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Contents | Volume 8, Issue 3 / Fall 2018

On our cover: Zariah enjoys a morning snack of local cantaloupe at the Cary Towne KinderCare childcare center in Cary, North Carolina. This center is joining with many other providers from around the country enrolling in farm to early care and education programs to help connect low-income families with sources of fresh, local foods. This center committed to feeding children three or more local food items a week through the growing season, exposing children to a variety of new fruits and vegetables while also investing in local farmers and distributors. See the article in this issue, “Farm to Childcare: An Analysis of Social and Economic Values in Local Food Systems,” by Jacob C. Rutz, J. Dara Bloom, Michelle Schroeder-Moreno, and Chris Gunter. *Photo credit: Jacob C. Rutz; used with permission.*



Editorial

IN THIS ISSUE: The Wellbeing of Its Children: The Ultimate Expression of a Nation’s Wealth / *Duncan Hilchey* 1

Columns

CULTIVATING COMIDA: Dignity and Devastation in Vermont’s Dairy Industry / *Teresa Mares* 5

THE ECONOMIC PAMPHLETEER: The Battle for the Future of Food / *John Ikerd* 9

DIGGING DEEPER: New Thinking on “Regional” / *Kate Clancy with Kathryn Z. Ruhf* 13

Voices from the Grassroots

Community Kitchen Freezing and Vacuum Packaging / *Anna Dawson* 19

Open Call Papers

Farm to Childcare: An Analysis of Social and Economic Values in Local Food Systems / *Jacob C. Rutz, J. Dara Bloom, Michelle Schroeder-Moreno, and Chris Gunter* 23

“Put Your Own Mask on Before Helping Someone Else”: The Capacity of Food Hubs to Build Equitable Food Access / *Lesli Hoey, Fink Shapiro, and Noel Bielaczyc* 41

Economic Analysis of Local Food Procurement in Southwest Florida’s Farm-to-School Programs / *Jonathan Adam Watson, Danielle Treadwell, and Ray Bucklin* 61

Farm Direct at Five Years: An Early Assessment of Oregon’s Farm-Focused Cottage Food Law / *Lauren Gwin, Christy Anderson Brekken, and Lindsay Trant* 85

Perspectives on a Local Food Access and Nutrition Education Program from Cooperative Extension Nutrition Educators / <i>Jared McGuirt, Stephanie B. Jilcott Pitts, Rebecca A. Seguin, Margaret Bentley, Molly DeMarco, and Alice S. Ammerman</i>	105
Toward a Community Impact Assessment for Food Policy Councils: Identifying Potential Impact Domains / <i>Larissa Calancie, Kristen Cooksey Stowers, Anne Palmer, Natasha Frost, Holly Calhoun, Abbey Piner, and Karen Webb</i>	123
The Local Food System Vitality Index: A Pilot Analysis to Demonstrate a Process for Measuring System Performance and Development / <i>Jairus Rossi, Timothy A. Woods, and Alison F. Davis</i>	137
The Progressive Agriculture Index: Assessing and Advancing Agri-food Systems / <i>Maizy T. Ludden, Rick Welsh, Evan Weissman, Duncan Hilchey, Gilbert W. Gillespie, and Amy Guptill</i>	159
Cultivating Successful Student Farms through Site Selection and Design / <i>Rebekah VanWieren</i>	187
Reviews	
Mobilizing Food: A Review of Building Nature's Market (review of <i>The Business and Politics of Natural Foods</i> , by Laura J. Miller) / <i>Review by Corey Lee Wrenn</i>	207
Rethinking Control: Complexity in Agri-environmental Governance Research (review of <i>Agri-Environmental Governance as Assemblage: Multiplicity, Power, and Transformation</i> , by Jérémie Forney, Chris Rosin, and Hugh Campbell) / <i>Review by Matt Comi</i>	213
Ending Hunger Is Possible — Institutional Change Matters (review of <i>Beginning to End Hunger: Food and the Environment in Belo Horizonte, Brazil, and Beyond</i> , by M. Jahi Chappell) / <i>Review by Marianna Siegmund-Schultze</i>	217
Gritty Philosophical Thinking about Food Justice Doing (review of <i>Food Justice in US and Global Contexts: Bringing Theory and Practice Together</i> , edited by Ian Werkheiser and Zachary Piso) / <i>Review by Christine Porter</i>	221
Transformative Change Eludes the Well-Meaning but Fractured Food Movement (review of <i>Stand Together or Starve Alone: Unity and Chaos in the U.S. Food Movement</i> , by Mark Winne) / <i>Review by Renee Brooks Catacalos</i>	225
Injustices Made Right: Ed Scott Jr.'s Victory in Saving the Family Farm (review of <i>Catfish Dream: Ed Scott's Fight for His Family Farm and Racial Justice in the Mississippi Delta</i> , by Julian Rankin) / <i>Review by Aaryn Wilson</i>	229
Following Food to its Source (review of <i>Knowing Where It Comes From: Labeling Traditional Foods to Compete in a Global Market</i> , by Fabio Parasecoli) / <i>Review by Carrie Scrufari</i>	231








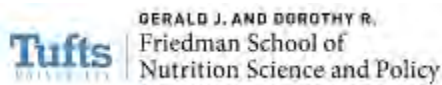


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IN THIS ISSUE
DUNCAN HILCHEY

The wellbeing of its children: The ultimate expression of a nation's wealth



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It seems like just yesterday that I attended a very early farm-to-school workshop in the mid-'90s at a national conference. I don't remember the name of the conference or where it took place, but I vividly recall the animated discourse that included expressions of frustration in navigating the National School Lunch and Department of Defense's Fresh Fruit and Vegetable program protocols. I also heard the kernels of clever strategy being formulated in a handful of schools around the country to get fresh local farm products into their cafeterias. Back in those early days, things sure were complicated—but also exciting.

The U.S. has come a long way since then. With federal and foundation support, the National Farm to School Network is thriving, and nearly half of all U.S. schools purchase at least small amounts of local farm products. The U.S. is also sprouting farm-to-college, farm-to-prison, farm-to-hospital, and now farm-to-childcare programs. This 20-year trend in direct wholesaling to sympathetic local institutions was a logical maturation of the food movement that began with the resurgence of farmers markets in the late 1970s and the advent of community supported agriculture operations (CSAs) in the 1980s. And one might argue that food hubs were a natural next response to the challenges of meeting the needs of institutions—that is, the small-scale wholesaling established by intrepid farm-to-school organizers.

On our cover: Zariah enjoys a morning snack of local cantaloupe at the Cary Towne KinderCare childcare center in Cary, North Carolina. This center is joining many other providers from around the country enrolling in farm to early care and education programs to help connect low-income families with sources of fresh, local foods. This center committed to feeding children three or more local food items a week through the growing season, exposing children to a variety of new fruits and vegetables while also investing in local farmers and distributors. See the article in this issue, "Farm to Childcare: An Analysis of Social and Economic Values in Local Food Systems," by Jacob C. Rutz, J. Dara Bloom, Michelle Schroeder-Moreno, and Chris Gunter, at <https://doi.org/10.5304/jafscd.2018.083.004>.

Photo credit: Jacob C. Rutz; used with permission.

The cover of this issue (courtesy of Jacob Rutz at North Carolina State University) reflects not only the youth and promise of the farm-to-institution movement, but also its growing diversity. Alas, if the health and wellbeing of children is a key indicator of any nation's real wealth, then many countries (and especially the United States) have a long way to go. The U.S. has the highest rate of childhood hunger of any Global North nation outside of Eastern Europe.¹ Farm-to-childcare is a way to push increased access to fresh, healthy food down the age scale, where it has the chance to influence food choices for life. While not without its challenges, it is an exciting new opportunity in the supply chain that parents and both the public and private sectors should be looking at. It has the potential to become another critical piece in a resilient community food system infrastructure that is emerging out of growing collaborations among local activists, nonprofits and Cooperative Extension, local government, and researchers and educators in higher education.

As always, we offer a fresh crop of columns in this issue. In *Dignity and Devastation in Vermont's Dairy Industry*, **Teresa Mares** delves into the new Milk with Dignity program in which dairy farmers receive a premium for their fair treatment of migrant employees.

Kate Clancy collaborates with **Kathryn Ruhf** in encouraging us to consider aggregating our local efforts into strong regional collaborations in *New Thinking on "Regional."* And in his Economic Pamphleteer column, *The Battle for the Future of Food*, **John Ikerd** makes a strong case for agroecology as the best antidote to global agriculture industrialization.

Next, in her *Voice from the Grassroots* story, *Community Kitchen Freezing and Vacuum Packaging*, **Anna Dawson** shares her decades-long effort to produce local frozen meals from the community, for the community. We hope to publish many more "voices" in coming issues. Learn more about the Voices from the Grassroots series on our website.²

Our first open-call paper is *Farm to Childcare: An Analysis of Social and Economic Values in Local Food Systems* by **Jacob C. Rutz, J. Dara Bloom, Michelle Schroeder-Moreno, and Chris Gunter**, who explore some of the tensions between the values and economic realities of this new short supply chain.

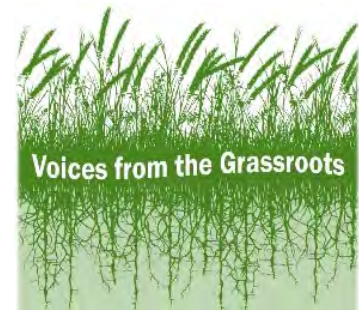
Finding that food hubs need to be financially solvent before they can fully address community food security, **Lesli Hoey, Lilly Fink Shapiro, and Noel Bielaczyc** offer wise advice in *"Put Your Own Mask on Before Helping Someone Else": The Capacity of Food Hubs to Build Equitable Food Access*.

Continuing our mini-theme of short supply chains, **Jonathan Watson, Danielle Treadwell, and Ray Bucklin** explore the financial challenges and opportunities in a large-scale, districtwide farm-to-school program in *Economic Analysis of Local Food Procurement in Southwest Florida's Farm-to-School Programs*.

Next, *Farm Direct at Five Years: An Early Assessment of Oregon's Farm-Focused Cottage Food Law* by **Lauren Gwin, Christy Anderson Brekken, and Lindsay Trant** provides us with a candid glimpse into the efficacy of a state initiative to foster simultaneously food entrepreneurship and food safety.

Switching now from supply chains to more food policy-oriented papers in our fall issue, **Jared McGuirt, Stephanie Jilcott Pitts, Rebecca Seguin, Margaret Bentley, Molly DeMarco, and Alice Ammerman** explore the perceived feasibility of CSA subsidies in *Perspectives on a Local Food Access and Nutrition Education Program from Cooperative Extension Nutrition Educators*.

In *Toward a Community Impact Assessment for Food Policy Councils: Identifying Potential Impact Domains*, **Larissa Calancie, Kristen Cooksey-Stowers, Anne Palmer, Natasha Frost, Holly Calhoun, Abbey Piner, and Karen Webb** proffer a useful approach to classifying the impacts of food policy councils.



¹ <https://www.unicef-irc.org/article/1626-first-global-estimates-of-food-insecurity-among-households-with-children.html>

² <https://www.foodsystemsjournal.org/index.php/fsj/grassroots>

Next, we have two papers presenting tools for measuring progress in the good food movement. First, **Jairus Rossi, Timothy Woods, and Alison Davis** present *The Local Food System Vitality Index: A Pilot Analysis to Demonstrate a Process for Measuring System Performance and Development*. This is followed by another prototype index presented in *The Progressive Agriculture Index: Assessing the Advancement of Agri-food Systems*, by **Maizy Ludden, Rick Welsh, Evan Weissman, Duncan Hilchey, Gil Gillespie, and Amy Guptill**.

Our final open-call paper, *Cultivating Successful Student Farms through Site Selection and Design* by **Rebekah VanWieren** provides insights into locating and developing a successful student farm.


Finally, in this issue we catch up on a backlog of book reviews:

Corey Lee Wrenn reviews *Building Nature's Market: The Business and Politics of Natural Foods* by Laura J. Miller. **Matt Comi** reviews *Agri-Environmental Governance as an Assemblage: Multiplicity, Power, and Transformation* by Jérémie Forney, Chris Rosin, and Hugh Campbell.

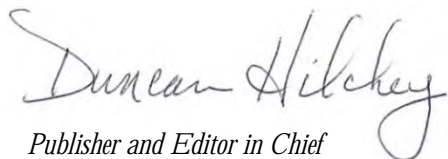
Marianna Siegmund-Schultze reviews *Beginning to End Hunger: Food and the Environment in Belo Horizonte, Brazil, and Beyond*, by M. Jahi Chappell. **Christine Porter** reviews *Food Justice in US and Global Contexts: Bringing Theory and Practice Together*, edited by Ian Werkheiser and Zachary Piso.

Renee Brooks Catacalos reviews *Stand Together or Starve Alone: Unity and Chaos in the U.S. Food Movement*, by Mark Winne. **Aaryn Wilson** reviews *Catfish Dream: Ed Scott's Fight for His Family Farm and Racial Justice in the Mississippi Delta*, by Julian Rankin. And finally, **Carrie Scrufari** reviews *Knowing Where It Comes From: Labeling Traditional Foods to Compete in a Global Market*, by Fabio Parasecoli.

We are pleased to announce that JAFSCD is now listed in the **Directory of Open Access Journals (DOAJ)**, a mostly volunteer organization that thoroughly vets open access journals and only includes nonpredatory publications in its listing (<https://doaj.org>). This is a great endorsement of our publication policies and practices, and is good news for our readers, authors, and especially our shareholding libraries, which consult the DOAJ to ensure their support goes to reputable publications.

As this is the holiday season, the staff of JAFSCD wish our readers, authors, columnists, reviewers, advisors, partners, and shareholding organizations safe travel and good times with friends and family. 

With appreciation,



Publisher and Editor in Chief



CULTIVATING *COMIDA*:
PUSHING THE BORDERS OF FOOD, CULTURE, AND POLITICS
TERESA M. MARES

Dignity and devastation
in Vermont's dairy industry

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After years of challenging economic conditions, the first several months of 2018 spelled disaster for a number of Vermont's dairy farms. As reported in a local weekly newspaper article, "Selling the Herd: A Milk Price Crisis Is Devastating Vermont's Dairy Farms" (Heintz, 2018), the ongoing downturn in milk prices has led a number

Dr. Teresa Mares is associate professor of anthropology at the University of Vermont. Her research focuses on the intersection of food and migration studies, and particularly how diets and foodways of Latino/a immigrants change as a result of migration. She is currently examining border politics and food access issues among Latino/a dairy workers in Vermont and is writing a book on this topic, entitled The Other Border: Sustaining Farmworkers in the Dairy Industry, under contract with University of California Press. Recent publications include "Navigating Gendered Labor and Local Food: A Tale of Working Mothers in Vermont," in Food and Foodways, and a co-authored chapter, "Eating Far from Home: Latino/a Workers and Food Sovereignty in Rural

of farms to close shop. This leaves just 749 dairy farms in a state where more than 11,000 existed seven decades prior. Alongside increased costs of production, this article also reveals that dairy farmers are receiving little more for their milk than they did in the late 1970s, despite the ever-increasing costs of production and environmental pressures. The economic downturn has had a

Vermont," in Food Across Borders: Production, Consumption, and Boundary Crossing in North America.

Outside the classroom, Dr. Mares has led a number of community food projects. She is co-director of Huer-tas, 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.

pronounced effect on smaller family farms, particularly those with fewer than 200 cows, and has affected organic and conventional dairies alike. These economic realities have exacerbated the consolidation of the industry, leaving mega-farms as those most likely to survive. These same farms are often criticized for contributing to mounting concerns about the state's water quality and questionable labor conditions, particularly for the immigrant farmworkers who are in large part responsible for sustaining the dairy industry.

Amidst this deepening crisis, the farmworker-led organization Migrant Justice officially launched the Milk with Dignity program in early 2018. This groundbreaking program extends the model of Worker-Driven Social Responsibility pioneered by the Coalition of Immokalee Workers (CIW) in the tomato fields of Florida, with the goal of improving the working conditions and well-being of Vermont's dairy farmworkers. After years of campaigning for a formal agreement with Ben & Jerry's, Migrant Justice signed the Milk with Dignity agreement with Ben & Jerry's on October 3, 2017, receiving a good deal of media attention (Scheiber, 2017) and local support from the dozens of individuals who turned out to witness the historic signing. This agreement requires that the farms in Ben & Jerry's supply chain abide by a code of conduct that was developed by farmworkers, with Ben & Jerry's paying a premium price to participating farmers. As farmworker leader Enrique "Kike" Balcazar stated at the signing ceremony, this agreement represents a "new day for dairy" (Migrant Justice, 2017, para. 3).

The Milk with Dignity Program is not the only campaign led by Migrant Justice; the organization has been active since 2009, calling for impartial and bias-free policing and fighting against wage theft, poor working and living conditions, and the targeting and detention of farmworker activists. Milk with Dignity, however, likely has the most potential to bring about seismic and sustained

changes in the Northeastern U.S. dairy supply chain, primarily to the benefit of immigrant farmworkers. For full disclosure, I have served on the board of Migrant Justice since January 2017, a position that has allowed me to better understand both the potential and challenges of the Worker-Driven Social Responsibility model. In this column I do not draw upon the confidential information that I am privy to as a board member, but rather my academic investigations into the information that has been made publicly available in the media and Migrant Justice's own organizational literature.

The five main elements of the Milk with

Milk with Dignity likely has the most potential to bring about seismic and sustained changes in the Northeastern U.S. dairy supply chain, primarily to the benefit of immigrant farmworkers.

Dignity program include a farmworker-authored code of conduct, farmworker education (focusing on educating about their rights under the code of conduct), the establishment of a third-party monitoring body for enforcement and auditing, economic relief (in the form of price premiums going to farmers following the code), and the guarantee of a legally binding agreement that defined the contract as legally enforceable (Migrant Justice, 2015). The Milk with Dignity program is

currently being monitored by a recently formed third party, the Milk with Dignity Standards Council, which will coordinate regular audits on participating farms where farmworkers and their employers will be interviewed regularly.

The Milk with Dignity Standards Council is not intended to be distant from the program, as is often the case in fair trade models, but rather will act as a permanent and locally based guiding force and resource for farmers and farmworkers alike. If, during an audit, it is seen that a farmer is not following the code of conduct, he or she will be issued a corrective action plan to bring them into greater alignment with the program. Migrant Justice does not see Milk with Dignity as a punitive program; rather, the model is designed with the more comprehensive goal of identifying problems so that the employers understand the standards and the codes, with the ultimate goal of ensuring that

they follow through and provide fair working conditions. At the same time (and similar to the CIW model), the program has a “zero tolerance” for grave abuses, such as sexual abuse. Migrant Justice is hopeful that the economic benefits that are funneled to the farmers through the Milk with Dignity agreement—specifically receiving a premium for their product from Ben & Jerry’s—will offset the costs of compliance.

