potential Users



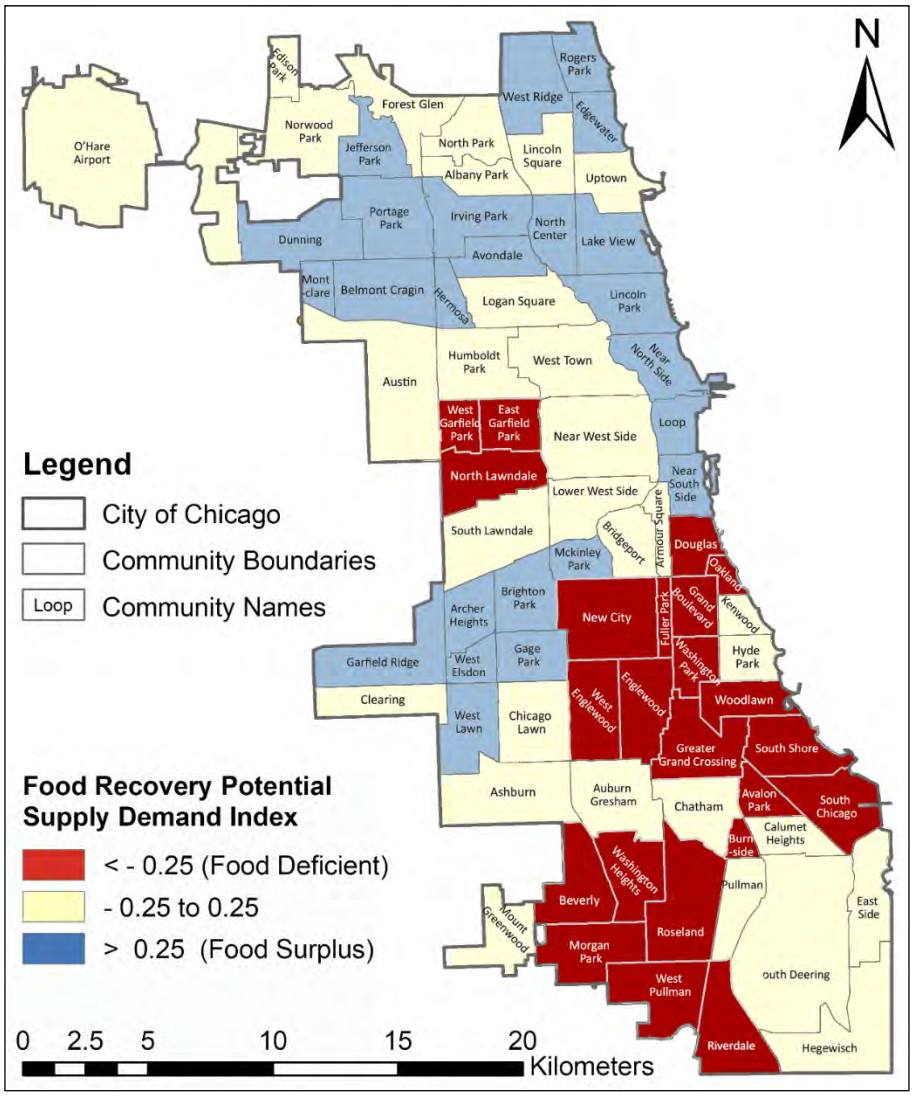
design food scrap collection infrastructure strategically based on the FWV and composition of waste generators in order to facilitate reuse and recycling programs at the community level. "Hot spots" of FWV could serve as the anchors of food recovery locations, instead of contributing to environmental injustice.

This study has demonstrated the importance of engaging small food waste generators in alternative FWM programs. As concluded in the case study, residences generate nearly twice as much FWV as businesses and contribute to more than one-third of the total recoverable food in Chicago. An inclusive approach of FWM will not only improve the accuracy in inventory modeling, but also present potential opportunities for community-specific implementation. Adopting an inclusive FWM framework can foster a bottom-up approach for FWM. Participatory approaches to FWM also present potential opportunities for educating communities, enhancing FW data accuracy, fostering organized networks, and implementing a preferred hierarchy of FWM efficiently.

Most importantly, our proposed FWM modeling and planning framework promote local solutions to FWM by connecting food waste generators and potential users. The information derived from our proposed model aims to facilitate collaboration among residents, businesses, and institutions as community consortia in minimizing food waste disposal. By connecting food scrap generation with reuse and recovery options, this study demonstrates empirical evidence of spatial mismatch. FWM efficiencies and social equity goals can be further improved if planning can pair up food surplus and shortage communities strategically, although further analysis is still needed to examine collection and transportation strategies as well as their ensuing impacts.

We anticipate that developing community-specific FWM models, involving local stakeholders, and disseminating the results would also increase the awareness of food waste problems and provide valuable references for public education, which

Figure 4. Spatial Matching of Food Waste Donation Potential and Food Banks by Chicago Community Areas



have been identified as key solutions to address barriers of food waste diversions and to promote best-practice programs (Freeman & Skumatz, 2010; Neff et al., 2015). Improving and/or increasing communication between local communities and food recovery networks would also provide valuable opportunities for data validation, which currently has limited options, as previously discussed above. In particular, additional information from residents and business owners in the planning process can help refine the estimates for small food waste generators. Besides quantity, the quality of food scraps is crucial for determining the range of options for food scrap recovery and reuse. Uncertainties about the quality over time and across seasons make food scraps particularly difficult to model compared to products with longer life spans (e.g., e-waste and automobile tires). Sharing data by the community on food purchasing and consumption behaviors is key to addressing constraints and uncertainties on food data.

Future work and greater data availability could help expand the proposed FWM modeling and planning framework. Our numerical models can be adapted to market dynamics and technology advancement by, for example, adjusting the generation rate and recovery rate. After the modeling results are validated, the data references that we have developed could enable transportation logistics analyses that explore efficient strategies to match food shortage and surplus. In addition, testing the model in other regions could reveal the heterogeneities in food flows and correspondingly provide empirical references for region-specific hierarchy solutions for FWM.

To conclude, it is important to further clarify that food waste prevention necessitates both food discard recovery and source reduction. Essentially, our hypothesis is that better measurement of the location and volume of excess food helps prevent food waste. Our numerical analysis and planning framework have focused on food recovery, or "recoverable food," in addition to addressing food waste in general. Strategies for source reduction involve many more complex factors (e.g., technology, economic incentives and/or disincentives, behavioral issues related to culture, religion, and diet). Although not the focus of this study, source reduction would make economic sense as the first step of sustainable FWM, instead of managing food already produced, distributed, purchased, and discarded. Compared to the logistics planning of food recovery trips, however, food purchasing and consumption behaviors may not be easily influenced by public policies in the short term. This suggests that the cost effectiveness of FWM strategies may vary by temporal as well as geographic scopes. While the benefits of community-based planning strategies discussed here may be more predictable, and we may be able to see those benefits sooner than those of source reduction programs, source reduction should be a continuous and long-term planning goal.

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References

Abdulla, M., Martin, R., Gooch, M., & Jovel, E. (2016). The importance of quantifying food waste in Canada. *Journal of Agriculture, Food Systems, and Community Development*, *3*(2), 137–151. https://doi.org/10.5304/jafscd.2013.032.018

Ai, N., & Leigh, N. G. (2017). *Planning for sustainable material and waste management* (Planning Advisory Service Report No. 587). Chicago: American Planning Association. Executive summary available online: https://www.planning.org/publications/report/9124041/

Baccini, P., & Brunner, P. H. (2012). *Metabolism of the Anthroposphere: Analysis, evaluation, design* (2nd ed.). Cambridge, MA: MIT Press. https://doi.org/10.7551/mitpress/8720.001.0001

Brinkley, C., Birch, E., & Keating, A. (2016). Feeding cities: Charting a research and practice agenda toward food security. *Journal of Agriculture, Food Systems, and Community Development*, *3*(4), 81–87. https://doi.org/10.5304/jafscd.2013.034.008

Business for Social Responsibility [BSR]. (2012). *Food waste: Tier 1 assessment*. Food Waste Reduction Alliance. Retrieved from http://www.foodwastealliance.org/wp-content/uploads/2013/06/FWRA_BSR_Tier1_FINAL.pdf

BSR. (2013). *Analysis of US food waste among food manufacturers, retailers, and wholesalers.* Food Waste Reduction Alliance. Retrieved from http://www.foodwastealliance.org/wp-content/uploads/2013/06/FWRA_BSR_Tier2_FINAL.pdf

BSR. (2014). *Analysis of US food waste among food manufacturers, retailers, and restaurants.* Food Waste Reduction Alliance. Retrieved from http://www.foodwastealliance.org/wp-content/uploads/2014/11/FWRA_BSR_Tier3_FINAL.pdf

Buzby, J. C., Farah-Wells, H., & Hyman, J. (2014). *The estimated amount, value, and calories of postharvest food losses at the retail and consumer levels in the United States* (EIB-121). U. S Department of Agriculture, Economic Research Service. https://doi.org/10.2139/ssrn.2501659

California's Department of Resources Recycling and Recovery [CalRecycle]. (2015). Food Scraps Management Case Studies (Model Programs). Retrieved August 10, 2017 from https://www.calrecycle.ca.gov/Organics/Food/CaseStudies/

Cascadia Consulting Group [CCG]. (2006). *Targeted statewide waste characterization study: Waste disposal and diversion findings for selected industry groups: Contractor's report to the board.* California Integrated Waste Management Board (CIWMB). Retrieved from https://www2.calrecycle.ca.gov/Publications/Download/787

CDM. (2010a). *Chicago waste diversion study.* Chicago Department of Environment. Retrieved from https://www.cityofchicago.org/content/dam/city/depts/doe/general/RecyclingAndWasteMgmt_PDFs/WasteAndDiversionStudy/WasteDiversionStudyReport2.pdf

CDM. (2010b). *Waste characterization study.* Chicago Department of Environment. Retrieved from https://www.cityofchicago.org/content/dam/city/depts/doe/general/RecyclingAndWasteMgmt_PDFs/WasteAndDiversionStudy/WasteCharacterizationReport.pdf

Chicago Metropolitan Agency for Planning [CMAP]. (2017). *Community data snapshots.* The CMAP Data Hub. Retrieved from https://datahub.cmap.illinois.gov/dataset/community-data-snapshots-raw-data

Cordell, D., Drangert, J., & White, S. (2009). The story of phosphorus: Global food security and food for thought. *Global Environmental Change, 19*(2), 292–305. http://dx.doi.org/10.1016/j.gloenvcha.2008.10.009

Department of Sanitation at City of New York [DSNY]. (2015a). *Diversion Report II: NYC organics collection pilot, April–September 2014.* Retrieved from https://www1.nyc.gov/assets/dsny/docs/about_OrganicsCollection-LL77-DiversionReportII-2015_0815.pdf

DSNY. (2015b). *Diversion Report III: NYC organics collection pilot, October 2014 – April 2015.* Retrieved from https://www1.nyc.gov/assets/dsny/docs/about_LL77_DiversionReportIII_June2015_0815.pdf

Draper/Lennon, Inc. [DLI]. (2002). *Identification, characterization, and mapping of food waste and food waste generators in Massachusetts.* Massachusetts Department of Environmental Protection. Retrieved from https://www.mass.gov/files/documents/2016/08/qn/foodwast.pdf

DLI & Atlantic Geoscience Corp. [AGC]. (2001). *Identifying, quantifying, and mapping food residuals from Connecticut businesses and institutions: an organics Recycling Planning Tool Using GIS.* Connecticut Department of Environmental Protection. Retrieved from http://www.ct.gov/deep/lib/deep/compost/ssomfile/ssomreport.pdf

DuPage County. (2012). Northeast Illinois Compost Locations. DuPage County Open GIS Data.. Retrieved August 10, 2017, from http://dupage.maps.arcgis.com/apps/OnePane/basicviewer/index.html?appid=3a5936a077514821977c04bd689ec3c2

Elser, J., & Bennett, E. (2011). Phosphorus cycle: A broken biogeochemical cycle. *Nature,* 478(7367), 29–31. http://doi.org/10.1038/478029a

End Food Waste Now [EFWN]. (2011). *End food waste: Facts.* Retrieved May 8, 2015, from http://www.endfoodwastenow.org/index.php/resources/facts but no longer available online. Hard copy in possession of authors.

Evans-Cowley, J. S., & Arroyo-Rodríguez, A. (2016). Integrating food waste diversion into food systems planning: A case study of the Mississippi Gulf Coast. *Journal of Agriculture, Food Systems, and Community Development, 3*(3), 167–185. https://doi.org/10.5304/jafscd.2013.033.003

Feeding America. (2017). *Map the Meal Gap 2017: Highlights of findings for overall and child food insecurity.* Retrieved from http://www.feedingamerica.org/research/map-the-meal-gap/2015/2015-mapthemealgap-exec-summary.pdf

Food and Agriculture Organization of the United Nations [FAO]. (2013). *Food wastage footprint: Impacts on natural resources: Summary report.* Rome: Food and Agriculture Organization of the United Nations. Retrieved from http://www.fao.org/3/i3347e/i3347e.pdf

Freeman, J., & Skumatz, L. A. (2010). *Best management practices in food scraps programs.* U.S. Environmental Protection Agency Region 5. Retrieved from http://www.foodscrapsrecovery.com/EPA_FoodWasteReport_EI_Region5_v11_Final.pdf

Girotto, F., Alibardi, L., & Cossu, R. (2015). Food waste generation and industrial uses: A review. *Waste Management, 45,* 32–41. https://doi.org/10.1016/j.wasman.2015.06.008

Griffin, M., Sobal, J., & Lyson, T. A. (2008). An analysis of a community food waste stream. *Agriculture and Human Values, 26*(1–2), 67–81. https://doi.org/10.1007/s10460-008-9178-1

Gruber, V., Holweg, C., & Teller, C. (2016). What a waste! Exploring the human reality of food waste from the store manager's perspective. *Journal of Public Policy and Marketing, 35*(1), 3–25. https://doi.org/10.1509/jppm.14.095

Gustavsson, J., Cederberg, C., Sonesson, U., Otterdijk, R. V., & Meybeck, A. (2011). *Global food losses and food waste: Extent, causes and prevention.* Rome: Food and Agriculture Organization of the United Nations.

Hoover, D. (2017). *Estimating quantities and types of food waste at the city level.* Natural Resources Defense Council. Retrieved from https://www.nrdc.org/sites/default/files/food-waste-city-level-report.pdf

Illinois Food Scrap Coalition [IFSC]. (2015). *Food scrap composting challenges and solutions in Illinois report.* Retrieved from http://illinoiscomposts.org/files/IFSC-FoodScrapReportFINAL-Jan2015.pdf

Integrated Waste Management Board, California [IWMB]. (2009). *California 2008 statewide waste characterization study.* California Environmental Protection Agency. Retrieved from https://www2.calrecycle.ca.gov/Publications/Download/911

Jones, T. W. (2004). *Using contemporary archaeology and applied anthropology to understand food loss in the American food system.* University of Arizona, Bureau of Applied Research in Anthropology. Retrieved from https://humwp.ucsc.edu/gleaningstories/pdf/jones_foodwaste.pdf

Kessler Consulting, Inc. [KCI]. (2012). *Mecklenburg County, NC food waste diversion study: Final report.* Mecklenburg County Solid Waste Reduction/Composting. Retrieved from https://www.mecknc.gov/LUESA/SolidWaste/Documents/Food%20Waste%20Diversion%20Study%20Final.pdf

LA Sanitation, City of Los Angeles [LASAN]. (2013). *Zero waste progress report.* Retrieved from https://planning.lacity.org/eir/8150Sunset/References/4.K.3.%20Solid%20Waste/SW.04_Zero%20Waste%20Progress%20Report_March%202013.pdf

Leigh, N. G., Realff, M. J., Ai, N., French, S. P., Ross, C. L., & Bras, B. (2007). Modeling obsolete computer stock under regional data constraints: An Atlanta case study. *Resources, Conservation and Recycling, 51*(4), 847–869. https://doi.org/10.1016/j.resconrec.2007.01.007

Levkoe, C. Z., & Wakefield, S. (2011). The Community Food Centre: Creating space for a just, sustainable, and healthy food system. *Journal of Agriculture, Food Systems, and Community Development*, *2*(1), 249–268. https://doi.org/10.5304/jafscd.2011.021.012

Mercer, A. G. (2013). *Assessment of food waste generation in Mercer County, New Jersey.* Alternative Energy Innovation Center, Bordentown, New Jersey. Retrieved from http://envirostewards.rutgers.edu/alumniassociation/PDFs/An%20Assessment%20of%20Food%20Waste%20Generated%20in%20Mercer%20County_%200122%2013.pdf

Miller, M., Anderson, M., Francis, C., Kruger, C., Barford, C., Park, J.& McCown, B. H. (2016). Critical research needs for successful food systems adaptation to climate change. *Journal of Agriculture, Food Systems, and Community Development*, *3*(4), 161–175. https://doi.org/10.5304/jafscd.2013.034.016

Neff, R. A., Spiker, M. L., & Truant, P. L. (2015). Wasted food: US consumers' reported awareness, attitudes, and behaviors. *PloS One, 10*(6), e0127881. https://doi.org/10.1371/journal.pone.0127881

Northeast Recycling Council [NERC]. (2010). *Guidance for special event food waste diversion.* Northeast Recycling Council. Retrieved from https://nerc.org/documents/guidance_for_special_event_food_waste_diversion.pdf

O'Donnell, T. H., Deutsch, J., Yungmann, C., Zeitz, A., & Katz, S. H. (2015). New sustainable market opportunities for surplus food: A food system-sensitive methodology (FSSM). *Food and Nutrition Sciences, 6*(10), 883–892. https://doi.org/10.4236/fns.2015.610093

Parfitt, J., Barthel, M., & Macnaughton, S. (2010). Food waste within food supply chains: Quantification and potential for change to 2050. *Philosophical Transactions of the Royal Society B: Biological Sciences, 365*(1554), 3065–81. https://doi.org/10.1098/rstb.2010.0126

RecyclingWorks. (2015). *Food waste estimation guide.* Recycling Works Massachusetts. Retrieved August 11, 2017, from http://www.recyclingworksma.com/food-waste-estimation-guide/#Jump06

ReFED. (2016). *A roadmap to reduce U.S. food waste by 20 percent.* Rethink Food Waste Through Economics and Data. Retrieved from https://www.refed.com/downloads/ReFED_Report_2016.pdf

San Francisco Recycling Program [SFRP]. (2000). *City of San Francisco food waste diversion pilot program.* City of San Francisco. Retrieved from https://www.calrecycle.ca.gov/docs/cr/Organics/food/SanFran2.pdf

Schupp, C. L., Getts, K. M., & Otten, J. J. (2018). An evaluation of current lunchroom food waste and food rescue programs in a Washington state school district. *Journal of Agriculture, Food Systems, and Community Development*, *8*(1), 167–186. https://doi.org/10.5304/jafscd.2018.081.013

Skumatz Economic Research Associates [SERA]. (2014). *The costs and benefits of Minnesota K-12 school waste management program.* Retrieved from https://www.pca.state.mn.us/sites/default/files/p-p2s6-15.pdf

Smith, W. H., Shiralipour, A., & Kessler, M. (1998). *Final report: Food waste diversion in Florida.* University of Florida Institute of Food and Agricultural Sciences Center for Biomass Programs and Florida Organic Recyclers Association. Retrieved from http://www.floridaforce.org/wp-content/uploads/2019/04/Food-Waste-Diversion-in-Florida-Final-Report.pdf

Thyberg, K. L., & Tonjes. D. J. (2016). Drivers of food waste and their implications for sustainable policy development. *Resources, Conservation and Recycling, 106*, 110–123. https://doi.org/10.1016/j.resconrec.2015.11.016

U.S. Census Bureau. (2012). *All sectors: Geographic area series: Economy-wide key statistics: 2012* [Table]. 2012 Economic Census of the United States. The data are searchable by interactive table at https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml

U.S. Environmental Protection Agency [U.S. EPA]. (2009). Food waste management cost calculator, version 1.0. Retrieved February 2019 from https://www.epa.gov/sites/production/files/2017-01/foodcost3.xls

U.S. EPA. (2010*). Food waste biogas economic model.* U.S. Environmental Protection Agency Region 9. Retrieved February, 2014, from https://archive.epa.gov/region9/organics/web/xls/epa-food-waste-biogas-economic-model.xls

U.S. EPA. (2012a). *Putting surplus food to good use.* Retrieved from https://archive.epa.gov/wastes/conserve/tools/rogo/web/pdf/food-guide.pdf

U.S. EPA. (2012b). *Food scrap recycling: A primer for understanding large-scale food scrap recycling technologies for urban areas.* Retrieved from http://www.ct.gov/deep/lib/deep/compost/compost_pdf/large_scale_food_scrap_recycling_primer_epa.pdf

U.S. EPA. (2012c). *Updated mapping of food residual generation in Connecticut: Final report.* Retrieved from http://www.ct.gov/deep/lib/deep/compost/compost_pdf/ct_food_residual_generator_report_2012.pdf

U.S. EPA. (2014a). *Municipal solid waste in the United States facts and figures: A methodology document.* Retrieved from https://www.epa.gov/sites/production/files/2015-12/documents/methodolgy_document_for_selected_municipal_solid_waste_products.pdf

U.S. EPA. (2014b). *Reducing wasted food and packaging: A guide for food services and restaurants.* Retrieved from https://www.epa.gov/sites/production/files/2015-08/documents/reducing_wasted_food_pkg_tool.pdf

U.S. EPA. (2016a). *Advancing sustainable materials management: 2014 fact sheet.* Retrieved from https://www.epa.gov/sites/production/files/2016-11/documents/2014_smmfactsheet_508.pdf

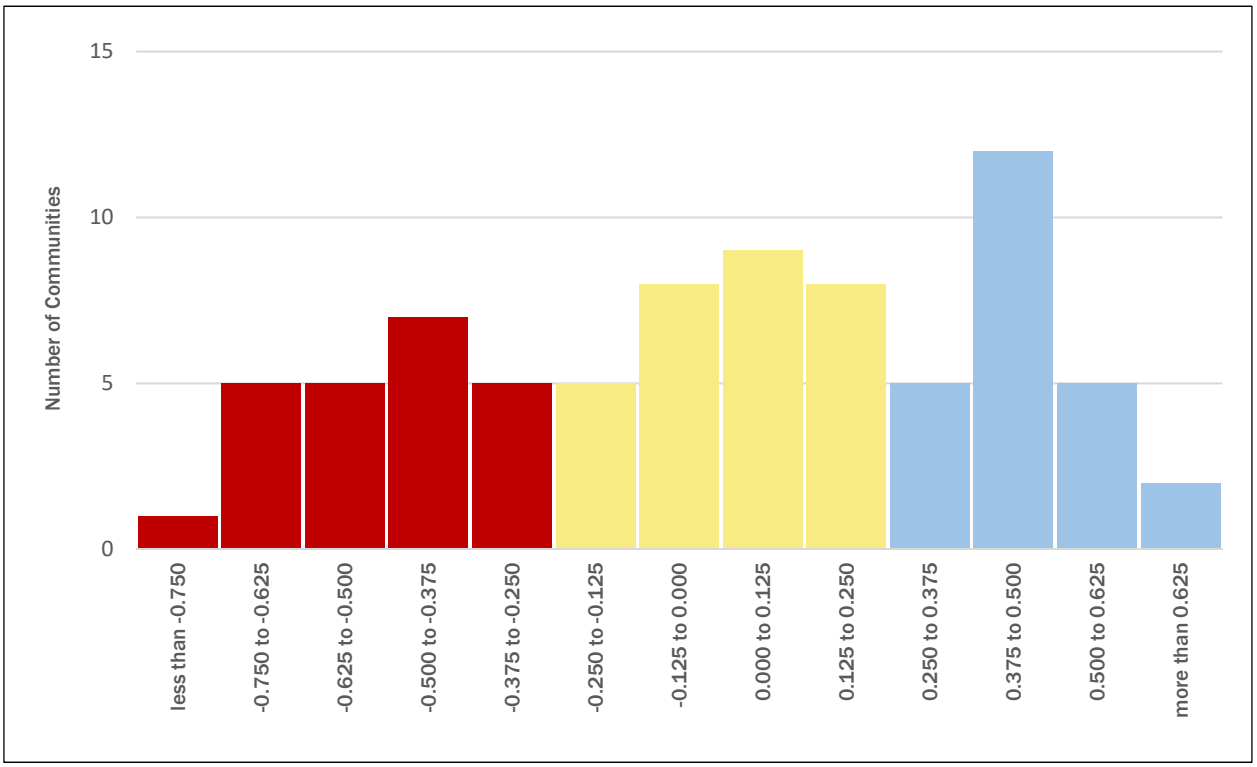
U.S. EPA. (2016b). *Food waste management in the United States, 2014*. U.S. Environmental Protection Agency, Office of Resource Conservation and Recovery. Retrieved from https://www.epa.gov/sites/production/files/2016-12/documents/food_waste_management_2014_12082016_508.pdf

U.S. EPA. (2016c). *Waste reduction model.* Retrieved from https://www.epa.gov/warm/versions-waste-reduction-model-warm

Vermont Agency of Natural Resources [VANR]. (2014). *Universal recycling materials management map*. Retrieved from http://anrmaps.vermont.gov/websites/Organics/default.html

Waste and Resources Action Programme, UK [WRAP]. (2013). *Household food and drink waste in the United Kingdom 2012*. Retrieved from http://www.wrap.org.uk/sites/files/wrap/hhfdw-2012-summary.pdf

Appendix. Histogram of Supply-Demand-Index for Chicago Communities



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A food hub to address healthy food access gaps: Residents' preferences

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Abstract

Interventions aimed at improving access to healthy food in low-income communities should consider the preferences of residents. Household food shoppers in two urban, low-income communities were asked about their preferences for vendors at, and qualities of, a potential nearby food hub. Universally, participants preferred availability of whole foods, primarily fruits and vegetables. They also favored cleanliness, quality, and affordability. The demographics and preferences of potential customers raise central issues that would need to be integrated into the development of a food hub, namely affordability (likely through subsidization), attention to accommodation and cultural accessibility, and programming that builds community.

Keywords

Food Hub, Food Access, Food Desert, Urban, Poverty, Consumer Demographics, Consumer Preferences, Food Environment

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Introduction

Low-income communities often have less physical access to affordable, healthy foods because of a lack of supermarkets and supercenters. Although referred to as 'food deserts,'1 these areas often have food retail shopping options in the form of convenience stores, resulting in higher prices and a lower quantity and quality of healthy items (Beaulac, Kristjansson, & Cummins, 2009; Walker, Keane, & Burke, 2010). Areas that lack healthy food options are disproportionately communities of color experiencing high rates of poverty; these communities are also associated with relatively higher levels of poor mental and physical health outcomes, such as greater levels of stress, poorer diet quality, and greater food insecurity (Caspi, Sorensen, Subramanian, & Kawachi, 2012; Clifton, 2004; Ver Ploeg, 2012; Walker et al., 2010). Due to these disparities, the implementation of place-based strategies that address inequities in the food environment is now a focus of many federal, state, and local policy initiatives.

One place-based strategy is a food hub. Food hubs are growing in popularity in the United States as a way to address shortcomings of the conventional food system (Colasanti, Hardy, Farbman, Pirog, Fisk, & Hamm, 2018; Levkoe et al., 2018). The most common shortcoming addressed by food hubs is a lack of market access and growth opportunities for small and mid-size producers (Woods, Velandia, Holcomb, Dunning, & Bendfeldt, 2013). More than 80% of all food hubs have this producer-focused goal (Colasanti et al., 2018). As such, food hubs are often described as centers for aggregating, distributing, and selling locally or regionally sourced foods from multiple producers to access and expand markets and meet the demands of buyers (Woods, Velandia, Holcomb, Dunning, & Bendfeldt, 2013). In addition, some food hubs are emerging to address shortcomings of the food system from the consumer perspective, such as a lack of access to healthy food in certain communities (Colasanti et al., 2018; Levkoe et al., 2018; Koch & Hamm, 2015). For instance, food hubs with this goal are offering a wide range of educational services, such as nutrition and cooking classes; they also may have features such as a small grocery store or mobile market and accept Supplemental Nutrition Assistance Program (SNAP) benefits to increase affordability (Colasanti et al., 2018; Koch & Hamm, 2015). Food hubs also have goals that, while not directly involving food, aim to positively transform the food system; these goals include fostering local decision-making power, keeping money within the community, providing a venue for entrepreneurship and new jobs, and serving as a vehicle for community-based economic development (Levkoe et al., 2018; Lerman, 2012; Matson & Thayer, 2013).

While the USDA provides a definition for food hubs (Barham, Tropp, Enterline, Farbman, Fisk, & Kiraly, 2012), the range of purposes for food hubs is likely the reason why no single definition of a food hub is universally accepted. In practice, food hubs have varying missions, values, business models, features, services, and customer bases (e.g., institutional, other retail, and consumers) (Horst, Ringstrom, Tyman, Ward, Werner, & Born, 2011; Levkoe et al, 2018). They emerge from varying contexts and are designed to meet needs of a community rooted in a particular place, giving each food hub a unique expression (Levkoe et al., 2012).

Embedded in this flexibility are practical tensions, particularly for food hubs that have non-financial goals strongly related to their mission, such as increasing healthy food access for low-income consumers. These hubs often find that they are pulled in different directions by competing forces, such as the need to be viable in a market economy and the desire to be agents of social justice (Levkoe et al., 2018). For example, in areas that lack access to healthy foods, the aggregation of

[1] Areas with no supermarkets, but with fast food and convenience options are often referred to as "food swamps" (Rose, Bodor, Swalm, Rice, Farley, & Hutchinson, 2009). Our team prefers to use the term "healthy food access gaps" instead of "food deserts" or "food swamps." Food deserts suggest a lack of food, when these locations, particularly urban locations, often have a plethora of unhealthy food (Pike et al., 2017). Further, the terms "desert" and "swamps" are not asset-based approaches to characterizing community members' residential locations.

product can also be a strategy to reduce costs to low-income consumers. Yet, given that most food hubs aim to increase the viability of small and mid-size producers, the aggregation of source-identified local product, on one hand, can increase the price premiums for local producers; this can, in turn, produce a tension between the needs of the producer and the needs of low-income consumers. Indeed, Koch and Hamm (2015) found that despite the fact that many food hubs in the Midwest aimed to increase healthy food access for underserved customers, maintaining a viable food hub business was the first priority of hub management. Another tension for social enterprises[2] is the need to fund social and community-based services, likely creating a reliance on grants, which impacts long-term sustainability of the business (Colasanti et al., 2018; Levkoe et al., 2018).

Despite these tensions, in 2014, a local community development corporation in Cleveland, Ohio, saw this flexibility in food hub definition as an opportunity to link goals for improving healthy food access, economic development, and agricultural and culinary job opportunities in an area with a high rate of poverty, food insecurity, and limited access to healthy food retailers. The community development corporation received a Healthy Food Financing Initiative grant to support the development of a food hub, a term adopted by the development corporation to describe their work. This food hub was conceptualized as having the following goals: (1) create employment and business opportunities; (2) bring healthy, local, affordable food choices to high need communities; (3) develop a healthy food distribution system; and (4) implement strategies that promote and encourage healthy food education and consumption.

In this research, we sought to examine the consumer preferences for this new food hub. We found little market research targeting residents of so-called food deserts, despite nearly 50% of food hubs actively operating in such places, 43% of food hubs accepting SNAP benefits, up to 37% of hubs organizing around a direct-to-consumer model, and 68% of food hubs having at least some direct-to-consumer sales (Barham et al., 2012; Colasanti et al., 2017; Feldstein & Barham, 2017).[3] A notable exception, however, is Weatherspoon, Oehmke, Coleman, Dembele, and Weatherspoon's (2012) study in which they examined the preferences of consumers from food deserts for specific fruits and vegetables, income and price responsiveness, and the many constraints low-income consumers face in general (not in regards to a food hub). They found that consumers from food deserts respond to the introduction of fresh fruits and vegetables in the neighborhood; however, they also found that lower purchasing power would need to be coupled with incentives to increase purchasing.