The momentous signing of the Milk with Dignity Agreement with Ben & Jerry’s was only possible after many years of hard campaigning and struggle. The public campaign began in 2015, following a number of meetings between Migrant Justice and staff at Ben & Jerry’s. Through these meetings, Migrant Justice aimed to educate the company on the labor abuses and unfair working and living conditions that plague their supply chain. This education, as well as the direction for the campaign, were informed by the comprehensive farmworker survey (Migrant Justice, n.d.) carried out by Migrant Justice, which documented the poor working and living conditions that many farmworkers in the dairy industry encounter. Based on this data and inspiration from the CIW, the code of conduct was formulated. Adapting the CIW model to Vermont has required Migrant Justice to closely study the dairy supply chain to investigate the most promising leverage points for its campaign and which companies are likely to sign on to the program. Ben & Jerry’s, with its stated commitment to issues of social justice and its history of purchasing fair-trade ingredients, was the most promising company to pressure initially. Purchased by global behemoth Unilever in 2000 for US\$326 million, Ben & Jerry’s has maintained a hold on its social mission despite what many feared would be a total corporate takeover—not only of the brand but of its emphasis on progressive causes.

The Milk with Dignity model is designed with the comprehensive goal of identifying problems so that the employers understand the standards and the codes, with the ultimate goal of ensuring that they follow through and provide fair working conditions.

The future development and scaling up of the Milk with Dignity program and its human rights framework, even beyond the corporate food system, looks very encouraging given the recent development of the Worker-Driven Social Responsibility (WSR) Network. Founded in 2015, this network aims to “afford protection for the most vulnerable and lowest-wage workers in global supply chains” (WSR Network, n.d., para. 1) and is critical of the failures of corporate social responsibility schemes and multistakeholder initiatives that seek to bring nongovernmental organizations and other institutions into the processes of setting and monitoring workplace standards (WSR Network, n.d.). As of late 2017, the WSR Network comprises a coordinating committee including the Business and Human Rights Resource Center, the Centro de Trabajadores Unidos en Lucha (Center for Workers United in Struggle), the Coalition of Immokalee Workers, Migrant Justice, the National Economic and Social Rights Initiative, T’ruah: The Rabbinic Call for Human Rights, and United Students Against Sweatshops. While it is true that Bangladeshi sweatshop workers and Vermont farmworkers are worlds apart in how they live and

labor, the WSR model is powerful in that it recognizes the common forces that endanger and exploit workers in these disparate supply chains. The WSR proposes a radically different solution to the human rights abuses rampant within global supply chains compared to corporate social responsibility programs, which often fail to center the needs and priorities of workers.

While it is too soon to tell whether the Milk with Dignity program will help to turn the tide in Vermont’s dairy downturn, there is tremendous potential in the model it proposes, particularly for premium products like Ben & Jerry’s. It is clear that business as usual is not working for Vermont’s large-scale dairy farmers (or, indeed, for dairy

farmers in any state) and that alternatives are sorely needed. Further, if international trade and tariff conversations continue to be as volatile as they are currently (Calamur, 2018), dairy may very well emerge as a central point of contention between

the U.S. and our trade partners. In my next column I will continue these conversations and bring readers of *CULTIVATING COMIDA* up to speed on the progress of the Milk with Dignity rollout.



References

- Calamur, K. (2018, June 11). Trump's beef with Canadian milk: Why pick a fight with Canada, of all places? *The Atlantic*. Retrieved from <https://www.theatlantic.com/international/archive/2018/06/trump-canada-dairy/562508/>
- Heintz, P. (2018, April 11). Selling the herd: A milk price crisis is devastating Vermont's dairy farms. *Seven Days*. <https://www.sevendaysvt.com/vermont/selling-the-herd-a-milk-price-crisis-is-devastating-vermonts-dairy-farms/Content?oid=14631009>
- Migrant Justice. (n.d.). *Farmworkers document abuse & propose solution: Milk with Dignity!* Retrieved from <http://www.migrantjustice.net>
- Migrant Justice. (2015, April 29). *Farmworkers call on Ben & Jerry's to stand up for dairy workers' rights in supply chain!* [Blog post]. Retrieved from <https://migrantjustice.net/blogs/anonymous/farmworkers-call-on-ben-jerrys-to-stand-up-for-dairy-workers-rights-in-supply-chain>
- Migrant Justice. (2017, October 3). *A new day for dairy: Milk with Dignity agreement signed! Watershed moment for workers' rights in the dairy industry* [Blog post]. Retrieved from <http://www.migrantjustice.net/>
- Scheiber, N. (2017, October 3). Ben & Jerry's Strikes Deal to Improve Migrant Dairy Workers' Conditions. *The New York Times*. <https://www.nytimes.com/2017/10/03/business/ben-jerrys-migrant-workers.html>
- Worker-Driven Social Responsibility Network. (n.d.). Mission. Retrieved August 22, 2018, from <https://wsr-network.org/about-us/mission/>



THE ECONOMIC PAMPHLETEER JOHN IKERD

The battle for the future of food

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We are in the midst of a battle for the future of our food systems. In spite of persistent denials, today's so-called modern food system simply cannot be sustained for much longer. Mounting evidence of the negative impacts of today's dominant systems of food production on the natural environment, public health, animal welfare, and the quality of rural life is becoming difficult to deny or ignore.

The U.S. Environmental Protection Agency

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/>

(U.S. EPA) consistently identifies agriculture as the leading nonpoint source of pollution of rivers and streams and a major contributor to pollution of lakes, wetlands, estuaries, and groundwater (U.S. EPA, n.d.). Massive “dead zones,” such as those in the Gulf of Mexico and Chesapeake Bay, developed with the industrialization of American agriculture (National Geographic Society, 2011). Agriculture has also been identified as a major contributor to global climate change. Experts disagree, but an emerging consensus seems to be

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.

that agriculture globally contributes about 15% of human-caused greenhouse gas emissions—about the same as transportation (Nahigyan, 2016). Animal agriculture is a major contributor, and environmentalists have joined animal welfare advocates in calling for an end to industrial animal agriculture.

Agricultural pollution has also become a major public health issue. In 2015, the World Health Organization concluded that glyphosate, the world's most widely used agricultural pesticide, is "probably carcinogenic to humans" (International Agency for Research on Cancer, World Health Organization, 2015). Numerous scientific studies confirm that residues of glyphosate are ubiquitous in the air, soil, water, food, and even in our bodies (Watts, Clausen, Lyssimachou, Schütte, Guadagnini, & Marquez, 2016). Health risks are not limited to agricultural chemicals. Scientists around the world have confirmed that the routine use of antibiotics in large-scale confinement animal operations is a significant contributor to the rise in human infections by antibiotic-resistant bacteria, such as the deadly MRSA. The U.S. Centers for Disease Control and Prevention (2013), the World Health Organization (2016), and a special Summit Meeting on the United Nations (General Assembly of the United Nations, 2016) have all called for significant restrictions or bans on the routine use of antibiotics in livestock operations for growth promotion and disease *prevention* rather than treatment.

The dominant systems of food production are becoming indefensible. The fundamental question is whether to try to fix the current system or instead to replace it. The dominant players in the food system are trying to fix it, as replacing it would mean losing their position of dominance. Virtually every major agri-food corporation now includes sustainability in its mission statement and issues an annual sustainability report to convince its investors and customers that the corporation is

responding to growing public concerns. The industrial agriculture establishment is attempting to restore confidence and trust through a multimillion dollar public-relations campaign funded by agri-food corporations and mainstream agricultural organizations (Hamerschlag, Lappé, & Malkin, 2015). The U.S. Farmers and Ranchers Alliance, for example, with a budget of US\$11 million in 2011, is one of more than a dozen industry front groups formed specifically to restore the tarnished public image of "modern agriculture" (Ruskin, 2015).

In addition, the large agri-food corporations are modifying their production practices, when deemed economically feasible, to temper public demands for stricter government regulations. Both Tyson and Purdue have announced plans to stop using antibiotics in their poultry operations

(Amelinckx, 2017). Walmart recently joined McDonald's on a growing list of food markets and restaurants announcing intentions to source eggs only from "cage-free" poultry operations (Pacelle, 2017). Organic food production has been embraced by large agri-food corporations—after they found ways to industrialize and dominate the organic movement (Ikerd, 2018). Industrial producers of row crops are promising to reduce agricultural pollution of streams

and aquifers, if they are given government funds as an incentive and additional time to implement voluntary programs (Environmental and Energy Study Institute, 2016).

In the meantime, most agriculture producers are relying on the currently accommodating regulatory environment to maintain the industrial status quo, including special right-to-farm laws. All 50 states have some type of legislation that protects agricultural producers from nuisance lawsuits by neighbors who are adversely affected by their operations (Weldon & Rumley, n.d.). A recent trend in right-to-farm legislation has been to expand protection explicitly to industrial farming systems, such as concentrated animal feeding operations

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(CAFOs) and genetically modified crops. Model legislation developed by the American Legislative Exchange Council is being used in many agricultural states (The Center for Media Democracy, 2017).

These and other attempts to defend and protect industrial agriculture tend to focus on separating and insulating agriculture from the ecological and social environment in which farms must function. Confinement livestock and poultry operations remove animals from their natural habitat and isolate them physically and visually from public exposure. Hydroponic vegetable production removes crop production from reliance on soil fertility as well as the vagaries of climate and weather. Genetic engineers are attempting to weatherproof crops. Farming by GPS-guided robots and drones would reduce future needs for farmworkers and the associated risks to public health. Advocates extoll the environmental and social benefits

of such innovations. The basic question is whether separation or shielding from nature and society results in better systems or simply hides their fundamental flaws from public view. Regardless, if the battle for the future of food is to be won by the industrial agri-food system, it seems agriculture must be essentially separated from nature and society.

The logical alternative is to replace industrial agriculture with a fundamentally different model of agri-food production that would reconnect agriculture with nature and society. Today, this alternative model goes by various names, including organic, ecological, biological, biodynamic, sustainable, resilient, regenerative, and restorative agriculture, as well as permaculture, holistic management, and nature farming. The unifying principle of all of these alternatives is their recognition and respect for the inherent interconnectedness of agriculture with its natural environment—with the air, water, soil, and energy flow of nature.

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These alternatives share common roots in the scientific principles of agroecology, which applies the science of ecology to agriculture (Altieri, n.d.). Ecology is a study of the relationships of living organisms, including humans, with the other elements of their natural and social environment. In living systems, all things are interconnected. All elements of farming—soil, plants, animals, workers, farmers—are interrelated with everything else.

Farms also are connected integrally with the natural bioregions and social communities within which, and for which, they function. Agri-food economies, being creations of societies, are but one dimension of the agroecological environment. When agroecological farmers do any one thing, they are aware that other things may be affected on their farms as wholes as well as in their bioregions and communities.

Agroecology was the natural model of choice for the global food sovereignty movement,

which proclaims “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” (Nyéléni, 2007, quoted in Ikerd, 2015, p. 13). Perhaps more relevant in the U.S., agroecology provides a science-based conceptual foundation for the local food movement, which could well evolve into the primary contender with industrial agriculture for the future of food (Ikerd, 2017).

The sustainable alternative to today’s industrial agri-food system is less well defined because it is a diverse, individualistic, dynamic, emerging agroecological system. Regardless, the battle for the future of food is between those attempting to separate and insulate today’s industrial agri-food system from nature and society and those who are striving to create a sustainable agri-food system that functions in harmony with its ecological, social, and economic environment.



References

- Altieri, M. A. (n.d.). *Agroecology: Principles and strategies for designing sustainable farming systems*. Retrieved from the Agroecology in Action website: http://www.agroeco.org/doc/new_docs/Agroeco_principles.pdf
- Amelinckx, A. (2017, March 9). Big Chicken goes antibiotic-free. *Modern Farmer*.
<https://modernfarmer.com/2017/03/big-chicken-goes-antibiotic-free/>
- Center for Media Democracy, The. (n.d.). *Right to farm laws*. SourceWatch. Last updated October 4, 2017, and retrieved August 22, 2018, https://www.sourcewatch.org/index.php/Right_to_Farm_Laws
- Centers for Disease Control and Prevention. (2013). *Antibiotic resistance threats in the United States, 2013*.
<https://www.cdc.gov/drugresistance/threat-report-2013/pdf/ar-threats-2013-508.pdf>
- Environmental and Energy Study Institute. (2016, February 26). *In federal, state and private initiatives to improve water quality, no clear answers*. Retrieved from <https://www.eesi.org/articles/view/in-federal-state-and-private-initiatives-to-improve-water-quality-no-clear->
- General Assembly of the United Nations. (2016, September 21). *High-level meeting on antimicrobial resistance* [Press release]. Retrieved from <https://www.un.org/pga/71/2016/09/21/press-release-hl-meeting-on-antimicrobial-resistance/>
- Hamerschlag, K., Lappé, A., & Malkan, S. (2015). *Spinning food: How food industry front groups and covert communications are shaping the story of food*. Friends of the Earth. Retrieved from <http://www.foe.org/projects/food-and-technology/good-food-healthy-planet/spinning-food#sthash.8Xhj3lqt.dpuf>
- 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. <http://dx.doi.org/10.5304/jafscd.2015.052.004>
- Ikerd, J. (2017). Soul of the local food movement. *Journal of Agriculture, Food Systems, and Community Development*, 7(4), 5–7. <http://dx.doi.org/10.5304/jafscd.2017.074.002>
- Ikerd, J. (2018). The industrialization of organics. *Journal of Agriculture, Food Systems, and Community Development*, 8(1), 9–12. <http://dx.doi.org/10.5304/jafscd.2018.081.001>
- International Agency for Research on Cancer, World Health Organization. (2015). *Evaluation of five organophosphate insecticides and herbicides* (IARC Monograph Volume 112). Retrieved from <http://www.iarc.fr/en/media-centre/iarcnews/pdf/MonographVolume112.pdf>
- Nahigyan, P. (2016, February 9). *How much does agriculture contribute to global warming?* Planet Experts. Retrieved from <http://www.planetexperts.com/how-much-does-agriculture-contribute-to-global-warming/>
- National Geographic Society. (2011). *Dead zone*. Retrieved from <https://www.nationalgeographic.org/encyclopedia/dead-zone/>
- Pacelle, W. (2016, April 5; updated 2017, December 6). Breaking news: Walmart, the nation's biggest food seller, says no to cage confinement for hens [Blog post]. *Huffington Post*. Retrieved from https://www.huffingtonpost.com/entry/breaking-news-walmart-the_b_9620272.html
- Ruskin, G. (2015, January 21). *U.S. Farmers and Ranchers Alliance—Key facts*. U.S. Right to Know. <https://usrtk.org/hall-of-shame/us-farmers-and-ranchers-alliance/>
- U.S. Environmental Protection Agency [EPA]. (n.d.). *Polluted runoff: Nonpoint source (NPS) pollution: Nonpoint source: Agriculture*. Retrieved January 2017 from <https://www.epa.gov/nps/nonpoint-source-agriculture>
- Watts, M., Clausen, P., Lyssimachou, A., Schütte, G., Guadagnini, R., & Marquez, E. (2016). *Glyphosate* [Monograph]. Pesticide Action Network. Retrieved from <http://pan-international.org/wp-content/uploads/Glyphosate-monograph.pdf>
- Weldon, K., & Rumley, E.. (n.d.). *States' right-to-farm statutes*. The National Agricultural Law Center. <http://nationalaglawcenter.org/state-compilations/right-to-farm/>
- World Health Organization. (2017, November 7). *Stop using antibiotics in healthy animals to prevent the spread of antibiotic resistance* [News release]. Retrieved from <http://www.who.int/mediacentre/news/releases/2017/antibiotics-animals-effectiveness/en/>



DIGGING DEEPER

Bringing a systems approach to food systems

KATE CLANCY AND GUEST COLUMNIST KATHRYN Z. RUHF



New thinking on “regional”

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In 2010, we presented a set of arguments and assumptions supporting the value of regional thinking and the regional scale in food systems work in papers that we wrote under the aegis of the Northeast Sustainable Agriculture Working Group (Clancy & Ruhf, 2010; Ruhf & Clancy, 2010). We pointed out that local food has resonated with the public, producers, and marketers, and that it has inspired many supportive public policies. We also

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talked about some of the drawbacks of the focus on “local”—its varied definitions, and its shortcomings as a framework for sustainable and resilient food systems.

We described how regions, which go beyond the local scale, play a unique and essential role in meeting the food needs of a population. Regions also play an important role in sustaining food chain participants and the natural resource base in the face of environmental, social, economic, and climate uncertainty. To us, “regional” signifies a substantial volume and variety of products that can more fully address demand when compared with “local” foods.”

Regional implies a larger scale, often multistate, but is not strictly limited to a radius or state boundary. We believe that the regional scale is one of multiple scales—along with local, national and

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global—that will produce food for the American diet into the future. Regional-scale food systems consider at a landscape scale certain needs and limitations, such as transportation efficiencies, broad land use and protection, energy use, production systems, and climate. Using a regional scale provides an essential context for addressing cultural dynamics and differences, natural and human-made disturbances, and diversity and equity challenges that cannot be adequately encompassed at the local scale.

In the last decade, more discussion about “regional food systems” has appeared in both academic and popular literature. However, despite growing sophistication about food systems, “local” and “regional” are still often taken to be synonymous, interchanged or conflated. In one example the two terms are defined as being exactly the same (Sustainable Table, n.d.). In a new report, despite “regional food system” appearing in the title, the terms local and regional are used throughout with virtually no differentiation (Dumont, Davis, Wascalus, Wilson, Barham, & Tropp, 2017). In a recent paper, the term regional is utilized consistently even though the material cited is describing local (Mittal, Krecji, & Craven, 2018).

We argue that to significantly advance many sustainable agri-food system objectives, “regional” and “thinking regionally” need distinction and attention. If we conflate the terms local and regional, and do not distinguish regional as a legitimate and necessary food systems framework, we lose its place, power, and potential to achieve our overall vision as well as to implement practical strategies. We bolster our arguments here with highlights from a number of new research papers—especially those related to scale, climate change, resilience, and systems approaches.

As Born and Purcell (2006, cited in Palmer et al., 2017) point out, scale itself has no inherent merit; the contributions of a specific scale depends

on how well they serve a particular goal. If greater food self-reliance (not self-sufficiency) is a goal, then attention at the regional level is essential to advance the ability of any area to utilize its land and other resources to maintain and enhance productive farms and farm access, and to feed more of its residents. Significantly greater supplies and varieties of food for a larger population can be more adequately fulfilled at a regional scale, compared to a local one. If self-reliance goals are only set at the local level, those communities do not see their role in a larger context (Carlsson, Callaghan, Morley, & Broman, 2017). We made this point with regard to land use and farmland preservation in our earlier work, but it applies to all resources, including water and energy. In the Enhancing Food Security in the Northeast (EFSNE) project, researchers found that a number of foods are produced and sold throughout the region. They also found that more food could be produced under a variety of growing conditions and supply chain adaptations on a regional basis (Clancy et al., 2017).

Many experts have pointed out that resilient systems must exist at multiple scales (Schipanski et al., 2016). There is a need for integrated strategies that could foster resilience across scales (Whitfield, Challinor, & Rees, 2018). This means that people must work, or at least think, across scales. They must recognize what each scale literally “brings to the table” and where their vulnerabilities are. These

authors point out that we need platforms and suites of practices that will be adapted to scale and context, in part because the cross-scale and multi-sited nature of food systems presents multiple challenges (Whitfield et al., 2018). These arguments are diminished, if not lost, if local and regional scales are conflated.

A number of these challenges relate to the sustainable use of resources. Researchers in British Columbia (Kissinger, Sussmann, Dorward, & Mullinix, 2018) studied multiple biophysical

If we conflate the terms *local* and *regional*, and do not distinguish regional as a legitimate and necessary food systems framework, we lose its place, power, and potential to achieve our overall vision as well as to implement practical strategies.

impacts of a local food system. They found that it was not necessarily more environmentally sustainable and therefore was “not as compelling an argument for food system localization” (Kissinger et al., 2018, p. 1). Comparable research at a regional level would be most welcome as there are few if any studies that address this.