The purpose of this research brief is to inform the development of food hubs that seek to increase access to healthy foods for low-income residents. Our goal was to examine the following research questions based on resident surveys collected prior to opening the food hub: (1) How important are specific food hub vendors and food hub qualities to potential customers? and (2) Do these preferences vary depending on how likely customers are to shop at the food hub?

Study Sites, Survey, Methods

This research emerged from a natural experiment in which a food hub was being developed and implemented in Cleveland, Ohio, under the direction of a local community development corporation and their partners. A separate research grant was awarded to external evaluators to evaluate the impact of the food hub on resident norms and dietary behaviors using a quasi-experimental design involving residents in the Cleveland community and a comparison group from a socio-demographically similar community in Columbus, Ohio. These two communities are located approximately 150 miles (241 km) apart. Both communities were classified as urban food deserts, having

[2] A social enterprise can be defined as a nongovernmental organization (e.g., private nonprofit or for-profit) using a market-based approach to solving social problems (Kerlin, 2006).

[3] Food deserts, as defined by the Food, Conservation, and Energy Act of 2008, are areas "with limited access to affordable and nutritious food, particularly such an area composed of predominantly lower-income neighborhoods and communities."

both low access to a full-service supermarket within one mile (1.6 km) and being low income (Pike et al., 2017). The present analysis focuses on participants from both communities prior to developing the food hub with the goal that our findings will provide guidance to other communities implementing food hubs as a strategy to promote healthy food access.

Participants included 482 household food shoppers who completed a baseline phone survey between August 2015 and September 2016, providing answers to all questions relating to demographics, their current health condition, their food hub vendor and quality preference, and their likely shopping frequency.[4] Table 1 describes the demographics of the participants. A little over two-thirds of participants are African-American and female with a high school level of education or less. Sixty-one percent are not employed. Household income is low, with most reporting an annual income of less than US$20,000 and 64.5% reporting the receipt of SNAP benefits within the last 12 months. A little over half do not use their own cars for their main grocery shopping. The majority of participants self-reported a diagnosis of high blood pressure, heart disease, diabetes, and/or obesity.

Table 1. Participant Demographics (*N*=482)

Demographics	Participants (#)	Percent[a] or Mean
Gender		
Female	354	73.4%
Male	128	26.6%
Education		
Grades 1–11	103	21.4%
Grade 12 or GED	186	38.6%
Technical School or Some College	134	27.8%
College Graduate	58	12.0%
Employment		
Employed	188	39.0%
Out of Work	94	19.5%
Not in Workforce[b]	199	41.2%
Household Size (Average)	2.56	
Household Income ($US)		
Less than 10,000	176	36.5%
$10,001–$20,000	146	30.3%
$20,001–$30,000	76	15.8%
$30,001 or More	78	16.2%
Supplemental Nutrition Assistance Program		
SNAP Participant	311	64.5%
Non-participant	170	35.3%
Race		
White	130	27.0%
Black or African American	332	69.0%
Other	19	4.0%
Car Use for Main Food Shopping		
Use Own Car	255	52.9%
Do Not Use Own Car	226	46.9%
Self-reported Diagnosed Health Condition		
High Blood Pressure	195	40.5%
Heart Disease	37	7.7%
Diabetes	76	15.8%
Obesity	139	28.8%
One of the Above Conditions	268	55.6%

[a] Calculations exclude missing data.
[b] Choices were Unable to Work, Homemaker, Student, and Retired.

Given that no food hubs existed near these communities and the developers of the food hubs considered a "hub" to be a new and evolving (and flexible) concept, we asked respondents to "imagine" one. Further, because we asked for feedback on something that was novel, we did not want to limit their imagination. We informed participants that the hub could have multiple farmers or vendors selling a wide variety of foods in the same area, which may also have restaurants. Further, we explained that, unlike a farmers market, the food hub would be open seven days a week.

[4] The full study has 519 participants. For this paper, we limited it to the 482 participants who completed all sections of the survey needed to complete the analysis.

Participants used a 4-point Likert scale when stating how important particular vendors would be in determining whether to shop at a neighborhood food hub. Responses ranged from 1='Not at all important' to 4='Very important,' and they included the option 'I would not shop at the food hub.' Additionally, their interest level in being a vendor or employee at the food hub was assessed with the 3-point Likert scale ranging from 1='Not at all interested' to 3='Very interested.'

To analyze the preference data, we first calculated the mean for vendor and hub quality preferences across participants. Significant differences between each mean preferences ($p<.05$) were then tested using repeated measures ANOVA with post-hoc tests for pair-wise comparison using the Bonferroni correction (i.e., comparing each vendor preference with all other vendor preferences and each hub quality preference with all other hub quality preferences). Next, these preferences were examined by the likely frequency of shopping. Respondents were asked how frequently they currently shop at their main food shopping locations and then how frequently they would shop at a neighborhood food hub. These two frequencies were used to create a new variable indicating whether participants were likely to shop at the food hub at more, less, or about the same frequency as their main shopping locations. For each food hub vendor and hub quality, significant differences between food hub shopping frequencies were tested using one-way ANOVA ($p<.05$) with post-hoc tests. All analyses were performed using SPSS, version 24.

Preferences for Vendors and Food Hub Qualities

Tables 2 and 3 rank order the mean importance of

Table 2. Participants' Food Hub Vendor Preferences

Food Hub Vendor Type	Mean	Std. Dev.	Fruit and Vegetable	Fresh Meat or Butcher	Cheese and Dairy	Fish or Seafood	Herbs and Spices	Pasta and Dry Goods	Bakery	Staple Goods	Value-added	Prepared Foods	General Merchandise	Fresh Cut Flowers or Plants
Vendors of Whole Food Products			**Significantly Different from $p<.05$**											
Fruit and Vegetable	3.81	0.45		X	X	X	X	X	X	X	X	X	X	X
Fresh Meat or Butcher	3.71	0.6	X		X	X	X	X	X	X	X	X	X	X
Cheese and Dairy	3.55	0.68	X	X			X	X	X	X	X	X	X	X
Fish or Seafood	3.54	0.82	X	X			X	X	X	X	X	X	X	X
Herbs and Spices	3.34	0.8	X	X	X	X			X	X	X	X		X
Vendors of Nonperishables														
Pasta and Dry Goods (e.g., beans, grains)	3.27	0.78	X	X	X	X			X	X	X	X		X
Bakery	3.06	0.84	X	X	X	X	X	X				X	X	X
Staple Goods (e.g., coffee, flour, sugar)	3.01	0.95	X	X	X	X	X	X			X		X	X
Vendors of Ready-to-Eat Foods														
Value-added (e.g., pre-cut fruit, salsa, jam)	2.96	0.89	X	X	X	X	X	X				X	X	X
Prepared Foods	2.73	0.97	X	X	X	X	X	X	X	X	X		X	
Vendors of Nonfoods														
General Merchandise (e.g., toiletries, diapers)	3.32	0.96	X	X	X	X			X	X	X	X		X
Fresh-cut Flowers or Plants	2.66	0.99	X	X	X	X	X	X	X	X	X		X	

specific food hub vendors and qualities across all participants. In Table 2, similar vendors are grouped and then ranked from highest to lowest by the mean preference score across participants. Overall, preferences for vendors are significantly different ($F_{11,471} = 79.211$, $p<.001$). To examine the pair-wise differences, Table 2 includes cross-listings of each vendor type. On the right side of the table an "X" denotes a significant difference between the vendor listed on the left and the vendor titled in that column with an "X." For example, preferences for fruit and vegetable vendors are significantly different than preferences for all other vendors. Preferences for cheese and dairy vendors are significantly different than preferences for all other vendor *except* for fish or seafood vendors. Preferences for cheese and dairy are not significantly different than fish or seafood.

Participants ranked fruit and vegetable vendors highest, followed by meat vendors, both of which are significantly more important than any other food vendor types listed. Vendors selling whole foods such as fruits, vegetables, meats, and fish were rated as being more important than vendors selling nonperishable foods, ready to eat foods, and nonfoods such as flowers.

Table 3 presents the preferences for qualities of a food hub. Like preferences for vendors, overall, preferences for food hub qualities are significantly different ($F_{10,472} = 120.502$, $p<.001$). To examine pair-wise differences, Table 3 is read the same as Table 2. On the right side of the table an "X" denotes a significant difference between the vendor listed on the left and the vendor titled in that column with an "X. Customer service qualities were rated as the most important features of a food hub. Cleanliness was rated the highest across all participants, followed by quality. While cleanliness and good quality are significantly different from all other qualities, they are not significantly different from one another. Affordability is ranked third and is significantly higher than the other categories of ease of use, community engagement, and employment opportunities. The ease of use category was the next most important (although not significantly different than welcoming and variety), indicating a

Table 3. Participants' Food Hub Quality Preferences

Food Hub Qualities	Mean	Std. Dev.	Clean	Good Quality	Affordability	People Are Welcoming	Good Variety	Convenient to Shop	One-stop Shop	Vendors from Comm.	Customers from Comm.	Work as an Employee	Work as a Vendor
Customer Service and Product Qualities			**Significantly Different from $p<.05$**										
Clean	3.95	0.24			X	X	X	X	X	X	X	X	X
Good Quality	3.91	0.33			X	X	X	X	X	X	X	X	X
Affordability	3.85	0.44	X	X	X			X	X	X	X	X	X
People Are Welcoming	3.78	0.48	X	X						X	X	X	X
Good Variety	3.77	0.49	X	X						X	X	X	X
Ease of Use													
Convenient to Shop	3.73	0.54	X	X	X					X	X	X	X
One-stop Shop	3.69	0.63	X	X	X					X	X	X	X
Community Engagement													
Vendors Are from Community	3.1	0.87	X	X	X	X	X	X	X			X	X
Customers Are from Community	3.01	0.92	X	X	X	X	X	X	X			X	X
Employment Opportunities													
Work as an Employee	2.23	0.04	X	X	X	X	X	X	X	X	X		X
Work as a Vendor	1.91	0.04	X	X	X	X	X	X	X	X	X	X	

Table 4. Mean Food Hub Vendor Preferences by Food Hub Shopping Frequency

	Intended Food Hub Shopping Frequency Compared to Main Store		
Food Hub Vendors	**Less Frequently**	**About the Same**	**More Frequently**
Vendors of Whole Food Products			
Fruit and Vegetable	3.77	3.85	3.87
Fresh Meat or Butcher	3.66	3.71	3.79
Cheese and Dairy	3.51	3.54	3.65
Fish or Seafood	3.56	3.46	3.65
Herbs and Spices	3.24	3.42	3.42
Vendors of Nonperishables			
Pasta and Dry Goods (e.g., beans, grains)	3.25	3.29	3.3
Bakery	3.03	3.04	3.16
Staple goods (e.g., coffee, flour, sugar)*	2.96	2.97	3.23
Vendors of Ready-to-Eat Food			
Value-added (e.g., pre-cut fruit, salsa, jam)	2.91	2.98	3.01
Prepared Foods	2.71	2.80	2.7
Vendors of Nonfoods			
General Merchandise (e.g., toiletries, diapers)*	3.21	3.40	3.47
Fresh Cut Flowers or Plants	2.60	2.68	2.77
N=	229	142	111

* significant at $p<.05$

Table 5. Mean Food Hub Quality Preferences by Food Hub Shopping Frequency

	Intended Food Hub Shopping Frequency Compared to Main Store		
Food Hub Qualities	**Less Frequently**	**About the Same**	**More Frequently**
Customer Service and Product Qualities			
Clean	3.95	3.97	3.94
Good Quality	3.89	3.94	3.95
Affordability	3.81	3.86	3.91
People Are Welcoming	3.75	3.82	3.81
Good Variety*	3.74	3.78	3.86
Ease of Use			
Convenient to Shop	3.69	3.77	3.81
One-stop Shop	3.62	3.71	3.75
Community Engagement			
Vendors Are from Community	3.07	3.19	3.08
Customers Are from Community	2.95	3.12	3.02
Employment Opportunities			
Work as an Employee*	2.13	2.19	2.47
Work as a Vendor*	1.80	1.97	2.08
N=	229	142	111

* significant at $p<.05$

preference for a food hub that is convenient and offers one-stop shopping. The community engagement category was significantly less important, indicating lower preferences for having vendors and customers from the community. Finally, the least important qualities related to employment at the food hub. While being a vendor at the food hub or an employee at the hub ranked at the bottom, it should be noted that 78% of respondents are at least somewhat interested in employment or vending opportunities (responding with a 2 or 3 on the 3-point Likert scale).

Tables 4 and 5 show food hub vendor and quality preferences by intended food hub shopping frequency. Almost half of the participants (47.5%) reported that they would shop at a food hub less frequently than their main stores. Overall, few significant differences exist between intended food hub shopping frequency and preferences,

which include preferences for vendors (Table 4). Participants that intend on shopping at the same or greater frequency at the hub prefer fruits and vegetables, herbs and spices, general merchandise, and staple goods more than those who intend to shop less frequently. Staples and general merchandise preferences seem logical given that these items are part of the full shopping experience that is associated with their main food shopping location (supermarket or supercenter). Likewise, variety and convenience are significantly more important to more frequent shoppers (Table 5). Finally, being interested in vending or working at the food hub is significantly correlated with intended shopping frequency at the food hub.

Considerations when Intervening in Food Deserts

Among this sample of low-income urban residents, participants expressed preferences for access to whole foods from a food hub, particularly fruits and vegetables. This aligns with typical foods offered at food hubs and the types of foods aimed at increasing healthy food access and improved nutrition (Colasanti et al., 2018). Preferences for prepared foods ranked very low, which could be related to the fact that these products are ineligible for purchase using SNAP benefits. Considering that 65.5% of the sample were SNAP recipients, the ineligibility of purchasing prepared foods with SNAP benefits could very well be a contributing factor their low ranking among participants. Coupling food hub implementation with programming to further demand for whole foods, such as community cooking and nutrition classes (Hardy, Hamm, Pirog, Fisk, Farbman, & Fischer, 2016) or other programs aimed at reducing the costs of whole foods (such as the USDA Food Insecurity Incentive Program), may increase the financial sustainability of food hubs in healthy food access gap contexts.

Cleanliness, product quality, and affordability were the most preferred qualities of the food hub environment. The salience of cleanliness for a food hub could suggest that food retail spaces in low-income neighborhoods may inconsistently meet desired cleanliness standards. These preferences may indicate a need for place-based food environment interventions to be designed to accommodate community needs and preferences, in addition to physical and economic access to healthy foods. Food environment interventions are critiqued for not being 'for' specific neighborhoods. For example, farmers market interventions are described as already 'raced,' 'classed,' and 'othering' by residents from low-income neighborhoods (Larchet, 2014). In this research, we asked participants with little prior knowledge of what a food hub is to "imagine" a food hub in their neighborhood. This intervention may have been perceived to be more inclusive and better aligned with shopping preferences. Future research will explore how these perceptions change once a food hub is realized in a neighborhood.

While still ranking as important, on average, when asked about preferences for vendors and customers being from the community, these categories ranked lower than the food hub environment and product features. To address the underlying relational- and values-based principles of a food hub, developers in a food desert will likely need to consider designing programming to build local residents' commitment to engage with the hub. Moreover, developers should consider thinking more broadly about market research and include other dimensions beyond preferences to determine community readiness for a food environment intervention (Edwards, Jumper-Thurman, Plested, Oetting, & Swanson, 2000).

The socio-demographics of the target and control communities may give food hub developers pause. Concerns regarding market viability exist when purchasing power is low and unemployment is high (Ver Ploeg, Dutko, & Breneman, 2014). Given the rates of SNAP participation, integrating the ability to pay with SNAP benefits would help ensure both economic and sociocultural accessibility. Low purchasing power raises the tension between market-driven and justice-driven approaches to food hub development and signals the need for a social enterprise to make products more affordable (via, for example, grant dollars or public-private partnership) and to sustain the market.

Finally, an issue raised in these data is the opportunity to address two community needs

simultaneously: improving healthy food access and providing employment opportunities. A food hub has the potential to accomplish both goals if both are prioritized. Findings from this research, given that participants reported high rates of unemployment and a desire to work at a food hub, reveal the need for food hub interventions to begin with a dual focus on healthy food access and employment.

Conclusion

Areas that lack healthy food access represent a shortcoming of the conventional food system. Bringing a market-based solution, like a food hub, to such areas—ones that supermarkets have largely avoided—is filled with tensions. However, existing hubs demonstrate that food hubs can be flexible entities that can and, in some cases, are run as social enterprises. To address these tensions, food hub developers aiming to serve low-income residents in an area that lacks access to healthy food can take the first step by understanding market demand—i.e., understanding their customer profile, their customer preferences for specific products (e.g., specific fruits and vegetables, rather than the broad product category of "fruits and vegetables"), and understanding preferences for the quality of the shopping environment. A next step would be to determine community readiness and any needed programming to accompany the market component of the hub.

In our study, participants living in two food deserts were surveyed and asked to imagine a neighborhood food hub and state their preferences for food hub vendors and hub qualities. Their whole food preferences align with typical food hub vendors. However, the demographics and preferences of potential customers also raise central issues that would need to be integrated into the development of a food hub, namely affordability. This can likely be accomplished through subsidization, attention to accommodation and cultural accessibility, conjoint programming that builds community and commitment, and jobs training and employment. These types of developments would be handled best by a social enterprise oriented toward community development.

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References

Barham, J., Tropp, D., Enterline, K., Farbman, J., Fisk, J., & Kiraly, S. (2012). *Regional food hub resource guide*. Washington, D.C.: U.S. Department of Agriculture, Agricultural Marketing Service. Retrieved from https://www.ams.usda.gov/sites/default/files/media/Regional%20Food%20Hub%20Resource%20Guide.pdf

Beaulac, J., Kristjansson, E., & Cummins, S. (2009). A systematic review of food deserts, 1966-2007. *Preventing Chronic Disease, 6*(3), A105. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2722409/

Caspi, C. E., Sorensen, G., Subramanian, S., & Kawachi, I. (2012). The local food environment and diet: A systematic review. *Health & Place, 18*(5), 1172–1187. https://doi.org/10.1016/j.healthplace.2012.05.006

Clifton, K. J. (2004). Mobility strategies and food shopping for low-income families: A case study. *Journal of Planning Education and Research, 23*(4), 402–413. https://doi.org/10.1177/0739456X04264919

Colasanti, K., Hardy, J., Farbman, J., Pirog, R., Fisk, J., & Hamm, M. W. (2018). *Findings of the 2017 National Food Hub Survey*. East Lansing, MI: Michigan State University Center for Regional Food Systems & The Wallace Center at Winrock International. Retrieved from https://foodsystems.msu.edu/2017foodhubsurvey

Edwards, R. W., Jumper-Thurman, P., Plested, B. A., Oetting, E. R., & Swanson, L. (2000). Community readiness: Research to practice. *Journal of Community Psychology*, *28*(3), 291–307. https://doi.org/10.1002/(SICI)1520-6629(200005)28:3%3C291::AID-JCOP5%3E3.0.CO;2-9

Feldstein, S., & Barham, J. (2017). *Running a food hub: Learning from food hub closures*. Washington, D.C.: U.S. Department of Agriculture, Rural Development. Retrieved from https://www.rd.usda.gov/files/publications/SR77_FoodHubs_Vol4_0.pdf

Hardy, J., Hamm, M., Pirog, R., Fisk, J., Farbman, J., & Fischer, M. (2016). *Findings of the 2015 National Food Hub Survey*. East Lansing: Michigan State University Center for Regional Food Systems. Retrieved from https://www.canr.msu.edu/foodsystems/resources/report/2015%20national%20food%20hub%20survey%20findings.pdf

Horst, M., Ringstrom, E., Tyman, S., Ward, M. K., Werner, V., & Born, B. (2011). Toward a more expansive understanding of food hubs. *Journal of Agriculture, Food Systems, and Community Development*, *2*(1), 209–225. https://doi.org/10.5304/jafscd.2011.021.017

Kerlin, J. A. (2006). Social enterprise in the United States and Europe: Understanding and learning from the differences. *Voluntas: International Journal of Voluntary and Nonprofit Organizations*, *17*(3), 247–263. https://doi.org/10.1007/s11266-006-9016-2

Koch, K., & Hamm, M. W. (2015). The role of values in food hub sourcing and distributing practices. *Journal of Hunger & Environmental Nutrition*, *10*(4), 483–495. https://doi.org/10.1080/19320248.2015.1045668

Larchet, N. (2014). Learning from the Corner Store: Food reformers and the black urban poor in a Southern US city. *Food, Culture & Society, 17*(3), 395–416. https://doi.org/10.2752/175174414X13948130848386

Lerman, T. (2012). *A review of scholarly literature on values-based supply chains*. Davis: University of California, Davis, Agricultural Sustainability Institute.

Levkoe, C. Z., Hammelman, C., Craven, L., Dandy, G., Farbman, J., Harrison, J., & Mount, P. (2018). Building sustainable food systems through food hubs: Practitioner and academic perspectives. *Journal of Agriculture, Food Systems, and Community Development*, *8*(2), 107–122. https://doi.org/10.5304/jafscd.2018.082.008

Matson, J., & Thayer, J. (2013). The role of food hubs in food supply chains. *Journal of Agriculture, Food Systems, and Community Development*, *3*(4), 43–47. https://doi.org/10.5304/jafscd.2013.034.004

Pike, S. N., Trapl, E. S., Clark, J. K., Rouse, C. D., Bell, B. A., Sehgal, A. R., … Freedman, D. A. (2017). Examining the food retail choice context in urban food deserts, Ohio, 2015. *Preventing Chronic Disease*; *14*, 160408. https://doi.org/10.5888/pcd14.160408

Rose, D., Bodor, J. N., Swalm, C. M., Rice, J. C., Farley, T. A., & Hutchinson, P. L. (2009). *Deserts in New Orleans? Illustrations of urban food access and implications for policy*. Ann Arbor: University of Michigan National Poverty Center & USDA Economic Research Service Research.

Ver Ploeg, M. (2012). *Access to affordable and nutritious food: Updated estimates of distance to supermarkets using 2010 data*. U.S. Department of Agriculture, Economic Research Service. Retrieved from https://www.ers.usda.gov/webdocs/publications/45032/33844_err143_summary.pdf?v=0

Ver Ploeg, M., Dutko, P., & Breneman, V. (2014). Measuring food access and food deserts for policy purposes. *Applied Economic Perspectives and Policy*, *37*(2), 205–225. https://doi.org/10.1093/aepp/ppu035

Walker, R. E., Keane, C. R., & Burke, J. G. (2010). Disparities and access to healthy food in the United States: A review of food deserts literature. *Health & Place, 16*(5), 876–884. https://doi.org/10.1016/j.healthplace.2010.04.013

Weatherspoon, D. D., Oehmke, J. F., Coleman, M. A., Dembele, A. S., & Weatherspoon, L. J. (2012). Will long term food desert consumers purchase fresh fruits and vegetables? *Choices, 27*(3), 1–5. Retrieved from http://www.choicesmagazine.org/choices-magazine/theme-articles/an-evaluation-of-food-deserts-in-america/will-long-term-food-desert-consumers-purchase-fresh-fruits-and-vegetables

Woods, T., Velandia, M., Holcomb, R., Dunning, R., & Bendfeldt, E. (2013). Local food systems markets and supply chains. *Choices, 28*(4), 1–4. Retrieved from http://www.choicesmagazine.org/choices-magazine/theme-articles/developing-local-food-systems-in-the-south/local-food-systems-in-the-south-a-call-for-a-collaborative-approach-to-assessment

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The Farmers Market Metrics Project: A research brief on scalable data collection in the Minneapolis-St. Paul Metro

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Abstract

Maintaining funding for local and regional food system initiatives requires reliable data to demonstrate their impacts. Data that are specific to farmers markets in a localized context are not readily available. The Farmers Market Metrics Project is a three-way partnership between farmers markets, local government, and a university to elevate the capacity of the markets in the Minneapolis–St. Paul Metro region through regionally collected metrics to quantify their presence in the regional food system. In this research brief, we introduce the FM360 data collection method being developed by the project, which is scalable across geographic areas. Scalability is critical to making the data collection process adaptable and effective in cases involving multiple data sources and when flexibility is needed in defining the food system parameters to satisfy partners and prospective funders.

Keywords

Collaborative, Community-University Partnership, Farmers Markets, Market Managers, Metrics, Minneapolis-St. Paul, Primary Data Collection, Regional Food System, Vendors, Visitors

Introduction

Public, private, and nonprofit entities have increasingly championed local and regional food systems, as consumer interest in healthy foods and thriving local communities has grown. These local and regional initiatives are typically propelled by a series

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of term-defined projects and initiatives funded by public, private, and nonprofit sources. Short-term funding, however, has the potential to discourage momentum, and funding opportunities for continued work are much more limited than those for new projects. Farmers markets, "the historical flagship of local food systems" (Brown & Miller, 2008, p. 1296), face competition for the limited financial resources available for local and regional food systems, from various initiatives, old and new alike. Evaluations or impact assessments are effective ways to overcome such barriers to secure sustained funding, but such assessments require reliable metrics or data. In most cases, data that are specific to farmers markets in a localized context are not readily available and require primary data collection.

In major U.S. metropolitan regions, farmers markets share both vendors and patrons. The Minneapolis–St. Paul seven-county metro region (the MSP metro or the Twin Cities) is home to about 90 farmers markets. These markets vary in size, ownership, governance, and management structure. The oldest of the markets, the St. Paul Farmers Market, dates back to 1853. The largest of the markets, the Minneapolis Farmers Market on Lyndale Avenue, first opened in 1937. Many smaller markets have opened within the past decade, bringing fresh local produce directly to neighborhoods, public spaces, and even office buildings. Despite the apparent vibrancy, several farmers markets have seen a decline in support or patronage, as they compete with corporate retail outlets or food cooperatives touting similar offerings of fresh local foods and possibly with other farmers markets. When vendor and customer bases overlap, documenting the activities of one farmers market in isolation is not very meaningful. Demonstrating the combined activities of all markets within a region across multiple layers of jurisdictions is a challenge that no individual market can take on alone.

The MSP Metro Farmers Market Metrics Project emerged from the efforts of several farmers market managers who noticed a lack of basic data on farmers markets in the region. Partnerships with the City of Minneapolis and the University of Minnesota provided critical guidance, resources, and skills to capitalize on the impetus of the market managers. As such, the project developed a regional approach to food system metrics collection based on this unique, three-way partnership between farmers markets, local government, and university. In late 2018, it completed the second year of a three-year project funded by the U.S. Department of Agriculture (USDA) Farmers Market Promotion Program.

The primary goal of the Farmers Market Metrics Project is to elevate the capacity of farmers markets in the MSP Metro region to articulate their own value to the local food system. The project also aims to establish an efficient, effective, and scalable data collection method for measuring farmers market activities in a defined area. Scalability is important because geographic and political boundaries that shape the collective identities of farmers markets (e.g., neighborhood, city, or county) are nebulous and overlapping. Standardized metrics can be aggregated over given localities or regions to meet the needs of different audiences to effectively garner support for the markets. This research brief introduces FM360, which is the data collection approach we developed during the first years of the project, and demonstrates considerations in cases involving multiple data sources across administrative boundaries. We conclude with a discussion of factors contributing to the success of the project thus far, challenges ahead, and how the project may be useful to others.

Literature Review

The three main stakeholders of farmers markets are vendors, consumers, and managers. Studies that report the impacts or activities of farmers markets have generally collected primary data because secondary data are not readily available for their purposes, although few studies provide details about the data collection methods. Most numerous are studies based on data collected from visitors at farmers markets aimed at understanding their characteristics, preferences, and shopping behavior. Typically, visitors are intercepted at the market by surveyors based on an established sampling method (e.g., Sadler, Clark, & Gilliland, 2013). Rapid Market Assessment (RMA; Lev, Brewer, & Stephenson, 2008) was developed to help farmers markets obtain visitor metrics without elaborate

survey work. They propose to count arriving visitors in 10- or 20-minute intervals and ask visitors to respond to a limited number of multiple-choice questions posted on easels using round stickers. These dot surveys have become familiar fixtures in farmers markets.

A few studies across the country have collected data from more than one market stakeholder group at multiple markets. Notable examples include those in Iowa (Varner & Otto, 2008), Oklahoma (Henneberry, Whitacre, & Agustini, 2009), South Carolina (Hughes & Isengildina-Massa, 2015), Washington (Ostrom & Donovan, 2013), Maine (Maine Federation of Farmers' Markets, 2017), and upstate New York (Schmit & Gómez, 2011). Farmers' Markets Canada contracted a comprehensive national study to establish a benchmark in 2009 encompassing 508 farmers markets identified across the country (Experience Renewal Solutions, 2009). As methodological innovations besides RMA, self-assessment tools have been developed for markets to demonstrate their impacts. The Sticky Economic Evaluation Device (SEED) by Market Umbrella, an independent nonprofit organization, allows for markets to collect and store data through their online accounts and process data to generate detailed impact reports. The service is available to markets for free in exchange for giving Market Umbrella access and publishing rights to their data (Market Umbrella, 2012). The Farmers Market Coalition (FMC), a national advocacy organization in the U.S. for farmers markets, offers Farmers Market Metrics, an online system of data collection and reporting, which is available to markets for a fee (FMC, n.d.-b).

Specific guidance on how to implement an urban regional metric collection is limited. The Farmers Market Metrics Project contributes to the literature by exploring and refining ways to collect data from three stakeholder groups across the region. The project uses a scalable approach based on a three-way partnership between farmers markets, local government, and a university. We refer to the resulting data collection method as FM360.

Methods

The makeup of the project team is a unique aspect of the Farmers Market Metrics Project. As has been previously mentioned, the project is led by a three-way partnership that consists of market managers, local government staff, and academics. In the case of our project, the university represented on the team is the University of Minnesota, and the local government is the City of Minneapolis. Most of the earliest markets that participated in the project were from Minneapolis. While the project's leadership reflects this history, members of other communities are continuing to get more involved as the project expands.

The USDA defines farmers markets as "markets that feature two or more farm vendors selling agricultural products directly to customers at a common, recurrent physical location" (USDA Agricultural Marketing Service, n.d., para. 1). Thus, markets are defined by their physical location, even if multiple markets are referred to as a group and/or managed by the same entity or individual. The same market may operate on more than one day in a given week. The project also includes public markets with a single farm vendor selling agricultural products along with other nonfarm vendors. According to the USDA's National Farmers Market Directory, as of March 2018, there were 196 markets in Minnesota, 79 of which were within the MSP metro region. But the local market scene is larger and more dynamic than what is posted in the directory. The lists of markets maintained by county agencies and the City of Minneapolis showed there to be 87 markets in the MSP metro region, and the project team members were made aware of new markets opening and existing ones closing throughout the summer months. Thus, the scope of the Farmers Market Metrics Project—i.e., including all farmers markets in the MSP metro region—is both well-defined and constantly fluctuating.

The project team referenced the list of 37 metrics identified by the FMC (n.d.-a) to select the metrics of interest. Given the dearth of information, obtaining basic counts of total vendors and estimated total visitors and the total market sales were clear priorities. For the latter, the team did not feel comfortable with the FMC's recommended method to mandate or request vendors to submit anonymously completed slips at the end of the market day. Instead, the team decided to ask all

vendors to identify their annual sales in the preceding market season by choosing in the survey the range of sales that would apply to them. This was augmented with an option for some selected vendors to provide weekly sales information over the market season in return for a stipend. The team felt it was critical to avoid imposing additional burdens on managers and vendors during the project implementation, in contrast to the self-assessment approach of Market Umbrella and FMC. Additionally, the team decided to avoid reliance on volunteers to ensure that metrics were collected in a unified manner across markets for consistency.[1] Hence, the collection and entry of metrics were handled by a field crew that was trained and managed by the university researcher. The field crew collecting the customer data via dot surveys was coordinated and monitored by the university researcher and graduate assistant. The graduate assistant also distributed and collected the vendor surveys both at pre-season vendor meetings and at farmers markets throughout the entirety of the market season. The manager survey was administered online and designed to be completed for each market. Managers who oversaw multiple markets received a unique survey link for each market. The university researcher drafted and finalized instruments for each of the three surveys with input from the other team members. The university researcher also assumed the role of maintaining the metrics database.

For visitor metrics, the team applied the RMA (Lev et al., 2008) using dot surveys and visitor counting with a modification. By requiring fewer people to conduct the counts, the visitor count modification aims to make the metric more attainable for markets with fewer resources (Nowak, 2019). In addition to the four dot-survey questions, the field crew asked for the zip codes of the participants' place of residence and the modes of transportation they used to visit the market. The target was to collect the visitor metrics during four-hour periods on two market dates at every participating market to reduce event-specific effects.[2] The first round of visitor metrics was collected from most, if not all, participating markets before the second round of collection took place.

Recognizing a market as a coherent unit, the team prioritized collecting all metrics from a given market over encompassing all markets in the region at the start. Thus, the metrics collection first engaged a limited number of markets and progressively expanded the geographic scope. This enabled not only reporting of impacts at any geographic identity, but also allowed for adjusting the scope by available funds. For the Farmers Market Metrics Project, the plan of scaling up has allowed for the project to begin with limited funds while additional funds were sought. The scale of the project and its participating markets has roughly doubled every season. It started with 12 predominantly Minneapolis-based markets in 2016's pilot season, increased to 27 markets in Minneapolis and St. Paul in 2017's first season of USDA funding, and finally increased to 53 markets across the MSP metro area in 2018. The project plans to reach all 90 or so metro farmers markets in 2019.

Discussion

The Farmers Market Metrics Project utilizes our FM360 approach driven by a productive, three-way partnership. The FM360 approach consists of regional-scale, market-wide (vendor, customer, and manager) scope, and minimal resource commitment from market vendors and managers. The unique characteristic of this approach is that since the methods are standardized, markets across the region can compare their results to various levels of benchmarks, making the project outputs not only informative to the assessment of the regional food system, but also valuable to farmers markets on an individual basis.

Perhaps most critical to the project's success thus far is the three-way partnership between the markets, the city, and the university that has led the endeavor. This partnership has helped the project

[1] Varner and Otto (2008) mention that in their study, the attendance record was inconsistent across markets because managers were asked to count and provide them.

[2] Market hours or weather might call for fewer hours of collection period in some cases, but for a valid set of metrics, at minimum two hours were allocated. Also, collection might occur on only one market date at the smallest markets.

face the challenge of sustainability, both in terms of leadership and funding. Two managers on the project team have moved on, but the project has withstood the turnover owing in part to the steadiness of the government and university members and to the successors of the managers taking their places on the project team. The government and university partners have shared responsibility for moving the project along and contributed resources that have been complementary. Farmers market managers have provided site-level coordination that otherwise would have expended project resources.

Refining the implementation procedures is an ongoing process, and several more seasons are needed to identify best practices for the FM360 method. For example, the way we administer vendor surveys will continue to evolve to improve response rates. The project is currently supported by a three-year grant, and the future of metrics collection beyond the grant period is unknown. Several strategies and scenarios are being explored to sustain the efforts. This challenge of coming up with realistic and promising options for the financial sustainability for the future of the metrics endeavor is the key to being able to fully propose the FM360 as a new sustainable and replicable method.

Conclusion

It is critical to equip communities with tools to effectively demonstrate the importance of their food system activities before any existing funding support or momentum is lost. This research brief reports on how the Farmers Market Metrics Project is collecting metrics from three distinct stakeholders at markets in the MSP metro region. The three-way partnership among farmers markets, the local government, and university has been valuable when forming a team for planning and implementing data collection. The FM360 approach is scalable across geographic areas, which is important in cases involving multiple data sources and when flexibility is needed in defining the food system parameters to satisfy all members of the team or prospective funders.

The Farmers Market Metrics Project is yielding rich data from vendors, visitors, and market managers, which will be fully analyzed to reveal the presence of farmers markets in the MSP metro region. Such findings from metrics will be deferred until the end of the project. In 2019, the project ideally will lay the groundwork for a foundation of sustained data collection that Twin Cities farmers markets can use to better articulate their contribution to the regional food system and their respective communities. A next step is to work with communities in regions beyond the MSP metro to further examine the adaptability, scalability, and effectiveness of FM360 in different settings and locations. The team welcomes collaboration with other communities around the nation that may consider adapting the FM360 approach to benchmark capacity-building efforts for their local food systems.

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References

Brown, C., & Miller, S. (2008). The impacts of local markets: A review of research on farmers markets and community supported agriculture (CSA). *American Journal of Agricultural Economics, 90*(5), 1296–1302. https://doi.org/10.1111/j.1467-8276.2008.01220.x

Experience Renewal Solutions. (2009). *National farmers' market impact study 2009 report*. Farmers' Markets Canada. Retrieved from https://www.unbc.ca/sites/default/files/sections/david-connell/farmers-markets/nationalfarmersmarketimpactstudy2009.pdf

Farmers Market Coalition [FMC]. (n.d.-a). Farmers market metrics: Metrics. Retrieved May 1, 2016, from http://farmersmarketcoalition.org/programs/farmers-market-metrics/metric-selection/

Farmers Market Coalition [FMC]. (n.d.-b). Programs: Farmers market metrics. Retrieved March 5, 2019, from https://farmersmarketcoalition.org/programs/farmers-market-metrics/

Henneberry, S. R., Whitacre, B., & Agustini, H. N. (2009). An evaluation of the economic impacts of Oklahoma farmers markets. *Journal of Food Distribution Research*, *40*(3), 64–78. http://purl.umn.edu/99760

Hughes, D. W., & Isengildina-Massa, O. (2015). The economic impact of farmers' markets and a state level locally grown campaign. *Food Policy, 54*, 78–84. https://doi.org/10.1016/j.foodpol.2015.05.001

Lev, L., Brewer, L. J., & Stephenson, G. (2008). *Tools for Rapid Market Assessments* (Special Report 1088-E). Retrieved from https://catalog.extension.oregonstate.edu/sr1088

Maine Federation of Farmers' Markets. (2017). *Maine Farmers' Market Annual Report 2017*. Pittsfield: Maine Federation of Farmers' Markets.

Market Umbrella. (2012). *Farmers markets contribute millions to local, regional economies* [Press release]. Retrieved July 14, 2018, from the Market Umbrella website. [No longer online].

Nowak, J. (2019, February). Visitor count insights [Webinar session]. Presented with L. Schreiber, *Farmers Market Metrics in Minnesota.* Webinar hosted by Midwest Farmers Market Partners and USDA Food and Nutrition Services.

Ostrom, M., & Donovan, C. (2013). *Summary report: Farmers markets and the experiences of market managers in Washington state.* Washington State University Small Farms Program. Retrieved from http://csanr.wp2.cahnrs.wsu.edu/wp-content/uploads/sites/32/2013/11/WSU-FMMS-report-Nov-2013.pdf

Sadler, R. C., Clark, M. A. R., & Gilliland, J. A. (2013). An economic impact comparative analysis of farmers' markets in Michigan and Ontario. *Journal of Agriculture, Food Systems, and Community Development*, *3*(3), 61–81. https://doi.org/10.5304/jafscd.2013.033.009

Schmit, T. M., & Gómez, M. I. (2011). Developing viable farmers markets in rural communities: An investigation of vendor performance using objective and subjective valuations. *Food Policy*, *36*(2), 119–127. https://doi.org/10.1016/j.foodpol.2010.10.001

U.S. Department of Agriculture Agricultural Marketing Service. (n.d.). Local Food Directories: National Farmers Market Directory. Retrieved July 2018 from https://www.ams.usda.gov/local-food-directories/farmersmarkets

Varner, T., & Otto, D. (2008). Factors affecting sales at farmers' markets: An Iowa study. *Review of Agricultural Economics, 30*(1), 176–189. https://doi.org/10.1111/j.1467-9353.2007.00398.x

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The North Carolina Food Pantry Organizational Capability and Mapping Study: Research brief and pilot study

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Abstract

Given the importance of food banks to the availability of accessible food, attention to the resilience of regional systems for bringing food from producers to distributors—including local food pantries—is of prime concern. By utilizing a partnership between Appalachian State University and Feeding America, through the Second Harvest Food Bank of Northwest North Carolina, we gathered information regarding the capabilities of seven regional food pantries. This pilot study focused on the capabilities of the selected food pantries to provide food assistance, promote self-efficacy, and address root causes of hunger in their communities.

We utilized a cross-sectional survey developed at the University of Oklahoma as well as descriptive statistics to create resource maps utilizing geographic information systems (GIS) software. This approach provided a model for an upcoming survey of three hundred food pantries located throughout the state of North Carolina to be implemented by Appalachian State University and research partners from the University of North Carolina. The larger study will expand knowledge regarding the best practices for food pantry operations, highlight opportunities to strengthen organizational capabilities including nutrition offerings and other wraparound services, support the development of resource maps to optimize the use of regional and self-efficacy-related resources for low-income clients and communities, and promote the

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expansion of opportunities for collaboration and funding.

Ultimately, we plan to utilize statewide data to develop a Food Pantry Capability Index based on selected measures encompassing available food assets, financial resources, size of area served, population-specific demographics, and number and type of auxiliary services offered including economic development initiatives. Such an Index could be used nationwide to assess and improve overall food resiliency and self-efficacy for given communities, counties, regions, and states.

Keywords
Capability, Capacity, Food Bank, Food Pantry, Food Resilience, Food Resource Center, GIS Mapping, Resilience, Resource Mapping, Self-Efficacy

Introduction

Given the importance of food banks to the availability of accessible food, attention to the resilience of regional systems for bringing food from producers to distributors—including local food pantries—is of prime concern. This paper provides a description of methods used to conduct a completed pilot study and subsequent research which is now in progress. The long-term aim of this project is to: 1) expand the base of knowledge regarding local food pantries, including the creation of resource maps to promote regional- and state-level optimization of food access, and 2) to develop an easy-to-use, practical instrument to assess the capabilities of food pantries to meet client needs and to support the food resilience of local communities and their greater regions. We believe it is important for the well-being of food pantry clients and their communities to share this brief describing our research in progress to provide other interested researchers with information which could potentially lead to expansions of the geographic scope of this effort. In addition, we hope to prompt productive research collaborations which could benefit the populations served by local food pantries.

Literature Review

While the concepts of food system resilience and sustainability have been the topic of much scholarly interest in recent years, the concept of food pantry capabilities has yet to be explored to the same degree (Bazerghi, McKay, & Dunn, 2016; Tendall et al., 2015). A *capable* individual or organization possesses attributes required for performance, or has traits conducive to or permitting the achievement of a desired goal (Merriam-Webster Dictionary, 2018a). Thus, a *capable* food pantry is one with the organizational skills and resources to achieve the desired goals of (1) effectively and efficiently providing clients with a reliable source of safe and nutritious food in times of immediate need, and sustaining an adequate supply of food resources in the face of changing environmental conditions and a variable client base, (2) promoting self-efficacy in clients to enable them to meet their own nutrition needs to the greatest extent possible, and (3) consistently addressing the root causes of hunger in communities (Feeding America, 2018b). Food pantry *capabilities* are those things the food pantry has the potential to do with its human, material, and financial resources (Capability, n.d.).

Nussbaum described *capabilities* in relation to individuals, as "…the answers to the question, 'What is this person able to do and to be?'" (Nussbaum, 2011, p. 20). Capabilities, then, if we extrapolate from the personal to the organizational, include *opportunities* resulting from the unique blend of competences, social and environmental settings, and choices made by an entity at a specific given time (Nussbaum, 2011). Choices made by food pantry leaders in response to their particular situations may enhance or restrict organizations' capabilities (Nussbaum, 2011).

Capacity refers to the ability of a facility or organization to hold or accommodate products or people, the physical and mental abilities of individuals, and/or the ability of an individual or organization to perform or produce (Merriam-Webster Dictionary, 2018b). The term *capability* encompasses the meaning of *capacity,* and is considered a synonym (Capability, n.d.). In the food bank literature, both terms are used to express similar concepts. In this paper, we prefer the term *capability,* as it refers to the effective performance of all key functions of the agency.

Capability serves as the vehicle which carries an organization beyond short-term viability toward

resilience and sustainability. A capable food pantry organization makes choices and seizes opportunities supportive of ongoing, stable function. Resilience is the maintenance of function over time in the face of disturbances, and sustainability is the preservation of a system for the long term (Tendall et al., 2015). Optimization of food pantry resilience and sustainability would enhance pantry capabilities and thus, the overall food environment of geographic regions. A tool specifically designed to quantify the capability of individual or regionally grouped food pantries to meet clients' nutrition needs immediately and over time, promote self-efficacy, and address the root causes of hunger would contribute to the evaluation and improvement of geographic regions' food resiliency (Feeding America, 2018b).

Food pantries meet critical needs by providing emergency and short-term access to food and nutrition resources for food-insecure, low-income populations within specific communities (Mousa & Freeland-Graves, 2018; Schumann, Trull, & Noack, 2015). Some food pantries may struggle to meet such needs due to geographic or financial vulnerabilities; for example, rural food pantries may face challenges in maintaining their supply chains due to their distance from common supply chain channels (Miller et al., 2016).

Large hunger relief organizations, such as Feeding America, regularly gather data and report findings from constituent pantries. Actionable knowledge regarding the organizational capabilities of food pantries within given geographic regions enhances the ability of organizations to respond to population needs (Weinfield et al., 2014). The importance of data collection regarding the operation of food pantries is growing, as pantries in developed nations are serving an increasing number of clients who are chronically food insecure; that is, clients who rely on the food pantry as their main source of food over the long term (Bazerghi et al., 2016; Feeding America, 2011; Ford, Lardeau, Blackett, Chatwood, & Kurszewski, 2013; Garratt, 2017).

Food Pantry Capabilities. A small but growing body of scholarly literature is focused on food pantry capabilities. Bazerghi, McKay, and Dunn (2016) found that food pantries (referred to as "food banks" for the purposes of their study) were generally limited in their ability to improve food security outcomes among target populations, and that key indicators of capability included adequate operational resources, availability of perishable foods such as fruits and vegetables, and a focus on identified client needs. Akalis (2014) reported that three factors that often curtail the capability of food pantries to respond to client needs include dependence on volunteer staffing, lack of suitable facilities, and inadequate funding. Wetherill and colleagues described food pantry capability barriers including a lack of nutrition policies to promote nutrition education among clients, and low inventories of healthful foods such as fresh fruits and vegetables (Wetherill et al., 2019).

Increasing interest in the development of food pantry capabilities is indicated by conferences such as the Northern Illinois Food Bank's Access Capability and Engagement (ACE) Conference, workshops focused on building food pantry capacity including those implemented by the Capital Area Food Bank, and capacity-building grant opportunities exemplified by those funded by the Global Food Banking Network (Capital Area Food Bank, n.d.; Northern Illinois Food Bank, 2016; The Global Food Banking Network, 2018). Capability-enhancing efforts have included training and workshops focused on volunteer recruitment, fund raising, grant writing, outreach to diverse populations, community gardening projects, and best practices for managing food distribution chains (Capital Area Food Bank, n.d.; Edwards, 2014; Northern Illinois Food Bank, 2016; The Global Food Banking Network, 2018). Awareness of the importance of nutrition policies (including the provision of nutrition education and healthful foods) as a vehicle to promote food pantry capabilities is evidenced by recent research on this topic (Caspi, Grannon, Wang, Nanney, & King, 2018; Martin, Wolff, Callahan, & Schwartz, 2018; Wetherill et al., 2019).

Toward a Food Pantry Capability Index. The concept of a "capability index" is not new. Worstell and Green (2017) analyzed case studies and identified eight qualities common to resilient locally based food systems that could be quantified to create an objective "resiliency/sutainability

index." The researchers concluded their paper by proposing a list of statements—based on the eight qualities—which could be used to define resilient and sustainable food systems (Worstell & Green, 2017). It is possible that a similar methodology could be applied to describe "capable" food pantries.

In a 2014 report on regional food bank operations completed for the Kate B. Reynolds Charitable Trust, leaders of food banks recognized for their effectiveness described their best practices (Edwards, 2014). Food banks are regional storage and distribution centers for food that is allocated to smaller local food pantries (Feeding America, 2018c). Food pantries are front-line organizations that receive food resources from regional food banks and then distribute that food directly to clients to relieve food insecurity in local communities. Food bank leaders identified the capacity of partner agencies (food pantries) to distribute food as the "weakest link" in regional food distribution systems. The leaders listed tier ratings of constituent agencies as a best practice to identify high-performing pantries whose services could be expanded, those that could benefit from support to increase capacity, and those whose closure might allow better targeting and utilization of resources (Edwards, 2014). This identified best practice implies that an organized system—perhaps a capability index—for assessing food pantry capabilities could be helpful in optimizing resource allocation to better serve clients.

The Food and Agriculture Organization of the United Nations (FAO) developed a "resilience tool" to assess the capacity of individual households to withstand major changes (called "shocks") in their food security status (Food and Agriculture Organization of the United Nations, 2010). While the tool was designed for the household level, it provides a list of criteria and a mathematical equation to quantify the relationships among the criteria and generate a resiliency score. Thus, the FAO tool may serve as a useful model for the development of a food pantry index. The tool's criteria for determining household food resiliency include income, access to food, physical assets such as land, availability of food and/or income assistance, access to services, adaptive capacity that may be enhanced by education level and a variety of income streams, and stability of criteria as time passes (FAO, 2010). It may be that parallel criteria for food pantry resilience could be described. These could include annual budget and access to food supplies; physical facilities of the pantry; availability of government support such as commodity foods; access to expertise and support services; adaptive capacity as determined by the training and education of pantry staff; collaborations and partnerships with larger support organizations such as food banks; number and variety of income and donation sources; and stability of criteria as time passes.

Schumann, Trull, and Noack (2015) assessed and reported on the capacity of food pantries in San Diego County, California, to provide services to clients. The criteria of capacity delineated by the researchers provide helpful suggestions for operational functions to be addressed by a food pantry capacity tool, including sources of food, location of pantry sites, populations served, operating hours, paid and volunteer workforce, storage capacity, nutritive value of foods, availability of transportation, managerial considerations (including office space and technology), communication practices, marketing plan, advocacy activities, compliance and reporting of activities, and fundraising practices (Schumann et al., 2015).

In Puna, a rural region of Hawaii, a coalition of individual citizens and groups came together to determine how to best support and enhance their communities (Hawaii Alliance for Community Based Economic Development, 2016). The report focuses on two topics: disaster preparedness and capacity building of food pantries to support emergency food needs. The authors identified six areas important to food pantry capabilities: sustainability, outreach and communication, going beyond canned food to provide auxiliary services, navigation of regulations, coordination and collaboration with individuals and community organizations, and food as an entry point to community services. The authors present four aspects of resiliency that include connection to others, connection to place and ʻĀina,[1] connection to the past and future, and

[1] ʻĀina is the Hawaiian term for land or earth (Pukui & Elbert, 1986).

connection to self (Hawaii Alliance for Community Based Economic Development, 2016). These aspects may point to important components of food pantry capability in relation to community networks and connections. Throughout the report, a focus on community assets and strengths, rather than community deficiencies, is encouraged (Hawaii Alliance for Community Based Economic Development, 2016).

Caspi et al. (2018) recognized the need to assess the nutritional quality of food distributed by food pantries. The researchers developed the FAST (Food Assortment Scoring Tool), a 13-item tool to score the overall nutrient content of food selected by food pantry clients. The FAST was compared with the Healthy Eating Index-2010 (HEI-2010), a tool developed by the United States Department of Agriculture to compare particular eating patterns' adherence to the Dietary Guidelines for Americans (USDA Food and Nutrition Service, 2019). The researchers found that the FAST correlated well with the Healthy Eating Index-2010 and was feasible and easy to use in real-life food pantry settings (Caspi et al., 2018). While the nutritive value of foods provided is an important aspect of food pantry operations, FAST does not evaluate overall food pantry operations. It does, however, provide an example of quantifying food pantry functions and the importance of food pantry nutrition policies, and provides useful input toward construction of an overall food pantry capability index.

The literature suggests that developing a food pantry capability index based on specific criteria encompassing identified qualities and characteristics of effective food pantries would be useful and is feasible. Such an index may encourage further research and positive change that could result in improved quality of life and increased self-efficacy for food pantry clients.

Study Objectives

The specific objectives of the complete research study are threefold. First, the authors seek to address the question: "What is the capability of food pantries to deliver services to specific geographic regions that address root causes of hunger and support nutrition needs and self-efficacy of the populations served?" Second, the authors seek to develop regional food pantry resource maps to visually disseminate study data for use in assessing regional capabilities by study partners and other interested persons and organizations. Third, the authors seek to develop a Food Pantry Capability Index tool (FPCI) to quantify the ability of individual food pantries to carry out their operations and key functions. The objective of the pilot study described in this paper was to develop and refine a methodology that has the potential to be standardized and used as a model in a statewide food pantry assessment, and to be used as a data gathering tool in regards to developing the FPCI. An additional, overall objective is to increase the body of knowledge of best practices among area food pantries.

Study Partners

Feeding America food banks. Feeding America is the United States' largest hunger relief organization, and encompasses over 200 food banks and 60,000 food pantries nationwide (Feeding America, 2018d). By supplying food pantries, food banks play a key role in the delivery of groceries to food pantry clients (Bazerghi et al., 2016). Seven strategically located Feeding America food banks provide the entire state of North Carolina with food warehousing and distribution services (Feeding America, 2018a, 2018c).

Second Harvest Food Bank of Northwest North Carolina (SHFB NWNC) is one of North Carolina's seven Feeding America food banks. SHFB NWNC's mission statement includes two goals: (1) to provide essential food assistance, and (2) to engage the community in eliminating hunger and its causes (SHFB NWNC, 2015). This mission aligns with Feeding America's mission, which is also twofold: (1) to feed America's hungry through a nationwide network of member food banks, and (2) to engage America in the fight to end hunger (Feeding America, 2018b). Because of the close connection between Feeding America and SHFB NWNC, benchmark measures and best practice guidelines which result from SHFB NWNC operations can be disseminated across the U.S. to address food security issues.

U.S. Department of Agriculture. This

investigation received initial input and advice from the U.S. Department of Agriculture, Southeast Regional Office Food and Nutrition Service leadership team (SERO USDA FNS). SERO USDA FNS articulated its specific goals for (1) the development of resource maps for food pantry locations and service areas to support the needs of SNAP-eligible clients, (2) evaluation of pantry customer service practices to effectively meet client needs, and (3) assessment of the capability of food pantries to provide services that promote self-efficacy among food pantry clients in the southeast region of the United States (Barth, 2018). Food pantry resource mapping can provide important information to SERO USDA FNS regarding the ability and resiliency of specific geographic areas of the state of North Carolina to cope with food emergencies and to meet the needs of underserved, low-income populations.

The North Carolina Food Pantry Organizational Capability and Mapping Study, Northwest North Carolina Module (NCFPCM NWNC), was designed to strengthen the ability of Feeding America and its North Carolina affiliate food banks to address their mission by assessing the capabilities of local food pantries to meet client needs. The pilot study on which we report was a component of the NCFPCM NWNC, and of a larger study of food pantries to be implemented throughout the entire state of North Carolina (the full study is referred to as NCFPCM). The pilot study was conducted in cooperation with regional partners including the SHFB NWNC and SERO USDA FNS. The larger study will be conducted by a regional coalition that includes North Carolina's constituent Feeding America Food Banks, SERO USDA FNS, Appalachian State University, and researchers from other University of North Carolina System institutions.

Research Methods

Study Design

Our study design employs a cross-sectional survey and includes four phases. The preparation (Phase One) and pilot phases (Phase Two) have been completed and are reported here. The implementation phase (Phase Three) of the NCFPCM NWNC is currently underway and consists of survey delivery to food pantries across SHFB NWNC's service area, with completion of northwest North Carolina data collection anticipated by June 2019. The data analysis and dissemination of study findings phase (Phase Four) is planned for the summer and fall of 2019. IRB oversight was not required by the Appalachian State University Office of Research Protections on the determination that the study did not constitute human subject research.

Phase One: Preparation. Prior to conducting the pilot study, research partnerships were established with the University of Oklahoma, SHFB NWNC, and SERO USDA FNS. The Appalachian State University research team was assembled and included experts in clinical nutrition, public health nutrition, and geographic information science. Survey developers from the University of Oklahoma granted permission to utilize the survey that was employed in this study and provided training to the Appalachian State University researchers in the use and implementation of the survey. The survey assessed each participating food pantry's current practices and capabilities with respect to (a) basic organizational information, (b) structure and governance, (c) facilities and operations, (d) use of technology, (e) source(s) of funding and financing, (f) nutrition practices and services, and (g) services and assistance that support economic development and skill-building resulting in living wage opportunities for clients.

We conducted online and in-person meetings with personnel from the SHFB NWNC. During these meetings, SHFB NWNC staff reviewed and made minor changes to the survey language to be consistent with language used by SHFB NWNC. Additional tasks completed during the preparation period included organization of the pilot study and planning for regional implementation of the wider survey in the fall of 2018.

Phase two: Pilot study (April 2018 through August 2018). In order to test and evaluate the study methods, including administration of the survey both in person and via online survey software, Appalachian State University research faculty and graduate students implemented a pilot study in April 2018. SHFB NWNC staff recommended seven food pantries in their service area as initial

survey sites, and on-site appointments were scheduled with food pantry directors to administer—or in one case, explain—the survey. Food pantry directors answered the survey questions. Six of seven surveys were completed face-to-face in order to collect participant comments on the survey questions and to evaluate clarity of the survey language as reported by the participant population. The survey was prepared for online administration using Qualtrics survey software, and the seventh pilot survey was administered via online deployment (Qualtrics, 2018). The participant who completed the online pilot survey provided comments and feedback on the experience.

Data Analysis

Data from the face-to-face surveys were entered into Qualtrics software and were combined with data obtained online from the seventh survey. The pilot analysis resulted in descriptive statistics. One of the co-investigators, who is a geographic information scientist, experimented with mapping a variety of study findings. Preliminary mapping of the seven sites was completed in geographic information systems (GIS) software using Environmental Systems Research Institute's (ESRI) ArcMap (2018).

Results

Preliminary analysis of the pilot data revealed that numbers did not always follow a logical pattern. For example, larger budgets did not necessarily equate to larger number of households or clients served. The number of volunteers does not align perfectly with volume or need in every case. These types of misalignments may create challenges in both capability and resilience in some pantries, while others may have more capacity than necessary. Expanded data from the larger overall survey, as well as examination of food pantry criteria such as length of time in service, overall number of labor hours provided by staff and volunteers, and other factors may provide insights into variability in outcomes.

The mean length of time the pantries had been operating was 28 years (median time 34 years). Four of seven pantries were affiliated with religious organizations. Four of seven pantries own the buildings from which they operate, two lease operating space, and one pantry uses a sponsor-owned building free of charge. The mean percentage of food provided to the pantries by SHFB NWNC was 60%, indicating that SHFB NWNC is a key contributor to pantries' stability and capability to carry out their missions.

Among the seven food pantries, over 11,000 unique clients and 4,000 households receive monthly food assistance. The mean and median labor hours contributed per food pantry per week by volunteers were 476 and 336, respectively. Of the seven food pantries, six offered either a full-choice or semichoice food selection model, indicating that clients may choose foods with varying degrees of independence. One pantry offered mobile food distribution to outlying areas in its service region, and another pantry tailored its hours to shift workers.

Six of seven pantries reported having no written nutrition policy. Food pantry leaders indicated that certain preferred foods (defined as $\geq$ five of seven food pantries per item) were the focus of increased acquisition efforts, including fruits, vegetables, eggs, nuts and seeds, lean animal protein, dried beans and lentils, dairy, and dairy alternatives. A majority of pantries reported needing additional equipment, in particular commercial-grade refrigerators and freezers. All the pantries offered certain non-food items, such as toiletries and cleaning supplies, when available. Selected preliminary quantitative data results are provided in Table 1.

Participating food pantry leaders identified their desired strategic directions for capability enhancement, including expanding their facilities, developing the client choice model, obtaining commercial-grade refrigerated storage, increasing the number of volunteers, and obtaining reliable and sustainable funding sources. Three of seven food pantries reported providing auxiliary services focused on assisting clients in achieving increased self-efficacy, and two additional food pantries mentioned such auxiliary services as planning a strategic direction for future development. Reported auxiliary services included partnerships with local and regional employers and educational facilities to provide employment training and job opportunities; housing assistance; and referrals to appropriate

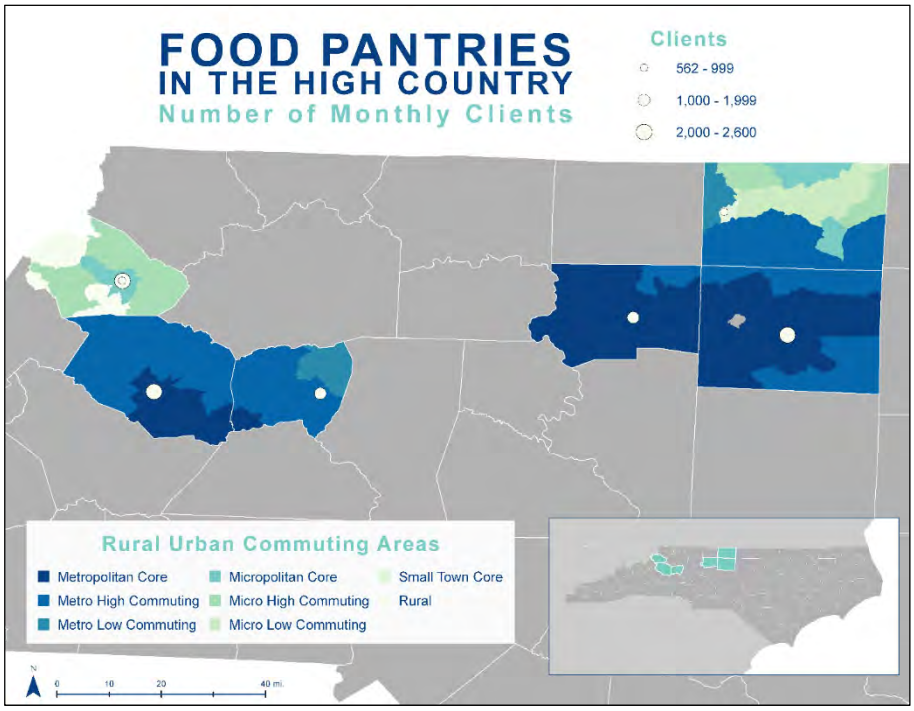
Table 1. Selected Summative Preliminary Quantitative Data from Pilot Survey of Seven Regional Food Pantries in Northwest North Carolina

Data Collected	Mean	Median
Time in operation (in years)	28	34
Number of unique clients (per month)	1580	2281
Number of households served (per month)	592	350
Pounds of food distributed (per year)[a]	452,648[b]	255,204[c]
Number of labor hours provided by volunteers (per week)	476	336
Distance traveled by clients to reach the pantry (in miles)	9	5
Percent of total food distributed provided by Second Harvest Food Bank	60	56
Annual operating budget (non-food, in US$)	503,410[b]	633,730[b]
Annual food budget (in US$, rounded to the nearest dollar)	227,712[b]	161,139[b]

[a] One pantry measured food distribution in "boxes," for a total of 11,385 boxes per year; another pantry measured food distribution in "meals," for a total of 150,000 meals per year. [b] Based on 4 pantries that reported food distribution in pounds.
[c] Based on 6 reporting pantries.
Note: 1 lb.=.45 kg; 1 mile=1.6 km

agencies as needed. The geographic information scientist co-investigator conducted resource mapping of study results. Resource maps may be useful in generating hypotheses and directions for future research by other investigators. Example resource maps are found in Figures 1 and 2.