Taking the Northeast as an example, droughts are projected to be more common in the future due to climate changes (Sweet, Wolfe, DeGaetano, & Benner, 2017) despite predictions of higher annual precipitation in the Northeast (Hristov et al., 2018). These anticipated dry spells will cause declines in crop yields and increases in crop losses (Sweet et al., 2017). Farmers also face challenges with regard to energy and may reduce energy risk through, for example, growing more of their own feed (Ciolkosz & Helsel, 2017). But these effects are site-specific across the region’s 300 counties. This suggests that relying on a region that encompasses multiple latitudes to mitigate specific local effects is a sound strategy.

Climate change may exacerbate vulnerabilities, but it may also open up new opportunities for farming in the Northeast region (Wolfe et al., 2018). New research has modeled the effects of climate change on some commodities grown in the Northeast states over the next 50 years (Resop, Fleisher, Timlin, Mutiibwa, & Reddy, 2016). This research has also offered suggestions as to what adaptations farmers can make to maintain yields. Because these effects and adaptive strategies will vary across the region, it makes sense to think regionally in terms of overall food production.

Climate change, the decline and degeneration of natural resources, and other conditions constitute serious challenges to food system resilience (Lengnick, Miller, & Marten, 2015). As research has uncovered some of the drawbacks to the emphasis on local food, such as transportation inefficiencies (Lengnick et al., 2015), other research

has offered new arguments in support of food system development at the regional scale (Clancy et al., 2017; Lengnick et al., 2015). The benefits of food system development at the regional scale include the contributions of multiple scales to strong resilience as mentioned above, as well as to increased biodiversity, food chain infrastructure, land conservation and access, farming opportunity, and culturally diverse products. Most papers leave scale undefined, and some draw fairly small-scale boundaries. But regional is not geographically hardwired; any acknowledgment or application of the regional framework is a good start.

Reimagining, and then operationalizing, food systems that can overcome these challenges require researchers and practitioners to connect the pieces

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of this complex social and ecological puzzle (Institute of Medicine & National Research Council, 2015; The Economics of Ecosystems and Biodiversity [TEEB], 2018) across scales and sectors. Siloed approaches, arbitrary boundaries, and loose definitions prevent us from identifying key linkages and from recognizing the present and potential unintended effects of food system decisions on farmers, other supply-chain members, consumers at all income levels, and the

environment. Only systems approaches allow us to see the “why” and “how” of the integrated and interconnected spatial boundaries of policies and programs. This is clearly evidenced by climate, water, and energy, which do not stop at borders. Bringing systems thinking to bear helps people consider the relevant spatial and temporal boundaries and assess the impact of policy and program changes at more than one sector or scale.

Examples in the U.S. and abroad showcase regional approaches to address food resilience. Lengnick, Miller, and Marten (2015) offer the cooperative food network in the Twin Cities area of Minnesota as an example of a mature, self-organizing regional food system. This cluster has overlapping and unique relationships with smaller

towns and cities in the Upper Midwest. These researchers offer the idea of a nationally integrated network of sustainable metropolitan food systems as a way to improve climate resilience and diversity.

In a similar vein, the City-Region Food System is progressing in Europe and Latin America (Blay-Palmer, Santini, Dubbeling, Renting, Taguchi, & Giordano, 2017). City-regions are defined as urban centers and their surrounding peri-urban and rural hinterlands. Participants see the approach as a way to integrate flows of resources and products across sectors and to develop relevant urban-rural policy frameworks.

Food Solutions New England is described as a “regional, collaborative network organized to support the emergence and continued viability of a New England food system that is a resilient driver of healthy food for all, racial equity, sustainable farming and fishing, and thriving communities” (Food Solutions New England, n.d., para. 1). Policy initiatives, farm to institution, professional and advocacy network, and a framing document called “50 x 60: A New England Food Vision” demonstrate a six-state commitment to thinking and acting regionally.

We feel that these are truly pressing issues—as the effects of climate change are appearing more quickly than originally predicted, and all regions are

experiencing increasing land loss and food insecurity, among other negative impacts.

We think that:

1. Researchers and practitioners should bring a systems lens to their work and stop conflating the terms local and regional.
2. Activities and research at the local level should be applauded, supported, and encouraged to connect to larger contexts.
3. The importance and utility of geographic scales working together should be built into all food systems work.
4. We should apply the principles of resiliency to efforts at every level at which food systems actors engage.
5. Recognizing that regions have flexible boundaries should not hamper specific projects from delineating useful and relevant boundaries at larger-than-local scales.
6. All food system advocates should acknowledge the importance and relevance of work at multiple scales and seek to network across levels.

We welcome research, examples, and arguments that build on this concept of “thinking regionally.”



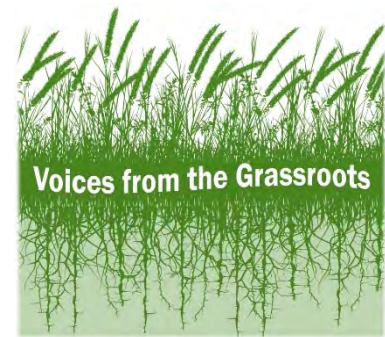
References

- Blay-Palmer, A., Santini, G., Dubbeling, M., Renting, H., Taguchi, M., & Giordano, T. (2018). Validating the city region food system approach: Enacting inclusive, transformational city region food systems. *Sustainability*, 10(5), 1–23. <https://doi.org/10.3390/su10051680>
- Carlsson, L., Callaghan, E., Morley, A., & Broman, G. (2017). Food system sustainability across scales: A proposed local-to-global approach to community planning and assessment. *Sustainability*, 9(6), 1–14. <https://doi.org/10.3390/su9061061>
- Ciolkosz, D. & Helsel, Z. (2017, June). *Energy resilience on the farm*. Presentation as part of the USDA NRCS Climate Hub Webinar Series. Retrieved from <http://www.climatewebinars.net/webinars/energy-strategies-for-farm-resilience-in-the-northeast>
- Clancy, K., Bonanno, A., Canning, P., Cleary, R., Conrad, Z., Fleisher, D.,... Tichenor, N. (2017). Using a market basket to explore regional food systems. *Journal of Agriculture, Food Systems, and Community Development*, 7(4), 163–178. <https://doi.org/10.5304/jafscd.2017.074.018>
- Clancy, K., & Ruhf, K. (2010). Is local enough? Some arguments for regional food systems. *Choices*, 25(1). Retrieved from <http://www.choicesmagazine.org/magazine/article.php?article=114>
- Dumont, A., Davis, D., Wascalus, J., Wilson, T. C., Barham, J., & Tropp, D. (2017). *Harvesting opportunity: The power of regional food system investments to transform communities*. St. Louis, Missouri: Federal Reserve Bank of St. Louis. Retrieved from <https://www.stlouisfed.org/community-development/publications/harvesting-opportunity>
- Food Solutions New England. (n.d.). *Home*. Retrieved from <http://www.foodsolutionsne.org/>

- Hristov, A. N., DeGaetano, A. T., Rotz, C. A., Holberg, E., Skinner, R. H., Felix, T.,... Hollinger, D. Y. (2018). Climate change effects on livestock in the Northeast US and strategies for adaptation. *Climatic Change*, 146(1–2), 33–45. <https://doi.org/10.1007/s10584-017-2023-z>
- Institute of Medicine & National Research Council. (2015). *A framework for assessing effects of the food system*. Washington, D.C.: The National Academies Press.
- Kissinger, M., Sussman, C., Dorward, C., & Mullinix, K. (2018). Local or global: A biophysical analysis of a regional food system. *Renewable Agriculture and Food Systems*. Advance online publication. <https://doi.org/10.1017/S1742170518000078>
- Lengnick, L., Miller, M., & Marten, G. G. (2015). Metropolitan foodsheds: A resilient response to the climate change challenge? *Journal of Environmental Studies and Sciences*, 5(4), 573–592. <https://doi.org/10.1007/s13412-015-0349-2>
- Mittal, A., Krejci, C. C., & Craven, T. J. (2018). Logistics best practices for regional food systems: A review. *Sustainability*, 10(1), 1–44. <https://doi.org/10.3390/su10010168>
- Palmer, A., Santo, R., Berlin, L., Bonanno, A., Clancy, K., Giesecke, C.,... Rocker, S. (2017). Between global and local: Exploring regional food systems from the perspectives of four communities in the U.S. Northeast. *Journal of Agriculture, Food Systems, and Community Development*, 7(4), 187–205. <https://doi.org/10.5304/jafscd.2017.074.017>
- Resop, J. P., Fleisher, D. H., Timlin, D. J., Mutiibwa, D., & Reddy, V. R. (2016). Climate, water management, and land use: Estimating potential potato and corn production in the U.S. Northeastern Seaboard Region. *Transactions of the ASABE*, 59(6), 1539–1553. <https://doi.org/10.13031/trans.59.11748>
- Ruhf, K., & Clancy, K. (2010). *It takes a region ... Exploring a regional food systems approach* (Working paper). Northeast Sustainable Agriculture Working Group. Retrieved from <http://nesawg.org/sites/default/files/NESAWGRegionalFoodSystemFINALSept2010.pdf>
- Schipanski, M. E., McDonald, G. K., Rosenzweig, S., Chapell, M. J., Bennett, E. M., Bezner Kerr, R.,... Schnarr, C. (2016). Realizing resilient food systems. *BioScience*, 66(7), 600–610. <https://doi.org/10.1093/biosci/biw052>
- Sustainable Table. (n.d.). *Local & regional food systems*. Retrieved July 5, 2018, from <http://www.sustainabletable.org/254/local-regional-food-systems>
- Sweet, S., Wolfe, D., DeGaetano, A., & Benner, R. (2017). Anatomy of the 2016 drought in the Northeastern United States: Implications for agriculture and water resources in humid climates. *Agricultural and Forest Meteorology*, 247, 571–581. <https://doi.org/10.1016/j.agrformet.2017.08.024>
- The Economics of Ecosystems and Biodiversity [TEEB]. (2018). Systems thinking: An approach for understanding ‘eco-agri-food systems.’ In TEEB (Ed.), *TEEB for agriculture & food: Scientific and economic foundations*. Geneva: UN Environment. Retrieved from http://teebweb.org/agrifood/wp-content/uploads/2018/06/Foundations_vJun26.pdf
- Whitfield, S., Challinor, A. J., & Rees, R. M. (2018). Frontiers in climate smart food systems: Outlining the research space. *Frontiers in Sustainable Food Systems*, 2, 1–5. <https://doi.org/10.3389/fsufs.2018.00002>
- Wolfe, D. W., DeGaetano, A. T., Peck, G. M., Carey, M., Ziska, L. H., Lea-Cox, J.,... Hollinger, D. Y. (2018). Unique challenges and opportunities for northeastern US crop production in a changing climate. *Climatic Change*, 146(1–2), 231–245. <https://doi.org/10.1007/s10584-017-2109-7>

Community kitchen freezing and vacuum packaging

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In a 2016 study of fresh food loss on Vermont farms, Salvation Farms Director Theresa Snow and her colleague offered insights into farmer production problems. They extrapolated from their survey results that about 14.3 million pounds (6.5 million kg) of vegetable and berry losses occur on Vermont farms every year. Farm food problems included market saturation of fresh zucchini, lack of available help, not enough storage, blemishes on edible produce, fewer customers at farmers markets, and deterioration of produce in storage while waiting for a future market. Farm fresh produce waste problems, however, can be a training opportunity for community kitchens.

My interest in frozen food processing began after working on a community supported agriculture (CSA) vegetable farm in the late 1990s, where excess produce was composted, left to rot, or fed to pigs. To me, a retired farmer and former family

and consumer science teacher, these farm food waste issues shouted opportunities for addressing today's food waste and healthy food challenges through freezing.

My response to this waste was to design and build a kitchen in 2000 (inspected by New York State Agriculture and Markets) to explore value-added processing. The next year the Cornell Food Venture Center approved several frozen and vacuum-packed procedures I had developed. Boil-in-bags are used for blanching vegetables. After cooling, the vegetable broth is drained off and frozen to use to cook grains or to include in soup kits. Cut vegetable pieces are weighed, put into labeled 3 ml bags, vacuum sealed, and frozen. The vegetables are combined with separately packed cooked dry beans, cooked whole grains, savory sauces, and spices as freezer meal kits.

The front label (printed on a color laser printer) should include the product name, a photo of the product, an ingredients list, and the product weight. Labeling laws also require the statement

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“Keep frozen until use!” on the front label. Cooking instructions and nutrition information go on the back label. Inside, stories about the cooks and participating farmers can be shared to increase community food system connections.

Community kitchen-sized equipment are used. These include a storage freezer; a commercial upright tray freezer and an upright tray refrigerator, each with 17 shelves; a commercial vacuum packager; an outer vacuum bag sealer; and a commercial scale. Supplies include boil-in-bags for blanching, vacuum pouches for storing the frozen food, and the product labels.

With the help of a Cornell department of food science intern, I used a 2001 Northeast Sustainable Agriculture Research and Education (NESARE) grant, “A Community-Supported Kitchen,” to see if local customers would be interested in purchasing frozen individual foods and meal kits. I continued to explore creative freezing possibilities with community groups in Schenectady, NY, and Pittsfield, Massachusetts. I received interest even from kitchen managers at food banks. The teacher in me wanted to empower others to freeze local foods.

I discovered that it makes sense to freeze and vacuum-pack foods individually as fruits and vegetables are harvested. Vegetable blanching times were determined by their “cut shape,” in the form of cubes, purees, pieces, fresh seeds, or shreds. Fruits become frozen purees. Cooked whole grains and dry beans with 290% to 390% added water freeze and reheat nicely. These ingredients are combined with separately frozen savory sauces whose main ingredient is water. Spices provide the opportunity to fla-

vor the meals creatively. Consumers can add their own salt to taste. Cookbook recipes inspired kit combinations for soups (see Photo 1), quick breads (such as pumpkin bread), stir-fry meals (see Photo 2), heat-and-eat veggie burgers, and fruit sauces with less sugar than jam and more uses to boot.

Many farmers in the Northeastern U.S. grow small amounts of a lot of different foods. However, food hubs use freezing equipment that require lots of one kind of food. How can we freeze smaller quantities of unsold local produce foods that will otherwise be wasted or underutilized? Community kitchens near the farms could be the answer. With the appropriate training materials, school cafeterias, vocational technical classrooms, family and consumer science culinary classes at high schools, food banks, and church kitchen cooks could freeze and vacuum-pack the wide variety of foods grown locally.

One barrier to producing frozen and vacuum-packed foods is that Hazard Analysis Critical Control Point (HACCP) plans are required that cover all the processing steps. Since November 2017, the New York State Health Department website has supported food service operators wanting to freeze and

Photo 1. Curried Butternut Squash Chowder Freezer Meal Kit



Photo 2. Cajun Vegetable Cheese Stir Fry Freezer Meal Kit



vacuum-pack local foods (also called reduced oxygen packaging, or ROP).¹

HACCP plans are approved by the appropriate New York county health departments for school and food bank kitchens. Help writing HACCP plans is available at other online websites. A vacuum-packaging company offers online help.² HACCP training is available at the U.S Food and Drug Administration (FDA) website.³ The Cornell Food Venture Center works with food entrepreneurs in the Northeast who use state-inspected kitchens. Cornell offers a HACCP course to students. HACCP-trained college interns could work with county health departments and community kitchen staffs to produce plans for approvals.

My vision is to reduce local farm food waste by producing freezer meal kits with instructions that teach consumers how to cook while addressing today's consumer health issues. Dietitians could lead the way by helping design products. Culinary-

trained professionals can use their sensory imagination to create culturally relevant recipes for taste-testing and production. Training programs involving community kitchen staff, teens, retirees, and food pantry participants can reduce initial product development costs while creating interest and developing culinary skills for future jobs. Even CSAs with excess fresh produce could add frozen offerings to their fresh ones.

Why isn't this happening now? I believe the major problem is the lack of easy-to-follow, online training materials suitable for teens and adults. Professionally designed presentations with video clips can empower community cooks to produce meals that address local farm sustainability issues and meet consumer health needs. Community kitchens could become year-round local farm food markets. I am working on developing the training materials and welcome collaborators.



References

- Snow, T., & Dean, E. (2016). Food loss in Vermont: Estimating annual vegetable & berry loss. A salvation farms' analysis. Retrieved from http://salvationfarms.org/VT_Food_Loss_Study_2016.pdf

¹ Information about this is at http://www.health.ny.gov/environmental/indoors/food_safety/pubs/rop_guidance.pdf

² See <http://www.haccp-portal.com>

³ See <https://www.accessdata.fda.gov/scripts/foodSafetyPlanBuilder/>

Farm to childcare: An analysis of social and economic values in local food systems

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Abstract

Farm to institution is a component of the local food movement, representing the growing link between local producers and organizations like schools, prisons, and hospitals. These are organizations that have concentrated buying power and thus a sizable influence on local food supply chains. Farm to childcare represents a next step in

farm to institution, serving young children at the apex of their habit formation and biological development, and providing economic opportunities for local farmers. Using a qualitative case study methodology in one urban county in North Carolina, this paper asks the questions: (1) How do childcare centers, farmers, and distributors negotiate the tensions between social and financial values in the farm-to-childcare initiative? and (2) What strategies do these supply chain actors use to overcome barriers? Analyzing the perceptions of participation in a farm-to-childcare project of 11 childcare centers, 11 farmers, and four distributors shows parallel values for children's health and community con-

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nections to farmers actualized in the relationships and purchase of local foods. However, market-driven values and actions dominated the supply chain for all participants when business solvency seemed to be in opposition to central social commitments. Childcare centers and nonprofit distributors subsidized local food purchases with inexpensive, nonlocal food and grant funding, respectively. Many farmers preferred expressing social values through noncommercial activities rather than sacrificing economic viability to participate in socially oriented programs. This study suggests that achieving the social goals of farm-to-childcare programs requires creative strategies, such as coordinating sales of smaller than Grade A produce, purchasing from multiple local sources, and aggregating demand from multiple centers.

Keywords

Embeddedness, Marketness, Local Food Systems, Farm to Childcare, Case Study

Introduction

Farm to institution, including hospitals, schools, and childcare centers (CCCs), has garnered major attention as a next step in the local food movement to address systemic challenges in creating equitable food systems (Campbell, Carlisle-Cummins & Feenstra, 2013; Feenstra, Allen, Hardesty, Ohmart & Perez, 2011). Local food systems are framed as providing consumers authenticity, health, tradition, and taste through socially embedded forms of food production and exchange, including farmers markets, community supported agriculture (CSA), and farm to school (F2S) programs (Allen, 1999; Feenstra, 1997). These social values of local food systems are not necessarily inherent in the scale, organizations, or theories of change often attributed to them (Allen, 1999; Goodman & DuPuis, 2002; Guthman, 2008; Hinrichs, 2003; Winter, 2003). Instead, local food systems uphold a multifaceted and often contradictory value system that may limit food accessibility or environmentally

sustainable farming practices in tandem with more equitable arrangements (Allen, 1999; DuPuis & Goodman, 2005). Different degrees of social values and market-driven activity in the local food system color the reality of how producers sell their crops, how consumers purchase food, and how farm to institution programs function (Hinrichs, 2000, Izumi, Wright & Hamm, 2010b).