Figure 1. Pilot Study GIS Mapping Example: Rural and Urban Continuum Codes and the Number of Monthly Clients at Each Food Pantry



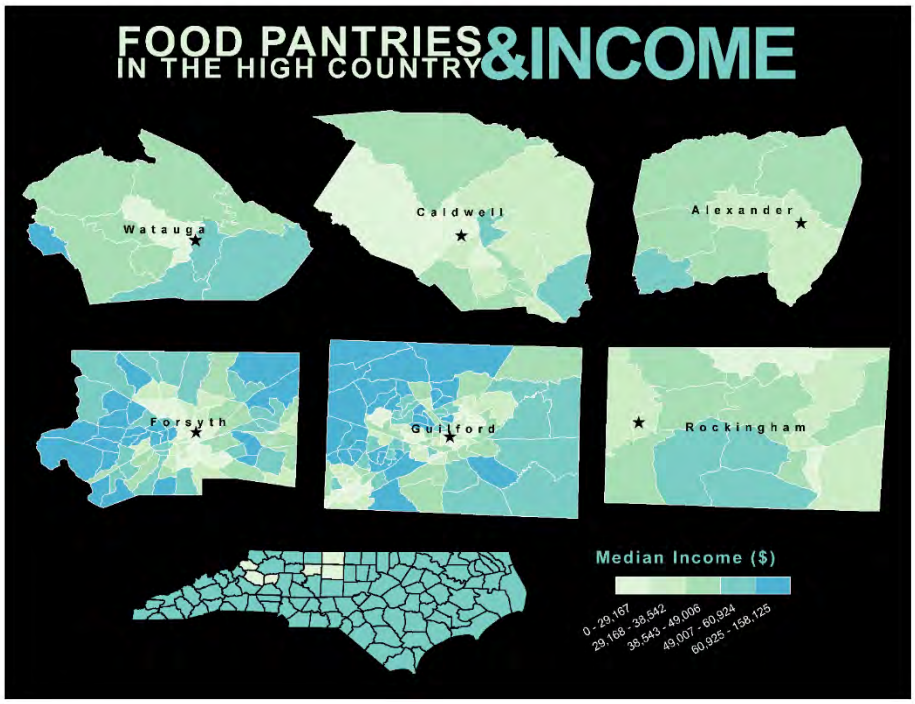
Source: U.S. Census Bureau (2010), U.S. Department of Agriculture (2010).

As a result of data analysis, the investigators identified selected data points that may be useful as measures of food pantry capability. We plan to continue developing the tool as our expanding database provides further information on each of the indicators. We are considering using a Likert scale to obtain a score for each item, with the overall mean score providing a "capability score"; however, determination of an appropriate scoring mechanism is still evolving. Possible indicators for development of the FPCI, a rationale for utilizing each indicator, and "criterion sentences" based on the methods of Worstell and Green (2017) are found in Table 2.

Discussion

Lessons learned from the pilot study include the need for minor adaptations of survey wording to align with SHFB NWNC terminology and the identification of specific questions that often

Figure 2. Pilot Study GIS Mapping Example: Median Income at the Census Tract and Food Pantry Locations



Source: U.S. Census Bureau (2017).

required clarification for participants by the survey administrator.

Implementation of the survey using Qualtrics software helped the investigators learn how to effectively use this tool, including use and administration of the online survey, techniques for using the survey software for data analysis, and methods for mapping data obtained from the survey. As a result of suggestions during the pilot study from the study geographic information scientist and the SERO USDA FNS leadership team, four additional survey questions were developed and added to the survey. Data for these questions were obtained by phone calls or emails to participants after the initial pilot survey was administered. Following completion of the pilot study, the updated and finalized survey was entered into Qualtrics as a new survey in preparation for administration during Phase Three of the study.

A key observation by the investigators was that despite significant challenges in fulfilling their missions of alleviating hunger in people living with low incomes, food pantry leaders demonstrated core strengths of determination, dedication to their mission, and focus on the population served. The pantries have been in operation for a median length of 34 years, indicating that the organizations are deeply embedded n their communities. In addition, the number of service hours regularly contributed by volunteer staff came as a surprise to the investigators. Using the median value of 336 volunteer labor hours per week per pantry, about 122,304 hours are donated per year among the small sample of pantries surveyed during the pilot study. This highlights the commitment to community service and altruism indicated by both pantry leaders and volunteers, and is a key strength to be leveraged for improvement of regional food resiliency.

Applications to other research. Tools and assessments used to evaluate food pantries need to be adapted to the local situation in terms of language, culture, and terminology. Using survey software may add to the utility of the survey and the ease of data analysis. Additional questions specific to local situations may be needed. The pilot study helped the researchers realize the importance of identifying strengths in addition to challenges, as strengths may be substantial but are not always obvious. We recognized the need for a validated tool to identify areas for improvement and to help optimize the use of resources by pinpointing focus areas and thus the appropriate expertise needed to address those areas. Overall, we are encouraged that the pilot study supported the strength of our methodology for gathering data, and subsequently using that data to generate not only useful information, but viable and helpful tools. Assessing food pantry capabilities and resilience across locales and regions may be able to promote new linkages for

Table 2. Food Pantry Capability Index (FPCI) Development Table: Possible Data Indicators for Development of FPCI with Rationale and "Criterion Statements" for Each Item

Suggested Data Indicators for FPCI		
Indicator	**Rationale**	**Criterion [a]**
1. Key Function: Delivery of Food Assistance		
1. Number of individual clients served (per time period)	Indicator of the relative strength and consistency of the demand for services	A capable food pantry has the ability to meet its typical demand for services.
2. Amount of food distributed (per time period, in pounds, boxes, or other units)	Indicator of the ability of the pantry to meet the overall food volume demand of its distribution network	A capable food pantry is able to effectively and efficiently deliver needed volumes of food.
3. Percent of total food received from various sources (food bank, private donations, government surplus)	Indicator of the resilience of the pantry's supply chain, including an understanding of key suppliers, the most reliable suppliers, and the number and diversity of suppliers	A capable food pantry develops strong relationships with key members of its supply chain, seeks to locate reliable suppliers, and diversifies its supply chain as much as possible to promote sustainability.
4. Number of full- and part-time paid staff (in FTEs, per time period)	Indicator of the consistency of ability to operate and carry out key functions, including supervision and management of volunteers, fund-raising, and development of community and stakeholder relationships	A capable food pantry has adequate paid staff (both part-time and full-time) to support consistent operations, to supervise and manage volunteers, and to carry out key functions.
5. Number of volunteer hours donated (in FTEs, per time period)	Indicator of operating capabilities in regards to hours, services, and manpower, and capabilities related to key functions such as food acquisition, inventory management, food delivery and distribution, fund-raising, financial donations, and community and stakeholder relationships	A capable food pantry recruits and retains adequate volunteers to maintain its operating capabilities and perform key functions.
6. Total operating budget (per time period)	Indicator of funding available to pay for operating overhead and distribution-related expenses	A capable food pantry maintains an adequate and sustainable operations budget.
7. Total food budget (per time period)	Indicator of the ability to procure essential, core food ingredients, as well as higher-value foods	A capable food pantry operates with a food budget that is adequate and sustainable to provide core food ingredients and higher-value foods.
8. Funding sources	Indicator of the number and variety of funding sources and fund-raising networks	A capable food pantry develops and maintains multiple funding relationships and funding sources in order to promote consistency and sustainability of operations.
9. Capacity of back-up food supplies and an emergency management plan (in weeks)	Indicator of the effectiveness or existence of contingency or emergency management plan, and of the ability to operate under stressful conditions	A capable food pantry develops contingency plans and maintains appropriate emergency reserves to support and sustain essential operations during periods of stress.
2. Key Function: Client Service, Including Promotion of Self-Efficacy		
10. Mean distance traveled by clients to reach the pantry (in miles), with Rural-Urban Commuting Code included	Indicator of potential barriers to access for clients, such as distance, availability of transportation, and need for mobile distribution networks	A capable food pantry understands its clients' geographic barriers to access and develops effective strategies for ensuring adequate distribution of food, including development of mobile distribution networks when warranted.

Continued

11. Mean distance traveled by volunteers to reach the pantry (in miles), with Rural-Urban Commuting Code included	Indicator of possible barriers to maintaining adequate operating capability and the capacity to carry out key functions	A capable food pantry understands its volunteers' geographic barriers to access and develops effective strategies for ensuring that volunteers are able to get to the pantry to provide services.
12. Poverty rate and unemployment rate of population served	Indicator of the demand for food and other services	A capable food pantry understands the characteristics and needs of the population served, and is able to effectively address population needs.
14. Presence of a nutrition policy	Indicator of the promotion of self-efficacy through client choice, provision of healthful foods, and provision of targeted nutrition education	A capable food pantry develops self-efficacy among clients by developing and implementing a nutrition policy designed to promote client choice, provide healthful foods, and provide nutrition education to ameliorate food insecurity and promote good health.
3. Key Function: Addressing the Root Causes of Hunger in Communities		
15. Breadth and depth of the community network, with consideration of factors such as the number of years operating in the community, number of volunteers, number and type of funding sources, number of community partnerships, number of referrals and/or connections to other community agencies, consistency and amount of community engagement provided by key pantry staff	Indicator of the ability to interact and engage as a key organization in the community, and to serve as a key resource on hunger in the community	A capable food pantry intentionally and consistently seeks to build depth and breadth of relationships within its community and regularly engages with individuals and organizations in order to effectively address the root causes of hunger in the community.

[a] Based on the methodology of Worstell and Green (Worstell & Green, 2017).

expertise and service to be applied to regional food access needs. Future research may benefit from the development of both resource maps and the FPCI to identify areas for further investigation, as well as assess and evaluate the ability of food pantries to conduct essential operations.

Conclusion and Future Directions

The pilot study for the NCFPCM NWNC found that substantial amounts of food are distributed to over 11,000 individuals per month by seven food pantries affiliated with SHFB NWNC and located in the food bank's 18-county service area. In addition, the researchers identified core strengths of commitment and altruism among food pantry leaders and volunteers. The study demonstrated the feasibility of adapting and using a previously developed food pantry survey tool, and that tool is being used now to conduct both the full regional study and the statewide study. Initial data analysis resulted in the identification of data points that could quantify food pantry capabilities. First steps were taken toward developing a FPCI tool and mapping outputs. We anticipate that the full NCFPCM study will result in the identification and dissemination of best practices among food pantries, the development of resource maps to support optimization of regional food resources, and the construction of a FPCI tool that can be used to identify opportunities to improve local and regional food resilience.

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References

Akalis, S. (2014, September 10). Strengthening the food chain and growing agency capability with BJ's Charitable Foundation [Blog post]. Retrieved from https://www.feedingamerica.org/hunger-blog/strengthening-the-food-chain

Barth, M. M. [Reporter]. (2018, October 24). Notes taken at a planning meeting of the Southeast Regional Office of the USDA and the Southeastern University Consortium on Hunger, Poverty and Nutrition leadership team for the 2019 Southeastern University Consortium on Hunger, Poverty and Nutrition Symposium. Notes in possession of the reporter.

Bazerghi, C., McKay, F. H., & Dunn, M. (2016). The role of food banks in addressing food insecurity: A systematic review. *Journal of Community Health, 41*, 732–740. https://doi.org/10.1007/s10900-015-0147-5

Capability. (n.d.). In *Merriam-Webster's online thesaurus*. Retrieved July 9, 2019, from https://www.merriam-webster.com/thesaurus/capability

Capable. (n.d.). In *Merriam-Webster's online dictionary*. Retrieved August 27, 2018, from https://www.merriam-webster.com/dictionary/capable

Capacity. (n.d.). In *Merriam-Webster's online dictionary* Retrieved August 27, 2018, from https://www.merriam-webster.com/dictionary/capacity

Capital Area Food Bank. (n.d.). Capacity building. Retrieved February 4, 2019, from https://www.capitalareafoodbank.org/programs/capacity-building/

Caspi, C. E., Grannon, K. Y., Wang, Q., Nanney, M. S., & King, R. P. (2018). Refining and implementing the Food Assortment Scoring Tool (FAST) in food pantries. *Public Health Nutrition, 21*(14), 2548–2557. https://doi.org/10.1017/S1368980018001362

Edwards, M. S. (2014). *Trends & best practices in food distribution systems: A focus on food banks & partner agencies*. Winston-Salem, NC: Kate B. Reynolds Charitable Trust. Retrieved from http://kbr.org/wp-content/uploads/2014/10/Trends-Best-Practices-FINAL.pdf

Environmental Systems Research Institute. (2018). ESRI: ArcGIS Desktop. Redlands, California.

Feeding America. (n.d.-a). Find your local food bank. Retrieved June 12, 2018, from http://www.feedingamerica.org/find-your-local-foodbank/

Feeding America. (n.d.-b). About us. Retrieved June 13, 2018, from http://www.feedingamerica.org/about-us/

Feeding America. (n.d.-c). Our network: Delivering food and services. Retrieved June 11, 2018, from http://www.feedingamerica.org/our-work/food-bank-network.html

Feeding America. (n.d.-d). Working together to end hunger: Our work. Retrieved June 12, 2018, from http://www.feedingamerica.org/our-work/

Feeding America. (2011). *Food banks: Hunger's new staple* [Research brief]. Retrieved from http://www.feedingamerica.org/research/hungers-new-staple/hungers-new-staple-full-report.pdf

Food and Agriculture Organization of the United Nations [FAO]. (n.d.). *Measuring resilience: A concept note on the resilience tool*. Retrieved from http://www.fao.org/docrep/013/al920e/al920e00.pdf

Ford, J. D., Lardeau, M.-P., Blackett, H., Chatwood, S., & Kurszewski, D. (2013). Community food program use in Inuvik, Northwest Territories. *BMC Public Health, 13*, 970. https://doi.org/10.1186/1471-2458-13-970

Garratt, E. (2017). Please sir, I want some more: An exploration of repeat foodbank use. *BMC Public Health, 17*, 828. https://doi.org/10.1186/s12889-017-4847-x

Global Food Banking Network, The. (n.d.). *Building capacity: Offering growing food banks the tools to flourish and thrive*. Retrieved February 14, 2019, from https://www.foodbanking.org/what-we-do/building-capacity/

Hawaii Alliance for Community Based Economic Development. (2016). *Puna community resilience and capacity building final report*. Retrieved from https://www.hacbed.org/wp-content/uploads/2017/04/Puna-Resiliency-Final-Report-UPDATED.pdf

Martin, K. S., Wolff, M., Callahan, K., & Schwartz, M. B. (2018). Supporting wellness at pantries: Development of a nutrition stoplight system for food banks and food pantries. *Journal of the Academy of Nutrition and Dietetics, 119*(4), 553–559. https://doi.org/10.1016/j.jand.2018.03.003

Miller, W., Rogalla, D., Spencer, D., Zia, N., Griffith, B. N., & Hinesburg, H. B. (2016). Community adaptations to an impending food desert in rural Appalachia, USA. *Rural Remote Health, 16*(4), 3901. Retrieved from www.rrh.org.au/journal/article/3901

Mousa, T. Y., & Freeland-Graves, J. H. (2018). Impact of food pantry donations on diet of a low-income population. *International Journal of Food Sciences and Nutrition, 70*(1), 78-87. https://doi.org/10.1080/09637486.2018.1466271

Northern Illinois Food Bank. (2016, May 18). ACE Conference: Increasing the capabilities of our network [Blog post]. Retrieved from the Full Plate blog: https://solvehungertoday.org/full-plate-blog/ace-conference-increasing-capabilities-network/

Nussbaum, M. C. (2011). *Creating capabilities: The human development approach*. Cambridge, Massachusetts: The Belknap Press of the Harvard University Press. https://doi.org/10.4159/harvard.9780674061200

Pukui, M. K., & Elbert, S. H. (1986). *Hawaiian dictionary: Revised and enlarged edition.* Honolulu, Hawaii: University of Hawaii Press.

Qualtrics. (2018). Qualtrics (Version May 2018). Provo, Utah, USA. Retrieved from http://www.qualtrics.com

Schumann, M. J., Trull, C., & Noack, C. (2015). *Food and function: An assessment of the capacity of food pantry programs in San Diego County*. Retrieved from http://catcher.sandiego.edu/items/soles/FoodPantryCapacityReport_August2015.pdf

Second Harvest Food Bank of Northwest North Carolina [SHFB NWNC]. (n.d.). About us. Retrieved June 12, 2018, from http://www.hungernwnc.org/about-us/index.html

Tendall, D. M., Joerin, J., Kopainsky, B., Edwards, P., Shreck, A., Le, Q. B., . . . Six, J. (2015). Food system resilience: Defining the concept. *Global Food Security, 6*, 17–23. https://doi.org/10.1016/j.gfs.2015.08.001

U.S. Census Bureau. (2010). *American FactFinder: Census 2010 summary file 1 (SF 1) 100-percent data, table P001: Selected population and housing characteristics* [Data table].

U.S. Census Bureau. (2017). *TIGER/Line shapefiles: Counties (and equivalent).* Retrieved August 1, 2018, from https://www.census.gov/cgi-bin/geo/shapefiles/index.php

U.S. Department of Agriculture [USDA]. (2010). *Rural-urban commuting area codes.* Retrieved August 1, 2018, from https://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes/

USDA Food and Nutrition Service. (2019, January 31). *Healthy Eating Index (HEI).* Retrieved from https://www.fns.usda.gov/resource/healthy-eating-index-hei

Weinfield, N. S., Mills, G., Borger, C., Gearing, M., Macaluso, T., Montaquila, J., & Zedlewski, S. (2014). *Hunger in America 2014: National report*. Retrieved from http://help.feedingamerica.org/HungerInAmerica/hunger-in-america-2014-full-report.pdf

Wetherill, M. S., Williams, M. B., White, K. C., Li, J., Vidrine, J. I., & Vidrine, D. J. (2019). Food pantries as partners in population health: Assessing organizational and personnel readiness for delivering nutrition-focused charitable food assistance *Journal of Hunger & Environmental Nutrition, 14*(1–2), 50–69. https://doi.org/10.1080/19320248.2018.1512931

Worstell, J., & Green, J. (2017). Eight qualities of resilient food systems: Toward a sustainability/resilience index. *Journal of Agriculture, Food Systems, and Community Development, 7*(3), 23–41. https://doi.org/10.5304/jafscd.2017.073.001

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Farmers' willingness to pay for operating a collective postharvest refrigeration unit in an eastern Mediterranean rural community

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Abstract

One-third of crops harvested globally is lost due to inadequate or lack of postharvest storage facilities. This paper explores farmers' willingness to pay (WTP) for a common refrigeration unit to reduce postharvest losses in the Bekaa valley, a Lebanese breadbasket. Using the contingent valuation (CV) method—a survey-based economic technique used mainly for the valuation of nonmarket environmental and public goods—this study was conducted with a sample of farmers in selected village municipalities in the area under study. The results indicate that most farmers (72%) are highly concerned about postharvest losses, and that 80% were willing to pay varying amounts for the proposed initiative, with most WTP values falling within the range of US$21–US$30 per month (31%). By contrast, a considerable proportion of the farmers (20%) were not willing to pay any fee for establishing the common refrigeration unit. Results further establish the different small-scale farmers' characteristics and factors affecting WTP. Some factors including longer farming experience, higher variable costs associated with farming operations, working year-round in farming, and access to wholesale markets, significantly increased WTP for access to a common refrigeration unit, depending on the type of cultivated crops. These results are of particular interest for developing relevant policies and informing decision-making intent to solve postharvest management issues in developing economies. This study establishes the importance of offering refrigeration services at discounted or subsidized prices to smaller farmers as a public good aimed at promoting agrarian and rural development.

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Keywords
Small-scale Farmers; Farmers' Willingness to Pay; Postharvest Loss; Contingent Valuation Method; Policy Analysis; Developing Economies

Introduction

One-third of crops harvested globally, equivalent to 1.3 billion metric tons per year, is lost throughout the food supply chains, from agricultural production to final consumer level (Food and Agriculture Organization of the United Nations [FAO], 2011). Food losses in developed economies and developing economies are comparable, yet are concentrated in different levels of the food value chain. In the former, more than 40% of losses occur at consumer and retail levels (FAO, 2011), whereas in the latter, around the same percentage of losses occurs due to inadequate or lacking postharvest storage facilities (FAO, 2011). The myriad ramifications of food losses, not least at the postharvest level, are socially and economically debilitating, and contribute significantly to the reliance on food imports, environmental problems and concerns, land abandonment, food insecurity, failed rural development, and the instability of farmers' livelihoods.

As part of the wider discourse on pro-poor agricultural growth and development, there are ongoing debates on the viability of small-scale farming (Bush, 2016; FAO, 2017; Henson, Jaffee, Cranfield, Blandon, & Siegel, 2008). This is fundamental to sustain equitable growth for rural smallholder farmers in developing countries. However, such farmers remain vulnerable in their livelihoods due to the multiple challenges and bottlenecks that plague farming in in the developing world.

While small-scale farmers have a competitive advantage over large-scale commercial producers—principally through lower costs in accessing and managing family labor as well as superior local knowledge—the small scale of their operations leads to greater costs in virtually all non-labor inputs (Poulton, Dorward, & Kydd, 2010). For instance, non-labor costs are mainly associated with access to resources and services (e.g., capital, farm inputs and output markets, technical information, seasonal finance, and quality assurance). These factors, including postharvest services, are increasingly undermining the survival prospects of small-scale farming in increasingly competitive agri-food markets (Poulton et al., 2010). Therefore, over the past decades, many developing countries and development agencies have shifted their efforts to increasing smallholder participation in higher-value agro-food markets (World Bank, 2010). This can be an essential step for meeting economic development and poverty reduction objectives.

In Lebanon, agriculture and the related agri-food sectors play a significant role in the economy of the fertile Bekaa Valley, the country's foremost farming area and breadbasket. The rural population of the Bekaa region, largely consisting of small-scale farmers, depends on farming to sustain their livelihoods (FAO, 2017). According to the U.S. Agency for International Development (USAID), "Lebanon has the highest proportion of cultivable land, per capita, in the Arab world" (USAID, 2014b, para. 1). This study is motivated by the notion that any response to challenges in the agricultural sector requires the support of small-scale or family farmers. Ultimately, postharvest challenges can affect a large proportion of the food supply chain for the entire population. Previous field research, assessment, and preliminary key informant interviews were conducted in many communities of the Bekaa region. The findings indicated the need to respond to the postharvest challenges faced by farmers.

Globally, a third of crops harvested are lost due to inadequate postharvest storage facilities or their absence (FAO, 2011). For developing economies, preharvesting management, processing, storage infrastructure, and market facilities are either not accessible or insufficient (World Bank, 2011). Locally, small-scale farmers are excluded from coordinated supply chains, attributable to their lack of access to storage facilities, in parallel with failures in policies set up to this end, if any. This contributes to the relatively weak competitiveness of small-scale farmers in the market, postharvest losses, and an increase in food waste, coupled with the exacerbation of waste management problems (FAO, 2017). In contrast, reducing postharvest losses would reduce the reliance on imported food and reduce environmental concerns, and decrease land abandonment, strengthen food security, and

improve rural development and farmers' livelihoods (Hodges, Buzby, & Bennett, 2010; Ulrich et al., 2012).

Within the agro-food sector, many studies (Abass et al., 2014; Adeoye, Odeleye, Babalola, & Afolayan, 2009; Basappa, Deshmanya, & Patil, 2007; Basavaraja, Mahajanashetti, & Udagatti, 2007; Buyukbay, Uzunoz, & Bal, 2010; Buzby, Farah-Wells, & Hyman, 2014; Sharmaa & Singhb, 2011; Tefera, 2012; Tefera et al., 2011) have conducted economic analyses of postharvest losses of different types of produce. Other studies have used survey-based stated preference (SP) tools, such as contingent valuation (CV) (Brugarolas, Martinez-Carrasco, Bernabeu, & Martinez-Poveda, 2009; Da Costa & Santos, 2016; Garming & Waibel, 2009; Khan & Damalas, 2015; Posri, Shankar, & Chadbunchachai, 2006) and choice experiments (CE) (Chakir, David, Gozlan, & Sangare, 2016; Jin, Wang, He, & Gong, 2017; Mahadevan & Asafu-Adjaye, 2015; Travisi & Nijkamp, 2008), to estimate the willingness to pay (WTP) to prevent the potential environmental and health risks arising from pre- or postharvest practices. In addition, these methods have mainly been used in agro-food marketing for analyzing WTP for residue-free food products. However, to our knowledge, none of the existing studies has estimated farmers' WTP to reduce postharvest-related challenges.

Agricultural producers use a variety of refrigeration systems to extend the shelf life of perishable materials. Cooling not only reduces the potential for spoiling due to bacterial growth, but also reduces the humidity levels for some products. Accordingly, a refrigeration unit may be used in common by groups of farmers as a type of cooperative commercial infrastructure for the storage of agricultural commodities. The unit is used to store wholesale produce prior to distribution and to help reduce the producers' postharvest losses.

This paper evaluates the potential for operating a common refrigeration unit to address small-scale farmers' challenges related to postharvest losses in a selection of municipalities in the Baalbek region of the Bekaa valley. Farmers are presented with a hypothetical scenario where they are provided full subsidies for purchasing the cooling room, but are expected to cover operational and maintenance costs. Using a CVM survey, the benefits of these units were elicited using farmers' WTP to access the postharvest common refrigeration facility.

Methodology

Survey Design

We designed and administered a survey instrument to a sample of 130 small-scale farmers in different rural communities of the Bekaa. According to the 2010 agricultural census conducted by the Ministry of Agriculture[1] in Lebanon, there are 3,206 farmers operating in the study area. We developed a first draft of the questionnaire and pretested it with five farmers selected randomly from small-scale farmers' communities. The pretest was conducted in order to check the respondents' general understanding of the questionnaire. The instrument was further refined before it was deemed suitable for use. The range of hypothetical fees for using the refrigeration unit to be randomly assigned to the respondents was devised after a rapid assessment of the market for locally existing refrigeration units. The units considered are already established for farmers who refrigerate a part of their produce. Results from the assessment indicated that farmers pay approximately US$3 to US$5 per approximately 22 to 33 lb. (10 to 15 kg) of produce (every 3 months), with some fluctuations depending on the refrigeration facility or types of crops. Accordingly, a small-scale farmer would pay between US4300 and US$450 per metric ton of produce stored in refrigerators for the three-month period, which is equivalent to US$100 to US$150 per month. It is important to note that respondents were informed that the proposed initiative would be financially covered through external sources of funding. Participating farmers would jointly have to pay for the operation and maintenance costs of the common fresh produce refrigeration units. These units will allow access to temporary storage for crops and therefore will help the farmer defer selling until the local market price becomes satisfactory.

[1] The raw dataset was kindly provided by the Ministry of Agriculture.

The questionnaire consisted of three sections. The first section gathered farmers' demographic profiles and socio-economic conditions (e.g., level of education, years of involvement in agriculture, income level, surface land cultivated, type of crops cultivated, etc.).

The second section gathered information on the farmers' attitudes and levels of concern over postharvest losses and their access to postharvest storage facilities. Other questions gauged the farmers' views on the most suitable solutions to increase agricultural production and revenue (e.g., processing facilities, postharvest storage, increasing the area under cultivation, crop diversification).

The third section of the questionnaire contained the WTP scenario. Prior to the WTP questions, the CV survey clearly informed the farmers that they would be expected to pay a modest monthly fee to access the refrigeration facility. Subsequently, 6 payment categories were proposed, taking into consideration that the current fee paid per farmer is between US$100 and US$150 per month. The degree of seriousness of respondents was assessed by the interviewer as a means in order to help in evaluating the validity of the WTP question. The interviewer assessed this measure by determining whether the respondents spent enough time pondering the WTP question for the proposed initiative.

Field Interviews

Our study area consisted of villages falling within the Baalbek district of the Northern Bekaa region, a region which is the breadbasket of Lebanon. This district is the largest in the country and encompasses about 95 municipalities and occupies a total area of around 573,037 acres (2,319 km^2).

This study was designed to ensure that neither the survey sampling nor the questionnaire design introduced significant biases. The sampling design was based on data collected from municipalities, which are used to identify local small-scale farmers actively engaged in farming. Sampling was conducted using the snowball technique, whereby a small group of initial informants is used to nominate—through their social networks—other small-scale farmers who could potentially contribute to the study.

We collected data from the 16 villages that were randomly selected. These villages are characterized by several prevailing factors that vary greatly across them, such as cultivated area, type of cultivated crops, socio-economic characteristics, age groups, and access to adequate support (e.g., access to agricultural inputs and to information on agricultural practices or advanced techniques). Of the 130 face-to-face interviews, 110 were fully completed from start to end. Overall, the response rate was about 84%.

The Contingent Valuation Method

The contingent valuation (CV) method is an established method for nonmarket valuation (Misra, Huang, & Ott, 1991; Weaver, Evans, & Luloff, 1992) that gauges respondents' preferences and values for public goods and services by relying on their responses to contingent circumstances embedded in an artificially structured market (Seller, Stoll, & Chavas, 1985). The CV method has been applied traditionally in environmental valuation but has been extended to other sectors, including the agro-food sector (Venkatachalam, 2004). The aim of the CV method is to administer surveys to determine how respondents will value changes to the provision not only of private goods, but also of public goods, such as environmental improvements, landscape amenities, or community development schemes (Fuks & Chatterjee, 2008; Mitchell & Carson, 1989).

In this study, we adopted the CV method to estimate farmers' WTP toward the operating expenses of a cooperatively owned, postharvest refrigeration unit. The goal is to determine small-scale farmers' interest in the common refrigeration unit as a means to reduce their challenges relating to postharvest losses. To help explain the respondents' stated answers and establish their validity, survey participants were asked their opinions and attitudes concerning the cooperative refrigeration unit.

In our study, we establish whether respondents are willing to incur an increase in their costs of production in return for access to temporary refrigerated storage that may allow them to reduce food losses, decide on the terms of sale, and indirectly improve their rural livelihoods. This survey proposes a cold storage solution to small-scale

farmers' postharvest challenges and elicits their maximum WTP for it. The resulting data are used to propose alternatives to reduce the challenges encountered by small-scale farmers and are linked to the different characteristics of small-scale farmers and their challenges. The different characteristics include socio-economic factors such as household income, level of education, type of cultivated crops, farming experience, access to wholesale market, and cultivated land surfaces. Other variables include the price they are willing to pay and the characteristics of small-scale farmers that are mainly formalized as categorical variables.