Farm to early care and education is one example of a local food initiative that attempts to bridge low-income children and local farms through a mutually beneficial market relationship. Farm to early care and education includes elements of experiential learning and environmental design, but we will focus on local food procurement within CCCs (henceforth farm to childcare, or F2CC) as a central theme and activity in this paper. (North Carolina Farm to Preschool Network, 2016).¹ Farm-to-childcare programs procure local food through direct and indirect markets, including distributors, farmers, and farm stands. Local food is then served to children during meals and as part of educational programs exposing children to new foods, where food comes from, and who grows it. The majority of F2CC research focuses on the multifaceted benefits to children's health generated by educational and consistent exposure to fresh, local foods (Hoffman et al., 2016; Williams et al., 2014). However, far less research examines the "farm to" portion of the relationship; this creates a black box in the literature for how local food supply chains work in CCCs as well as what financial and social benefits exist for supply chain partners.

At both a functional and theoretical level, F2S has informed the formation of F2CC (Stephens & Oberholtzer, 2016). Yet in comparison to F2S programs, F2CC has lower barriers to entry for local farmers and more flexibility in food purchasing; furthermore, F2CC is not expected to have financially self-sustaining cafeterias (Hoffman et al., 2016). Federal funding for food in many CCCs is similar to free and reduced lunches in the

¹ It should be noted that "childcare centers" are a specific type of care setting under the more broad definition of early care and education settings for children, which include childcare centers, licensed and unlicensed family childcare, private preschools, Head Start/Early Head Start, state preschools, and programs through K-12 districts (Stephens & Oberholtzer, 2016). This paper specifically observed and analyzed F2CC participating centers in the local food system.

public school system, subsidizing costs for low-income families through the Child and Adult Care Food Program (CACFP). This can open the door for centers to utilize federal funding toward F2CC related activities (Kline, 2015). The unique nature of F2CC procurement activities warrants its own body of research separate to that of F2S.

Presently, there is a gap in the literature examining the role and benefits for actors across the entire F2CC supply chain. This paper uses a case study approach to ask the questions: (1) How do CCCs, farmers, and distributors negotiate the tensions between social and financial values in the F2CC initiative? and (2) What strategies do these supply chain actors use to overcome barriers? We begin by demonstrating that F2CC is a unique but related system compared to F2S, requiring an analysis of the similarities and differences between the two in relation to the local food system. Social embeddedness theories are utilized to frame the relationships in the F2CC case study in order to examine previously under-researched components of the whole supply chain and value system. Central themes that permeate our theoretical and strategic analysis include values for local food, community cohesion, and children's wellbeing, similar to findings from F2S research. Friction arose in the F2CC program when achieving social goals seemed outside the potential for a financially viable market. In the concluding section, we will explore practical strategies for implementing F2CC for each actor.

Literature Review and Background

Local Food in Farm to Childcare

Present analyses of F2CC primarily focus on nutritional and educational behavioral changes for children and their parents as a central outcome of these programs (Hoffman et al., 2016; Williams et al., 2014). Farm-to-childcare meals have been found to be more nutritious than nonlocal meal service, especially in terms of fruit and vegetable servings (Gibson et al., 2014). Exposure to more fruits and vegetables, as well as increased frequency of exposure within an F2CC-style program, positively influences children's willingness to try and like fruits and vegetables (Carroll et al., 2011;

Farfan-Ramirez, Diemoz, Gong & Lagura, 2011; Izumi, Eckhardt, Hallman, Herro, & Barberis, 2015; Story, Kaphingst, & French, 2006; Williams et al., 2014). The emphasis of F2CC programs on the whole eating environment shows positive perceptions from teachers and behavioral change from parents (such as purchasing local food) as a result of F2CC programming (Gibson et al., 2014). The National Farm to Preschool Survey of Early Care and Education Providers corroborates the findings that CCCs are using more local food in meals and programs, translating into greater exposure, consumption, and behavioral change (Hoffman et al., 2016; Stephens & Oberholtzer, 2016). We include this central theme of childhood wellbeing through local food-based nutrition programming in F2CC in our analysis of the values of supply chain participants.

Far less research examines the economic relationships between farmers, distributors, and CCCs engaged in F2CC programs. A handful of pilot programs have documented direct sale relationships such as on-site farmers markets and CSA-style programs (Carroll et al., 2011; Hoffman et al., 2012). Results from the 2015 National Survey of Early Care and Education Providers also indicates that local food purchases are most common directly from grocery stores, farmers markets, and individual producers compared to intermediaries (Stephens & Oberholtzer, 2016). While current F2CC literature assumes that farmers and other supply chain businesses are economically benefiting, few studies have analyzed all perspectives of F2CC supply chain actors, contributing to a lopsided focus on the benefits and challenges to children, parents, and CCCs (Conner et al., 2012; Conner, Sevoian, Heiss & Berlin, 2014; Izumi, et al., 2010b). The anticipated friction between ensuring long-term business solvency and achieving broad social goals for farmers and consumers through F2CC projects requires inclusion of a socio-economic theoretical analysis of this supply chain. In the next section, we will explore theories of embeddedness and marketness as our theoretical framework to structure an analysis of F2CC projects, before turning to the F2S research in this area to inform the current study and serve as a point of comparison.

Embeddedness and Marketness in Local Food Systems

The relationships that form the F2CC supply chain can be organized into a system of interrelated values using the economic sociology theoretical frameworks of embeddedness and marketness. Social science scholars have adapted these economic theories of behavior from the works of Polanyi and Granovetter into a critique of food system actors' perceptions and motivations (Block, 1990; Hinrichs, 2000). Social embeddedness captures the idea that economic interactions are not just a simple set of rational choices, but instead part of complex social relationships (Granovetter, 1985; Hinrichs, 2000). Borrowing from the work of Block (1990), Hinrichs (2000) utilizes the concept of marketness to further enrich the description of the tensions between economic and social values in direct agricultural markets (Hinrichs, 2000). Marketness describes a polarization of values that juxtaposes nonprice considerations (like degree of social connectivity) against price-oriented motivations (Hinrichs, 2000; Kirwan, 2004). High levels of marketness in the agri-food system literature are often correlated with systems that value economic profits, large-scale production and/or efficiency, and industrial models of food production (Hinrichs, 2003). In mirror opposite, the moral economy of local and alternative food is framed to favor community well-being, small-scale production, and "natural" models of food production (Hinrichs, 2003).

Local food systems are often the *modus operandi* of embedded food systems, purposefully incorporating social, cultural, and ecological factors into their operations in opposition to more conventional food systems that favor price and efficiency (Izumi, Wright & Hamm, 2010a; Kirwan, 2004). However, "local" and alternative markets cannot always be equated with fair wages or internalization of ecological costs without explicit dedication to socially just causes (Allen & Guthman, 2006; Born & Purcell, 2006; DuPuis & Goodman, 2005; Izumi et al., 2010a). Hinrichs critiques the assumed embeddedness of local food systems (such as farmers markets and CSAs) as spaces that privilege social connectivity to purposefully decommodify food, but which still favor and depend on a wealthy, privileged customer base to exist (Hinrichs, 2000).

Economic longevity for farmers may require a healthy but constrained dose of marketness to thrive in these self-proclaimed alternative markets (Hinrichs, 2000). Likewise, representing "conventional" as purely market-oriented obscures the level to which all food systems are socially embedded in long-term relationships and varying degrees of regional affinities (Bloom & Hinrichs, 2010; Izumi et al., 2010a).

Farm to School as a Precursor to Farm to Childcare

Because F2S is a precursor to F2CC, the literature is more robust and offers lessons to be learned for theoretically disentangling the value systems of F2CC participants as well as offering practical conclusions that relate to F2CC programs. We now outline the findings of F2S research for each major group of actors in F2S (farmers, distributors, and consumers) to highlight how these actors balance social embeddedness and marketness.

For farmers, research has shown that commercial relationships with schools have primarily constituted 5% or less of their farming operations' total gross sales, suggesting the impetus for farmer participation in F2S is not primarily economic (Conner et al., 2014; Izumi et al., 2010b; Joshi, Izumi & Feenstra, 2008; Low et al., 2015; Ohmart, 2002; Thornburg, 2013). Instead, farmers have been found to value social benefits, like improving children's dietary habits and supporting community efforts through F2S (Izumi et al., 2010b). However, some studies suggest that despite the low economic value of sales to schools, farmers who participate in F2S programs are diversifying their markets in an attempt to reduce risk (Conner et al., 2012; Izumi et al., 2010b). Functionally, sales and logistical issues persist for farmers operating in F2S programs in part due to the low prices in this market, as well as the fact that schools require decentralized purchases, small deliveries, and have seasonal demand and under-equipped school kitchens (Izumi et al., 2010b; Joshi et al., 2008). Some outlier farmers identified by Conner et al. (2012) demonstrate that those motivated primarily by economic interests were willing to incur transactional costs, resulting in greater profitability than farmers primarily motivated by social responsibility. This suggests that for F2S to be a profitable

market, socially motivated farmers should move beyond the idea of schools as a charity by dedicating greater resources to meeting the logistical needs of F2S customers (Conner et al., 2012). Based on these findings, we include the two central themes of social responsibility to community and economic opportunities in the subsequent analysis to analyze the perspectives of farmers taking part in F2CC.

Distributors also play a role in F2S programs, often acting as the glue that connects farmers to schools in a multitude of fashions. Distribution entities are frequently categorized as conventional broadliners or values-based supply chains to differentiate degrees of reciprocity and trust within the chain as well as degrees of local food system focus (Brayley, Clark & Anand, 2012; Feenstra et al., 2011; Izumi et al., 2010a). Conventional broadline distributors carry a wide range of products in addition to produce, focus on wholesale purchasing, and have the goal of driving down prices to improve overall supply chain efficiency and profitability (Feenstra et al., 2011). Values-based supply chain frameworks incorporate ideals like “local,” “sustainable,” and “organic” into distribution activities that are often carried out by food hubs² or other alternative agri-food actors (Conner et al., 2011; Feenstra et al., 2011; Feenstra & Ohmart, 2012; Hardesty et al., 2014). Values-based supply chains differ from conventional supply chains (and thus conventional distributors) because they intentionally serve small and mid-sized farms and work to communicate and share risk at every link in the chain (Stevensom & Pirog, 2008). However, food distributors are increasingly framed as “hybridized,” or delivering local foods while drawing upon the practices and resources of conventional mechanisms of food distribution (Bloom & Hinrichs, 2011; Forssell & Lankoski, 2015). Values in these relationships are also complex, based in economic efficiency and optimization as well as social reciprocity with regional farmers or competition with other distributors (Izumi, 2010a). As F2S programs mature and expand, distributors’ participation has grown to meet the needs for

scaling-up these markets in order to improve impacts for regional farmers and other supply chain participants (Christensen, Jablonski, Stephens, & Joshi, 2017; Conner et al., 2011; Feenstra & Ohmart, 2012; Low et al., 2015). It is imperative to include the experiences of distributors in research and evaluation to understand the full economic and social impacts of F2S programs. In our analysis of an F2CC project, we include both broadline and values-based distributors to better elucidate their role in facilitating supply chains between farmers and CCCs.

School administrators and food service staff make up the final link in the F2S chain. Schools face a myriad of economic challenges, as their budgets must meet strict federal requirements to maintain low prices through competitive bidding processes while also meeting nutritional standards. In addition, schools are often required to have a financially viable, or sometimes even profitable, food service (Izumi, Alaimo, & Hamm 2010c; Poppendieck, 2010). Despite these challenges, the values that schools receive from participation in F2S programs may largely revolve around improving children’s health and interest in school meal improvement (Izumi et al., 2010c; Schafft, Hinrichs & Bloom, 2010). School administrators and food service staff also value the community improvement aspect of F2S by supporting local food economies and building relationships with specific farmers (Izumi et al., 2010c). As a result, we explore the social values that inform CCCs’ participation in the F2CC project, as well as the practical strategies they employ in order to make these arrangements financially viable.

The primacy of economic motivations in the F2S supply chain in contrast to strong values-centric decision making between farmers, distributors, and schools remains a key issue that guides research examining actions and perspectives in F2S programs. As described earlier, CCCs are also distinct from public school systems in terms of having more entry points for farmers and more flexibility in food purchase and use. These differences mean that CCCs may have unique strategies

² Food hubs are defined as centrally located enterprises focusing on aggregating, distributing and marketing a specific region’s agricultural output (produce) to reach a variety of wholesale, retail and institutional customers (Barham et al., 2012).

that are unavailable to K-12 schools to overcome economic barriers in order to incorporate social values into their procurement. Therefore, while we expect to find similarities between F2S and F2CC projects in terms of the tensions between socially embedded values and market-based actions among participants in these initiatives, the logistical differences in federal procurement programs and childcare operations necessitate further examination.

Methods

Case Study Characteristics

In this grant-funded F2CC project, a cohort of 15 CCCs received a small subsidy (based on child enrollment) to enhance local food purchases and participated in educational workshops hosted by North Carolina Cooperative Extension. This case study is based on the first year of the F2CC project from May 2015 through May 2016. Educational workshops for CCCs focused on cooking with local foods, marketing to parents, procuring local items, and teaching children about nutrition. This F2CC project also pursued partnerships with local farmers and distributors to improve relationships within the supply chain and provide business opportunities for farms in the region. Farmers and

distributors were canvassed to determine their resource and technical assistance needs to engage with CCCs throughout the year. Technical assistance included help in grant writing for cold-storage equipment, pursuing additional childcare markets beyond the project, and fostering relationships between local farms and distributors.

Research Participants

Eleven CCCs out of the 15 involved in the first year of the F2CC project participated in this case study. Once a CCC's procurement options were identified, the farm or distributor they partnered with was approached to be involved in the research as well. In total, 11 farmers and/or farm sales representatives and four distributors agreed to participate in this case study.

General participant information is described in Tables 1, 2, and 3, though some descriptive observations stand out. Childcare centers all utilized more than two options for procuring local food for

Table 1. Childcare Research Participants and Identifiers of the Child Population for Centers

Child Care Centers by Range of Enrollment (<i>n</i>)	Average % Children on Child and Adult Care Food Program Subsidy	Average No. of Procurement Options Reported for All Food Purchases
30-59 (3)	57%	2.67
60-100 (3)	83%	3.67
101-185 (5)	33%	2.6

Table 2. Distributor Research Participants and Identifiers of Operation and Scale

Distributor by Structure (<i>n</i>)	Average Number of Employees	Average Years in Operation	Product Extent
Nonprofit (2)	2	4	Produce
For Profit (2)	100	46	Range of food and nonfood products, including produce

Table 3. Farmer Research Participants and Identifiers of Operation and Scale

Farmers by Primary Market (<i>n</i>)	Farm Size Range (acres)	Product Focus in General	Average Years in Operation
Direct to Consumer (2)	<1-4	Diverse mix of fruits and vegetables	3
Mixed (6)	5-515	Diverse mix of fruits and vegetables; small livestock; perennial fruits	10.75
Distributor (3)	750-15,000	Sweet potatoes, vegetables, some annual fruits	50+

an average of 100 children per center. Farmer operation sizes were bimodal in distribution, with one group ranging from less than one to 10 acres and the other comprising larger farms ranging from 750 to over 10,000 acres. All farms focused on a profitable central market (like direct to consumer or through a distributor) but also utilized several different market channels. Participating distribution companies also exhibited a polarization by operational size. Two were small, with less than three employees, and operated as nonprofit food hubs with specific social missions to serve low-income customers. The other two distributors (one was national, one was regional) were considered broadliners, providing produce (both local and nonlocal), paper products, and other nonfood supplies, meeting the criterion for hybrid distributors according to the definition explained previously.

Case Study Methodology

A case study methodology was chosen to capture the complexity and exploratory nature of this emerging F2CC supply chain. A case study is a detailed examination of events that preserves the unitary character of the social object of study to exhibit the operation of a general theoretical principle (Creswell, 2013; Guest, Namey & Mitchell, 2013). This case study was divided into two data collection steps to build rapport, develop credibility, and encourage participants to fully represent their diverse and often conflicting perspectives (Guest et al., 2013; Mack, Woodson, MacQueen, Guest, & Namey, 2005). The steps were (1) participant observations on all accessible study sites, and (2) semistructured interviews with critical informants.

The primary author conducted participant observations over single or multiple days (up to three) on 26 sites for each CCC, farm, and distributor, taking detailed field notes from experiences working in the kitchens, dining areas, and in the field. Incorporating the experience of members from these institutions—who ordinarily do not have a voice in knowledge production (including cooks, farm workers, and truck drivers) but are integral to the function of the case being studied—provided accuracy for interpreting results (Guest et

al., 2013; Mack et al., 2005). Observations were used to immerse the primary author in the language and terminology of the research participants, which subsequently informed the development of interview guides and the coding process (observational notes were not coded themselves). Semistructured interviews with critical informants at all 26 sites followed the participant observation, which allowed the primary author to utilize a common interview guide while incorporating prior interactions and following emerging and unexpected themes (Creswell, 2013). Directors from each CCC were interviewed about barriers and opportunities in the local food supply chain and how they addressed serving low-income families. Farmers and distributors were questioned about their experiences and perceptions partnering with CCCs to provide local produce. All interviews were recorded and transcribed verbatim. Transcriptions were thematically coded by the primary author to attach and assign meaning to strings of text to organize and develop themes from the data, as described by Coffey and Atkinson (1996) and Saldaña (2009). Coding began with the development of a series of preliminary descriptive codes distilled from participant observation experiences, which were then applied to interview transcripts. These codes captured themes from the lived experience of F2CC actors, such as “connections across community,” “childcare infrastructure,” “individual leadership,” and “personal satisfaction.” A separate set of inductive codes was developed from the interviews themselves as themes arose, such as “informal networks,” “role of distributors,” and “local food labeling and market value.” A third coding was then conducted to further analyze the interviews and relate the descriptive codes back to the theoretical concepts of embeddedness and marketness. These included codes such as “civic agriculture,” “F2CC champions,” and “social responsibility.”

The validity and reliability of research findings were addressed in multiple ways. First, prolonged engagement with research participants through observations in multiple settings helped the researcher gain in-depth understanding of the case at hand and built rapport with critical informants to gather detailed notes (Creswell, 2013; Mack et

al., 2005; Yin, 2009). The primary author discussed key themes derived from the analysis with members of the F2CC project administrators, as experts in the field, to provide triangulation in determining the reliability and validity of emerging results. Reporting findings using illustrative descriptions (e.g., using descriptive quotes) that allow readers to understand the case at hand contributes to clarity and visibility of central themes identified in this study (Merriam, 1995).

Results and Discussion

This case study explored the dual nature of social embeddedness and marketness in the local food supply chain between CCCs, farmers, and distributors to identify creative strategies to make F2CC projects viable. Our findings indicate that CCCs valued children's health and supporting small farms, operationalized by patronizing different forms of local food distribution channels. Likewise, most farmers and distributors shared similar perspectives in general of the importance of working with low-income children to improve health outcomes. However, the whole supply chain was tempered with an economic reality that required different strategies to maintain a level of marketness to operate at a basic level. Through the often conflicting socially embedded and more price-driven values, the F2CC supply chain fluctuated between addressing equity in the food system and being challenged to ensure financial viability and long-term sustainability for those involved.