Results and Discussion

Survey and Sample Characteristics

Table 1 summarizes all variables included in the

Table 1. Summarized List of Selected Variables Considered in the Data Analysis

Variable	Symbol	Description	Re-coded variables
Age	age	Categorical variable; age of the respondents/farmer	Age
Gender	gender	Sex of the respondents/farmer	Gender
Education	education	Categorical variable; education level of the respondent/farmer	Knowledge1: no or lower education Knowledge2: secondary and higher education
Cultivated land size	land_cult	Categorical variable; cultivated lands total surface (in m^2)	Land1: Less than 40,000 square meters Land2: 40,000 square meters and more
Experience in farming	inv_duration	Categorical variable; duration of involvement in agricultural production (years)	Experience1: less than 10 years Experience2: 10-20 years Experience3: more than 20 years
Working season	season	Categorical variable; seasonality of employment in the agricultural sector (Months/year)	Season1: 0-3 months Season2: 3-6 months Season3: 6-9 months Season4: all year round
Cultivated crops	cultivated_crops	Type of cultivated crops (apple, grape, potato, onion, cherry, apricot/peach, vegetables, wheat, rose, almond, olive, grains)	(type of crop)1: 0=no (type of crop)2: 1=yes
Number of workers	people_engaged	Categorical variable; number of HH members involved in agricultural production	people_engaged1: 3 or less people_engaged2: more than 3
Ownership characteristics	land_operation	Categorical variable; agricultural land ownership characteristics	Ownership1: owner of land Ownership2: renter of land Ownership3: sharecropper of land
Income source	main_income_source	Agriculture as a main source of income	main_income_source1: no main_income_source2: yes
Share of income from agriculture	Share_inc	Categorical variable; share of income from agriculture from total income	Percentage1: more than 50% of total income Percentage 2: less than 50% of total income
Access to wholesale market	wholesale_market	Framers have access to wholesale market	Wholesale_market1: no Wholesale_market2: yes
Concern to postharvest storage	concern	Categorical variable; farmers have concern about having access to adequate postharvest storage facility	Concern1: concerned Concern2: not concerned
Concern to postharvest loss	concern_post_harv_loss	Categorical variable; concern relating to postharvest losses	Concern_post_harv_loss1: concerned Concern_post_harv_loss2: not concerned Concern_post_harv_loss3: strongly concerned
Willingness to pay	WTP	Willingness to pay (yes, or no)	Wtp1: no Wtp2: yes
Amount willing to pay	WTP_dollars	Categorical variable; maximum amount that farmers are willing to pay (US$)	Price
Farmers not WTP	not_support	Cause for which farmers are not supportive of the initiative	
Income	income_cat	Categorical variable; monthly household income category (US$ per month)	Income1: less than US$1,000 Income2: US$1,000 and more
Seriousness	serious	Categorical variable; level of seriousness of the respondents	Seriousness1: high seriousness Seriousness2: low seriousness

dataset. A correlation test was applied to identify potentially multicollinear variables. Accordingly, variables that were found to have a correlation coefficient larger than 0.4 in absolute value were examined separately in a preliminary model, and only variables that were more significant (with a lower *p* value) were included in the final model.

Table 2 presents the socio-demographic characteristics of the sample. The greatest percentage of surveyed farmers were male (98%), despite the fact that the agricultural labor is performed substantially by women. Indeed, this is expected given the nature of farming in Lebanon and the region, which is male-dominated when it comes to land tenancy and decision-making. Ages of interviewed farmers ranged from 18 to 60 years old, with most farmers (36%) between the ages of 30 to 50, and 22% above 60, while only 13% were between 18 and 30. About 88% of the farmers have some formal education, although the percentage of farmers with higher education does not exceed 25%.

Results in Table 2 indicate that only 39% of the farmers rely solely on income generated from agricultural production and farming activities with no access to alternative income generation opportunities. Thirty-five percent have a monthly household income ranging between US$1,500 and US$2,000.

Cultivated land surface area varied within the sample, with 80% of respondents cultivating less than 10 acres (4 hectares) of land. It is worth noting that small-scale farmers were purposefully selected to ensure that the results of this study would specifically serve to address the challenges encountered by small-scale farmers. Moreover, results showed that 66% of the farmers have been involved in farming activities for more than 20 years. About 62% of the farmers reported active involvement of at least three household members in farming activities, and 84% of farmers reported to be landowners. Indeed, most of these farmers inherited these lands from their ancestors and continued their engagement in agricultural production. However, their level of engagement in farming seems to be changing over time, with many farmers (35%) only seasonally (3–6 months) employed in farming. About 29% of the farmers practice farming throughout the different seasons of the year. Results also showed that 91% of farmers have direct access to wholesale markets, suggesting that production resulting from farming activities is intended to be sold at local markets and not only for personal domestic consumption.

The survey included questions to assess farmers' concerns about postharvest losses and access to postharvest refrigeration prior to eliciting their WTP to have access to postharvest refrigeration units. While 72% of the farmers showed a high level of concern about postharvest losses, 56% were concerned about postharvest storage.

Turning to WTP elicitation, two consecutive questions were administered to respondents. The first asked farmers whether they are willing to pay to have access to postharvest refrigeration. Those who indicated yes were asked a second question that gauged approximately how much they would

Table 2. Socio-Demographic Characteristics of the Sample

Characteristics	Percentage
Demographic profile of the farmers	
Age between 30 and 50 (years)	36
Male	98
Monthly household income between 1,500 and 2,000 (USD)	35
Agriculture as a main source of income	39
Level of education (educated)	88
Farming characteristics	
Cultivated land size less than 40,000 square meters	80
Farming experience with more than 20 (years)	66
Number of workers more than 3	62
Working season between 3-6 (months)	35
Landowners	84
Access to wholesale market	91
Concern/ Attitude	
Strongly concerned about postharvesting storage	56
Strongly concerned about postharvest losses	72
WTP	
Framers willing to pay	80
Respondents seriousness	
Very Serious	39

be willing to pay monthly to have access to this refrigeration facility. Results indicated that 80% of farmers were willing to pay to have access to the refrigeration unit.

Farmers' Willingness to Pay

Table 3 tabulates farmers' WTP distribution across price levels. The table shows that 20% of farmers, out of 110 respondents, were not willing to pay any premium at all. The mean WTP was categorized into several price ranges. Considering the mid-points of the ranges, US$25/month constituted the major (31%) preferred category of the respondents. The average WTP is around US$29. Because the maximum WTP values are left-censored at zero and right censored at 70, and are reported on US$10 intervals between these two bounds, an interval regression model was used for model and WTP estimation. Variables tested to exert multi-collinearity were dropped from the model.

When farmers were asked for the reasons they objected to the payment vehicle, four main groups of answers were obtained: (1) the respondent faces postharvesting challenges but lacks resources to invest in the proposed initiative; (2) the respondent does not face postharvesting challenges; (3) the respondent does not think the proposed initiative will have any positive income on their rural livelihood; and (4) the respondent faces postharvesting challenges but prefers investing in other areas related to the agricultural sector. Many iterations were attempted to arrive at the final model specification, whose estimated coefficients are shown in Table 4. All coefficients are highly statistically significant and have the expected sign, and all variables are categorical.

The coefficients for all-year working season, apple cultivation, access to wholesale market, concern over postharvest losses, and vegetable cultivation are positive and highly statistically significant. This indicates that farmers involved all year in agriculture production, with high

Table 3. Distribution of Willingness to Pay (WTP) Across Price Levels

Price in US$	Frequency	Percent	Cumulative
0	22	20	20
21–30	34	31	51
31–40	25	23	74
41–50	15	14	87
51–60	7	6	94
61–70	4	4	98
>71	2	2	100
Total	*110*	*100*	

Note: The range between 1 and 20 was not selected by any of the respondents.

Table 4. Model Estimation Results for the Interval Regression Analysis

Variable	Description	Coefficient	Std. Error
Seriousness	Not serious (0) Highly serious (1)	0 (base) 39.281***	7.715
Working season	9 months or less (0) All year round (1)	0 (base) 10.213***	4.793
Experience in farming	More than 20 years (0) 20 years or less (1)	0 (base) –7.836**	3.759
Cultivated land size	40,000 square meters and more (0) Less than 40,000 square meters (1)	0 (base) –9.365*	5.209
Cultivated crops	Do not cultivate apples (0) Cultivate apples (1)	0 (base) 8.455**	3.896
	Do not cultivate vegetables (0) Cultivate vegetables (1)	0 (base) 7.056*	4.291
Access to wholesale market	No (0) Yes (1)	0 (base) 14.479**	7.038
Concern to postharvest loss	Low or no concern (0) Highly concerned (1)	0 (base) 9.121**	3.957
Number of workers	More than 3 (0) 3 or less (1)	0 (base) –11.795***	3.643
_cons		–18.84	13.7

Note: *Significant at $p<0.1$. ** Significant at $p<0.05$. *** Significant at $p<0.01$ Log likelihood= -199; 22 left-censored observations at price<=0; 88 uncensored observations; 0 right-censored observations

concern over postharvest storage and losses, are willing to pay significantly to have access to such a postharvest unit. Similarly, farmers who cultivate apples or potatoes and have access to wholesale market have a significantly higher willingness to pay. On the other hand, other variables such as level of experience, surface land cultivated, and number of people engaged in agriculture showed a negative sign with highly significant impact. This indicates that farmers who have less experience, as well as smaller cultivated land surface area and fewer household members engaged in agriculture, are willing to pay less to have access to the postharvest storage unit.

Table 5 presents the expected mean values of the WTP at each covariate level evaluated at the sample means of the remaining covariates, taking into account censoring at zero. Results are indeed in line with the interval regression model estimates reported above. Only across cultivated land sizes and types of cultivated crops were differences insignificant at the 5% significance level. For the remaining covariates, WTP values were significantly and sizably different across levels. Starting with seriousness, highly serious respondents had an expected mean WTP value that is nearly 10 times that of the less serious respondents, which validates the model and WTP findings. In terms of working season, respondents who work all year round reserve a WTP (~US$18/month) that is around 80% higher than those who work less than 9 months (~US$10/month). As for experience, results suggest that respondents who have farmed longer than 20 years have a WTP that is 55% larger than that of less experienced farmers. Interestingly, respondents with access to a wholesale market have a WTP that is more than double that of those who do not have access. This result no doubt arises from the added value that the two types of facilities would afford the farmer when offered together. Equally important is cultivated land surface areas, whereby farmers who cultivate approximately 10 acres (40,000 square meters) or more have a WTP that is higher than those who cultivate less, which indicates that WTP increases, as expected, with this indicator of farmers' wealth. Respondents highly concerned about postharvest losses have considerably higher WTP values compared to those who have low or no concern, lending further validity to the model. WTP values were also affected by the type of cultivated crops. For instance, farmers who cultivate apples and vegetables have a WTP that is about 54% higher than those who do not. Finally, farmers who employ more than three workers have a WTP that is nearly double that of those with less than three workers. Indeed, this suggests that higher variable costs associated with farming operations (labor and possibly other costs) are highly conducive to WTP for reducing postharvest losses.

What these results imply, in terms of policy, is that farmers highly value setting up refrigeration units along the lines proposed in this CVM survey. This is established by the fact that four-fifths of our sample would be willing to pay a substantial

Table 5. Expected WTP Values at Various Covariate Levels (US$/month)

Variable	Description	Margin	Std. Error
Seriousness	Not serious	3.18	2.58
	Highly serious	30.77	4.07
Working season	9 months or less	9.97	4.09
	All year round	17.55	4.76
Experience in farming	More than 20 years	16.57	4.9
	20 years or less	10.75	3.82
Cultivated land size	40,000 square meters and more	17.2[a]	5.79
	Less than 40,000 square meters	10.24[a]	3.36
Cultivated crops	Do not cultivate apples	10.54[a]	3.58
	Cultivate apples	16.82[a]	5.20
	Do not cultivate vegetables	11.00[a]	4.47
	Cultivate vegetables	16.25[a]	4.22
Access to wholesale market	No	8.66	4.71
	Yes	19.35	4.12
Concern to postharvest loss	Low or no concern	10.32	4.07
	Highly concerned	17.09	4.58
Number of workers	More than 3	18.21	5.07
	3 or less	9.47	3.55

Note: Margins sharing a letter (a) in the group label are not significantly different at the 5% level.

amount to access such a service. Moreover, our preliminary assessment of commercial refrigeration units that exist in the area suggests that in view of their monopolistic position, they are able to charge farmers storage fees as high as US$150 per ton per month. This is further proof that farmers are willing to incur large costs to acquire this service if they have to. Yet when contrasted to our empirical findings, the results indicate that farmers clearly suffer from prevailing market fees for cold storage that seem to be highly overpriced. Our study results, therefore, indicate the need to set up non-commercial refrigeration units on the grounds that they not only offer a critical added-value service to farmers, but also provide a 'public good' offered at discounted and/or subsidized price to help bring down general refrigeration costs in this area, especially for smaller farmers.

Conclusion

This study examines farmers' willingness to pay (WTP) to operate a common refrigeration unit to reduce postharvest losses, which was assessed by means of a farmer survey in selected municipalities in the Northern Bekaa district of Baalbek, a breadbasket of Lebanon. Using the contingent valuation methods (CVM), the results indicate that most farmers (72%) are highly concerned about postharvest losses, and 80% were willing to pay varying fees for the proposed initiative. Most stated WTP values were around US$25 per month (for nearly a third of the sample), while a considerable proportion of farmers (20%) were not willing to pay any fee. Having a high income associated with agriculture and having a high level of education were associated with high WTP. Similarly, farmers with more than 20 years' experience in farming have a WTP that is 55% higher than that of less experienced farmers. Equally significant, respondents who work all year round have a WTP that is around 80% higher than those who work fewer than 9 months. Other factors, such as type of cultivated crops, also affected farmers' WTP, whereby farmers who cultivate apples or potatoes with access to a wholesale market had a WTP that is more than double that of those who do not. A large cultivated land surface area was also a significant predictor of positive WTP, indicating that farmers' wealth is a significant driver of WTP. Results also suggest that higher variable costs associated with farming operations (e.g., number of laborers) are highly conducive of WTP for reducing postharvest losses. For instance, farmers who employ more than three workers have a WTP that is nearly double that of those with fewer than three workers. Finally, our study establishes not only the importance of refrigeration as a value-added service highly valued by farmers, but also that it is highly overpriced in the existing market, not least from the perspective of small-scale farmers. Therefore, this study recommends that this service be offered at discounted or subsidized prices to smaller farmers (by municipalities, for example) in order to help enhance the viability of their businesses. The importance of such a goal to agrarian and rural development cannot be overstated.

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References

Abass, A. B., Ndunguru, G., Mamiro, P., Alenkhe, B., Mlingi, N., & Bekunda, M. (2014). Post-harvest food losses in a maize-based farming system of semi-arid savannah area of Tanzania. *Journal of Stored Products Research, 57*, 49–57. https://doi.org/10.1016/j.jspr.2013.12.004

Adeoye, I. B., Odeleye, O. M. O., Babalola, S. O., & Afolayan, S. O. (2009). Economic analysis of tomato losses in Ibadan Metropolis, Oyo State, Nigeria. *African Journal of Basic and Applied Sciences, 1*(5–6), 87–92.

Basappa, G., Deshmanya, J. B., & Patil, B. L. (2007). Post-harvest losses of maize crop in Karnataka - An economic analysis. *Journal of Agricultural Science, 20*(1), 69–71.

Basavaraja, H., Mahajanashetti, S. B., & Udagatti, N. C. (2007). Economic analysis of post-harvest losses in food grains in India: A case study of Karnataka. *Agricultural Economics Research Review, 20*, 117–126.

Brugarolas, M., Martinez-Carrasco, L., Bernabeu, R., & Martinez-Poveda, A. (2009). A contingent valuation analysis to determine profitability of establishing local organic wine markets in Spain. *Renewable Agriculture and Food Systems, 25*(1), 35–44. https://doi.org/10.1017/S1742170509990202

Bush, R. (2016). *Family farming in the Near East and North Africa* (International Policy Centre for Inclusive Growth (IPC-IG) Working Paper No. 151). Brasília, Brazil: Food and Agriculture Organization of the United Nations and the International Policy Centre for Inclusive Growth of the United Nations Development Programme. Retrieved from https://www.fao.org/3/a-i6537e.pdf

Buyukbay, E. O., Uzunoz, M., & Bal, H. S. G. (2011). Post-harvest losses in tomato and fresh bean production in Tokat province of Turkey. *Scientific Research and Essays, 6*(7), 1656–1666.

Buzby, J. C., Farah-Wells, H., & Hyman, J. (2014). *The estimated amount, value, and calories of postharvest food losses at the retail and consumer levels in the United States* (Information Bulletin No. 121). U.S. Department of Agriculture. Economic Research Service. https://doi.org/10.2139/ssrn.2501659

Chakir, R., David, M., Gozlan, E., & Sangare, A. (2016). Valuing the impacts of an invasive biological control agent: A choice experiment on the Asian ladybird in France. *Journal of Agricultural Economics, 67*(3), 13–30. https://doi.org/10.1111/1477-9552.12160

Da Costa, C. A., & Santos, J. L. (2016). Estimating the demand curve for sustainable use of pesticides from contingent-valuation data. *Ecological Economics, 127*, 121–128. https://doi.org/10.1016/j.ecolecon.2016.04.019

Food and Agriculture Organization of the United Nations [FAO]. (2011). *Global food losses and food waste: Extent, causes and prevention.* Rome: Author. Retrieved from https://www.fao.org/3/a-i2697e.pdf

FAO. (2017). Study of small-scale family farming in the Near East and North Africa: Focus country: Lebanon *[Étude sur l'agriculture familiale a petite échelle au proche-orient et afrique du nord pays focus Liban]*. Rome: FAO, CIHEAM-IAMM, and CIRAD. Retrieved from https://www.fao.org/3/a-i6608f.pdf

Fuks, M., & Chatterjee, L. (2008). Estimating the willingness to pay for a flood control project in Brazil using the contingent valuation method. *Journal of Urban Planning and Development*, *134*(1), 42–52. https://doi.org/10.1061/(ASCE)0733-9488(2008)134:1(42)

Garming, H., & Waibel, H. (2009). Pesticides and farmer health in Nicaragua: A willingness-to-pay approach to evaluation. *The European Journal of Health Economics, 10*(2), 125–133. https://doi.org/10.1007/s10198-008-0110-9

Henson, S., Jaffee, S., Cranfield, J., Blandon, J., & Siegel, P. (2008). *Linking African smallholders to high-value markets: Practitioner perspectives on benefits, constraints, and interventions* (Policy Research Working Paper No. 4573). The World Bank. https://doi.org/10.1596/1813-9450-4573

Hodges, R. J., Buzby, J. C., & Bennett, B. (2010). Postharvest losses and waste in developed and less developed countries: Opportunities to improve resource use. *The Journal of Agricultural Science, 149*(S1), 37–45. https://doi.org/10.1017/S0021859610000936

Jin, J., Wang, W., He, R., & Gong, H. (2017). Valuing health risk in agriculture: A choice experiment approach to pesticide use in China. *Environmental Science and Pollution Research, 24*(21), 17526–17533. https://doi.org/10.1007/s11356-017-9418-2

Khan, M., & Damalas, C. A. (2015). Farmers' willingness to pay for less health risks by pesticide use: A case study from the cotton belt of Punjab, Pakistan. *Science of the Total Environment, 530-531*, 297–303. https://doi.org/10.1016/j.scitotenv.2015.05.110

Mahadevan, R., & Asafu-Adjaye, J. (2015). Exploring the potential for green revolution: A choice experiment on maize farmers in Northern Ghana. *African Journal of Agricultural and Resource Economics, 10*(3), 207–221.

Misra, S. K., Huang, C. L., & Ott, S. L. (1991). Consumer willingness to pay for pesticide-free fresh produce. *Western Journal of Agricultural Economics, 16*(2), 218–227.

Mitchell, R. C., & Carson, R. T. (1989). *Using surveys to value public goods: The contingent valuation method.* New York: Resources for the Future Press.

Posri, W., Shankar, B., & Chadbunchachai, S. (2006). Consumer attitudes towards and willingness to pay for pesticide residue limit compliant "safe" vegetables in northeast Thailand. *Journal of International Food and Agribusiness Marketing, 19*(1), 81–101. https://doi.org/10.1300/J047v19n01_05

Poulton, C., Dorward, A., & Kydd, J. (2010). The future of small farms: New directions for services, institutions, and intermediation. *World Development*, *38*(10), 1413–1428. https://doi.org/10.1016/j.worlddev.2009.06.009

Seller, C., Stoll, J. R., & Chavas, J.-P. (1985). Validation of empirical measures of welfare change: A comparison of non-market techniques. *Land Economics, 61*(2), 156–175. https://doi.org/10.2307/3145808

Sharma, G., & Singh, S. P. (2011). Economic analysis of post-harvest losses in marketing of vegetables in Uttarakhand. *Agricultural Economic Research Review, 24*(2), 309–315.

Tefera, T. (2012). Post-harvest losses in African maize in the face of increasing food shortage. *Food Security, 4*(2), 267–277. https://doi.org/10.1007/s12571-012-0182-3

Tefera, T., Kanampiu, F., De Groote, H., Hellin, J., Mugo, S., Kimenju, S, … Baziger, M. (2011). The metal silo: An effective grain storage technology for reducing post-harvest insect and pathogen losses in maize while improving smallholder farmers' food security in developing countries. *Crop Protection, 30*(3), 240–245. https://doi.org/10.1016/j.cropro.2010.11.015

Travisi, C. M., & Nijkamp, P. (2008). Valuing environmental and health risk in agriculture: A choice experiment approach to pesticides in Italy. *Ecological Economics, 67*(4), 598–607. https://doi.org/10.1016/j.ecolecon.2008.01.011

Ulrich, A., Speranza, C. I., Roden, P., Kiteme, B., Wiesmann, U., & Nüsser, M. (2012). Small-scale farming in semi-arid areas: Livelihood dynamics between 1997 and 2010 in Laikipia, Kenya. *Journal of Rural Studies*, *28*(3), 241–251. https://doi.org/10.1016/j.jrurstud.2012.02.003

U.S. Agency for International Development (USAID). (2014). *Lebanon: Agriculture and food security*. Retrieved October 24, 2017, from http://www.usaid.gov/lebanon/agriculture-and-food-security

Venkatachalam, L. (2004). The contingent valuation method: A review. *Environmental Impact Assessment Review, 24*(1), 89–124. https://doi.org/10.1016/S0195-9255(03)00138-0

Weaver, R. D., Evans, D. J., & Luloff, A. E. (1992). Pesticide use in tomato production: Consumer concerns and willingness-to-pay. *Agribusiness, 8*(2), 131–142. https://doi.org/10.1002/1520-6297(199203)8:2<131::AID-AGR2720080205>3.0.CO;2-W

World Bank, The. (2010, April). *Building sustainable small-scale agriculture in Southern Africa.* Paper presented at the Regional Agriculture and Food Security Forum 2010, Livingstone, Zambia. Retrieved from http://documents.worldbank.org/curated/en/913441500442854638/Regional-agriculture-and-food-security-forum-2010-building-sustainable-small-scale-agriculture-in-Southern-Africa

World Bank, The. (2011). *Missing food: The case of post-harvest grain losses in sub-Saharan Africa* (Report No. 60371-AFR). Washington, D.C.: World Bank. Retrieved from http://documents.worldbank.org/curated/en/358461468194348132/Missing-food-the-case-of-postharvest-grain-losses-in-Sub-Saharan-Africa

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Roots of resistance and resilience: Agroecology tactics for resettlement in El Salvador

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Abstract

In the current era of intensifying global migration and displacement, people face significant obstacles as they resettle and reestablish community in a new place. This reflective essay explores the process that the researchers used to study how one community in El Salvador employed agroecology tactics for resettlement after the Salvadoran civil war and has remained rooted despite new forms of violence across Central America. The authors reflect on how their relationship to the community and their role as researchers from the United States visiting El Salvador unearths important connections between resettlement and agroecology. An approach utilizing oral histories, participant observation, and situation analysis revealed the need to connect macrolevel sociological perspectives on the environment to a spiritually informed understanding of how people relate to food systems and agriculture in everyday life. The essay highlights how cooperative agroecology tactics can contribute to people's ability to resist the forces that create contemporary environmental, human rights and international justice crises after displacement—or confront them with resilience. Concluding insights from El Salvador are offered to inform future agroecology and food systems scholarship and practice.

Keywords

Methodology, Praxis, Agroecology, Resettlement, Everyday Life, Religion and Spirituality, Social Movements, Environmental Knowledge

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Vamos todos al banquete,
a la mesa de la creación,
cada cual con su taburete,
tiene un puesto y una misión.

Hoy me levanto muy temprano,
ya me espera la comunidad,
voy subiendo alegre la cuesta,
voy en busca de tu amistad.

Dios invita a todos los pobres,
a esta mesa común por la fe,
donde no hay acaparadores,
y a nadie le falta un con que.

Dios nos manda hacer de este mundo,
una mesa de fraternidad,
trabajando y luchando juntos,
compartiendo la propiedad.

Let's all go to the banquet,
to the table of creation,
each with his or her seat,
each have a place and a mission.

Today I wake up very early,
the community is waiting for me,
I am going up the hill joyfully,
I am in search of your friendship.

God invites all the poor,
to this common table by faith,
where there is no greed,
and nobody lacks what they need.

God commands us to make this world,
a table of brotherhood and sisterhood,
working and fighting together,
sharing what we have.

—*"Vamos Todos Al Banquete," by Guillermo Cuéllar*

This is a popular folk hymn often sung at masses and before mealtime in El Salvador. It serves as a reminder of the spiritual and communal potential of the land and the harvest, and of the capacity of food to bring people together. Monseñor Oscar Romero commissioned this song for *La Misa Popular Salvadoreña* (The Salvadoran Popular Mass), and its lyrics were inspired by one of Padre Rutilio Grande's homilies. Grande was a Jesuit priest whose assassination in 1977 was one of the first killings directed at a religious leader during El Salvador's civil war (Kelley, 2015).

The words of this song weave together images that guide much of this reflective essay on our work and experience in El Salvador: of coming to the table to break bread, sharing hopes and dreams, making space for one another, and in general remembering to consciously build community in everyday life. This song captures the spirit of faith and relationship that we bore witness to in El Salvador during our time there, which is in contrast with the stories of war, trauma, and fear that are also deeply present in El Salvador. Salvadorans have great capacity to hold both *la lucha* (the struggle) as well as faith and hope for building a different future.

One of the co-authors of this study, Megan, got to know this song, El Salvador, and the Santa María de la Esperanza community through an undergraduate study abroad program called the Casa de la Solidaridad (Yonkers-Talz, 2003), where she studied for a semester and then returned to work. Part of her work involved being placed in a community-based learning praxis site, which is where she initially got to know the Santa María community and Mercedes, a community leader, activist, and *campesina*.[1] The research project described here offered an opportunity to reconnect with the community and stay with our friend Mercedes. Throughout the project, we had the opportunity to speak with residents about their reality and experience, and to do so in a manner that would foster mutual learning.

In this essay, we share our reflections on the

[1] In the Latin American context, farmers and peasants often use the term campesino/a to describe themselves. Many people have come to use the term proudly, in order to connect their lives with historical or contemporary political struggles for land rights and food sovereignty (Montes, 1988; Holt-Giménez, 2006).

process of doing research in El Salvador and use experiences from the field to highlight ways that this particular context might contribute to agroecology research and practice. To accomplish these two objectives, the essay is organized in the following way. First, it situates the social and historical context of El Salvador in relationship to agroecology, and then it reflects on the project's methodological approach. Next, the essay highlights a few notable encounters in our fieldwork. Finally, it summarizes some of the lessons we learned from Salvadoran people about how agroecology practices can become tactics for resettlement.

Agroecology in the Social and Historical Context of El Salvador

From our first day in the community, and throughout our project, we were continuously struck by the hospitality and openness of Santa María residents to our presence. As we traveled around the community, we reconnected with community members that Megan had previously met and were introduced to strangers. In each of these encounters we were welcomed into the local agroecological context as people we met often showed us what they were growing, spoke about the land, or offered us food they had grown. Although community members did not typically tell us about the scientific, ecological characteristics of the land, or use the term agroecology, they did share the local, social, and environmental context with us while inviting us to develop our own appreciation for their land. Even if residents did not want to be interviewed, and several did not, we were never turned away. This hospitality is markedly different from what we are accustomed to as U.S. citizens, where fear and uncertainty (especially at the time of this writing) seem to deeply pervade our politics, neighborhoods, and relationships.

Overall, the orientation of deep hospitality that the Santa María residents seemed to carry toward us was both comforting and surprising, given the history between the country where we are citizens, the United States, and El Salvador. El Salvador's civil war, which took place from the late 1970s to 1992, resulted in the death of approximately 75,000 civilians. The loss endured during the civil war cannot be separated from the millions of dollars of military aid that the Nixon, Carter, and Reagan administrations sent to El Salvador. This aid was in addition to the military training provided to Salvadoran army units at the School of the Americas in Fort Benning, Georgia, now known as the Western Hemisphere Institute for Security Cooperation. The U.S. government not only stayed silent during the horrific violence that happened as a result of its funding, it actively covered up the brutality of the war in an effort to protect the perpetrators within the Salvadoran government (Bonner, 2016; Danner, 1993).

Today, the U.S. continues to have a large impact on the lives of Salvadorans. The complicated and deadly gang violence in El Salvador has resulted in large part from the deportation of gang members from Los Angeles to El Salvador in the 1990s. When gang members arrived back in El Salvador during that time, often having originally fled to the U.S. due to the war violence, they were entering a very complicated social fabric. As El Salvador continued its civil war recovery, gang violence multiplied under the "iron fist" tactics of the newly forming national police force that failed to address the root causes of gang affiliation (Wolf, 2017). Today, El Salvador has one of the highest homicide rates in the world. The Rev. Gerardo Mendez, a priest who works in San Salvador with young people, puts it this way: "The problem of violence has many causes, social familial, and economic. We've always said: the violence doesn't exist because of the gangs. The gangs exist because of the violence" (Garsd, 2015).

Gang violence continues to traumatize Salvadoran communities. In 2016, there were a recorded 5,278 homicides. Despite being a small country with only 6.5 million people, by 2017 El Salvador was experiencing an average of 10 homicides daily (Malkin, 2017). This reality has had a complex connection to the United States. Throughout history, decisions made in the United States have had profound effects on El Salvador—ranging from financially supporting the Salvadoran Civil War, contributing to the gang problem, and now turning away and deporting many migrants seeking safety and opportunity in our country (Gonzalez, 2011).

As researchers from the U.S., we found ourselves asking: what is the larger historical narrative

between our two countries? How were we being attentive to these connections in our preparation and carrying out of this project? How were we sharing our reality when asked about our life back home, while being attentive to our privilege and the way that U.S. policies are currently affecting the lives of Salvadorans? It was important as researchers to carry these connections with us. While our project and interviews focused on community life and agriculture in Santa María, we also spent time connecting more informally with community members to be open to potential learning.

During a short visit to another Salvadoran town, we also learned about other community agriculture practices in the country. About an hour from Santa María, in Suchitoto, the Centro Arte Para La Paz (Arts Center for Peace) was featuring the work of local permaculturalists as part of an exhibit on the history and future of human settlement in El Salvador. The center was founded during the Salvadoran civil war with leadership from Sister Peggy O'Neill and local community members. Sister Peggy told us how many people in Suchitoto have been inspired by the "cosmic vision" of the local permaculture movement. We began to see how community members in Santa María were part of a larger, ongoing movement of resistance, resilience, and local power through cooperative agricultural practices in El Salvador (see, for example, Duffy, 2015).

In the years since the 1992 Chapultepec Peace Accords following the war, many people who were forcibly displaced had to resettle either within El Salvador or abroad. In many cases, cooperative agricultural practices have been part of this process across El Salvador through the related permaculture, food justice, food sovereignty, and agroecology movements (see, for example, Gómez, 2014; Millner, 2017; Radio Mundo Real, 2016). More generally, agroecology emphasizes the ecology of food systems, including the technical, social, and ecological aspects of how food gets from seed to plate (Altieri, 1995; Gliessman, 2014). Our experience in Santa María and El Salvador has much to contribute to a transdisciplinary, participatory, and action-oriented approach to agroecology (Méndez, Bacon, & Cohen, 2013).