Childcare Center's Value System

Childcare centers participated in local food supply chains as both consumers receiving products and institutions asserting strong value systems. Taking care of children is a "heart and mission" choice as one center director attested, informing the social ethic of CCC's work with low-income children and their families. Their participation in the F2CC supply chain is an actionable result of the embedded value they place in improving children's eating behaviors and improving communities writ large. Centers also expressed strong positive perceptions of the social network they formed using local food to form a relationship with farmers, improve local

economies, and support like-minded entrepreneurs along the way. However, daily and structural barriers inhibited their expression of social values through local food partnerships. Frequently, strategies to overcome barriers related to cooking inexperience and proximity to markets and funding required additional reliance on market-based solutions.

Relationships informed by degrees of social embeddedness guided CCC's choice of food providers (either farmer or third-party distributor) that prioritized personal relationships over more conventional, business-oriented transactions. One director who purchased from both a farmer and a food hub commented on her desire for a personable relationship with a farmer, saying, "I was able to hear about all the options in the area and chose [farmer's name] because he was polite and had a down-home feeling." Exploring all options for procuring local food through programs like F2CC was a necessity for CCCs to develop an interest in serving local food and to develop confidence in their ability to find convenient options. Individual relationships allowed for an educational experience through face-to-face interaction when farmers participated in the center's garden activities, story times, and special events. Similar to Hinrichs' findings in regard to social embeddedness in direct to consumer markets, the direct marketing relationship reflected deeper values associated with localness for CCCs; because trusting relationships were favored, local food was pursued and perceived as fresher and better tasting, which meant that kids would be more likely to consume produce, ultimately making them healthier (Hinrichs, 2000). Thus, CCC's values for improving childhood nutrition were intimately bound up in being local food consumers. One director of a larger center buying from a food hub clarified her interest in buying local food by saying, "Because it is better food, less preservatives, you know none of the additives are in it, it is just healthier for the kids, and we are going to keep supporting local." Becoming educated and knowledgeable about the presence of synthetic and unwanted ingredients in food continued to increase CCC directors' buy-in to F2CC programs.

Actualizing embedded social values in CCCs

became tenuous when structural realities inhibited the procurement and use of fresh local foods. To begin with, just the step of transitioning into serving *fresh*, regardless of the *localness*, of the product, challenged many centers because kitchen space was unfit to receive fresh foods. Because many CCCs' design was intended for frozen, canned, or prepared foods, counter space was limited, sinks could not handle soil or silt (nor fit large quantities of vegetables), and refrigerators were at capacity. Financially, centers frequently reported lack of funding for the labor associated with the preparation of fresh foods as well as for the fresh, local foods themselves. One director addressed her challenge to increase fresh local foods saying, "When you go to all fresh you have to have an extra cook. You have to have two people full time, because it's a lot of preparation, and that's what people fail to realize." CCCs' strategies for aiding cooks included allowing teachers aids to help process foods and even have children help with simple, safe tasks (like picking basil leaves off the stem). Also, the lack of sales-orientation during mealtime (as described in the school setting) allowed for children to sample new produce in addition to lending a helping hand in the kitchen. Once new local items were available to centers, cooks struggled to learn how to purchase and prepare fresh produce in quantities and styles appropriate for children. One cook commented on her challenging experience by saying, "The first time we ordered a bushel of collards, I was like I have no idea how much a bushel of collards is! Like is it 3 leaves?...Is that enough to serve 120 kids?" Many CCCs relied on the training for cooks provided by the F2CC program to help their centers transition into fresh, local foods.

Centers expressed an interest in supporting local businesses financially in order to support the person and social values behind the product; as one director commented, "That [F2CC] wasn't something I even thought about, but once I did, and I had rapport with [farmer], I spread his name around because he is a local entrepreneur like myself." Not only was the director weaving a relationship between the center and the farmer, but also further integrating the farmer into the larger childcare community and opening the door for a

larger market opportunity. In this way, the value for local food transcended simply buying a quality product and became more about relating to the farmer. Buying local food from a farmer fit into a selective patronage that favored small, new, and minority-owned farms and their narratives. Elevating these stories in the local food system became an extension of CCCs' social interests. One director linked African American heritage to her center's food procurement strategy, explaining,

One thing for me is that the farmer we had was African American, and the majority of the children we serve are African American, too. I thought that it was very important for them to see someone that looks like them that is doing something with food.

As a market exchange for this center, F2CC represented a means to infuse social justice, authenticity, and community into the lives of both the children in the center and their larger community. Partnering with a local farmer was perceived as providing an emotional and social benefit to the children in the CCC (and presumably the farmer and director) beyond what they had derived from previous procurement sources.

From the childcare perspective, the ideological antithesis to these highly embedded social markets were more conventional or hybrid distributors. When CCCs expressed their most idealized versions of local food, mainstream food products were often portrayed as less trustworthy and large corporations as unaligned with local food values. One childcare director of a nonprofit center commented, "I know they're in business to make money, but larger corporations are in the business to make a lot of money. So they charge what the market demands, and you know we have to pay it." The interest to pair with organizations that shared similar values (health-oriented, local-focused) and operated at a similar scale (small size) encouraged partnering with nonprofit food suppliers (food hubs), charitable farmers, and other CCCs. A number of franchise centers began to experiment with creative logistical arrangements, pooling their demand and having teachers or directors distribute food from a centrally located childcare center.

Despite their ideological resistance to supporting large-scale distributors, the participation of CCCs in local food systems was dependent in part on their maintained patronage of broadline vendors. Because fruits and vegetables only make up a portion of CCCs' food budgets, the ability to financially express embedded social values for local food was predicated on a relationship with the conventional market. In this way, local foods were subsidized by cheaper, industrial products, and social values that were expressed verbally were balanced by the marketness displayed through actions and budget sheets. One center director hinted at the reality of investing more time and energy in local fruits and vegetables compared to the rest of the meal by saying, "So I may spend a little more on fresh fruits and vegetables here but I know how to go out and find a sale on rice and toys and other things." The complex value system CCCs held for food and the resulting markets they pursued were deeply enmeshed in both idealized forms of business transactions and their daily monetary realities.

Farmers' Values in Partnering with Childcare Centers

The local food supply chain from farmer to CCC in this case study was complex, yet nascent, spanning multiple avenues for product and financial exchange. Farmers expressed a spectrum of values that motivated their interest in supplying food to CCCs (through direct or intermediated means), from market-based incentives to a more socially embedded rationale. These values were not divided into a polarized dichotomy, but varied in relationship to their size and primary focus to achieve their own basic goals.

Some farmers in this project made efforts to reflect socially embedded values within the context of their market-based relationships. Smaller farms with direct connections to end consumers often used their time to be educators and used their farms as an educational space by inviting CCCs to experience the farm. This allowed the farmers to build trust and increase the possibility of establishing a market relationship. Some farmers specifically hoped to help children, as one medium-sized farmer who sold to CCCs through a non-profit food hub said, "It's important to me for kids

to be able to see me as a farmer and also be able to have produce that's fresh, that's right next door to them." Despite interest from a majority of farmers in this study to partner with CCCs, those that engaged in a direct sales relationship with the childcare market itself were unable to sustain a viable profit (all but one farmer involved in this project abandoned direct sales to CCCs). Farmers expressed that selling to centers was a challenging experience; while they felt that their product was desired, the low volume and infrequent purchases were not sustainable for their bottom line. For the four farmers that started and stopped a direct sale with CCCs, all expressed that profitable sales were a precursor to the social investments (such as teaching children or helping in the garden) that CCCs expected. Despite the challenges for individual farmers, aggregation services, such as food hubs, provided the sense of social connection that CCCs desired while being able to handle the variability in purchasing quantity and frequency. We explore this distribution model and its potential to act as a viable alternative to provide social experiences and financial viability to F2CC projects in the next section.

Similarly, connecting through personable mechanisms and providing the educational experiences for children desired by CCCs was unfeasible for all producers in this study due to time constraints, farm location, and the scale of sales for larger farms. Instead, these farmers' social embeddedness often manifested more materially, such as donating surplus produce to charity. Gleaning the fields or donating boxes of sweet potatoes to a food bank allowed farmers to provide for low-income people through their own infrastructure and excess while maintaining a clear and efficient line between business and charity. CCCs were outside of these charitable networks that primarily served individuals and families through the emergency food system. Another farmer in this project, whose primary market consisted of selling tractor-trailer loads of produce to national or regional distribution companies, expressed a desire to "stay grounded" in his community by selling small boxes of produce to individuals, despite making little or no money from this activity. In this way, large-scale farmers demonstrated socially

embedded values without disrupting their main market channels.

These examples demonstrate that, although farmers reflected socially embedded values, they still often prioritized marketness over social embeddedness. One small farmer who partnered with a food hub grappled with the dual expectations of providing an embedded market experience for customers and maintaining economic viability, saying,

When you're running any business, you got to stay true to your focus so that you can be profitable and be sustainable, right? There are a lot of people that are passionate about getting good food to children, schools, and daycares and whatnot. It's not something that I would be good at. It's not something that I have a passion about. I have a passion about farming.

Although some farmers in this project expressed their "passion about farming" through a socially oriented agenda that included farm visits and educational experiences for CCCs, this farmer maintained a level of marketness to prioritize financial viability. She directed her energy toward higher volume markets through food hubs and higher margin sales directly to restaurants, limiting the reciprocity with low-income consumers to maintain a level of market success. Tangential goals in children's health issues were peripheral and relegated to others that were passionate about helping children in schools and childcare. Health-oriented service providers, such as related nonprofits, Cooperative Extension, and Smart Start programs, were more strategically and financially oriented than farmers to serve the nonprocurement-oriented needs of CCCs.

The transactional distance between larger farmers and CCCs in this study also inhibited a level of community connection and trust, which are understood as hallmarks of the local food system. At the same time, these farmers provided an affordable and convenient local food option for CCCs. All local farmers in this study who sold primarily through a distributor (see Table 3) were unaware that their products were consumed in

CCCs. One farm that sold local sweet potatoes via distributor networks was asked, "Do you know your product is used in a childcare center?" and the sales representative for this farm responded,

No, to be quite honest with you. The only reason we would know that is if they were buying from us direct and at a larger volume, and typically a childcare facility is not going to use the type of volume that would have us ship directly there.

Farmers of all sizes prioritized their customers first. This means larger farms prioritized brokers, distributors, and retailers. Communication about farm values in websites and handouts focused on issues that are important to larger distributors, such as product tracking services or international food safety certifications. For these farmers, their efforts to foster trust with customers consisted of implementing institutionalized mechanisms of promoting transparency, such as food safety certifications, rather than prioritizing social values for community relationships. At the same time, these larger scale farmers often sell to grocery stores, which is an outlet frequented by CCCs that purchase small quantities of food. Therefore, expanding local food access in markets where large farms operate, such as grocery stores, provides another avenue for CCCs to connect with local food options.

Distributors' Values in Partnering with Childcare Centers and Local Farmers

Distributors were the main contact for many relationships in the F2CC supply chain in this case study. Distributors acted as both creators and mediators of social values, communicating with both ends of the supply chain. For-profit distributors focused on the common mantra of "the customer comes first" by prioritizing low prices. Some larger farmers were specifically pursued by large-scale distributors in an attempt to source more local produce, which was used as a marketing tool. More socially oriented distributors, like nonprofit food hubs, committed to social agendas by focusing on sourcing products from small and minority-owned farmers in tandem with providing low-income institutions with local foods. However,

attending to the individual needs of those who struggled to participate in the market economy perpetuated an unsustainable dependence on grant-based funding for food provisioning through these food hubs. The challenge to serve both farmers and CCCs as partners manifested across these different scales, missions, and values held by distribution businesses.

Large, nationally operating distributors in this study (hybrids) approached local food procurement similarly to CCCs—that is, as a singular but embedded component of their overall food procurement strategy. For these distributors, local food was a strategy for marketing and developing a customer base, even without the socially embedded components of reciprocity and low-income consumer access. These distributors sourced local food when it was possible, and sometimes when it was less than ideal. As the regional hybrid distributor put it, “Buying local does not help our bottom line; but we do it because we think it’s the right thing to do.” At this one distribution company, the embedded social value for supporting local farmers was part of a “culture”; yet they also did not “just eat the price of local produce because it’s local.” Instead, market sensibilities guided their supply base to source from local first, and national and international suppliers to fill in the gaps. In fact, integrating local and nonlocal items helped distributors maintain the patronage of CCCs who valued the ability to purchase local food at low prices, allowing them to partially invest in local farms while still maintaining their bottom line. CCCs were able to leverage the growing recognition of local as a marketing tactic by specifically requesting local whenever possible, helping to drive demand beyond passively receiving local food when it was most convenient for a distributor.

On the other end of the spectrum, food hubs in this case study demonstrated embedded social values surrounding local foods both in their central goals and their communication to CCCs about the value of the farmer relationship. One food hub director used the concept of value-chains derived from the work of Stevenson and Pirog (2008) to emphasize the necessity of connectivity in the whole food system, saying, “I don’t think it’s impossible to serve both the farmer and the eater

in one value chain...An ideal system is one where farmers are making a living, and eaters are eating fresh local food.” As a food hub, mediating the value for local food between supplier and consumer fulfilled CCCs’ value of personable relationships and farmers’ need for committed customers. However, focusing on a dual social mission of addressing food security for low-income customers and providing stable pay for small and minority farmers challenged the capacity of food hubs to provide a sustainable food distribution model in the larger economy. The food hub director who framed her work as a “values-based” supply chain continued to ruminate on the friction of serving both ends of the chain, saying,

If we changed our markup a little bit and increased it, we could break even at 1.5 million, but that would mean charging more for food, which a lot of the programs that we’re currently working with may not be able to afford. It also takes away more dollars from the farmer...can we do everything we want to do, is it impossible to serve both farmers and eaters at the same time?

Operationally, food hubs were more challenged than the hybrid distributors to maintain a fiscally viable relationship with CCCs due to the smaller order sizes and fragmented ordering dates. For example, the food hub provided small quantities of novel local produce so that CCCs could offer taste-tests with children. However, they did not frequently charge for this service; instead, they wrapped it into the food hub’s central mission to provide access and exposure for children to new foods and subsidized it through grant funding. While this food hub director expressed that CCCs “may not be able to afford” fresh local foods, many centers were working towards procuring both small, experimental orders (like Brussels sprouts) and consistent, sizable produce purchases to support participants in the values-based supply chain.

One farmer that worked with food hubs commented on the challenge to provide affordable food options to low-income customers, saying,

So how does the [food hub] advocate for the small farmer when they have a huge mix of conventional and organic small guys? I know they do pad the pricing... They have grant money for that. But that is certainly not sustainable, you know what I mean? You're just facilitating this idea that food is cheap instead of necessarily costing.

Socially embedded food systems at the individual actor level facilitate the intended good of these markets—keeping food dollars local, investing in small farms, and supporting sustainable production. Taking a more protracted look, marketness in local food systems becomes necessary to ensure business solvency, since the embedded systems, in fact, do not solve the issues facing small farmers but instead perpetuate an illusion “that food is cheap.” However, CCCs and food hubs operating as nonprofits explicitly aim to improve childhood health and local farm viability, which are values *outside* a market solution. The grants and nonprofits that distort the unfettered market by supporting food system initiatives are how many low-income customers gain access to similar nutritious products available to a well-resourced customer base. Creatively using grant funding and state or nationally funded programs (like the CACFP) to help offset the cost of F2CC programs is a strategic component of reworking the local food system to benefit farmers, distributors, and children.

Conclusions

This case study provides insight into the tensions inherent in socially embedded food systems as they operate in a highly market-oriented world. The bounds of this one case in an F2CC supply chain limit broad generalizations to all local food systems or F2CC projects. Instead, they highlight patterns of how projects negotiate values and needs between different actors. Social embeddedness theories and evidence from the F2S literature illustrate the motivations actors express throughout the F2CC supply chain. Their motivations paint a picture of community investment through a commitment to seemingly altruistic missions that cannot be explained through rational self-interest alone. Marketness concepts help explain the extent

to which business-oriented decision making remains central to the actualized value system of these actors. Farm-to-childcare projects are organized around providing social benefits to supply chain actors; yet, the realities of making them sustainable require a stronger dedication and understanding of the financial needs of those involved. The small subsidy and the education and technical assistance that CCCs received through this project to overcome market barriers did not resolve outstanding challenges to connect low-income consumers and small farms. Instead, a more integrated approach to F2CC utilizing market-based approaches, values-based supply chains, education, and other creative strategies holds promise for future programs.


Compared to F2S, F2CC demonstrates many similarities and some differences, especially for CCCs. Farmers and distributors participated in the F2CC program to express a social commitment towards children's health and exposure to new foods, often without significant or consistent economic compensation, a similar finding in the F2S literature (Conner et al., 2012; Izumi et al., 2010a, 2010b; Thornburg, 2013). Distributors in F2S also often prioritized buying locally as a means to symbolically support their regional economy or struggling farmer communities (Izumi et al., 2010a; Schafft et al., 2010). Childcare centers are markedly similar to schools, both in their socially embedded values for supporting local farming economies and educating children while also facing economic constraints. However, CCCs differ from schools in their scale of procurement and their lower pressure for profitability in meal service. Despite the year-round demand for local foods, the small, decentralized nature of childcare further reduced order sizes from food suppliers compared to schools. Childcare center's relatively small size allowed for nimble, informal purchases from a variety of local outlets, opening the possibility for viable relationships with farmers markets, grocery stores carrying local products, and even local produce stands. Smaller purchases also fit into the varied schedules of directors and/or teachers, allowing them to stop at a farmers market on the way home from work or a grocery store on the way to work. This ultimately diminished logistical barriers to procuring local

foods. Those centers that did prioritize a single local food market participated as members of a values-based supply chain by committing to purchasing regularly and consistently, helping pull local food through the supply chain instead of passively receiving it when available. Childcare services also do not have the burden of selling food to children in the same way schools often must; the age of the children and organization of centers allow for a single menu to be served center-wide (see Poppendieck, 2010 for in-depth analyses of school lunch financial constraints). Creative educational opportunities—e.g., teaching children to help process fresh, raw produce or exploring all available local food markets—helped to also diminish internal barriers facing F2CC. The different structure of childcare food programs compared to K-12 schools suggests F2CC procurement programs focus on both supporting diverse regional food market options and aggregating demand from multiple, proximate CCCs.

Childcare centers, farmers, and local food advocates can improve the function of F2CC initiatives by adapting institutional policies and practices to fit with local food realities. Childcare centers can diminish internal challenges by providing technical assistance, in partnership with county services like Cooperative Extension, to cooks as extra training for processing raw, fresh produce. Also, by collaborating with nearby centers, groups of childcare providers may be able to aggregate demand aiding in delivery for a food distributor or in their own pickup logistics. Farmers may also find a strong market for off-grade produce, since lower prices and the potential for self-processing (small children primarily consume finely chopped and/or cooked foods) is useful to CCCs. Local food advocates and CCCs can petition mainstream food providers to continue the hybridization of the food supply so that local food is more readily available through mainstream markets, such as at grocery stores and through distributors. Overall development of local food infrastructure—through food hubs, grocery options, and farmers markets—all have the potential to be accessed by CCC consumers.

Limitations to the current study include generalizability, type of data collected, and the

length of the study. The F2CC project studied was based on a single program in one urban county in North Carolina, limiting the generalization of the findings to other F2CC programs or different geographic extents. Additional data that may have informed the results, such as money received or spent on local food transactions, was not possible to collect. Also, the short timeline of data collection did not allow for measuring the effect due to grant funds received by the CCCs, or follow-up to see if CCCs who participated in the first year of the project continued to purchase local products after the discontinuation of the subsidy. Despite limitations, this research provides critical insights into the function of F2CC programs and provides suggestions for further inquiry into similar projects.