Although issues of resistance and resilience have been explored in agroecology as they apply to social-ecological systems (Altieri & Nicholls, 2012; Gliessman, 2013; Koohafkan, Altieri, & Holt-Giménez, 2011) or the aftermath of disasters (for example, Holt-Giménez, 2002), the Salvadoran context presented here highlights the importance of understanding how agroecology is being employed for resettlement in an era of intensifying global migration and displacement. Research has begun to show that there are important connections to be made in this area, for example, in urban agriculture practices among immigrants (Mares & Peña, 2010) or gardening initiatives in refugee camps (Millican, Perkins, & Adam-Bradford, 2018). Moreover, agroecology has been studied as a means to repair social-ecological relationships in marginalized communities (Cadieux, Carpenter, Liebman, Blumberg, & Upadhyay, 2019) or create of conditions for bottom-up peace formation in environments that have a history of violence (McAllister & Wright, 2019). It also seems evident that in the process of advancing this kind of a "political agroecology," the spiritual and religious dimensions of people's experience with the land may be forgotten—which calls for a *deep agroecology* to more fully consider personal relationships with the environment (Botelho, Cardoso, & Otsuki, 2016).

The Salvadoran context builds on this research to highlight some of the connections among resistance, resilience, and agroecology in people's lived experiences with resettlement. Considering the continuing influence of ecological sciences in some agroecology perspectives (Méndez et al., 2013), which shape how resistance and resilience have been historically defined (Walker, Holling, Carpenter, & Kinzig, 2004), it is important to reflect on the social, political, and spiritual context of these terms.[2] In order to do this, our project combined macrolevel perspectives on environment and community development with a spiritually informed understanding of how people relate to

[2] In social and behavioral sciences, resilience has also historically been used to refer to an internal psychological state (Kumpfer, 1999). This is different from our approach, which looks at community experiences and social-ecological relationships.

food systems and agriculture in everyday life, beginning with the methodological approach.

Methods and Approach to Research

Our approach used the notion of praxis as process of engagement with the lived realities and experiences of the community members in Santa María de la Esperanza. In particular, we employed Jesuit Ignacio Martín-Baró's (1996) notion of praxis, which recognizes that social research can be limited if it does not seek to understand the lived, daily experiences of individuals. Martín-Baró's praxis invites us to transform ourselves as researchers and collaborators, and encourages us to seek ways to transform social reality. Martín-Baró was targeted for speaking out about human rights issues as the vice-rector of Central American University in San Salvador, which led to his murder in 1989.[3] As a scholar who dedicated much of his life to living and working with the Salvadoran people, Martín-Baró offers an approach to praxis and social transformation that is well suited to the Central American context (Lykes, 2014). As a Jesuit priest, Martín-Baró developed a nuanced understanding of the ways in which Salvadorans' faith and religion might affect different aspects of their lived experience. Accordingly, we sought to ground the project in three major tasks of a praxis-oriented research, as described by Martín-Baró (pp. 30–31):

- *Recovering historical memory*. Through recording oral histories, we explored how and why the community is using cooperative farming. We also sought to understand how identity is shaped individually and communally, how aspects of tradition and culture are preserved, and how lived experiences have affected how community members view themselves and their strengths. We engaged people's current impressions and their memories to understand the larger narrative of the community.
- *De-ideologizing everyday experience*: Our project aimed to retrieve the "original" experience that has potentially been covered over with naturalizing political ideologies, and return it back to the community through the production of a short bilingual booklet. We also followed the needs of community members, responding to present realities to craft a narrative of their own consciousness and reality.
- *Utilizing the people's virtues:* The project aimed to honor the people's virtues by recognizing resilience, solidarity, faith, and hope as virtues and a way of being for Salvadorans. Rather than solely focusing on categories, structure, or problems within the community, we sought to capture the intrinsic virtues and values that have allowed community members to survive through histories of oppression and injustice.

Our host was actively organizing an emerging women's cooperative in the community, and we were therefore also attentive to the role of women in cooperative activities, even though women were not necessarily the majority of farmers. We also learned how we might see ourselves in relationship to the community through the reflections of feminist theologian and philosopher Ivone Gebara. She connects "the struggle for survival" that women experience in the Global South to the disenchantment of an alienating and ecologically destructive "consumer culture" in the Global North. In other words, the *system* of globalizing political, economic, and environmental ideology poisons *both* the running water available to the poor *and* the spirit or psyche of those who live lives of material comfort (Gebara, 1999).

Acknowledging this continuing "coloniality of power" (Quijano, 2000) it was evident to us that our training in horticulture, sociology, theology, or social work may bias us toward our own model of social, developmental or horticultural science. We acknowledged that our data would be a result of this unequal encounter. Accordingly, our approach resonates with related emerging work in food sovereignty (e.g., Levkoe, Brem-Wilson, & Anderson, 2018) that asks how engagement with on-the-

[3] Martín-Baró was one of the six Jesuit priests who, along with their housekeeper and her daughter, were murdered by the Salvadoran Army in 1989 at their residence on the campus of José Simeón Cañas Central American University in San Salvador, El Salvador.

ground practice and activism might shape the production of academic knowledge about food systems. We therefore pay special attention to the encounters of these different kinds of knowledge as we experienced them in the community.

There is a long history of the United States and Europe exporting their ideas of environmental conservation in ways that may be destructive for local communities in Central America and other areas of the Global South (Gareau, 2007; Millner, 2016). Accordingly, we sought to investigate the particular *varieties of environmentalism* (Guha & Martinez-Alier, 1997) that Santa María residents employ in their cooperative work. Our overall goal was to learn more about the particular varieties of environmentalism and community action in El Salvador while reflecting on how a continuing coloniality of power may constrain Salvadoran social reality, academic disciplines, and United States professions. More specifically our goals were to:

- learn from the community development and agroecology tactics that Santa María residents use (to possibly inform or inspire future practices in the United States),
- reflect back the current situation of the community and farming cooperative through spoken, written, or visual representations (so that community members might see their already-existing wisdom in a new light and researchers might better understand own professional and scholarly work), and
- identify future possibilities for partnering with the community (through future research, support for community economic development, or acting as an intermediary with other governmental or nongovernmental organizations).

The general framework for achieving these goals was situation analysis. While situation analysis has become popular in studies of organizational behavior and management, here we were interested in a more sociological kind of situation analysis (Goffman, 1983; Stebbins, 1967) that Mindy Thompson Fullilove and colleagues further developed in their work to study and counteract the "serial forced displacements" of African American communities in U.S. cities (Fullilove, 2004; Fullilove & Wallace, 2011). From these scholars, we learned about the ways that displacement can trigger a traumatic loss of a social-emotional ecosystem—a web of social relationships that need to be forged again in resettlement.

More specifically, through the frame of situation analysis, we approached the community as an "interpersonal episode or complex state of affairs (the situation) in the context of the larger narrative of which it is a part (the embedding drama)," in order to understand things such as "how large social systems influence and constrain smaller ones, how epidemics impact individuals and families, or how seemingly isolated incidents are connected to one another" (Rennis, Hernandez-Cordero, Schmitz, & Fullilove, 2013, p. 192). Overall, through our presence and conversations in the community we sought to identify internal and external possibilities and constraints through an iterative process of recording, with feedback from community members, the following: the participants, the steps that people follow, the roles that people play, the rules that govern actions or decisions, the skills and knowledge that participants bring to a situation, the obstacles they face, the physical and social characteristics of the setting, and the conflicting or shared values or ideas of participants.

In order to investigate the current situation of the cooperative agriculture practices in Santa María, we relied on participant observation and oral histories collected over the course of three weeks living in the community. We spent time learning from and engaging with community members around different community sites: planting or harvesting in family or community farms, transporting freshly harvested food, attending local activist meetings, participating in an environmentalist march, and visiting agricultural sites in other parts of the country. In this process, to the greatest extent possible, we pursued a model of "reciprocal" food justice research, where we offered our own "sweat equity" on current community projects and responded to the community's needs and suggestions (Sbicca, 2015).

We recorded our personal observations in an ongoing photo journal and a daily written journal, including our analysis of farm, garden, or community sites; observations of the farming and agricultural practices that people employ; notes on our work alongside participants in daily farm tasks; identification of plants; and description of garden design. We conducted 12 interviews, including seven women and five men who ranged in age from approximately 30 to 90 years old. The interviews ranged from 30 minutes to an hour.

Throughout our time there, we would shift, sometimes uneasily, between accompaniment (of walking with people in their experience) and research (of trying to gather information on a topic that we had defined). Those who we interviewed were glad to tell us about their lives and have their names associated with their stories. Mercedes and others we met sometimes found our disposition as "researchers" interesting, or even amusing. Mercedes joked that we were very punctual whenever we set up a time for an interview, "like your capitalist culture has taught you." Although we tried to moderate our approach and disposition, this tension reemerged every time we did interviews, where almost everyone found the *formas de consentimiento* (consent forms) strange. We had been required to prepare consent forms for our university's Institutional Review Board, and the wording on these forms typically required a good amount of explanation. Most of the photos we took were meant to be for community members, which we returned to them as part of a separate, independently published bilingual photo book, distributed only within the community at the request of interviewees.

Prior to our arrival we consulted former volunteers who had lived in Santa María, and we were also in frequent communication with our host, Mercedes. With their guidance, we created a list of people in the community who had a special interest in agriculture. The interviews involved unstructured conversation based around key themes about the history of the community, including reasons for participating in the farming activities, plants that have a particular meaning or importance, the origins and preservation of seeds, history and transmission of agroecology/farming methods, or experience with governmental and nongovernmental organizations. We also allowed participants to define the scope of the conversation, and, accordingly, conversations often diverged based on their interests and activities. Often, conversations would continue after the formal interview was done, and some of this would make it into our daily notes.

We reviewed some of what we were learning with community members, and following the approach of situation analysis we focused on identifying the threats that the community was facing and its strengths. In this process, about six themes related to the contemporary situation of Santa María began to emerge. When we returned to the U.S., we continued to read through our notes and interviews and collect our reflections around the major themes we had identified in the community. In the process of exploring these themes in the sections that follow, we explain how our own limited forms of knowledge about El Salvador's social and environmental issues—taught to us in U.S. universities and culture—shaped what we expected and what we learned.

We found that the moments where our knowledge and the community's knowledge met or conflicted were vital to understanding how community members conceived of agriculture in their lives. For example, spirituality is often left out of U.S. psychology curriculums that tend to focus on diagnosis and treatment of individual abnormalities, yet community members made consistent and strong connections between spirituality, agriculture, material conditions, and their lives. In this sense, our interactions with the community challenged us, as researchers and practitioners, to expand our own sense of what an effective psychosocial or agroecology intervention might look like in response to displacement. In the following sections, we explore key lessons from these knowledge encounters across the themes of spirituality, hope, subsistence, relationship to the land, environmental knowledge, and refusal.

Lessons from the Field

Engaged spirituality as resource for community resilience. In our interviews, the theme of spirituality was often a part of people's narratives of community life, agriculture, and history. The Santa María

community and spirituality are deeply connected to the liberation theology teachings of priests who were considered radical by the church hierarchy, such as the martyred Saint Óscar Romero, and the practices of local leaders who organized to form *Comunidades Eclesiales de Base* (Christian Base Communities). This model of community inspired the founding of Santa María and birthed social movements that connected church teachings to a variety of direct actions for social change (Montgomery, 1994).

One interview where this connection was particularly evident was with Don Angel, Mercedes' father. Don Angel explained, "*Dios vive en cada persona"* (God lives in every person). It is through this faith lens that he chose to spend much of his adult life being a Catholic Catechist, work that he continued even when he was persecuted by the Salvadoran army for spreading what were seen as "communist ideologies." Don Angel connected his life, the survival of his family during the war, and their community's agricultural harvest and prosperity to the goodness and care of God. Although our own education initially led us to conceive of spirituality as a variable in peoples' lives or component of their experience, we came to see that, for many people, spirituality was actually integral to the cultivation of community resilience and a shared sense of belonging.

This communal connection became clear during an evening when, at 8:30 pm, Mercedes announced that we needed to go to a neighbor's house to retrieve some limes to sell in the market the following day. We, along with her son Manuel, piled into his car and drove on the community's winding road to our destination. When we arrived, a family (who did in fact have bags of limes waiting for us) greeted us warmly. This visit seemed to represent a sense of communal trust. Community members, in this instance, were working toward a common goal of getting produce to the market. This process required trust in one another and faith in their harvest. In many of our interviews, people expressed a sense of trust in the land; they trusted that the harvest would yield what they needed to survive. The prosperity of agriculture in the community seemed linked to an active sense of care and kinship among community members, working toward common goals.

Overall, connections between community, land, and spirituality were present in many of our interviews. Most people we spoke with frequently used God language; it was very common to hear "*Gracias a Dios*" (Thanks to God), "*Si Dios quiere*" (God willing), and "*Primero Dios*" (God first). This spiritual language was woven within community dialogue and allowed community members to have an intentionally spiritual relationship to their land. Many people spoke of their harvest using this language, connecting the generous harvest to God's grace.

We observed that much of the community was authentically living out this belief in God. It was made evident in the way they cared for one another and embodied their own resilience. Don Angel articulated a sort of spiritual resilience by saying: "*Diosito siempre me cuide*" (God always takes care of me). In our interviews, some community members shared their histories of the civil war—stories of survival, resilience, and also deep loss and injustice. As they continue *la lucha* (the struggle) of day-to-day life in a country that continues to be plagued with violence, their faith stands out boldly. Many community members spoke of a faith in one another and in God. Others described the faith it takes to farm and their trust that God will always provide the sustenance they need.

This spiritual resilience seemed to be connected to the larger context of people's faith. The Salvadorans we encountered did not seem to have a "blind faith" and trust in God, as a conventional materialist analysis of religion and society might contend. Rather, they embodied a faith in context, a sense of hope and solidarity developed through (rather than in spite of) the injustices they have faced. They expressed courage and conviction in God's vision of liberation and recognized that the hope of humanity is much larger than we can even imagine. Dean Brackley (2008), who spent several decades accompanying communities in El Salvador, explains it this way:

> While the truth of poverty and injustice makes a painful entry, the faith, contagious hope, and solidarity that accompany this evil are consoling and uplifting—so much so that life is

> worth celebrating, almost anytime. This great drama—the struggle of good and evil, grace and sin, the dying and the rising—gradually becomes the integrating factor that reconfigures our world. (p. 6)

Spiritual resilience can be seen as a resistance against injustice and the act of choosing gratitude and celebration in the midst of hardship. We witnessed this joy each day in the community—laughter and play among children, coming together of family and neighbors over meals, communal festivals, and celebrations of the harvest.

Overall, not only did the people of Santa María have very personal and intentional relationships to one another and the land, they also expressed a profound relationship to God. For many residents this deep faith seemed to embody their roots of resilience, and it was a source of strength as they encountered struggle in their lives. We asked community members about their hope for their community and land, and many shared their hopes with the phrase, "*Primero Dios"* (God first). This deep faith and trust in God seem to enrich the community with a fuller hope for their future, and a deeper love for one another, the land, and their Creator.

The abundant life of hope on the march. El Salvador faces a growing social and environmental crisis. Large, poisonous industries have destroyed the forests and polluted the land, air, and water (Jamail, 2011; Panayatou, 1998). In many places today, life is precarious and vulnerable to gang violence. Sustaining a community and maintaining trust can seem impossible in this situation, but as we witnessed in Santa María, community is a work in progress. Salvadorans continue to fight and organize for a better life and country. With the hard work of many activists, in 2017 El Salvador became the first country in the world to ban metal mining. Activists and communities continue to fight for the rights to public water, local agriculture, and community health. Care for the environment and collective stewardship of the earth is an act of protest that is necessary for survival.

Many Salvadorans, and especially residents in Santa María, described their work as part of a larger struggle for justice, *la lucha.* "We are still here, fighting," Adelia told us while we worked on a parcel of land farmed by a women's cooperative in the community. Lucia similarly explained, "We are fighting, this is the struggle we have—to see if this is how people are going to work and wanting to work like this [in cooperative agriculture] brings us closer and encourages us."

Perhaps not consciously, our outlook—as residents of the United States visiting El Salvador—had initially centered on images of poor Salvadorans living in violence and scarcity. This often-repeated narrative from the U.S. media derives from existing differences in material wealth between a country like the U.S. and El Salvador. But its extension to the dignity and capability of Salvadorans—as a lacking, deficient, or even demonized people—reflects a "Eurocentric Mythology" (Grosfoguel & Cervantes-Rodríguez, 2002) at the center of colonization, which positions "less developed" countries as less-than, in need of rescuing and research, or deserving exclusion and confinement.

Despite the vast material differences between El Salvador and the United States, there was consistent reference to abundance in our interviews. Phrases such as "we get everything we need from the land" were common, and at almost every occasion that we visited someone's house, we were given some kind of fruit. Rather than looking for the scarcity we set out to find, we began to see signs of abundance—hidden patches of corn and *güisquil* (squash) along the road, mangos rotting in the street because there were too many to eat, a sense of celebration where friends and neighbors were gathered, and jubilant, colorful parade floats at an environmental march in San Salvador.

It was challenging initially to recognize the sense of collective hope and shared abundant life, because in Northwestern cultures, like the one that raised us, it is mostly individual success and achievements that are a reason for celebration. As Ignacio Ellacuría (1991) explains:

> This [Latin American] hope that arises from life, that arises together with the promise and with the negation of death, is celebrated festively. The sense of fiesta, as it exists in the poor-with-hope, indicates for now that they

> have not fallen into the fanaticism of desperation and of the struggle for the sake of struggle. But neither do they fall therefore into the error of the fiesta purely for amusement that characterizes the Western world—fiesta lacking meaning and lacking in hope. Fiesta is not a substitute for missing hope; it is the jubilant celebration of a hope on the march. (pp. 61–62)

This sense of hope, abundance, and fiesta is not naive, but it is rooted in material reality. While U.S. consumer culture can be about an exorbitant accumulation that often has little connection to necessity or community, in El Salvador,

> The historical experience of death, and not merely of pain, of death by hunger and destitution or death by repression, and by various forms of violence, which is so living and massive in Latin America, reveals the enormous necessity and the irreplaceable value, first of all, of material life—as the primary and fundamental gift in which must be rooted all other aspects of life, which in the final analysis constitute development of that primary gift. That life must be expanded and completed by internal growth and in relation to the life of others, always in search of more life and better life. (Ellacuría, 1991, pp. 63–65)

One image that stands out from the march that we attended with Mercedes is the giant puppet of Oscar Romero at the top of a hill leading hundreds of environmentalists. Drawing attention to the need for public water infrastructure and programs that promote local food system ownership and control, people from communities across the country marched on what would normally be a busy street, with protest signs. For many people we met at the march, this moment was a direct extension of the long national struggle for democracy and peace. As one speaker before the march reminded us, a country that does not allow equal access to the abundance of our mother earth will never be at peace. This abundance ought to be stewarded in common, available to all. This was not a call for a utopian future, but something that many people there were already living out in their communities.

Economic subsistence through cooperative practices. Free trade zones, foreign investments, concentration of landholdings, and other forms of capitalist globalization contribute to the vulnerable position of many Salvadorans. Small farmers and businesses in El Salvador are isolated to sell their products to the global market or mold their livelihoods to the fluctuating demands of large, profit-seeking corporations and the shifting tastes of global consumer cultures. As many scholars have pointed out, this economic context has had devastating consequences, from alienation and displacement to violence, poverty, and environmental degradation (Durham, 1979; Faber, 1992; Garni & Weyher, 2013).

In the midst of this widespread experience of dispossession, the people whose stories we heard in Santa María indicated that they were able to survive and subsist based on the food that they grew as a community. This was because they did not seek to subsist alone, but together. Community members survive together through daily attention to family and collective farms, selling excess food to an urban cooperative in San Salvador, sharing with community members in need, and exchanging food through the town's collectively run store. The focus on daily survival—in some ways outside of typical capitalist modes of production—demonstrated that although the dominant mode of production across the world is increasingly capitalist, community life and maintenance enable a degree of freedom and self-determination that is partially outside the logic of the market. As sociologist Segundo Montes (1991) explains, El Salvador has long been characterized by both the presence of a capitalist mode of production and a noncapitalist mode of production, where some groups are "scarcely affected" by the ups and downs of capitalist markets.

In some ways, we were expecting (or maybe hoping) that people in Santa María would speak in radical political, spiritual, or ecological terms about the production of food in their community. Sometimes they did. Although we, as outsiders, had titled our initial project "roots of resistance and

resilience," we found that most community members did not quite know what this meant, and as we tried to explain it, we found that, in some ways, neither did we. We would still describe what we saw in community members as an extraordinary resilience in the historical context of an oppressive political, economic, and military regime, but for the community members we met this is not abstractly conceptualized. It is faced every day, and lived every day.

Overall, the people of El Salvador reaffirmed the empirical and theoretical value of research as praxis—to learn from the values and history revealed in people's lived experience (Martín-Barró, 1996). Social theories at Western universities, in which we have been schooled—from sociology and economics to social work and psychology—often have an individualist/capitalist (or occasionally a collectivist/Marxist undercurrent) as they employ abstract concepts of economic, social, and political systems to explain human behavior. Although ideologically different, both approaches to explaining social life and development tend to emphasize the process or outcomes of economic *production*. As we spoke to people in Santa María, however, we found an emphasis on the ongoing struggle, survival, and *maintenance* of social relationships and ecological health.

Because Santa María is a resettlement community (its initial inhabitants arrived during the civil war from more rural areas in El Salvador or refugee resettlement camps), many people consider their existence there to be a gift, for which they expressed gratitude for the founders of the community. The act of survival itself was considered an accomplishment. As countless community members told us, the work now is to continue on this founding. When people responded to our open-ended questions about why they farm in Santa María or why farming is important to them, they spoke about repetitive tasks such as weeding, preparing, planting, or daily acts of care in their individual or collective plots. These reflections focused on the promise of the harvest as something that they had to trust in order to survive.

Lazaró told us of long days walking back and forth across the community to tend to different areas, his own and parcels for the community. "I participate in agriculture because I do not have another option. . . . There is no other job, for me all of life is working the land," he told us as thunder and gathering clouds signalled another rainstorm approaching.

Lucia explained that, "Agriculture is good to have to survive because if you do not have money and you have food, you have more if you are harvesting for yourself. One knows what he or she is eating. One knows what he or she is going to eat is made of. It is the importance of working in the land. One knows that he or she is producing something good." In our conversations with Magdileno, he explained the importance of agriculture in a larger national context when he told us: "The agriculture in Santa María is important because we survive from it, we maintain the community from it. From it comes the tortillas to eat with the beans. That is important. . . . Maybe they have their good job in San Salvador, and from there, they pay for food: buy corn or tortillas. We do not, as we are more self-sufficient, we dedicate the community more to the work of agriculture. From there we have the corn and the beans to eat."

From our time in the community we learned that agriculture is not the only thing that the community maintains for survival; there is also active community involvement in the ongoing construction and maintenance of local infrastructures. While we were there, for example, several of the community members were involved in a repair project for the road that goes into the community. Community members explained that the farming and agricultural activities have always been conceptualized as a vital part of the larger community infrastructure, and they are a way for new arrivals to join with their neighbors in creating local power and community self-determination.

Relating to the land differently. The orientation toward economic subsistence through cooperative practices lends itself to different ways of relating to land and community. For example, in Western capitalist and patriarchal cultures, land is often only valued for its potential to produce economic profit; everyday relationships of maintenance and care are devalued compared to the productive labor of "male workers" (Wertheim, 2009). In Santa María,

an ethic of care seems to compete with, and sometimes triumph over, a global culture of patriarchal domination and exploitation. This was evident in how people presented their stories of the land in addition to the actual content of their stories.

Although it was not entirely clear through interviews how patriarchal or *machismo* culture specifically affects agriculture and farming activities, we did hear from several people that the male leadership had historically harbored *machismo* attitudes that privileged "productive men" over other aspects of the community. The continuing effects of this culture were evident when we interviewed the four women who take part in a women's cooperative. These women collectively care for a piece of land about 10-minute walk from the center of Santa María.

While men tended to have no problem sitting down and pontificating about their experience when we asked our general and open-ended questions, the women were sometimes more hesitant. In some cases, it would be obvious that the women we interviewed were less comfortable talking to Matt, and in those cases, Megan would ask more of the questions. Additionally, one woman explained that her husband would prefer that she stay at home, rather than go out to work on their plot of land, but she persisted anyway. Here, the women's farming cooperative is also a form of resistance to normative understandings of gender in the community.

In Santa María, growing food was part of a daily life of *cultural resistance* to the dominant culture that views the land as something to be exploited for profit.[4] The tools, language, and aspirations of agriculture were oriented toward the accumulation of local survival and power, not global exports. The growing method and style we noticed in farm spaces were both purposeful and informal. In Santa María most people do not grow in typical monoculture fields or rows of industrial agriculture. They embrace something more like what many researchers and practitioners call agroecology or permaculture. Agroecology and permaculture are two growing methods that have been appropriated, transformed, or adapted by *campesino* cultures across Latin American countries in different ways.

This resistance is also evident in how the overall approach of many people we met resists the "domination of nature" worldview that has historically propelled industrial agriculture and capitalism (Leiss, 1972). In all our interactions and conversations about agriculture in the community, residents usually began by referencing all the gifts that they receive from the land. Their approach to the land is deeply rooted in a spiritually informed sense of gratitude and relationship that makes community possible.

The land makes survival in Santa María possible, and it is also a gift of beauty. For example, Loncho summarized his feelings toward the land this way: "The land gives us life. It gives us mangos. It gives us avocadoes too. It is a beauty, the earth. It gives us flowers."

Similarly, Mercedes saw this generosity of the earth as something that has taught her about other areas of her life: "I have come to love the earth . . . to love the earth, and love plants … I have a direct relationship with plants. In this direct relationship is that I, my body, my being, is integrated … So I think the relationship is deep, this feeling of love for Mother Earth. And I feel that this gives me life, gives me energy, gives me strength, gives me vision, hope, and gives me food. I feel that plants complement my life."

In this sense, many members of the Santa María community are working to substitute a dominating and exploitative approach to the land with an emerging, more reciprocal environmental worldview that is founded on daily interactions of care. As we observed among community members, this was a work in progress where *machismo* culture and alternative, more feminist perspectives on the community and land were both present. The latter worldview enables community members to resist other forms of social or interpersonal violence, and is kept alive through the transfer of knowledge to the next generation.

[4] Using Eric Holt-Giménez's (2006) definition of cultural resistance: "campesino expressions of 'agri-culture,' that is, the ways farmer innovation, free association, mutual aid, food production, and environmental protection work through tools, organization, and language to fashion autonomous paths to equitable, sustainable futures" (p. xxi).

Environmental knowledge within and beyond classroom walls. Although much of our knowledge about the environment comes from classrooms, in Santa María, knowledge about the land and farming is often passed down in families and shared informally across the community. The way that knowledge about the environment is produced and passed on has many resonances with the history of popular education related to community landownership and cultivation in El Salvador (Millner, 2016). We often encountered a few of the most active farmers walking across the town, sharing updates on how plants or soil were doing that day. The older and more seasoned farmers we encountered also expressed great hopes for the next generation to continue to build on the foundation of community and agriculture that they had forged.

The community school that educates students through sixth grade often has holidays around the planting and harvest seasons so that students can work with their families. For Ali, a teacher in the community's school, this is not a distraction from school learning, but another component of the students' education. She hopes that students will bring their home life to the classroom and lessons from the classroom home to their parents, especially with new initiatives, such as the movement to use only organic fertilizers and build up a community composting program. She told us,

> As for the care of the environment, we try to do that as our daily bread. For example, with the issue of garbage, we have arranged for a car to come to pick up the garbage each month. We are there with the children [at the community school] every day to separate the waste, so that we can reuse the organic waste, for example. Also, within science lessons we try to do better environmentally with the students. So, I feel that it is something that we are sowing in children, so that after lessons they go talk with their parents…

The religious symbol of care for the earth as the community's "daily bread" seemed to be an aspiration that was not always perfectly achieved. The several young people we met did seem to be carrying a tension—between community history and the promise of formal education—and some of the older generation worries about the future of education and employment opportunities for the next generation in Santa María. In conversation with several people who shared their stories, we together imagined assembling a book that would provide a record of our conversations about the land and might serve to educate or inspire younger generations.

Rights of refusal: from idyllic place to conflicting aspirations. The name of the community, Santa María de la Esperanza [Saint Mary of Hope], says something about the orientation of the people who live there. It has been a community whose aspirations for a more peaceful and dignified life were expressed literally in colorful murals, vibrant gardens, personalized homes, and community encounters. Although it may be easy to romanticize the apparent successes of this kind of narrative, we also learned that such aspirations are never singular; they are contradictory and contested.

One afternoon, we went to visit a married couple in their home at the encouragement of other community members who suggested they might be interested in sharing their story. They were definitely not. Nevertheless, they invited us into their home, offering us food and drink as they explained their perspective.

From their point of view, there are certain families that have more power and access to land than others in the community. Early arrivals or people who had connections to the founders received better treatment. They pointed out that some of the familial plots of land were bigger or better than others—something that we had not considered as we were listening to the celebratory community narrative.

Because of this, the project represents only the collective views of those who were willing to share their story. It is not an entire community portrait; rather, it is a perspective on some of the approaches or tactics that have allowed the community to survive over time, particularly the people whose parents forged a life in Santa María.

In traveling to El Salvador to do research from a university in the United States, we had imagined that people in El Salvador deserved the right to tell

their story, especially to people coming from a country that is responsible for much of the terror during the Salvadoran civil war. This couple revealed that *refusal* is as powerful or important as *representation*. Their hospitality made it clear that they were not necessarily refusing us as people, but what we represented: a potentially dangerous intervention that they did not want. Perhaps, just as their survival was dependent on agriculture, so too it was connected to keeping unwanted foreign interventions or researchers out of their life—due to memories of other kinds of intervention that had historically caused damage and trauma.

Our interaction with this couple also helped us to avoid an over-idyllic imagination of Santa María. Even a community built in common on a foundation of shared values and experiences—striving for peace or a more hopeful future—is built on complex and unequal power relations. So, while we as researchers were bringing our own power dynamic, we were not visiting a power-neutral community in perfect harmony. Community members drew on a common store of memories to imagine their lives and future, but they did so in sometimes conflicting ways. From the refusals we encountered, we learned that resilience may be connected to an ability to resist the very forces that destabilize human and ecological life.

Concluding Reflections on Agroecology and the Research Process

This reflective essay has explored our approach to understanding how Salvadoran *campesino* culture is adapting to, or resisting, new threats that have emerged in the last half-century. Here we offer some conclusions on the research process and highlight ways that the Salvadoran context of resettlement might contribute to future scholarship and practice.

The orientation of our project began with the contemporary situation that Santa María is facing, which is a result of the community's evolving tactics to resettle in the aftermath of forced displacement. Such a focus allowed us to better understand how agriculture was woven into everyday life, in ways that both resisted and flowed across typical analytical categories of knowledge. We came to understand that action-oriented and participatory agroecology research would require a collaborative, open-ended, and flexible research disposition, and that this *way of being* needed to be actively cultivated. As researchers, such an approach was possible by noticing how our knowledge, actions, mannerisms, or way of speaking conflicted with community knowledge and expectations of us. In the process, we found that Martín-Baró's approach to praxis—including the wider social and political context of his work—was especially well suited to help us understand our own position as researchers and people's lived experiences. It also helped us to explore possibilities for more collaborative knowledge production.

As we listened to stories of the community, participated in daily life, and asked community members to frame their current situation, we were eventually able to "reflect back" what we heard in the form of a bilingual booklet. Although the short time we were in the community limited the scope of action that we could take and the number of people we could formally interview, we also realized that this approach allowed us to build relationships that could support future collaborations.

Community members we met in Santa María did not always talk about their work through the lens of "permaculture" or "agroecology," but we saw how their farming practices have much in common with the wider movement for community agriculture and food sovereignty in El Salvador and across Central America. Community members in Santa María paid attention to the specific crops being grown, in addition to the social, historical, and ecological context of their practices, as do agroecology movements and scholars. Our time in the field also demonstrated that it may be worthwhile to give particular importance to the social or spiritual dimensions of resilience and resistance in some agroecology contexts.

In Santa María, community members were not only trying to bounce back, recover, or adapt to changes (compare with Kumpfer, 1999; Walker et al., 2004) in the aftermath of war. The violence faced by the community was ongoing and involved new threats of economic isolation, gang violence, or police repression. In response, many people drew on shared history, religious symbols, or spiritual language to resist the dominant global econ-

omy, politics, and culture. Some of the tactics for resettlement that emerged from this resistance included, establishing connections to national movements, relating to the land differently, dispersing environmental education beyond classroom walls, sharing portions of the harvest to benefit community projects, and even refusing research interventions.

Throughout the research process we came to see that these tactics have special relevance for resettlement in an era of accelerating migration and displacement. For many of the Salvadorans we met, resistance is not only about rejecting harmful forces; it also involves sustaining meaningful places where community and shared life is possible. In this sense, it was important to understand the lived experiences, narratives, and virtues that allowed resistance to take on a quality of active hope where community members work to make the ecologically vibrant and socially just world they want to see.

Overall, these reflections emerge from the ways in which our own knowledge encountered the knowledge and virtues that were present in Salvadoran people. As we learned from the larger environmental activism taking place across El Salvador, we saw that tactics for resettlement within a single community can also be connected to wider organizing efforts, policy proposals, or propositions for community-led development. Lessons from the Salvadoran context can also encourage scholars, activists, and practitioners to consider how they proceed in an era of accelerating migration and displacement that is driven by dramatically uneven social and economic development. How do people stay rooted in this challenging situation? How do communities recover in the aftermath of state-sanctioned violence, environmental crisis, or extreme economic marginality? What is the role of a researcher in such a context? This project reaffirms that these are not new questions—which means we still have much to learn from communities that have been engaged in this struggle for a dignified life and community self-determination.

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References

Altieri, M. (1995). *Agroecology: The science of sustainable agriculture* (2nd Edition). Boulder, CO: Westview Press.

Altieri, M. A. & Nicholls, C. I. (2012). Agroecology scaling up for food sovereignty and resiliency. In E. Lichtfouse (Ed.), *Sustainable agriculture reviews* (Vol. 8). Dordrecht: Springer. https://doi.org/10.1007/978-94-007-5449-2_1

Bonner, R. (2016, April 15). Time for an apology to El Salvador. *The Nation.* Retrieved from https://www.thenation.com/article/time-for-a-us-apology-to-el-salvador/

Botelho, M. I. V., Cardoso, I. M., & Otsuki, K. (2016). "I made a pact with God, with nature, and with myself": Exploring deep agroecology. *Agroecology and Sustainable Food Systems, 40*(2), 116–131. https://doi.org/10.1080/21683565.2015.1115798

Brackley, D. (2008). Theology and solidarity: Learning from Sobrino's method. In S. J. Pope (Ed.), *Hope & solidarity: Jon Sobrino's challenge to Christians* (pp. 3–15). Maryknoll, NY: Orbis Books.

Cadieux, V. K., Carpenter, S., Liebman, A., Blumberg, R., & Upadhyay, B. (2019). Reparation ecologies: Regimes of repair in populist agroecology. *Annals of the American Association of Geographers, 109*(2), 644–660. https://doi.org/10.1080/24694452.2018.1527680

Danner, M. (1993). *The massacre at El Mozote.* New York: Vintage Books.

Duffy, R. N. (Director). (2015). *El pasado no es historia: Memorias de guerra y revolución en Chalatenango, El Salvador (The past is not history: Memories of war and revolution in Chalatenango, El Salvador)* [Film]. Retrieved from http://www.richardnduffy.com/?p=201

Durham, W. (1979). *Scarcity and survival in Central America: Ecological origins of the Soccer War*. Stanford, CA: Stanford University Press.

Ellacuría, I. (1991). Utopia and prophecy in Latin America. In J. Hassett & H. Lacey (Eds.), *Toward a society that serves its people* (pp. 44–88). Washington, D.C.: Georgetown University Press.

Faber, D. (1992). Imperialism, revolution, and the ecological crisis of Central America. *Latin American Perspectives, 19*(1), 17–44. https://doi.org/10.1177/0094582X9201900102

Fullilove, M. T. (2004). *Root shock: How tearing up city neighborhoods hurts America and what we can do about it*. New York: Ballantine Books.

Fullilove, M. T., & Wallace, R. (2011). Serial forced displacement in American cities, 1916-2010. *Journal of Urban Health, 88*(3), 381–389. https://doi.org/10.1007/s11524-011-9585-2

Gareau, B. (2007). Ecological values amid local interests: Natural resource conservation, social differentiation, and human survival in Honduras. *Rural Sociology, 72*(2), 244–268. https://doi.org/10.1526/003601107781169992

Garni, A. & Weyher, F. (2013). Dollars, 'free trade,' and migration: The combined forces of alienation in postwar El Salvador. *Latin American Perspectives, 40*(5), 62–77. https://doi.org/10.1177/0094582X13492126

Garsd, J. (2015, October 5). *How El Salvador fell into a web of gang violence* [Radio news segment]. National Public Radio. Retrieved from http://www.npr.org/sections/goatsandsoda/2015/10/05/445382231/how-el-salvador-fell-into-a-web-of-gang-violence

Gebara, I. (1999). *Longing for running water: Ecofeminism and liberation*. Minneapolis: Fortress Press.

Gliessman, S. R. (2013). Agroecology: Growing the roots of resistance. *Agroecology and Sustainable Food Systems, 37*(1), 19–31. https://www.tandfonline.com/toc/wjsa21/current

Gliessman, S. R. (2014). *Agroecology: The ecology of sustainable food systems* (3rd Ed.). Boca Raton, FL: CRC Press. https://doi.org/10.1201/b17881

Goffman, E. (1983). The interaction order. *American Sociological Review, 48*(1), 1–17. https://doi.org/10.2307/2095141

Gómez, W. (2014). El Sistema Agroforestal Quensungual en El Salvador: Estudio de caso (The Quensungual Agroforestry System in El Salvador. A case study). *MULTEQUINA, 23,* 55–63.

Gonzalez, J. (2011). *Harvest of empire: A history of Latinos in America*. New York: Penguin.

Grosfoguel, R., & Cervantes-Rodríguez, A. M. (2002). Introduction: Unthinking twentieth-century eurocentric mythologies: universal knowledges, decolonialization, and developmentalism. In R. Grosfoguel & A. M. Cervantes-Rodríguez (Eds.), *The modern/ colonial/ capitalist world-system in the twentieth century: Global processes, antisystemic movements and the geopolitics of knowledge* (pp. xi–xxix). Westport, CT: Praeger.

Guha, R., & Martinez-Alier J. (1997). *Varieties of environmentalism: Essays north and south*. London: Earthscan.

Holt-Giménez, E. (2002). Measuring farmers' agroecological resistance after Hurricane Mitch in Nicaragua: A case study in participatory, sustainable land management impact monitoring. *Agriculture, Ecosystems, and Environment, 93,* 87–105. https://doi.org/10.1016/S0167-8809(02)00006-3

Holt-Giménez, E. (2006). *Campesino a campesino: Voices from Latin America's farmer to farmer movement for sustainable agriculture*. Oakland, CA: Food First Books.

Jamail, D. (2011, February 21). *El Salvador's environmental crisis*. Al Jazeera. Retrieved from https://www.aljazeera.com/indepth/features/2011/02/201122017470922665.html

Kelley, T. (Ed.). (2015). *Rutilio Grande, SJ: Homilies and writings*. Collegeville, MN: Liturgical Press.

Koohafkan, P., Altieri, M. A., & Holt-Giménez, E. (2011). Green agriculture: Foundations for biodiverse, resilient and productive agricultural systems. *International Journal of Agricultural Sustainability, 10*(1), 61–75. https://doi.org/10.1080/14735903.2011.610206

Kumpfer, K. L. (1999). Factors and processes contributing to resilience: The resilience framework. In M. D. Glantz & J. L. Johnson (Eds.), *Longitudinal research in the social and behavioral sciences. Resilience and development: Positive life adaptations* (pp. 179–224). Dordrecht, Netherlands: Kluwer Academic Publishers.

Leiss, W. (1972). *The domination of nature*. Montreal: McGill-Queen's University Press.

Levkoe, C. Z., Brem-Wilson, J., & Anderson, C. R. (2018). People, power, and change: Three pillars of a food sovereignty research praxis. *Journal of Peasant Studies, 41*(6), 911–931. https://doi.org/10.1080/03066150.2018.1512488

Lykes, M. B. (2014). Ignacio Martín-Baró. In D. Coghlan & M. Brydon-Miller (Eds.), *The SAGE encyclopedia of action research*. Thousand Oaks, CA: SAGE

Malkin, E. (2017, January 13). A remarkable event in El Salvador: A day without murder. *The New York Times*. Retrieved from https://www.nytimes.com/2017/01/13/world/americas/el-salvador-no-murders-gangs.html?mcubz=3

Mares, T. M., & Peña, D. G. (2010). Urban agriculture and the making of insurgent spaces in Los Angeles and Seattle. In J. Hou (Ed.), *Insurgent public space: Guerrilla urbanism and the remaking of contemporary cities* (pp. 241-254). New York: Routledge.

Martín-Baró, I. (1996). *Writings for a liberation psychology*. Cambridge, MA: Harvard University Press.

McAllister, G., & Wright, J. (2019). Agroecology as a practice-based tool for peacebuilding in fragile environments? Three stories from rural Zimbabwe. *Sustainability, 11*(3), 790. https://doi.org/10.3390/su11030790

Méndez, V. E., Bacon, C. M., & Cohen, R. (2013). Agroecology as a transdisciplinary, participatory, and action-oriented approach. *Agroecology and Sustainable Food Systems, 37*(1), 3–18. https://www.tandfonline.com/toc/wjsa21/current

Millican, J., Perkins, C., & Adam-Bradford, A. (2018). Gardening in displacement: The benefits of cultivating in crisis. *Journal of Refugee Studies*. Advance online publication. https://doi.org/10.1093/jrs/fey033

Millner, N. (2016). Hybrid traditions: Permaculture, plants and the politics of nature in El Salvador. In M. Raftopolous and M. Coletta (Eds.), *Provincialising nature: Multidisciplinary approaches to the politics of the environment in Latin America* (pp. 39–64). London: Institute of Latin American Studies.

Millner, N. (2017). 'The right to food is nature too': Food justice and everyday environmental expertise in the Salvadoran permaculture movement. *Local Environment, 22,* 764–783. https://doi.org/10.1080/13549839.2016.1272560

Montes, S. (1988). Levantamientos campesinos en El Salvador (Peasant uprisings in El Salvador). *Realidad: Revista De Ciencias Sociales y Humanidades, 1,* 79-100. https://doi.org/10.5377/realidad.v0i01.5407

Montes, S. (1991). What is the dominant mode of production in El Salvador? In J. Hassett & H. Lacey (Eds.), *Toward a society that serves its people* (pp. 245–252). Washington, D.C.: Georgetown University Press.

Montgomery, T. S. (1994). *Revolution in El Salvador: From civil strife to civil peace* (Second Ed.). Boulder, CO: Westview Press.

Panayatou, T. (1998). *The El Salvador challenge: From peace to sustainable development*. DRCLAS NEWS. Cambridge, MA: David Rockefeller Center for Latin American Studies. Retrieved September 2018 from https://revista.drclas.harvard.edu/book/el-salvador-challenge

Quijano, A. (2000). Coloniality of power, Eurocentrism, and Latin America. *Nepantla: Views from South, 1*(3), 533–580. https://muse.jhu.edu/journal/140

Radio Mundo Real. (2016, December 8). *La agroecología es política: El Salvador en la lucha por la prohibición de agrotóxicos y por la agroecología (Agroecology is politics: El Salvador in the fight for the prohibition of agrotoxins and for agroecology).* Radio interview with Walter Gómez. Retrieved from http://www.radiomundoreal.fm/9492-la-agroecologia-es-politica?lang=es

Rennis, L. G., Hernandez-Cordero, L., Schmitz, K., & Fullilove, M. T. (2013). "We have a situation here!": Using situation analysis for health and social research. In A. E. Fortune, W. J. Reid, & R. L. Miller Jr. (Eds.), *Qualitative Research in social work* (2nd edition) (pp. 192–212). New York: Columbia University Press.

Sbicca, J. (2015). Solidarity and sweat equity: For reciprocal food justice research. *Journal of Agriculture, Food Systems, and Community Development, 5*(4), 64–67. https://doi.org/10.5304/jafscd.2015.054.004

Stebbins, R. (1967). A theory of the definition of the situation. *Canadian Review of Sociology, 4*(3), 148–164. https://doi.org/10.1111/j.1755-618X.1967.tb01209.x

Walker, B., Holling, C. S., Carpenter, S. R., & Kinzig, A. (2004). Resilience, adaptability, and transformability in social-ecological systems. *Ecology and Society, 9*(2), Art. 5. https://doi.org/10.5751/ES-00650-090205

Wertheim, C. (2009). After the revolution, who's going to pick up the garbage? *X-TRA: Contemporary Art Quarterly, 12*(2). http://x-traonline.org/article/after-the-revolution/

Wolf, S. (2017). *Mano dura: The politics of gang control in El Salvador*. Austin: University of Texas Press.

Yonkers-Talz, K. (2003). Educating for international solidarity. *Conversations on Jesuit Higher Education, 23,* 25–31.

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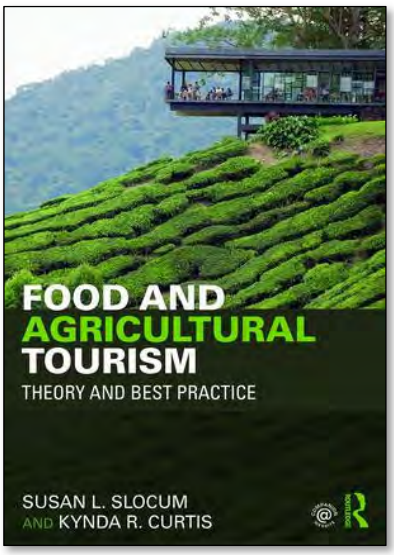
A food tourism textbook served in four courses

Review by Lisa Chase*



Review of *Food and Agricultural Tourism: Theory and Best Practice,* by Susan L. Slocum & Kynda R. Curtis. (2017). London: Routledge. Available as hardcover, paperback, and ebook; 262 pages.
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I was packing my suitcase to fly to Italy for the 1st World Congress on Agritourism when a large brown envelope showed up in my mailbox. I ripped open the package to find Susan L. Slocum and Kynda R. Curtis's new textbook, *Food and Agricultural Tourism: Theory and Best Practice.* Perfect reading for my flight to Europe!

Flying over the Atlantic Ocean, I flipped through the book and was immediately drawn in by the colorful case studies of food tourism around the world. The study questions for students had me hooked: How would you define authentic food from your area? How does globalization lead to specialization in agricultural production? What does "rice for life" mean? How can the Rattlesnake Hills Wine Trail enhance the visitor experience?

Slocum and Curtis explore these questions and many more in their well-written and well-organized textbook for college students. Professors seeking textbooks for their courses will appreciate the lay-out of the book, where each chapter begins with an overview, followed by a list of learning objectives. The meat of the chapter is presented in sections with clear headings, illustrated with relevant images, figures, and tables. Each chapter ends with a summary, study questions, and definitions. The final touch is a case study or two for each chapter, located just before the chapter's reference list. These compelling case studies include images and end with questions for students to ponder.

The book is divided into four parts. Part I focuses on food tourism and sustainable rural development, with chapters on (1) tourism, agriculture, and rural economic development; (2) food tourism and sustainable communities; and (3) food tourism offerings. These three chapters lay the groundwork for the rest of the book. Chapter 1

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provides background on the key industries of tourism, agriculture, and rural development and introduces several terms related to the study of economic impacts. Chapter 2 delves into sustainable tourism and presents a balanced discussion on its many benefits for communities while also acknowledging some of the associated challenges. Chapter 3 addresses agritourism, culinary tourism, food trails, events, and the importance of authenticity.

Part II describes the evolution of agriculture and the importance of food in contemporary culture. This section tackles topics such as globalizing agriculture to feed the world; rural landscapes, heritage, and economic development; and modern food movements. Chapter 4 lays out two centuries of historical background on the industrialization of agriculture, along with its caveats for consumers. Chapter 5 discusses the impacts of rural migration of families and youth to urban centers. Food tourism is presented as a strategy to revitalize rural communities. Chapter 6 focuses on three current food movements: buy local, foodie, and sustainable consumption. These food movements provide opportunities for rural economic development, which are detailed in Part III.

Part III examines food tourism markets and targeted destination design. Chapters explore food tourists and food tourism markets, as well as the process for developing a food tourism destination. Chapter 7 presents research on general traveler typologies, including so-called foodies and food tourists. Chapter 8 emphasizes the importance of identifying target markets and summarizes methods for market research. Chapter 9 details brand development and strategies to market destinations. These three chapters will be of interest to practitioners as well as faculty and students.

The final section, Part IV, concentrates on food tourism policy and practice, and includes chapters on policy and governance, safety in food tourism operations, and devising the food tourism product. Chapter 10 discusses good governance and policy cycles, and explores how they affect food tourism in both positive and negative ways. Chapter 11 focuses on food safety. While this is an important topic, the chapter is written by a contributing author (Karin Allen, Curtis's colleague at Utah State University), bringing in a new voice but slightly interrupting the flow of the text. Chapter 12 concludes the book with practical tools for developing business and marketing plans, including financial feasibility assessment and break-even pricing.

If you were to guess that this textbook has a lot of economics in it, you'd be correct. I suspect that is due to Curtis's influence, as she has a Ph.D. in economics and is a professor and Extension specialist in agriculture and food marketing in the Department of Applied Economics at Utah State University. The emphasis on economics is balanced by Slocum's background in sustainable rural development, policy implementation, and food tourism. She is an assistant professor in the Department of Tourism and Event Management at George Mason University. Both authors have traveled extensively, resulting in case studies and examples from all over the world. Many of the case studies were written by the authors, although some were contributed by others.

Publication of this textbook is aptly timed, as university programs in food systems are growing worldwide, along with interest in food tourism and agritourism. For instance, CABI has a new series on tourism that includes *Food and Wine Tourism: Integrating Food, Travel and Terroir,* by Croce and Meridies, and *Food Tourism: A Practical Marketing Guide,* by Stanley and Stanley. Slocum and Curtis's book was written as a textbook first and foremost, although it could be useful for practitioners. The books from CABI were primarily written for practitioners but could be used in the classroom. While all three books seek to cover the world, the countries emphasized in the case studies vary somewhat.

Slocum and Curtis's book is an important contribution to the literature, and I have no doubt it will be widely used by faculty and students working at the intersection of agriculture, tourism, and rural economic development. Faculty considering developing a course on food tourism need look no further. This textbook can serve as the framework for a semester-long course. The book can also complement existing syllabi that focus on broader issues related to food and agricultural tourism. I will not be surprised to find this book—with its relevant case studies and

practical advice related to policy, governance, and development of a food tourism destination—on practitioners' shelves as well.

As advertised, this textbook "fills a gap in the growing academic discipline of food and agricultural tourism." That gap, however, is extremely large, and the authors can continue to add value by helping to build the community of faculty, students, and practitioners who will use the book. This book has a companion website[1] with online quizzes for each chapter and resources for instructors. The rapidly growing field of food and agricultural tourism will surely benefit from Slocum and Curtis's textbook, along with complementary efforts to support this emerging community of practice.

[1] The companion website is at https://www.routledgetextbooks.com/textbooks/9781138931107/default.php

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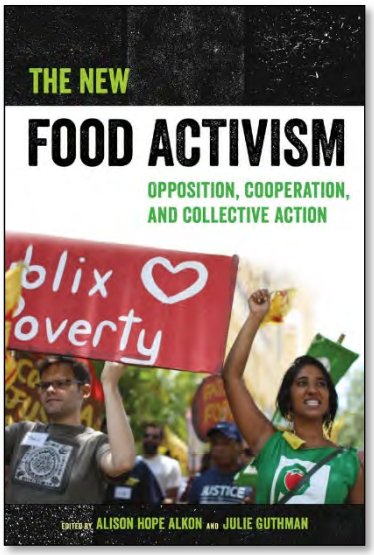
All roads lead to The New Food Activism

Review by Mustafa Hasanov *



Review of *The New Food Activism: Opposition, Cooperation, and Collective Action,* edited by Alison Hope Alkon and Julie Guthman. (2017). Oakland: University of California Press. Available as hardcover, paperback, and ebook; 344 pages. Publisher's website: https://www.ucpress.edu/book/9780520292147/the-new-food-activism

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The New Food Activism: Opposition, Cooperation, and Collective Action reminds us that understanding food activism in the world of alternative facts and post-truth politics requires breaking off with commonly established norms, criticisms, and controversies. With an awareness that there are connotations associated with "food justice" and "neoliberalism" that are quintessential in discussing food matters, Alison Hope Alkon and Julie Guthman propose that food activism is fertile ground for the growth of reflexive, innovative, and immersive food politics. Departing from the view that alternative food systems have been described as apolitical and short-sighted, this edited volume suggests that food activism embodies politics and strategic action. This new sort of food activism seeks to build alliances and coalitions that go beyond the current notion of alternatives in describing transformative changes in food systems. The book is divided into three parts, each unpacking different possibilities for the role of activism in reshaping food systems.

The chapters in Part One, "Regulatory Campaigns," follow and outline a notion on food activism in industrial agriculture. While some might argue that influencing industrial agriculture is far beyond the power of the "foodies," Jill Lindsey Harrison (Chapter 2) follows the pesticide regulatory reform activism in California. The chapter details two archetypes of anti-pesticide activism: sustainable agriculture and drift activism. Both

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forms of activism take different stances on public health, which seem to be underrepresented in sustainable agriculture regulatory reforms. Similarly, Emily Eaton (Chapter 3) discusses another controversy associated with inessive farming: genetically modified crops. Eaton outlines collective opposition strategies to genetically modified crops in Canada. The chapter suggests that a neoliberal outlook on collective action often does not take into account how producers, who act individually, can build coalitions and alliances that forge social and institutional support for a common good.

While people often associate local activism in food and agriculture domain with strong radical protests and perhaps grievances, Julie Guthman and Sandy Brown (Chapter 4) depict a rather unusual type of food activism—one that takes place in courts, instead of out in the streets. The chapter follows a trial on the potential use of methyl iodide, a chemical agent proposed for use as a fungicide and pesticide in California. Although the case was dismissed due to moot motion, the activists won because they were underestimated by their opponents, used clever tactics, and perhaps had a bit of luck.

Part Two, "Working for Workers," discusses issues of labor and food justice within food systems. Joshua Sbicca (Chapter 5) suggests that the notion of food justice in food systems needs to incorporate matters of labor and economic inequality. It is only by doing this that we can build labor–food justice alliances that will transform food politics. These alliances rely on confrontational labor campaigns, increasing the visibility of workers, address inequalities in class-conscious politics and create socially just food systems. Using examples of workplace justice campaigns on the local, regional, and national levels, Joann Lo and Biko Koenig (Chapter 6) emphasize the importance of the laborer in the creation of a sustainable food industry. The chapter outlines three strategies of solidarity with food laborers: (1) consumer support without boycotting products, (2) institutional activism that underpins labor standards, (3) and chain-of-command activism that supports fair labor conditions.

Analyzing consumer-based initiatives aimed at creating fair working conditions, Laura-Anne Minkoff-Zern (Chapter 7) proposes that placing the food worker in the center of transforming food systems will lead to improved labor conditions, provide just food, and ensure farmworker-led and consumer-supported change.

The third part of the volume, titled "Collective Practices," focuses on the impact of various collective practices in transforming food systems. In Chapter 8, Andrew Zitcer scrutinizes the homogeneity within the member base of co-ops and cautions that co-ops can easily slip into becoming spaces of exclusion. Nevertheless, consumer cooperatives are depicted as places of collective action, democratic practices, and community control. Developing this discussion of homogeneity, Meleiza Figueroa and Alison Hope Alkon (Chapter 9) attempt to break the association between eliteness and alternative food movement by analyzing initiatives in marginalized neighborhoods. They illustrate that the presence of alternative food hubs in working-class neighborhoods seems to be associated with three features: affordability, community building, and cooperative practices—all of which highlight the importance of collective performances and collective resistance. Expanding on this topic, Michelle Glowa (Chapter 10) looks into activism within urban agriculture initiatives. Glowa argues that urban agriculture is not merely about food access in urban areas, but also has implications for redefining property rights and the right to garden. The chapter points out that activism within urban agriculture projects can challenge property developers and rebuild the connection between markets, society, and individuals regarding land use.

Applying urban political ecology and solidarity economy lenses, Penn Loh and Julian Agyeman (Chapter 11) unpack the notion of a food solidarity economy as a conceptual vehicle that can explain the collective impact of food justice initiatives by incorporating issues of class, gender, and race. Hence, a food solidarity economy illustrates one possible way of breaking the ideological constraints of neoliberalism. Next, Tanya M. Kersen and Zoe W. Brent (Chapter 12) remind us that the debate on food systems and food politics often underestimates issues of land history and resource struggle. The authors propose that land, and

particularly, land justice, can be used as unifying elements in the ambiguities between resisting neoliberal land use practices and could justify the battles which the activists could wage against the system.

In the concluding chapter, Hope Alkon and Guthman draw parallels between movements, such as Occupy Wall Street and Black Lives Matter, and emerging forms of (new) food activism. This is a subtle reminder to the reader that food activism carries a set of subjectivities, where food is the anchor point that brings people and action together. The edited volume provides a varied reading on collective action, opposition, and cooperation within food systems. The chapters are written in a manner that makes the information accessible to general, knowledgable, and expert audiences. Hence, the book is a valuable edition for scholars, practitioners, activists, and others interested in the latest developments in food systems. *The New Food Activism* illustrates that food activism is not fixed in space and time. Rather, it is a spectrum, and understanding this spectrum better will help us to sustain the growth of a new food tradition that honors progressive food systems and society more broadly.

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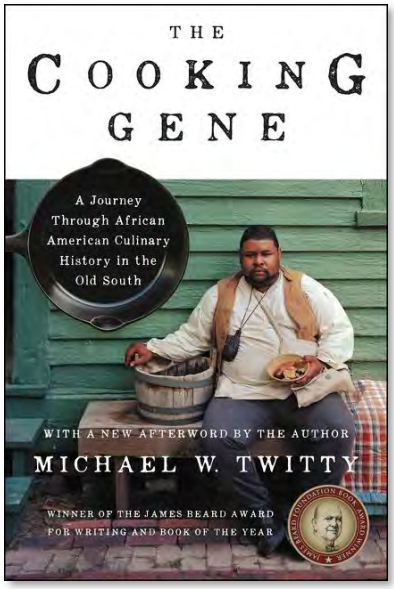
Devastation and celebration: Digging into culinary roots, race, and place



Review by Yona Sipos*

Review of *The Cooking Gene: A Journey Through African American Culinary History in the Old South,* by Michael W. Twitty. (2017). New York: HarperCollins. Available as hardcover, paperback, and eBook; 464 pages. Publisher's website: https://www.harpercollins.com/9780062379290/the-cooking-gene/

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If you don't already follow Michael Twitty (@koshersoul on Twitter), you are missing out on reflections and extended commentary on his powerful and acclaimed book, *The Cooking Gene: A Journey Through African American Culinary History in the Old South*. On October 11, 2018, the author tweeted, "The Cooking Gene is a culinary Roots. I wanted other families in African America and the African Atlantic to see ways they could do similar work. I wanted to introduce my country to [its] Black Southern culinary heritage and West Africans to their cousins." He clarifies, "My book is NOT a cookbook. It is a food memoir plus culinary history plus genealogical detective story with recipes. . . . 21 or so."

This concise meta-analysis allows details and treasures of the 425 pages of text, including a new afterword, to fall into sharper relief. Of his winding and comprehensive book, Twitty writes in the author's note, "If it were possible to give a linear, orderly, soup to nuts version of my story or any of my family's without resorting to genre gymnastics, I would have considered it. Instead, I am pleased with the journey as it has revealed itself to me" (p. 427).

The Cooking Gene traverses cultures, continents, regions, and 21 or so recipes to uncover the food-ways of today and yesterday, of freedom and bondage, of personal and collective. Twitty unflinchingly reveals the complicated history of Southern cooking alongside identity in America. He guides us along, sometimes by hand and oftentimes galloping far ahead, to share his intimate

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experiences of learning—from his furthest back grandmothers, culinary traditions, genetics—and mapping the foodways as complex, nonlinear, and ongoing. Readers are invited to sit with Mother Corn, King Cotton, and the multihued Queen rice, to spend time in Virginia and the greater Chesapeake, and to travel into the Upper South as pathways to understand the centrality of African experiences on Southern soul food. "Born in the womb of the mother of American slavery," he recounts how soul food exists alongside Southern hospitality, "an extension of *teranga,* one of the many indigenous concepts of peaceful living based upon hospitable treatment of others … brought from Senegal and Gambia with the Wolof, Serer, and Fulani" (p. 237). He skillfully wordsmiths the reader to imagine "women negotiating the cooking pots of a new life, using their collective knowledge and experience to make something that would soothe their exile—in tongues 3,500 miles apart with different stories of how they came to be irrevocably enslaved in an alien land. All of the negotiations and conflict … affected how the food came to be and what we think of as soul or Southern" (p. 163).

Chapter 1 begins as Morning Prayer and an introduction to Twitty cooking on a plantation in his "transformative historical drag" (p. 1). He intersperses stories and context with song lyrics, explaining that "some enslaved cooks timed the cooking by the stanzas of the hymns and spirituals" (p. 3). We meet members of his family and unsung Black culinary heroes; we learn of his pathways to becoming a renowned and independent scholar. He ends the chapter by declaring, "It is not enough to know the past of the people you interpret. You must know your own past" (p. 24). It follows, then, that in the next three chapters, Twitty articulates his own personal becoming and embracing his Blackness, gayness, Southerness, and Jewishness. He extends the intersectional *familiensinn* (sense of family) feelings with recipes of West African Brisket and Black-Eyed-Pea Hummus. In chapters 5 through 7, Twitty begins to explore African American genealogy in greater depth, starting with names, records, and slave routes. Aiming to find his "white man in the woodpile" (p. 96), he delves into his ancestral stories, finding kinfolk across racial lines. In chapter 8, he delves into the genetic 0.01% that makes each of us unique, holding readers close as he journeys into deeply personal familial DNA. After sharing results indicating that he can claim Africa, Europe, and North America each as his own, he concludes that "my food is my flag" (p. 139).

Chapters 9 through 12 recount racism, the twinning of sugarcane, corn, tobacco, and rice agriculture with slavery, and the birth of African American civilization and food traditions. Chapters 13 and 14 focus on African homesteads and personal gardens, truck patches and provision grounds, long pre-dating American victory gardens. Twitty shares insights from D.C.-based nutritionist Tambra Raye Stevenson, who further spells out the connections among food, racism, power, and justice—and the great potential of diet and lifestyle benefits from growing and cooking healthy, nutritious, African foods. Such community gardens can serve to green neighborhoods and connect to traditional knowledge. In chapter 15, Twitty interprets his ancestors' arrival to America in the 16th and 17th centuries, in search of familiar plants and fungi and learning the native ones, with African foodplants such as elephant ear taro and red rice also finding their way to American soil. "We were Americans and Africans all at once—tied to two worlds through a bewildering love of the land" (p. 295).