Future research in F2CC and other farm to institution programs could explore new topics relevant to all members of the supply chain. Farm-to-childcare research could move beyond an initial snapshot of the function and values central to local food supply chains to focus more directly on local food economics, program sustainability, and informal F2CC networks. Quantifying the changes due to grant funding F2CC activities would provide insight into the lasting impact that similar programs could have on local food economies. Comparisons between urban and rural counties' utilization of CACFP funding in F2CC procurement practices and nonfinancially incentivized programs may provide a new perspective on F2CC's efficacy within the broader childcare industry. The role of CCCs as logistical coordinators amongst informal networks of providers may also provide a novel opportunity for farm to institution researchers. Focusing research more specifically on the ability of farmers to capitalize on nascent F2CC markets—such as selling off-grade or small produce to CCCs—would provide insight into the viability of similar programs. Likewise, investigating the role of distributors in accessing sources and markets for local food that match existing infrastructure and business models would contribute to the F2CC discussion. With the growth in F2CC programs nationwide, a thorough and intersectional research agenda may provide new perspectives in local food practice, theory, and policy. 

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References

- Allen, P. (1999). Reweaving the food security safety net: Mediating entitlement and entrepreneurship. *Agriculture and Human Values*, 16(2), 117–129. <https://doi.org/10.1023/A:1007593210496>
- Allen, P., & Guthman, J. (2006). From “old school” to “farm-to-school”: Neoliberalization from the ground up. *Agriculture and Human Values*, 23(4), 401–415. <https://doi.org/10.1007/s10460-006-9019-z>
- 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. <https://doi.org/10.9752/MS046.04-2012>
- Block, F. (1990). *Postindustrial possibilities: A critique of economic discourse*. Berkeley. University of California Press.
- Bloom, J. D., & Hinrichs, C. C. (2010). Moving local food through conventional food system infrastructure: Value chain framework comparisons and insights. *Renewable Agriculture and Food Systems*, 26(1), 13–23. <https://doi.org/10.1017/S1742170510000384>
- Bloom, J. D., & Hinrichs, C. C. (2011). Informal and formal mechanisms of coordination in hybrid food value chains. *Journal of Agriculture, Food Systems, and Community Development*, 1(4), 143–156. <https://doi.org/10.5304/jafscd.2011.014.016>
- Born, B., & Purcell, M. (2006). Avoiding the local trap: Scale and food systems in planning research. *Journal of Planning Education and Research*, 26(2), 195–207. <https://doi.org/10.1177/0739456X06291389>
- Brayley, D., Clark, K., & Anand, M. (2012). *Produce distribution practices: Incorporating locally grown produce into New England's institutional food system*. Retrieved from <https://www.farmtoinstitution.org/sites/default/files/imce/uploads/4-Produce%20Distribution%20Practices%202012.pdf>
- Campbell, D., Carlisle-Cummins, I., & Feenstra, G. (2013). Community food systems: Strengthening the research-to-practice continuum. *Journal of Agriculture, Food Systems, and Community Development*, 3(3), 121–138. <https://doi.org/10.5304/jafscd.2013.033.008>
- Carroll, J. D., Demment, M. M., Stiles, S. B., Devine, C. M., Dollahite, J. S., Sobal, J., & Olson, C. M. (2011). Overcoming barriers to vegetable consumption by preschool children: A childcare center buying club. *Journal of Hunger & Environmental Nutrition*, 6(2), 153–165. <https://doi.org/10.1080/19320248.2011.576207>
- Christensen, L. O., Jablonski, B. B. R., Stephens, L., & Joshi, A. (2017). *Economic impacts of farm to school: Case studies and assessment tools*. Retrieved from <http://www.farmtoschool.org/Resources/EconomicImpactReport.pdf>
- Coffey, A. J., & Atkinson, P. A. (1996). *Making sense of qualitative data: Complementary research strategies*. Thousand Oaks, CA: SAGE.
- Conner, D. S., Nowak, A., Berkenkamp, J., Feenstra, G. W., Van Soelen Kim, J., Liquori, T., & Hamm, M. W. (2011). Value chains for sustainable procurement in large school districts: Fostering partnerships. *Journal of Agriculture, Food Systems, and Community Development*, 1(4), 55–68. <https://doi.org/10.5304/jafscd.2011.014.005>
- Conner, D., King, B., Kolodinsky, J., Roche, E., Koliba, C., & Trubek, A. (2012). You can know your school and feed it too: Vermont farmers' motivations and distribution practices in direct sales to school food services. *Agriculture and Human Values*, 29(3), 321–332. <https://doi.org/10.1007/s10460-012-9357-y>
- Conner, D., Sevoian, N., Heiss, S. N., & Berlin, L. (2014). The diverse values and motivations of Vermont farm to institution supply chain actors. *Journal of Agricultural and Environmental Ethics*, 27(5), 695–713. <https://doi.org/10.1007/s10806-013-9485-4>
- Creswell, J. W. (2013). *Qualitative inquiry & research design: Choosing among five approaches* (3rd ed.). Thousand Oaks, CA: SAGE.
- DuPuis, E. M., & Goodman, D. (2005). Should we go “home” to eat?: Toward a reflexive politics of localism. *Journal of Rural Studies*, 21(3), 359–371. <https://doi.org/10.1016/j.jrurstud.2005.05.011>

- Farfan-Ramirez, L., Diemoz, L., Gong, E. J., Lagura, M. A. (2011). Curriculum intervention in preschool children: Nutrition matters! *Journal of Nutrition Education & Behavior*, 43(4), S162–S165. <https://doi.org/10.1016/j.jneb.2011.03.007>
- Feenstra, G. (1997). Local food systems and sustainable communities. *American Journal of Alternative Agriculture*, 12(1), 28–36. <https://doi.org/10.1017/S0889189300007165>
- Feenstra, G., Allen, P., Hardesty, S., Ohmart, J., & Perez, J. (2011). Using a supply chain analysis to assess the sustainability of farm-to-institution programs. *Journal of Agriculture, Food Systems, and Community Development*, 1(4), 69–85. <https://doi.org/10.5304/jafscd.2011.014.009>
- Feenstra, G., & Ohmart, J. (2012). The evolution of the school food and farm to school movement in the United States: Connecting childhood health, farms, and communities. *Childhood Obesity*, 8(4), 280–289. <https://doi.org/10.1089/chi.2012.0023>
- Forssell, S., & Lankoski, L. (2015). The sustainability promise of alternative food networks: An examination through “alternative” characteristics. *Agriculture and Human Values*, 32(1), 63–75. <https://doi.org/10.1007/s10460-014-9516-4>
- Gibson, C. A., Harvey, S. P., Spaeth, K., Sullivan, D. K., Lambourne, K., & Kunkel, G. H. (2014). Farm to school, school to home: An evaluation of a farm to school program at an urban core Head Start preschool program. *Journal of Hunger & Environmental Nutrition*, 9(3), 334–349. <https://doi.org/10.1080/19320248.2014.929540>
- Goodman, D., & Dupuis, E. M. (2002). Knowing food and growing food: Beyond the production-consumption debate in the sociology of agriculture. *Sociologia Ruralis*, 42(1), 5–22. <https://doi.org/10.1111/1467-9523.00199>
- Granovetter, M. S. (1985). Economic action and social structure: The problem of embeddedness. *The American Journal of Sociology*, 91(3), 481–510. <https://doi.org/10.1086/228311>
- Guest, G., Namey, E. E., & Mitchell, M. L. (2013). *Collecting qualitative data: A field manual for applied research*. Thousand Oaks, CA: SAGE.
- Guthman, J. (2008). Bringing good food to others: Investigating the subjects of alternative food practice. *Cultural Geographies*, 15(4), 431–447. <https://doi.org/10.1177/1474474008094315>
- Hardesty, S. Feenstra, G., Visser, D., Lerman T., Thilmany-McFadden D., Bauman A... Rainbolt, G. N. (2014). Values-based supply chains: Supporting regional food and farms. *Economic Development Quarterly*, 28(1) 17–27. <https://doi.org/10.1177/0891242413507103>
- Hinrichs, C. C. (2000). Embeddedness and local food systems: Notes on two types of direct agricultural market. *Journal of Rural Studies*, 16(30), 295–303. [https://doi.org/10.1016/S0743-0167\(99\)00063-7](https://doi.org/10.1016/S0743-0167(99)00063-7)
- Hinrichs, C. C. (2003). The practice and politics of food system localization. *Journal of Rural Studies*, 19(1), 33–45. [https://doi.org/10.1016/S0743-0167\(02\)00040-2](https://doi.org/10.1016/S0743-0167(02)00040-2)
- Hoffman, J. A., Agrawal, T., Wirth, C., Watts, C., Adeduntan, G., Myles, L., & Castaneda-Sceppa, C. (2012). Farm to family: Increasing access to affordable fruits and vegetables among urban Head Start families. *Journal of Hunger & Environmental Nutrition*, 7(2–3), 165–177. <https://doi.org/10.1080/19320248.2012.703522>
- Hoffman, J. A., Schmidt, E. M., Wirth, C., Johnson, S., Sobell, S. A., Pelissier, K.,... Izumi, B. T. (2016). Farm to preschool: The state of the research literature and a snapshot of national practice. *Journal of Hunger & Environmental Nutrition*, 12(4), 443–465. Retrieved from <https://doi.org/10.1080/19320248.2016.1227747>
- Izumi, B. T., Wright, D. W., & Hamm, M. W. (2010a). Farm to school programs: Exploring the role of regionally-based food distributors in alternative agrifood networks. *Agriculture and Human Values*, 27(3), 335–350. <https://doi.org/10.1007/s10460-009-9221-x>
- Izumi, B. T., Wright, D. W., & Hamm, M. W. (2010b). Market diversification and social benefits: Motivations of farmers participating in farm to school programs. *Journal of Rural Studies*, 26(4), 374–382. <https://doi.org/10.1016/j.jrurstud.2010.02.002>
- Izumi, B. T., Alaimo, K., & Hamm, M.W. (2010c). Farm-to-school programs: Perspectives of school food service professionals. *Journal of Nutrition Education & Behavior*, 42(2), 83–91. <https://doi.org/10.1016/j.jneb.2008.09.003>

- Izumi, B. T., Eckhardt, C. L., Hallman, J. A., Herro, K., & Barberis, D. A. (2015). Harvest for healthy kids pilot study: Associations between exposure to a farm-to-preschool intervention and willingness to try and liking of target fruits and vegetables among low-income children in head start. *Journal of the Academy of Nutrition and Dietetics*, 115(12), 2003–2013. <https://doi.org/10.1016/j.jand.2015.07.020>
- Joshi, A., Azuma, A. M., & Feenstra, G. (2008). Do farm-to-school programs make a difference? Findings and future research needs. *Journal of Hunger & Environmental Nutrition*, 3(2–3), 229–246. <https://doi.org/10.1080/19320240802244025>
- Kirwan, J. (2004). Alternative strategies in the UK agro-food system: Interrogating the alterity of farmers' markets. *Sociologia Ruralis*, 44(4), 395–414. <https://doi.org/10.1111/j.1467-9523.2004.00283.x>
- Kline, A. (2015). *Local foods in the child and adult care food program with questions and answers*. (Memo CACFP 11-2015). Alexandria, VA: U.S. Department of Agriculture, Food and Nutrition Service. Retrieved from https://fns-prod.azureedge.net/sites/default/files/cacfp/CACFP11_2015os.pdf
- 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*. Economic Research Service, USDA. Retrieved from https://www.ers.usda.gov/webdocs/publications/42805/51173_ap068.pdf?v=42083
- Mack, N., Woodsong, C., MacQueen, K., Guest, G., & Namey, E. (2005). *Qualitative research methods: A data collector's field guide*. Retrieved from <https://www.fhi360.org/sites/default/files/media/documents/Qualitative%20Research%20Methods%20-%20A%20Data%20Collector%27s%20Field%20Guide.pdf>
- Merriam, S. B. (1995) What can you tell from an N of 1? Issues of validity and reliability in qualitative research. *PAACE Journal of Lifelong Learning*, 4, 51–60. Retrieved from <https://www.iup.edu/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=18193>
- North Carolina Farm to Preschool Network. (2016). *Reach for the stars with farm to childcare*. Retrieved from <http://growing-minds.org/documents/reach-for-the-stars.pdf>
- Ohmart, J. L. (2002). *Direct marketing to schools: A new opportunity for family farmers*. Davis: University of California Sustainable Agriculture Research & Education Program and the Agricultural Sustainability Institute at University of California, Davis. Retrieved from <http://asi.ucdavis.edu/programs/sarep/publications/food-and-society/directmarketing-schools-2002.pdf>
- Poppendieck, J. (2010). *Free for all: Fixing school food in America*. Berkeley: University of California Press.
- Saldña, J. (2009). *The coding manual for qualitative researchers*. Thousand Oaks, CA: SAGE.
- Schafft K., Hinrichs, C. C., & Bloom, J. D. (2010) Pennsylvania farm-to-school programs and the articulation of local context. *Journal of Hunger & Environmental Nutrition*, 5(1), 23–40. <https://doi.org/10.1080/19320240903574155>
- Stephens, L. & Oberholtzer, L. (2016). *Results from the 2015 national survey of early care and education providers: Local procurement, gardening, and food and farm education*. National Farm to School Network. Retrieved from http://www.farmtoschool.org/Resources/ECESurvey_Report.pdf
- Stevenson, G. W. & Pirog, R. (2008). Values-based supply chains: Strategies for agrifood enterprises of the middle. In T. A. Lyson, G. W. Stevenson, & R. Welsch (Eds.), *Food and the mid-level farm: Renewing an agriculture of the middle* (p. 119–146). Cambridge, MA: MIT Press.
- Story, M. P. D., Kaphingst, K. M., & French, S. (2006). The role of schools in obesity prevention. *The Future of Children*, 16(1), 109–142. <https://doi.org/10.1353/foc.2006.0007>
- Thornburg, G. K. (2013). Embeddedness, marketness, and economic instrumentalism in the Oklahoma farm-to-school program. *Journal of Rural and Community Development*, 8(3), 321–334. Retrieved from <http://journals.brandonu.ca/jrcd/article/download/1035/252>
- Williams, P. A., Cates, S. C., Blitstein, J. L., Hersey, J., Gabor, V., Ball, M...Singh, A. (2014). Nutrition-education program improves preschoolers' at-home diet: A group randomized trial. *Journal of the Academy of Nutrition and Dietetics*, 114(7), 1001–1008. <https://doi.org/10.1016/j.jand.2014.01.015>
- Winter, M. (2003). Embeddedness, the new food economy and defensive localism. *Journal of Rural Studies*, 19(1), 23–32. [https://doi.org/10.1016/S0743-0167\(02\)00053-0](https://doi.org/10.1016/S0743-0167(02)00053-0)
- Yin, R. K. (2009). *Case study research: Design and methods* (4th ed.). Thousand Oaks, CA: SAGE.

“Put on your own mask before helping others”: The capacity of food hubs to build equitable food access

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Abstract

In a bifurcated U.S. food market, where one market is largely controlled by national brands and global corporations alongside an expanding alternate market of hyper-local direct sales, midscale producers and processors are struggling to persist. One emerging strategy for rebuilding this middle of the food system—food hubs—has gained attention as a model that could rebuild local food economies

and equitable food access. Through an examination of Michigan food hubs, we ask about the extent to which and under what conditions food hubs can operationalize dual economic and social goals. We found many innovations and efforts to address food access in low-income communities—especially among food hubs that were nonprofits, had been operating for less time, and were more

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Author Note

The participant observation noted in the methods refers to the role that two of the authors played as external evaluators of the Michigan Food Hub Learning and Innovation Network, a network that the third author co-facilitates. However, the majority of the data collection for this study was completed outside the bounds of the Network evaluation activities. Portions of these findings were presented at the 2017 conference of the Association of Collegiate Schools of Planning.

dependent on external revenue—but their impact tended to be small-scale and uncertain. Most food hubs want to do more, but our study suggests they may not be able to until they can figuratively “put on their own mask before helping others.” That is, food hubs may be one means of increasing affordable, healthy food access in certain scenarios, but *equitable* food access may be an unrealistic and unsustainable goal unless they can ensure their own financial stability. Among other options for satisfying the requirements for equitable food access, financial survival, and returns to the farm gate, our findings suggest that food hubs attempting to reduce food access inequities may need to be subsidized as a public good, unless and until the public sector commits to a more comprehensive strategy to address food system failures.

Keywords

Food Hubs, Food Access, Agriculture of the Middle, Food System Planning, Michigan

Introduction

The U.S. food market has increasingly come to resemble two systems: the mainstream market controlled by national brands and globally focused corporations, and an expanding alternate market of hyper-local direct sales. This bifurcation is tied to a gradual loss of structural diversity in the food system, particularly in midscale regional production and processing, which is seen as key to scaling up more sustainable, economically viable, and socially equitable food businesses (Stahlbrand, 2017; Stevenson, Clancy, King, Lev, Ostrom, & Smith, 2011). One emerging strategy for rebuilding this middle of the food system—food hubs—aims to connect small and midsized farms to schools, hospitals, restaurants, retailers, and other buyers through aggregation and distribution infrastructure at the regional scale.

As food hub models attract public and private investment, diverse stakeholders are hopeful that they can support thriving local food economies while also increasing equitable food access. The U.S. Department of Agriculture (USDA), for

instance, states that “food hubs are providing wider access to institutional and retail markets for small to mid-sized producers, and increasing access to fresh healthy food for consumers, including underserved areas and food deserts” (Barham, 2010, para. 3). The 2016 National Food Hub Survey report (Hardy, Hamm, Pirog, Fisk, Farbman, & Fischer, 2016) also states that food hubs are “a part of the solution of the complex problem of food and nutritional insecurity” (p. 7), with similar claims made by academics (e.g., Glaza, 2013; Rose 2017), foundations (e.g., Surdna Foundation, 2014; Vitalist Health Foundation, n.d.), and nonprofits (e.g., Cooper, 2018; Healthy Food Access Portal, n.d.). While research is mounting to show how food hubs are creating jobs, offering fair prices to farmers, and sparking wider economic development (Colasanti, Hardy, Farbman, Pirog, Fisk, & Hamm, 2018; Jablonkski et al., 2016), evidence about food hubs’ contributions to affordable, local food access is both understudied and inconclusive (Berti & Mulligan, 2016).

Through an in-depth examination of Michigan food hubs, this paper seeks to untangle these expectations from practice. We ask about the extent to which and under what conditions food hubs can successfully operationalize dual social and economic goals.

Structural Changes in the U.S. Food System and the Rise of Food Hubs

The erosion of regional food systems and the continued loss of midsized farms,¹ especially since the 1980s, has been widely documented (Feenstra & Hardesty, 2016; Kirschenmann, Stevenson, Buttel, Lyson, & Duffy, 2008; MacDonald & Hoppe, 2018). Technological innovation in production methods and vertical integration of the food industry has played a major role in shifting production to larger farms, but many other complex processes are implicated as well, including agricultural policy and trade, farmer debt, commodity price fluctuations, shifting demographics, globalized economies, and more (MacDonald & Hoppe, 2018; Woods, 2014). In the case of livestock industries, rapid vertical

¹ By midsized and midscale producers, we mean farms with gross sales from US\$150,000 to US\$500,000, which draws on definitions used by Kirschenmann et al., 2008, Feenstra and Hardesty, 2016, and the USDA Farm Typology (USDA, 2015).

integration of production, processing, and marketing was enabled by the adaptation of more efficient production models, specialization by producers, geographic concentration, and contract farming (Abdalla, 2002; USDA, 2010). Likewise, fruit and vegetable supply chains have experienced significant concentration through intensified production and grower-processor integration (MacDonald, Hoppe, & Newton, 2018). At the same time, ownership of the grocery retail sector (and its distribution infrastructure) have become highly consolidated, applying downward price pressure on growers, packers, and processors (Hendrickson, Heffernan, Howard, & Heffernan, 2001).