In chapter 16, Twitty moves to fish, fowl, and other meats of the Old South, merged with African history to forever alter American wilderness. He decries the lack of faces of color—specifically Black faces—populating the contemporary food world, notwithstanding age-old knowledge and experience. Chapters 17 and 18 again delve deep into the persistent pain of slavery linked to the "sordid and greedy nature" (p. 344) of King Cotton. He articulates that the historical "disruption of the Black family, the interruption of an important community-driven ethnic economy, the engendering of a poor diet, an urgent desire to suppress learning and education, and a culture of unrelenting violence" (p. 358) are reverberating rampantly in contemporary American systems.

Chapters 19 through 21 offer a bittersweet summary of food as a "mystical lubricant between the living and the dead" (p. 367). Childhood mem-

ories are interspersed with a learned appreciation for old ways, visiting and being visited by Twitty's ancestors, both Black and White. Images of "survival, persistence, and memory" (p. 399) culminate alongside gratitude for complexity and meaning. The paperback edition offers a new afterword in which Twitty comes to certain peace while further reflecting on his question of how his destiny has been shaped by the history of Southern food (p. 404) but also why his soul has chosen this journey (p. 425).

The Cooking Gene stands as a testament to the multidimensionality of America. Devastation and celebration are entwined in what can surely be positioned as a living document. Readers are gifted with political, botanical, culinary, and personal histories, so finely detailed as to be exhausting, much as the journeys themselves must have been. But they are also uplifting—perhaps in part because this book has now been written and that in itself is worth commending. As Twitty tweeted (October 11, 2018), "We don't have a lot of culinary narratives from Black males or Black lgbt ppl or narratives of how food functions in Black families and Black culture." Twitty has masterfully taken oral traditions and, much as his chosen people have done throughout history, has recognized the value of writing them down. He rigorously shares tradition and discovery through his written word, deeply steeped in his own experience and insights. His identity provides the core, and his research, stories, and recipes emerge from that place of knowing, searching, and belonging/not-belonging. Twitty has extended an invitation to his readers to journey with him through the pain, the heat, the words, the wounds, and the path to healing. For academics, practitioners, and students of all stripes, it is well worth the trip.

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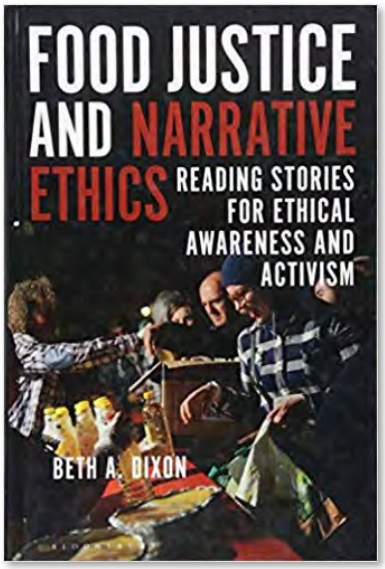
From Aristotle to the Coalition of Immokalee Workers: Ethical competence via narrative ethics grows food justice



Review by Matthew J. Young*

Review of *Food Justice and Narrative Ethics: Reading Stories for Ethical Awareness and Activism,* by Beth A. Dixon. (2018). London: Bloomsbury. Available as hardcover and eBook; 192 pages. Publisher's website: https://www.bloomsbury.com/us/food-justice-and-narrative-ethics-9781350054561/

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When conservationist Aldo Leopold wrote in the late 1940s about how one of the "penalties of an ecological education" includes "living alone in a world of wounds" (Leopold, Schwartz, & Leopold, 1968, p. 197), he could have very well been foreseeing the challenges confronting food systems advocates and food justice activists today.

Such advocates and activists become students of a probing moral education as they cultivate the targets of food justice in order to resolve myriad food injustices. State University of New York (SUNY) College at Plattsburgh philosophy professor Beth Dixon has written for years about how moral philosophy can greatly inform food justice theories and practices alike, including in her 2015 JAFSCD article, "Rewriting the Call to Charity: From Food Shelf Volunteer to Food Justice Advocate" (Dixon, 2015). Dixon's latest work, *Food Justice and Narrative Ethics: Reading Stories for Ethical Awareness and Activism*, guides the ethical novice (i.e., practically every food systems worker, food systems advocate, and food justice activist) on "learning to see what is unjust in a particular situation" via documentary films, ethnographies,

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and other food justice narrative-driven media. In turn, Dixon informs us about how we can "accurately identify what policies, laws, and structural conditions should change in order to discharge our responsibility for achieving social justice" (p. 3).

By the end of the introduction, Dixon has presented how narratives are a unique tool for illuminating "the ethically relevant circumstances that contextualize how individual people live as well as the background conditions that impede or constrain their actions" (p. 3). Dixon articulates that when food justice narratives fulfill conditions of particularity, accuracy, and emotional engagement during a "counterstory"—an alternative narrative that challenges the "socially-shared understanding" of a master narrative which "imposes a degrading identity on a person or a group, characterizing them as morally subnormal or abnormal" (p. 6)—something particular happens. Dixon suggests that ethical novices (e.g., food justice advocates and activists) learn the particular skill of how to "read the situation" across food justice narratives. These practitioners can gain confidence in answering more nuanced questions of food justice that include, "What is the relation between misfortune and injustice? What events could have been avoided or mitigated? Who is the (collective or individual) agent responsible? And who is to blame?"

Dixon lays out a guiding view in the first and second chapters that invites the reader to consider ethical perception as "intimately connected to practical wisdom since one uses this kind of perception to grasp particulars necessary for a person to have practical wisdom as well as moral virtue" (p. 22). Refreshingly, Dixon does not shy away from sharing gems of insight from the timely yet timeless philosophy of Aristotle, including the Aristotelian view of what it means to "develop moral virtue by habituation." In other words, when a food justice advocate continually engages with how to think, feel, and act in morally apt ways, he or she is able to grow his or her abilities of "imagination, attention, empathy, critical reason, habit, exposure to new moral categories" (p. 24) when reading, viewing, and extracting what is morally important in a food justice narrative.

From the third through sixth chapters, Dixon deftly guides the reader through examples of how ethical novices can apply criteria of particularity, accuracy, and emotional engagement to flesh out lessons of ethical relevance. In Chapter 3, "Food Insecurity-Hungry Women," Dixon critiques how lofty standards of moral innocence presented among those who are food insecure, including among Feeding America website stories, can converge with a reliance on narrators who are morally unaware of systemic forces driving the poverty and oppression food-insecure individuals and populations face, as done on GlobalGiving's website. In Chapter 4, "Rewriting the Call to Charity," Dixon offers examples of Sankura Slamata of Burkina Faso and Rejeya Khatun of Bangladesh, two entrepreneurial women who cultivate greater access to nutritious food and community capital in their respective homelands with the support of the culturally conscientious, systemically aware organization The Hunger Project and affiliated entities. In Chapter 5, "Farmworkers: 'It Is Very Ugly Here,'" Dixon cites how the ethnography *Fresh Fruit, Broken Bodies* and the film *Food Chains* confront master narratives of illusory voluntary migration and unlimited individual moral agency around migrant farmworkers. They offer up counterstories of, respectively, Triqui indigenous migrants detailing departures from lifelong destitution in their native Mexico to Washington state due to free trade agreements, and of predominantly Latino tomato harvesters in Florida forming the Coalition of Immokalee Workers who launch a hunger strike in order to bring real human faces and grossly underpaid wages to the fore of a nebulous, oppressive food supply chain. In Chapter 6, "Obesity, Responsibility, and Situated Agency," Dixon illustrates how the protagonist Prager in the memoir *Fat Boy, Thin Man* and the three leading youth in the film *Fed Up* debunk master narratives of "false dichotomies" in moral responsibility among those experiencing obesity. This means, in *Fat Boy, Thin Man,* how addressing obesity means addressing behavioral *and* environmental changes, and in *Fed Up* how extending the scope of responsibility for obesity needs to include public policies and institutions and not isolate individuals from their economic, political, and societal surroundings. Thus,

by the seventh chapter, "Practicing Philosophy," Dixon concludes her work by inviting ethical novices as food justice advocates to exercise blame as a moral protest in response to damaging master narratives and to "do something" in collective action for confronting injustice and oppression.

Ultimately, *Food Justice and Narrative Ethics* represents a critical, timely addition to the canon of food justice and the wider advocacy literature. Dixon's remarkable ability to synthesize academic theory across moral philosophy, alongside her own "eye for the particulars" in ethically salient details across a broad swath of food justice narrative–focused books and films, creates a compelling case for how and why moral philosophy needs to be included in future advocacy, food systems, government, political science, and sociology curricula. *Food Justice and Narrative Ethics* leaves the reader empowered to know that the act of writing and telling counterstories, which are capable of "shaping our moral imaginations about what is possible " (p. 89), provides an invaluable step in positioning us as food justice advocates to take responsibility for making a healthier, more equitable, more just, and more morally accountable future in meeting the timeless need for access to healthy food. From documenting how Aristotle wrote about ethical competence to detailing how the Coalition of Immokalee Workers has left its mark on food justice activism, Dixon's work charges us with the purpose of cultivating responsibility but also cultivating hope and optimism throughout the ages-long causes of providing food for all and justice for all.

References

Dixon, B. A. (2015). Rewriting the call to charity: From food shelf volunteer to food justice advocate. *Journal of Agriculture, Food Systems, and Community Development, 5*(2), 71–79. https://doi.org/10.5304/jafscd.2015.052.010

Leopold, A., Schwartz, C. W., & Leopold, A. (1968). *A Sand County Almanac and Sketches From Here and There.* London: Oxford University Press.

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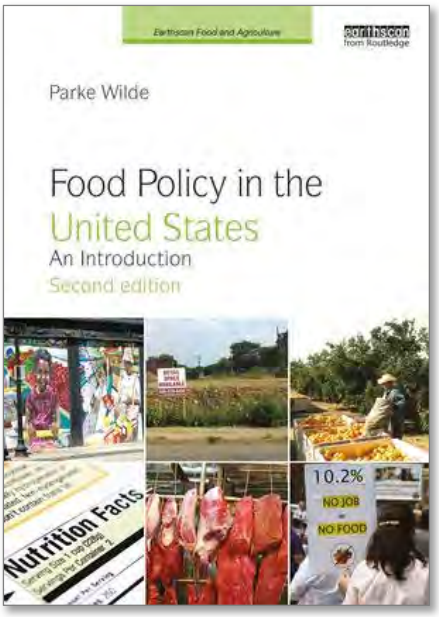
Wilde's textbook covers the fundamentals of food system policy

Review by Michael Zastoupil*



Review of *Food Policy in the United States: An Introduction (Second Edition),* by Parke Wilde. (2018). New York: Routledge. Available as hardcover, paperback, and eBook; 278 pages. Publisher's website: https://www.routledge.com/Food-Policy-in-the-United-States-An-Introduction-2nd-Edition/Wilde/p/book/9781138204003

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Many of us who are interested in food systems reach a point in our learning journey where we realize that our government is involved in nearly every aspect of the food system. Whether you are passionate about nutrition, food justice, or climate change, you can bet there is at least one government regulation or program that significantly affects that issue. Parke Wilde's second edition of *Food Policy in the United States: An Introduction* is a comprehensive guide perfect for the graduate or undergraduate student who needs to understand the policy-making world. The book is not too different from the first edition, aside from updates based on recent policy changes in sources like the 2014 farm bill and the *Dietary Guidelines for Americans 2015–2020.*

The textbook does its best to cover every major food policy topic from "farm to fork." Before he begins, Wilde uses Chapter 1 to give the reader a crash course in the legislative process and some basic economic terminology, like "externalities." He also takes the time to explain that this textbook is written from a public-interest perspective and that the book tackles questions about both how policies *should* be made and how policies are *actually* made.

Chapter 2 starts out by giving a bird's eye view

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of U.S. agriculture. It provides an easy breakdown of all farms by categories like income and product, using charts and tables based on U.S Department of Agriculture (USDA) data. It's only natural that Chapter 3 talks about the environmental consequences of the agricultural production described in Chapter 2. The majority of the chapter covers the most pressing environmental challenges one at a time, such as water scarcity and pollution, and the government policies that attempt to address them, such as the Clean Water Act. Since food systems are ultimately global, Chapter 4 is focused on international trade. Wilde uses economic models to explore several real-world trade situations, such as tariffs on U.S. corn exports to other countries and the impact of U.S. sugar subsidies on global sugar prices.

With each chapter, Wilde introduces a few more economic concepts to the reader using actual examples, such as the property rights dilemma inherent in fisheries. When possible, he also summarizes the major types of policy tools that are used according to their economic impact. For the novice trying to understand why crop insurance is different from direct payments to farmers, for example, these sections are instructive.

Chapter 5 covers the food manufacturing industry, focusing on the sector's long history of market power concentration and exploring economic concepts such as monopoly vs. monopsony and related antitrust regulations. Chapter 6 takes a look at the food retail and restaurant industries, examining issues such as food deserts, minimum wage laws, and the influence of price on consumers' food choices. Chapter 7 explains how food safety is regulated, including how risk is managed in the face of incomplete information and why cheese pizza is actually regulated by a different federal agency than pepperoni pizza.

While Wilde writes with the unbiased, evidence-based rigor of an economist, occasional flashes of his activist inclinations shine through. When writing about topics close to the heart of his own work, such as food labeling, Wilde writes with the chagrin of a policy advocate who has seen too many important food policy issues gridlocked in partisan debates for years. And yet he is still optimistic, dedicating the entire last chapter to all the ways that new advocacy coalitions and research can continue to improve U.S. food policy.

Chapter 8 explains in detail how the Dietary Guidelines for Americans is determined and why it is needed based on chronic disease trends. Chapter 9 unravels the messy legal issues involved in food labeling and advertising and the associated imperfect information problems. Chapter 10 describes hunger and food insecurity in the context of poverty and examines the economics of Supplemental Nutrition Assistance Program (SNAP) nutrition assistance for adults, while Chapter 11 explores nutrition assistance programs for children.

Wilde's writing style makes this textbook perfect for the student or food activist taking a comprehensive look at food policy for the first time. He writes clearly and concisely, using the tone of a natural teacher—approachable, intuitive, and supported by robust evidence. My only critique is that the textbook could benefit from more attractive visuals to explain its complex topics, beyond plain tables and charts. The use of boldface for key terms throughout the chapters is quite helpful, as are the sidebars with brief, real-world economic problems and stories. For those students who read everything and still want more, the companion website is an excellent source of additional information, news, and problem sets.

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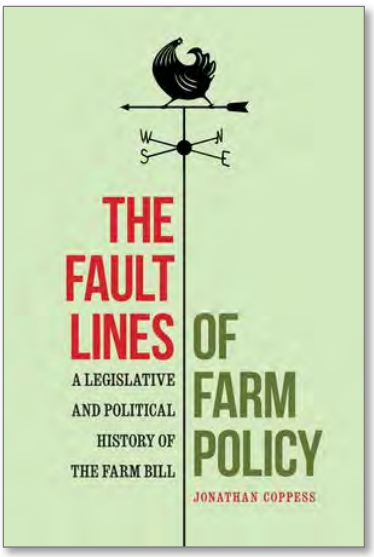
The political and legislative history that underlies the farm bill

Review by Sheila Fleischhacker, Georgetown University*



Review of *The Fault Lines of Farm Policy: A Legislative and Political History of the Farm Bill* by Jonathan Coppess. (2018). Published by University of Nebraska Press. Available in hardcover and eBook (PDF and EPUB); 504 pages. Publisher's website: https://www.nebraskapress.unl.edu/university-of-nebraska-press/9781496205124/

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In *The Fault Lines of Farm Policy,* Jonathan Coppess explores the evolution of the farm bill through the political and congressional interests representing the United States' three main commodity production regions: the South, the Midwest, and the Great Plains. Coppess combines analysis of his direct involvement in the legislative and executive branches' farm bills in 2008 and 2014 with extensive historical, contemporary political, and legislative analyses in his current academic role. Coppess served in the U.S. Senate and at the U.S. Department of Agriculture (USDA) from 2006 to 2013. These rich descriptions explain the underpinnings of congressional efforts and identify the drivers of American farm policy development.

Organized in chronological order, starting with the origins of farm policy from 1909 through the 2014 farm bill, each chapter (dedicated to one farm bill) provides a thorough presentation of the key political and legislative history of the era. Coppess concludes each chapter with his own thoughts and perspectives, which helps bridge the legislative process of one farm bill to its implementation to the next round of the farm bill's policy development. This is particularly useful as he interweaves the book's title and overarching theme of how "disputes among the South, the Great Plains, and the Midwest over farm policy form the primordial fault line and have been the defining characteristic of the debate throughout [farm policy's] history" (p. 8).

That is, Coppess focuses on the origins and evolution of the intense regional fights among the

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three major commodities produced in these regions: cotton, wheat, and corn. He discusses how these regions formed the original farm coalition and have continued to play dominant roles throughout farm policy development. Coppess details the political and congressional interests representing these commodities farm bill by farm bill, including coalition-building strategies, external and internal pressures on each coalition and its fault lines, and the impacts of commodity prices. These explorations of political fault lines and the reflections on how incredibly resilient these coalitions have been over the last eight decades provide insights on the recently passed 2018 farm bill, as well as metrics of effective policy outcomes of future farm bills.

Coppess noted the following three books served as great resources as he was writing this book: Bill Winder's *The Politics of the Food Supply: U.S. Agricultural Policy in the World Economy*; John Mark Hansen's *Gaining Access: Congress and the Farm Lobby, 1919–1981*; and Murray R. Benedict's *Farm Policies in the United States, 1790–1950: A Study of Their Origins and Development*. Each of these books is invaluable to those interested in farm policy history; notwithstanding, *The Fault Lines of Farm Policy* provides a contemporary synthesis of these works and a more focused analysis on the role of commodity coalitions. Coppess also used legislative history to help interpret statutory language, including reviewing debates on the House and Senate floors, committee reports, testimony at hearings, and other public records. In addition, he examined media sources like Keith Good on FarmPolicy.com and *Politico* news reports. He also drew from his personal knowledge, particularly of the 2008 and 2014 farm bills. These diverse sources of political and legislative histories ensure that the reader understands how actions on the Hill were being perceived by key stakeholders and the overall public at the time.

Increasingly, authors are tackling the United States' farm policy, targeting a range of audiences from agriculture scholars to consumers. This book does not provide extensive comparison of farm policy in other countries nor how regional coalitions of commodity production interests influence farm policy outside the U.S. Given the commodity coalition emphasis, this book consistently explains farm policies' impacts on crop prices. More recent coalitions impacting farm bill debates, such as those between public health and anti-hunger coalitions on the best ways to strengthen the role of nutrition in the USDA Supplemental Nutrition Assistance Program (SNAP; formerly food stamps) are briefly noted, particularly in the discussion of the 2014 farm bill. Without question, Coppess instills in readers the importance of reflecting on the origins and evolution of the farm policy before, during, and after embarking on future farm policy-making processes.

I would recommend this book for scholars on agriculture, as well as those working in research, policy, and practice on farm bill-related manners. The book feels like a textbook due to the extensive detail it provides, but chapters on the origin and early eras of farm policy might need to be combined or summarized for teachers wanting to invest a significant portion of their class on contemporary policy matters. I also would recommend this book to any academic or practitioner focused on the role of coalitions in the legislative process—how to build them, modify them, and understand their short- and long-term impacts.

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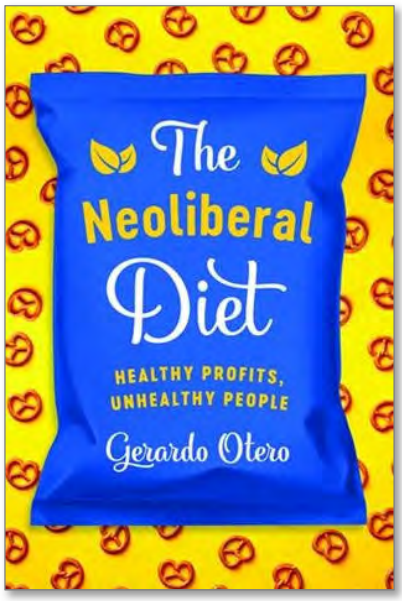
The capitalist diet: Energy-dense and profitable

Review by Nicholas Freudenberg, City University of New York *



Review of *The Neoliberal Diet: Healthy Profits, Unhealthy People* by Gerardo Otero. (2018). Published by University of Texas Press. Available in hardcover and paperback; 256 pages. Publisher's website: https://utpress.utexas.edu/books/otero-the-neoliberal-diet

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The Neoliberal Diet: Healthy Profits, Unhealthy People analyzes how global diets have changed in recent decades, what caused these changes, and who loses and gains by the transformation. Author Gerardo Otero is a professor of international studies at Simon Fraser University in Vancouver, Canada, and the author of several previous books on the global food system. In the book, Otero describes how the global diet that emerged at the turn of the 21st century has contributed to world-wide increases in overweight and obesity and how neoliberalism, the variant of capitalism that evolved in this period, promotes obesogenic diets.

Neoliberalism posits that markets are best equipped to solve all problems and that by deregulating, privatizing, and emphasizing individual responsibility, governments can unleash capitalist economies for growth (Harvey, 2007). Harvey describes neoliberalism as the corporate capitalist class's political response to the threats to their control that emerged in the late 1960s and 1970s.

Otero makes several points that warrant the attention of food policy analysts and advocates. First, he shows how changes in global food regimes such as the growth of corporate managed food trade, the consolidation of agribusiness and food sectors into a handful of giant transnational corporations, and the industrial production of corn, soy, and sugar have created a new global diet. Carlos Monteiro, a Brazilian nutritionist, and his colleagues call the energy-dense, nutrient-poor, highly processed foods that these companies produce *ultraprocessed* food (Monteiro et al., 2019). Their research shows that ultraprocessed food constitutes a growing share of calories consumed in high-income countries and is rapidly gaining in low- and middle-income countries. Ultraprocessed

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food has been associated with the rise of diet-related diseases and obesity (Monteiro, Moubarac, Cannon, Ng, & Popkin, 2013).

Second, Otero makes the case that the neoliberal diet exacerbates inequities between what low-income and wealthier people eat. Ultraprocessed food is generally cheaper and more available than healthier food and therefore is consumed more by the poor, while the better off can afford what Otero calls luxury foods—year-round fresh fruits and vegetables, whole grains, and some kinds of meat. Around the world, inequitable access to healthy food is becoming the leading driver of inequitable rates of premature deaths and preventable illnesses from diet-related diseases (Peeters & Blake, 2016), a dire consequence of the globalization of the neoliberal diet.

Third, Otero coins the term "neoregulation" (pp. 39–43) to describe regulations that arise from partnerships between corporations and governments. He observes that neoliberalism not only deregulates but also shifts the focus of government oversight from protecting consumers to protecting corporations. Neoregulation emphasizes the protection of intellectual property rights for agribusinesses, voluntary public-private partnerships as an alternative to mandatory government regulations, and using public support to enlist universities and scientists in corporate research. According to Otero, neoregulation supports the evolving cooperation between national governments and corporations that characterizes neoliberalism.

The changing role of government leads Otero to make a fourth point: governments can play an important role in protecting populations against harmful dietary changes. Some countries, even while engaging with the global economy and international trade, have made it a priority to safeguard their farmers and agricultural sectors, as a way to supply their own populations with real food and promote local economic development (p. 158). Until recently, Brazil illustrated this approach (Fukuda-Parr, 2018). Thus, he advocates efforts by civil society to pressure governments to defend farmers and eaters in the face of the embrace of the neoliberal food regime by corporations and high-income countries.

Finally, Otero highlights the roles of social movements in resisting neoliberalism and creating alternatives. He describes the role of social movements in the United States and elsewhere in improving conditions for food workers, taxing unhealthy commodities, protecting small farmers, expanding public food procurement, regulating the genetic modification of food, and enforcing antitrust laws. These mobilizations challenge the dominant neoliberal food system and create spaces for testing more transformative reforms.

By engaging with other social movements, including those for strengthening democracy, defending immigrants, creating a universal health care system, and expanding the rights of workers, women, and other excluded groups, the food justice movement can contribute to the idea that another world—and another diet—are in fact possible.

References

Fukuda-Parr, S. (2018). Developmental states, neoliberalism, and the right to food: Brazil and South Africa. In G. MacNaughton & D. F. Frey (Eds.), *Economic and social rights in a neoliberal world* (pp. 217–235). Cambridge: Cambridge University Press. https://doi.org/10.1017/9781108284691.011

Harvey, D. (2007). *A brief history of neoliberalism.* Oxford: Oxford University Press.

Monteiro, C. A., Cannon, G., Levy, R. B., Moubarac, J.-C., Louzada, M. L., Rauber, F., . . . Jaime, P. C. (2019). Ultra-processed foods: What they are and how to identify them. *Public Health Nutrition*, *22*(5), 936–941. https://doi.org/10.1017/S1368980018003762

Monteiro, C. A., Moubarac, J.-C., Cannon, G., Ng, S. W., & Popkin, B. (2013). Ultra-processed products are becoming dominant in the global food system. *Obesity Reviews*, *14*(S2), 21–28. https://doi.org/10.1111/obr.12107

Peeters, A., & Blake, M. R. C. (2016). Socioeconomic inequalities in diet quality: From identifying the problem to implementing solutions. *Current Nutrition Reports, 5*(3), 150–159. https://doi.org/10.1007/s13668-016-0167-5

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(Re)orienting food activism toward social justice

Review by Andrea Woodward, Berea College*

Review of *Food Justice Now!: Deepening the Roots of Social Struggle* by Joshua Sbicca. (2018). Published by University of Minnesota Press. Available in hardcover, paperback, and Kindle; 288 pages. Publisher's website: https://www.upress.umn.edu/book-division/books/food-justice-now

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A fitting place to begin a discussion about Joshua Sbicca's new book, *Food Justice Now!*, is with a story he shares near the middle of the book, where readers are introduced to a progressive farm situated along the U.S.-Mexico border. Wild Willow offers education for new organic farmers, provides healthy food to local consumers, hosts community gatherings, and practices non-wage exchange for labor—approaches considerably more sustainable and community-oriented than those typically used in our current food system. The farm stops short, however, of inserting itself into any kind of movement to support the rights of those migrant workers who perilously navigate the border on which the farm sits or to advocate for humane immigration reform. In so doing (and in not so doing), Wild Willow provides alternatives for local growers and consumers, but it does not confront the systems that dictate and limit the range of what those alternatives can look like. As such, the farm and the border it is situated upon are a powerful metaphor for this book's message. While most food-based activism does not take place in the literal face of racialized, economic, and political borders, it *always* does so in a figurative sense. Food activism ignores this to the detriment of social justice. So, what does it take to cross these boundaries, and why aren't more food activists doing so? What does it look like when they do, and what has this looked like historically? A central purpose of this book is to answer these questions. In the process, it offers a constructive and hopeful challenge to movements narrowly focused on issues such as health or the environment to aim higher at social justice.

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Sbicca spent five years researching food justice activists in California and found himself connecting the dots from food and social justice to mass incarceration, labor exploitation, and immigration. While these do not often appear together in discussions about food politics, in this context the combination makes perfect sense; after all, they are the social sites where, like tectonic plates on which everything around us is built, white supremacy and neoliberal capitalism fuse together to create some of the worst human-made disasters of our time. Among the rubble, food provides a powerful foothold from which to rebuild and reconfigure a socially just future. Sbicca's book walks readers through how this is happening in three different contexts in California, after first providing a historical context that reminds readers that the food movement does not need to be completely reimagined to attain social justice goals—it has a strong history that has not been given its due but that nevertheless offers many examples, lessons, and cues for activists today.

A central claim of the book is that the future of food-centered movements will depend on their ability to create more than alternatives (organic, local, etc.) within our neoliberal capitalist and white supremacist system. To guide this future, Sbicca first looks at how movements of the past have gone beyond alternatives to confront racial and economic inequalities head on. The first chapter walks readers through the agrarian populist movements of the post–Civil War era, the origins of the organic movement, the decades of farm worker organizing that made successes of the United Farm Workers possible, and the Black Power movement. After establishing the considerable legacy and lessons these movements have left behind for contemporary food justice movements, the second chapter presents a case study of a nonprofit, Planting Justice, that uses permaculture gardens to confront racism and other structural inequalities that have produced mass incarceration, high recidivism rates, and related resulting social problems in the United States. The organization creates meaningful, living-wage work that engages people in their communities, provides workers with mentoring and access to resources necessary for working through trauma, and lobbies local governments to prioritize investments in community-based re-entry programs over building more jails. Sbicca introduces a central idea of how "instead of seeing food as an end, food becomes a means for social change" (p. 79).

From mass incarceration, the book moves onto labor organization using the example of United Food and Commercial Workers (UFCW) Local 77, which actively confronts how structural racism and neoliberal capitalism have pitted oppressed groups against one another. First, the union resists narratives that place the white working class in opposition to immigrants and people of color. It has done this by shifting the composition of its leadership and the issues it tackles to represent the ethnoracial diversity and realities of the local workforce. Second, the union refuses to perpetuate divisions among economically oppressed groups that have been set in place by the neoliberal lie that affordable prices for consumers are incompatible with living wages for workers. Through leadership that reflects the ethnic and racial diversity of the workforce and through lobbying for higher wages and humane immigration reform, UFCW Local 77's confrontational politics is rooted in a kind of solidarity that enables it to fight for expanded opportunity for all, rather than small slices of turf for only some.

The last of the three case studies brings us back to the immigration scenario at the beginning of this review, where the U.S./Mexico border serves as a metaphoric line between food activism and food justice. The boundary between staff at San Diego Roots, which operates Wild Willow Farm, and farmworkers is not only geographic but also racial and ideological. Here, nonprofit staff committed to a more just food system have nevertheless normalized, rationalized, and even essentialized the social order found at the border and its militarization. This is in no small part due to the blind spots that arise from having a nearly all-white staff and leadership whose easy relationship with the border puts them out of touch with the deeper exigencies of social justice. The work of UFCW Local 77 described previously is brought back into focus here and in further detail to demonstrate what confronting an unjust system looks like in comparison to an approach

that seeks instead to only provide alternatives within it.

The chapters focusing on these three case studies build theory that connects to practice and can inform current food-based social justice work, and in so doing the author places this book in the domain of public sociology. The tone in these chapters is most accessible, however, to a public that is conversant in Gramsci's conjunctural analysis, Boggs's prefigurative politics and dialectical humanism, and Marx's dialectical materialism. As a result, while much of the book speaks to more of an academic than public audience, excerpts from the book have appeared in *The Utne Reader*, and Sbicca contributed a chapter based on his research to *The New Food Activism* (Alkon & Guthman, 2017), a text more specifically directed at audiences seeking a more accessible discussion and examples of how food activism and social justice activism can be one and the same. Overall, *Food Justice Now!* seems particularly geared to activists and academics seeking social theory to inform social justice work, particularly with a focus on how structural racism and neoliberal capitalism drive inequalities in our food system and larger society.

While the book locates the problems of our food system in institutional racism and neoliberal capitalism, these roots are also entangled with a patriarchy that is intermittently identified but never specifically analyzed in the book. More emphasis on this dimension of social inequality as it is manifested in our food system would have been useful. However, the groups represented in Sbicca's research (labor unions, formerly incarcerated men, and migrant farmworkers) leave the book's analysis best positioned to dissect how the food justice movement can confront economic and racial structural inequalities in particular, and that contribution is considerable. The final chapter gives glimpses of how land, labor, community development, health, and sustainability might look if we are serious about upending social problems such as hunger and climate change. In so doing, it delineates how the current structure of our food system precludes the kind of change necessary to achieve justice, and on the policy front, how a farm bill focused on social justice would appear radically different from the one we have now.

Reference

Alkon, A. H., & Guthman, J. (Eds.). (2017). *The New Food Activism: Opposition, Cooperation, and Collective Action*. Oakland: University of California Press.