Today, midscale agricultural producers are both too large to operate in direct markets and too small to compete in the commodity market (Feenstra & Hardesty, 2016; Kirschenmann et al., 2008). Recent efforts to renew “agriculture of the middle” have recognized the key role that “infrastructure of the middle” plays in linking midsized farms and scale-appropriate regional markets like schools, universities, and hospitals (Hardesty et al., 2014; Stahlbrand, 2017). Although they are in decline, fragmented, and unevenly distributed, a modest portion of this midscale infrastructure remains intact; family-owned distributors, produce houses, meat plants, and processing facilities can still be found scattered across rural and urban communities (Stevenson et al., 2011; USDA, 2010). At the same time, other changes in the food system have created new business opportunities for small and midsized producers and their business partners. Consumer demand has been shifting to include other values beyond price, such as locality and transparency, in reaction to health, environmental, and social concerns associated with a globalized food system (Zepeda & Deal, 2009). In addition, web-based food enterprise has disrupted conventional retail systems and created opportunities for innovative food businesses and direct marketing (Berti & Mulligan, 2016).

Food hubs have the potential to thread together these new business opportunities, increased demand for local food, and fragmented remains of midscale infrastructure. Defined as operations that focus on the aggregation, distribution, and/or processing of “source-identified

food products” that are primarily local and regional (Fischer, Pirog, & Hamm, 2015, p. 93), food hubs have expanded quickly across the U.S. in the last 10 years, more than doubling since 2009 to nearly 400 today (Colasanti, Hardy, Farbman, Pirog, Fisk, & Hamm, 2018; USDA, 2016).

Theoretical Framework and the State of the Evidence

To help explain why food hubs may or may not be able to affect affordable food access, we draw on the theoretical framework that Stroink and Nelson (2013) developed, based on social-ecological and complex adaptive systems theories. Structured around the idea that complex systems, like food systems, move through an adaptive cycle, they describe how the current, industrial system is facing a “rigidity trap” where the system is highly “structured and efficient...homogenous, resistant to change and rigid,” but also “more vulnerable to major disturbances” (p. 632). In reaction, food hubs (alongside many other food movement initiatives) are engaging in experiments to address multiple issues created by the dominant food system. Stroink and Nelson (2013) argue, however, that this start-up stage is beset by “numerous false starts and failed experiments” and that most emerging food hubs, regardless of their legal model, will face a “poverty trap” (p. 628). Unable to secure sufficient capacity and capital to grow, newly established food hubs will likely “spread themselves too thin” (p. 628) with insufficient resources to tackle all their goals, resulting in a limited impact on food access and other food systems problems (Stroink & Nelson, 2013). The goal is for food hubs to make it out of this poverty trap so they can begin to grow, increase their productivity and efficiency, leverage resources, and attempt to remove structural barriers to growth, such as inappropriate policies.

Stroink and Nelson (2013) found that the five food hubs they studied in Canada were able to “carve out niches of capital” (p. 632) while also contributing to equitable food access and new markets for local farmers. They also argue, however, that these efforts were still “limited and kept largely isolated” because food policies—as well as resources, training, research, and infrastructure—are often oriented toward an industrial food system

that undermines small and mid-sized producers and processors (Stroink & Nelson, 2013). Other scholars have shown that food hubs can fully incorporate their social missions once they scale up sufficiently to become financially viable (Cleveland, Müller, Tranovich, Mazaroli, & Hinson, 2014; Feldstein & Barham, 2017; Fischer et al., 2015), while one study found that food hubs can lose their commitment to low-income food access as they scale up (Franklin, Newton, & McEntee, 2011).

Case studies have also shown how both non-profit and for-profit food hubs have placed low-income food access at the forefront of their operations, but these studies also tend to acknowledge that the hubs are either heavily dependent on grants or still in the start-up phase, where they face considerable financial challenges (Cohen & Derryck, 2011; Cooper, 2018; Levkoe & Wakefield, 2011). On the other hand, Hodgins and Fraser's (2018) research on the impacts of 43 alternative food businesses on access among low-income consumers shows how operational constraints and financial viability were key barriers, but they concluded that a more important impediment was that business leaders were unaware of inequitable food access or showed a "lack of concern about low-income customers" (p. 154). However, these findings were blended across farmers markets, intermediaries (including food hubs), and social enterprises.

Study Location

Our study builds on this initial, but inconclusive, research base to examine more closely the mechanisms that may be supporting or limiting the efforts of food hubs to address equitable food access. We chose to focus on Michigan for several reasons. First, Michigan's unique geographic conditions (e.g., microclimates created by the Great Lakes, fertile soil, ample water supply) have made agriculture one of Michigan's top industries (Michigan Department of Agriculture & Rural Development [MDARD], 2018), second only to California in agricultural diversity (Lovejoy, Buhler, & Hanson, 2010). Michigan is also illustrative of the bifurcating food market throughout the U.S. Direct sales through farmers markets and

community supported agriculture operations (CSAs) became particularly pronounced after the 1980s global recession, as the state invested heavily in export-oriented, industrial agriculture, requiring small and mid-sized farms to become entrepreneurial in order to survive (DeLind & Benitez, 1990; Veeck, Che, & Veeck, 2006). At the same time, high rates of obesity, food insecurity, and limited access to fresh fruit and vegetables are apparent across urban and rural communities (Centers for Disease Control and Prevention [CDC], 2016; Gundersen, Dewey, Crumbaugh, Kato, & Engelhard, 2018). Concerns about uneven food access, in part, motivated hundreds of stakeholders to commit to the Michigan Good Food Charter in 2010, one of the first of its kind nationally (Colasanti et al., 2010).

Michigan is also home to one of the first technical assistance networks for food hubs in the U.S.: the Michigan Food Hub Learning and Innovation Network (MFHLIN). Launched in 2012, the MFHLIN leveraged state funding to establish a core group of food hubs "to help Michigan regional food and farm businesses succeed" (Michigan State University Center for Regional Food Systems [MSU CRFS], 2017, p. 1). Another stated goal is to "measurably increase healthy food access to low-income communities and vulnerable children in order to increase healthy outcomes" (MSU CRFS, 2017, p. 1). Prior to 2012, Michigan could claim two food hubs. In 2018, a dozen food hubs are operating, both small and large, serving anywhere from two to 800 institutional customers. In sum, this diversity of food hubs, the presence of a statewide food hub network focused on food access, and the broader context of a diverging agricultural economy made Michigan an ideal site for our study.

Methods

Given the dynamic nature of emerging food hubs, we used methods that would allow us to systematically compare food hubs and explore the issues that might influence their ability to engage in activities related to food access. This included a structured survey and semistructured interviews with individuals running food hubs in Michigan, an analysis of food hubs' mission statements,

interviews with a broader group of stakeholders who work with food hubs, and participant observation of MFHLIN meetings.²

To identify food hubs for the study, we collaborated with conveners of the MFHLIN to locate operations in the state that self-identified as a food hub in late 2016. As we became aware of additional food hubs that emerged during the course of the study, we added two more, resulting in a total of 11 food hubs. Between August 2016 and October 2017, food hub managers,³ executive directors, and co-owners (hereafter referred to as “food hub managers”) from these 11 food hubs completed a survey modeled after the 2015 National Food Hub Survey (Hardy et al., 2016). In addition to asking in the survey about each food hub’s legal status, mission, business model, core function(s), and activities related to healthy food access, we also analyzed written mission statements located on each of the food hub’s websites or reports.

We then completed interviews lasting one hour with 13 food hub managers from the 10 hubs that agreed to participate. Using a semistructured interview approach (Qu & Dumay, 2011) allowed us to clarify the answers provided in the survey and delve further into perceptions, strategies, and barriers related to addressing food insecurity. We also contextualized these perspectives by interviewing key informants who work with food hubs in a variety of ways (referred to throughout as “food hub partners”). Using snowball sampling (Atkinson & Flint, 2001), we identified eight food hub partners, including three university-based and nonprofit-based food hub consultants who have been instrumental in launching or running the MFHLIN; three people who previously ran a food hub or are just beginning to engage in food aggregation (all of whom are involved in the MFHLIN and play other roles, including consulting with food hubs, leading a food justice nonprofit, and running a farm); one scholar doing research on food hubs in the Midwest; and one grant officer from a national foundation that funds Michigan food hubs.

One or all members of our study team also

participated in five MFHLIN meetings held during our data-collection process. These meetings included two that convened members of the Food Hub Network and three joint meetings held with other Michigan-based networks focused on farm-to-institution programs, incubator kitchens, and food policy councils. Our unstructured observation of these meetings helped us identify relevant research questions early on and triangulate themes that emerged in our survey and interviews.

We used descriptive statistics to analyze the survey and thematic coding (Fereday & Muir-Cochrane, 2006) to identify shared and contrasting priorities, strategies, and perspectives in the interview transcripts and mission statements. A summary of the survey results and interview themes by food hub, overall averages, and national comparisons based on the 2017 National Food Hub Survey (Colasanti et al., 2018) are displayed in Table 1. In Table 2, results compare groupings of food hubs based on three factors that the literature tends to identify as key to explaining food hub strategies and successes: their legal status, years in operation, and dependence on grants and other external revenue. All themes and quotes—other than those that could compromise the anonymity of a food hub—are identified in the findings using unique codes, including “FH” for food hubs and the assigned ID in Table 1 (e.g., FH1, FH2) and “P” for the food hub partners (e.g., P1, P2).

Findings

As the remainder of our findings expand upon, most food hubs in this study—but especially nonprofits, newer food hubs, and those more dependent on external funding—prioritize or carry out activities focused on food access in economically disadvantaged communities. Our findings also show that these efforts are limited by a number of challenges. Nonetheless, food hub managers and their partners are still hopeful that a number of pathways exist for supporting food hubs to simultaneously improve equitable food access, their own financial survival, and returns to the farm gate.

² This study was approved by the Internal Review Board at the University of Michigan.

³ Three of the food hub managers (FH1, FH9, FH11) are also active farmers, offering a producer perspective.

General Food Hub Characteristics

Compared to food hubs nationally (Colasanti et al., 2018), a smaller percentage of food hubs in this study consider themselves nonprofits (27% vs. 42% nationally) or for-profits (27% vs. 37%), with more operating with “mixed” legal models⁴ (45% vs. 21%) (See Table 1). Food hubs in our study have also been in operation for only 3 years on average, compared to the national average of 9 years (Colasanti et al., 2018), although this varied considerably based on the legal model, with mixed models in operation for 1.5 years, nonprofits for 2.2 years, and for-profits for 6.7 years. On average, the Michigan hubs rely on 40% of external revenue from grants, donations, or government funding, while 36% rely on no external funding, compared to 64% of hubs nationally (Colasanti et al., 2018). Nonprofits in our study rely most on external funding (70% on average), compared to 46% for hubs with mixed models and no external funding among for-profits. Hubs in operation for a year or less are also more dependent on external funding (53% on average) compared to those that have been operating for three or more years (28%). In addition to outpacing other hubs on food access activities (discussed further below), the hubs that are nonprofits (and sometimes mixed models), a year old or less, and either moderately or highly dependent on external funding are also most likely to source from female farmers, farmers of color, beginning producers or suppliers, and small or medium farmers, and are also more likely to sell to customers who are under 50 miles (80 kilometers) away (Table 2).

Views, Intentions, and Actions Related to Food Access

All the food hub managers interviewed agreed that access to affordable, healthy food is a problem, either in their immediate vicinity or in surrounding communities. They used words like “food apartheid” (FH 4) and “food swamps” (FH 11) to

describe places that are flooded with cheap, unhealthy foods and that lack nearby, affordable fresh produce. Several also noted that food insecurity in nearby rural areas is just as problematic as in urban areas, but is overlooked (FH 2, 4, 6, 8).

All written mission statements also referred to a goal of increasing food access generally—for all residents—but as Table 1 shows, fewer food hubs specified that their food access commitment is intentionally focused on addressing inequities. Still, a higher proportion of Michigan food hubs compared to hubs nationally self-reported in the survey that their mission is “strongly” related to “increasing healthy or fresh food access to economically disadvantaged communities” (64% MI vs. 44% nationally) and to “addressing racial disparities through access to healthy food” (36% vs. 20%). This commitment to equitable food access, however, was still lower than the proportion of food hubs both in Michigan and nationally that saw a strong link between their mission and “improving human health in your community or region” (91% MI vs. 57% nationally) and “increasing access to markets for small and medium-sized farmers” (91% vs. 82%). Addressing food access in low-income communities was also noted in written mission statements less often than what was self-reported in the survey (36% written vs. 64% survey), and no written mission statement mentioned work on food access from a racial-disparities perspective.

Overall, newer food hubs, the nonprofits (and sometimes the mixed legal model hubs), and those most dependent on external revenue were the most likely to indicate a commitment to equitable food access in both the survey and their written mission statements (Table 2). Similarly, while most food hubs noted that they carry out between two and 10 equity-oriented food access activities⁵ (Table 1), those noting the highest number of activities were newer (6.0 activities vs. 3.2 among more

⁴ The following hubs were considered to have a “mixed” legal model: a self-declared “quasi-public,” economic development corporation; a subsidiary of a public community college; a project of the local city government and farmers market; a network of producers and businesses that are supported by a partnership between the local co-op, Michigan State University, and the local health department; and a for-profit operation that is highly subsidized currently by the larger, nonprofit operation.

⁵ One for-profit food hub that declined to be interviewed noted in the survey that it is not engaged in food access work.

Table 1. Summary of Food Hub Characteristics, Missions, Food Access Activities, Challenges, and Scaling Up Strategies, by Food Hub, Overall and Nationally

Food hub ID		1	2	3	4	5	6	7	8	9	10	11	MI overall	National	
Legal model	F=For-profit, M=Mixed, N=Nonprofit	F	F	F	M	M	M	M	M	N	N	N	-	-	
Years in operation ^a		3–4	6–10	6–10	≤1	≤1	≤1	≤1	3–4	≤1	3–4	3–4	3.1	9	
Percent of revenue from grants, donations or government funding		0	0	0	90	16	70	53	0	38	85	85	40	-	
Miles to 75% or more of customers ^b		<100	<250	<50	<50	<25	<25	<50	<25	<100	<50	<25	73	46	
Percent of suppliers owned or operated by:	Women	0	25	10	20	20	80	20	12	50	18	28	26	31	
	People of color	0	10	10	20	0	4	11	0	30	17	14	11	20	
	Beginner producers, suppliers ^c	0	50	30	100	80	41	25	15	90	15	83	48	46	
	Small, medium farmers ^c	0	60	81	100	100	60	61	100	100	96	90	77	89	
Analysis of mission statements from self-reports in the survey and written statements	Increasing healthy or fresh food access to <i>economically disadvantaged</i> communities	survey	x		x		x	x		x	x	x	64	44	
		written			x					x	x	x	36	-	
	Addressing <i>racial disparities</i> through access to healthy food	survey	x	x		x		x	x	x		x		36	20
		written												0	-
	Improving human <i>health</i> in your community or region	survey	x	x		x	x	x	x	x	x	x	x	91	57
		written	x				x	x			x	x	x	55	-
Increasing access to <i>markets</i> for small and medium sized farmers	survey	x	x	x	x	x	x	x	x	x		x	91	82	
	written	x	x	x	x	x	x	x	x	x	x	x	100	-	
Total number of food access activities from survey and interviews		3	3	0	5	3	6	10	2	6	5	6	4.4		
Number of activities <i>directly</i> affecting food access by low-income individuals and families		1	1	0	3	1	4	5	1	5	2	4	2.4	-	
Number of activities <i>indirectly</i> affecting food access by low-income individuals and families		2	2	0	2	2	2	5	1	1	3	2	2		
Educational activities noted in mission statements or survey		x	x		x	x	x	x	x		x	x	82	-	
Community engagement noted in mission statements or interviews		x		x	x				x	x	x	x	64	-	
Key challenge discussed in interviews: balancing financial viability, paying farmers fairly, and addressing inequitable food access			x			x	x			x	x	x	64	-	
Strategies suggested in interviews for scaling up food access work	Go through institutions and mainstream markets	x	x	x	x	x	x	x	x	x	x	x	100	-	
	Build the capacity of farmers to meet demand		x		x	x		x	x		x		64	-	
	Connect to food-assistance resources	x								x	x	x	36	-	
	Try adaptive food hub and food access strategies										x	x	18	-	
	Treat food hubs as a public good		x			x	x	x			x		45	-	

^a To maintain food hub anonymity, years in operation is provided as a range, but actual years was used to calculate the average for "MI overall." National averages for this and other questions are from the 2017 National Food Hub Survey (Colasanti et al., 2018). Answers are blank if the National Survey collected data differently or not at all. See note in Table 2 about the mission statements.

^b Food hub managers were asked "Would you say that 75% or more of your food hub's customers are located. . ." and then asked to select the category of miles that applied. Note: 1 mile=1.6 km.

^c We used the National Survey definition of "Beginner"—starting a business in the last 10 years. Rather than ask if "most" or "all" farm or ranch suppliers were small or midsized, as the National Survey asked, our survey asked for the *percentage* of small or midsized suppliers with gross sales less than US\$500,000. We did not collect the total number of suppliers.

Table 2. Food Hub Characteristics, Missions, and Views on Challenges and Strategies for Scaling Up Food Access Work Compared Across Groupings of Hubs by Legal Status, Years in Operation, and Percent of Revenue from External Sources

			Average or percent by legal status			Average or percent by years in operation		Average or percent by dependence on external revenue sources		
			For-profits	Mixed	Nonprofits	3 or more years	≤1 year	0%	16–53%	70–90%
<i>N</i>			3	5	3	6	5	4	3	4
Legal model		F=For-profit, M=Mixed, N=Nonprofit	-	-	-	3 F, 1 M, 2 N	4 M, 1 N	3 F, 1 M	2 M, 1 N	2 M, 2 N
Years in operation			6.7	1.5	2.2	-	-	6	0.8	2
Percent external revenue			0	46	70	28	53	-	-	-
Miles to 75% or more of customers			30	100	67	50	80	50	67	100
Percent of suppliers owned or operated by:	Women		12	30	32	15	38	12	30	36
	People of color		7	7	20	8	13	5	14	14
	Beginner producers, suppliers		27	52	63	32	67	24	65	60
	Small, medium farmers		47	84	95	71	84	60	87	86
Analysis of mission statements from self-reports in the survey and written statements ^a	Increasing healthy or fresh food access to <i>economically disadvantaged</i> communities	survey	33	60	100	50	60	25	67	100
		written	0	20	100	33	40	0	67	75
	Addressing <i>racial disparities</i> through access to healthy food	survey	0	40	67	17	60	0	67	75
		written	0	0	0	0	0	0	0	0
	Improving human <i>health</i> in your community or region	survey	67	100	100	83	100	75	100	100
		written	33	100	100	50	60	33	67	75
	Increasing access to <i>markets</i> for small and medium-sized farmers	survey	100	100	67	83	100	100	100	75
		written	100	100	100	100	100	100	100	100
Total number of food access activities from survey and interviews			2.0	5.2	5.7	3.2	6.0	2.0	6.3	5.5
Educational activities noted in mission statements or survey			67	100	67	83	80	75	67	100
Community engagement noted in mission statements or interviews			67	40	100	83	40	75	33	75
Key challenge discussed in interviews: balancing financial viability, paying farmers fairly, and addressing inequitable food access			33	40	100	50	60	25	67	75
Strategies suggested in interviews for scaling up food access work	Go through institutions and mainstream markets		100	100	100	100	100	100	100	100
	Build the capacity of farmers to meet demand		33	80	33	50	60	50	67	50
	Connect to food assistance resources		33	0	100	50	20	25	33	50
	Try adaptive food hub and food access strategies		0	0	67	33	0	0	0	50
	Treat food hubs as a public good		33	60	33	33	60	25	67	50

^a This question asked food hub managers to indicate if these topics were “strongly related,” “somewhat related” or “not related” to their missions. A hub has an “x” if they noted a topic as “strongly related.” If blank, they noted “somewhat related” for all topics, except for “racial disparities via food access,” which was noted by food hub 3 as “not related.”

established hubs); moderately dependent on external revenue (6.3 activities), or highly dependent (5.5 activities, compared to those with no external revenue with 2.0 activities); and nonprofits (5.7 activities) or mixed model hubs (5.2 activities, compared to for-profits with 2.0 activities). These activities are described in more detail below, divided by actions that have a direct and indirect impact on low-income food access.

Direct food access activities

Food hubs in our study are directly affecting food access in low-income communities by regularly donating to food pantries (6 hubs), accepting federal food assistance (6), and providing transportation to or deliveries from the local farmers market, particularly for seniors (3). Four food hub managers (FH 2, 6, 9, 10) additionally noted in interviews that they sell to institutional markets that serve low-income populations. One hub started selling fresh, local produce to a Meals on Wheels program after seniors started asking for better quality food. This hub also partners with a nonprofit that serves nearly 1,000 free meals a day, five days a week to low-income children in four area schools. Another manager described a partnership where the local high school purchases from the food hub every other week for five months, sending food home with students on the weekends. Two of the food hubs in our study also participate in Michigan's 10 Cents a Meal program, a farm-to-school food purchasing program described further below. One of these food hubs is also part of a Farm to Freezer program; run by Goodwill Industries of Northern Michigan, the program flash-freezes locally grown produce while the food hub handles distribution, as the manager explained:

To me, that is a really fine example of how multiple entities are addressing multiple issues that exist within a community in a creative way that is taking a systemic and holistic approach to the challenge rather than [only looking at the] food access problem. ... In the north (of Michigan), we can provide nutritious, fresh vegetables for [only] three months out of the year, but we can put infrastructure in place for processing that local produce in a

way that can provide fresh frozen product all year around. (FH 2)

Four food hubs, including one with a mixed model and all three nonprofits, also engage in direct-to-consumer sales in low-income communities (FH 7, 9, 10, 11). Managers from three of these hubs have "veggie box" programs that accept federal food assistance or that offer subsidized rates for low-income households. One program started as a workplace delivery system to aggregate produce from local farms. To make the program accessible to SNAP (Supplemental Nutrition Assistance Program, or food stamps) recipients, a grant subsidizes boxes half filled by the local food bank and half filled by the food hub. A second hub delivers 50 of its 80 veggie boxes each week to homebound seniors. This latter food hub also started operating a mobile market that accepts SNAP and Double Up Food Bucks (explained further below) and goes to businesses, senior centers, Head Start centers, schools, and outdoor sites during the summer. Finally, two of these food hubs also run neighborhood farm stands, which in one case runs for 20 weeks in 21 neighborhoods, most of which are low-income communities of color.

Indirect food access activities

Food hubs also mentioned a number of ways that their work may have an indirect impact on food access. Most food hubs (8 out of 11) partner with other nonprofits that work on food access by offering space, in-kind resources, or other assistance. For example, one hub is part of an umbrella group that runs a weekly food pantry, a farmers market, and several programs to build the capacity for backyard gardening in the city, including one program that employs youth to build garden boxes for low-income, low-mobility, and inexperienced gardeners. Another food hub is supporting a new nonprofit focused on community gardens, helping with logistics, and offering its website for promotion.

Some interviewees also note that food hubs play an educational, placemaking, and community-engagement role that may indirectly affect food access by "increasing the conversation about everything having to do with food" (P 8). Nearly all

food hub mission statements (FH 1, 4, 5, 8, 10, 11) and eight of the 11 survey respondents (FH 1, 2, 4, 5, 6, 7, 8, 10) indicated that their food hubs actively engage in some type of cooking, gardening, job training, or broader food systems education. The majority of mission statements (FH 1, 3, 4, 8, 9, 10, 11) also noted that their food hubs aim to create opportunities for “community participation,” demonstrate “concern for the community,” “ensure community buy-in and support,” “create a food community that empowers,” develop a “hub of the community,” “increase the ownership of our food system amongst all residents,” and “strengthen bonds of civic trust...as well as civic engagement.”

Several food hub managers (FH 3, 9, 11), including one for-profit and two nonprofits, described further in the interview how they have attempted to engage local residents. As one for-profit manager described, “We are the canvas upon which the community can draw upon what it wants to do...” (FH 3). This hub is also attempting to become an “informational clearinghouse,” to help local food pantries and farmers connect, and to be “neutral territory” when tensions emerge between food security organizations. Another nonprofit food hub manager explained that it recently received a grant to “get back to our community organizing roots, learn about the people and assets in our neighborhood, and help strengthen enterprises that we know exist underground in a neighborhood that isn’t supported by the current system” (FH 11). Even by their presence, one food hub partner argued that food hubs are a “physical demonstration of the food system” and can be a mechanism to raise awareness, and even action, around food access and other food systems issues:

It’s very hard for people to think abstractly. When you go to Eastern Market or Allen Street or the Flint Market, you say “this is a food hub!” You see people that grow the food, the way it gets aggregated and distributed to people that can’t come [to the market] and there’s a health clinic upstairs, and a Prescription [for Health Program]. ... At least people can see what you’re talking about. I don’t know if [food hubs] can solve

the problems [of food access], but they allow the public to understand ... [and perhaps, be inspired] to start doing very concrete initiatives. (P 7)

Challenges that Limit Food Access Efforts

While most food hubs are engaged in food access activities in some manner, interviewees also acknowledged that the impact of these efforts is often small or uncertain. One food hub partner observed that “most of the food hubs have a hyper-local impact on food access, within their neighborhood and not much beyond that” (P 2). Another partner who will soon launch a food hub saw the current state of food access work more as a function of the financial uncertainty many new food hubs face, citing how “once it is more figured out where [food hubs] sit economically, that will help to determine their contribution to [food] access” (P 6). This financial precariousness, and the limits it places on how much hubs can do around food access, was often discussed in Food Hub Network meetings as well as our interviews (FH 2, 5, 6, 9, 10, 11; P 2, 3, 4, 7) regardless of the food hub’s legal model, years in operation, or dependence on external revenue sources (Table 2). One food hub partner likened it to airline safety protocol, explaining that food hubs must remember to “put on your own mask on before helping others” (P 7), ensuring their own financial survival before they try to fix other problems in the food system.

A major reason food hubs struggle financially, some food hub managers (FH 2, 6, 9, 11) believe, is because concentration in the agri-food system is creating a “food crisis” (FH 2). It manifests in obscuring “the real price of food” (FH 9) from the public, creating lopsided competition between local food initiatives and industrially produced food.

In this context, interviewees expressed that food hubs *can* play a role in addressing food access, but all food hub managers we interviewed and four partners (P 2, 4, 5, 7) think only a “collective and collaborative, community-based approach” (FH 2) can fully address food access, which is “a shared responsibility of the community [that] includes nonprofits, institutions, government, philanthropy, and businesses” (P 4). As one food hub manager added, “It is on all of our shoulders. It is a federal,

state, local, community-based, and family-based priority” (FH 7). The other four food hub partners (P 1, 3, 6, 8) believe the ultimate responsibility for ensuring equitable food access falls on the shoulders of government, whether through the farm bill, SNAP, public universities, health departments, or urban planning offices. No interviewee, therefore, saw food hubs as the principal answer to the complex problem of food insecurity, because it requires multiple actions and because food hubs can play so many roles, as one food hub partner sees it:

Food hubs are one way that food access *could* be addressed in communities. It is not the *only* way and it is not the *best* way because some of those decisions are going to be made by the community itself. ... There are so many roles that a food hub might play, I don't know that a food hub needs to play all of them. ... The problem is too big! I don't think a food hub should hold itself accountable to fix such an enormous problem. ... There are problems that are just too big to solve! (P 8)

In another take on food insecurity, one food hub manager argued that food hubs—at best—are keeping small-scale farmers out of poverty: “When food access is mentioned, farmers aren’t necessarily even considered in that equation... The best work we’re doing is putting money in the hands of small local farmers and helping to increase their household wealth so that they can eat the stuff that they grow... We are [at least] keeping farmers from being on food stamps” (FH 11). One food hub manager also believes that food hubs ultimately would have to ignore “the other part of the equation”—supporting farmland preservation and the viability of farming as a career—if they tried exclusively to ensure that everyone had access to affordable food:

I think that we really have to be careful as a food hub... If our sole focus in the food industry is on the people who are marginalized, then we are not taking a systemic approach to the food crisis that we have in

this country... The single biggest challenge is that the amount of revenue generated by [providing equitable food access] is not sustainable as a capitalistic business venture. ... We would be unable to pay the farmers what the food cost. That would be putting a short-term band-aid on a systemic problem. We have traditionally taken the approach in our food system that food should be cheap and we drive down the price to the bottom of the value chain, which makes farming not a viable career choice as a livelihood. If we continue that approach we will not have any farmers. (FH 2)

Scaling Up Efforts to Address Low-Income Food Access

Despite the challenges, food hub managers and partners we interviewed believe that a number of strategies could enhance the financial viability of food hubs even as they help build markets for local farmers and more equitable food access, outlined below.

Work through institutions and mainstream markets

All the food hub managers and food hub partners agreed that the best way to scale up the food access reach of food hubs—while ensuring their own survival and the livelihoods of local farmers—is to work through large-scale institutions or mainstream markets where low-income populations shop and eat the majority of their meals. Three food hubs (FH 6, 7, 9) are exploring partnerships with small grocery and convenience stores, including one idea of incorporating “pop-up farm stands” in grocery stores to gradually increase demand for a more permanent presence. Another mechanism for reaching people where they shop is Michigan’s Double Up Food Bucks (DUF⁶) program, which one manager considers their food hub’s “most successful” food access strategy (FH 10). DUF allows SNAP recipients to double their SNAP benefits for the purchase of fruit and vegetables at participating farmers markets and grocery stores. One food hub manager is exploring how to support the independent retailers that are starting to accept DUF,

⁶ See more about Double Up Food Bucks: <http://www.doubleupfoodbucks.org/>

noting how: “I know that getting Michigan produce into the stores and merchandising is one of the biggest challenges. ... We could be the supplier for the Double Up stores, we could do the signage, and we could train their staff” (FH 5).

Within the realm of institutional buyers, one food hub manager (FH 2) is starting to see more opportunities to sell to hospitals because of Affordable Care Act incentives to invest in “community benefits” initiatives to cut health care costs (Union of Concerned Scientists [UCS] & Johns Hopkins Center for a Livable Future [CLF], 2014, p. 7). A food hub partner (P4) also thinks local government could play the same role, by passing citywide food procurement policies for public institutions. Two food hubs in our study are also involved in Michigan’s 10 Cents a Meal program. After an initial three-year pilot that launched in 2013 with seven school districts in three counties, the 10 Cents a Meal program⁷ recently secured additional state government match funding to cover 32 school districts in 28 counties. As one manager from a participating food hub explained, sourcing to schools can be logistically complicated without the involvement of a food hub to aggregate local products:

[The idea of incentivizing local food purchases] is great, but how do you get it to the schools? ... Have eight farmers who are all pulling up to the gate of the school throughout the course of the day?! Schools don’t have a receiving department and the cost associated with eight different invoices is not feasible. Our food hub solves a lot of issues by creating one invoice and delivering multiple products. (FH 2)

Build the capacity of farmers to meet demand

Despite the potential to serve more institutions, the majority of food hub managers (FH 2, 4, 5, 7, 8, 10)—regardless of their legal model, years in operation, or revenue sources—have needed to build the capacity of local farms to meet the larger volumes and food safety standards institutions demand. As one manager expressed, “We can’t

scale the farmers we have fast enough to meet the demand we are getting from institutions” (FH 2). Another food hub manager sees its investment in farmer capacity as the best means to ensure its hub’s economic viability: “I think one of the biggest leaps for food hubs is that we have a whole new [group] of new farmers who don’t know how to sell to food hubs. Farmer development is an investment in our future business” (FH 9). One food hub is having to do so much farmer support, it is considering transitioning from a for-profit to a nonprofit model because: “The type of work that we are doing is a lot of supplier hand-holding getting them ready to be distributors ... which means we are not making money. If we are trying to develop strong suppliers it lends itself more to a mission base than a business base.” Similarly, another food hub manager noted that farmer capacity-building is the main factor slowing its ability to reach institutional buyers:

We’re not going to discard the notion that we can get to institutional buyers...but it is going to be a slow grow. At every point, it will require some capacity building effort for farmers. [Several years ago, local farmers’] presentation of the produce was awful! So we started our business development workshops ... developing a business plan, safe food production, marketing, branding, etc. (FH 4)

Connect more effectively to food assistance resources

Four food hubs, including one for-profit (FH 1) and all three nonprofits (FH 9, 10, 11), believe that one of the most direct routes to increasing the capacity of food hubs to reach low-income consumers would be to improve mechanisms for tapping into federal food assistance. Six of the 11 food hubs surveyed (FH 4, 6, 7, 9, 10, 11), including three of the mixed-model and all three nonprofits, already accept public food assistance, such as SNAP (also known as EBT—Electronic Benefits Transfer). However, several food hub managers (FH 1, 9, 10) said it is not possible to accept federal food assistance benefits virtually, which affects

⁷ See more about the 10 Cents a Meal program: <https://www.groundworkcenter.org/projects/farm-to-school/10-cents-a-meal.html>

hubs that sell through online platforms. One of these hubs is planning to open a farm store but is daunted by the paperwork that it would take to accept SNAP. The other two food hubs find that the process of accepting SNAP makes their operations inefficient. One hub cannot deliver its veggie boxes to SNAP participants as it does other customers, because the EBT card owner must be present to swipe their card, in accordance with federal law. Another hub has organized its box delivery around EBT customer schedules, but deliveries must often be rescheduled when customers are not home, adding additional time and creating a delivery route not based on geographic efficiency.

A larger, related issue for one food hub is its limited capacity to reach more customers on federal food assistance; as one explained, “We’re not doing very well reaching EBT customers. ... Our farm stand is open four days a week, but we have a hard time getting people into that space. We just invested in signage. It has improved food access in the neighborhood but not by a lot. There is a lot of foot soldier organizing stuff that we could do in a better way.”

Adapt food hub models and strategies to address food access

Another idea that emerged in our interviews is to explore more adaptive food hub models and broader strategies to improve food security alongside local food economies. For instance, two of the food hub partners (P 4, 7) and two non-profit food hub managers (FH 9, 11) suggested that part of what can reduce their dependence on outside funding is to use the profits from one area to subsidize food access programs that operate at a loss. As one food hub partner has seen, “Food hubs need diverse markets to make it work for access. They need to cross-subsidize. ... They need 70 percent high end so they can do 30 percent low end” (P 4). For one food hub, this meant expanding its customer base to subsidize work with low-income customers, as staff came to accept that “You can still have your values while selling vegetables to rich people!” Another food hub started selling imported foods like bananas to attract more customers, but this essentially subsidized its local

food work and brought prices down for low-income residents. Its veggie box program, for instance, has an “à la carte” option that offers both local and non-local products, which is currently more popular than the “farmers choice box” entirely from local farms. One food hub partner described the need to consider more flexible food hub models as:

The willingness to say “OK, I’m not going to do what everybody wants, but are there ways to morph so that I can actually do the work of the food hub even better?” That’s a huge struggle. ... How do you have a clear mission ... without becoming a purist? You can get to a place where it becomes so sure of itself that it loses its ability to actually adapt and be resilient itself and figure out how to function in that community. ... It can become *anti* more than service oriented. (P 7)

Building from the notion of not becoming a “purist,” a second, related question two food hub partners raised (P 2, 3), including one person who previously ran a food hub, is whether the focus on food hubs is too narrow to adequately build local food economies alongside increased food access in low-income communities. As one partner framed it, it may be important to look at a broader supply-chain approach:

By looking just at food hubs, we’re missing a huge part of these small and midsized distributors. We might not call them food hubs because they sell lemons and coconuts, but they also sell lots of Michigan product, moving and delivering it to small grocers and businesses across the state where we don’t see any food hub activity. ... In northeast Michigan, one example is a business called Consolidated Fruit Distributors, a 75-year-old family-run produce distributor that drives around to IGAs and corner stores, selling all kinds of produce. They have 10 to 20 SKU’s⁸ for local produce that they distribute—they have the infrastructure, and relationships to

⁸ SKU is an industry abbreviation for “Stock Keeping Unit,” a unique code assigned to each inventory item.

deliver products. ... Even though they aren't a food hub, they should be a part of this work. We don't want to stop working with food hubs, but how do we broaden our scope to think about food distribution generally in this state? ... There may be value in widening the scope of food access and food value chain work to integrate more traditional, existing infrastructure and hybrid systems that sell local alongside non-local foods. (P 3)

Treat food hubs as public goods

Finally, tied to the challenges created by the global food system, many interviewees—including managers from diverse types of food hubs (FH 2, 5, 6, 7, 10) and nearly all the food hub partners (P 1, 2, 4, 6, 7, 8)—suggested that food hubs could be subsidized or supported through public financing. Especially considering the fact that “our food system is already riddled with subsidies,” one food hub manager noted how “I don't know how it's possible to have a business that is paying farmers a fair price and helping low-income families afford food without significant grant funding” (FH 5). For one manager, the preoccupation with making ends meet through sales and grant writing detracts from working on their core social mission. Even with nonprofit status, the manager noted, “I could work more on the projects that mattered more to a nonprofit if I wasn't so worried about our sales [and fundraising]” (FH 10). This manager went on to explain how the only way their nonprofit food hub has been able to support so many diverse programs around food access is because of its subsidies:

Ideally, the sales from the hub will support some of those activities that are less profitable but contribute to food access. That is not yet the case. We are currently 90% grant-funded and 10% revenue-funded. We are trying to flip it so that we are 10% grant-funded and 90% revenue-funded ... but we aren't close to it being financially viable at all. We would have to do half a million dollars in sales and we aren't close to that. ... Without the subsidy that nonprofits have access to, there's no way in hell these initiatives to increase food

access would be possible without a nonprofit status. I know there are successful hubs that are for-profit but they are probably not serving a low-income neighborhood. ... I think that government and foundations need to be committed to supporting hubs that are located in and serve low to moderate income populations. (FH 10)

Interviewees noted how subsidies, grants, low-interest loans, and other forms of debt-free capital allow food hubs to experiment, take chances, and tackle complex problems like food insecurity, with “flexibility ... [and the] time and space to make mistakes, to figure things out slowly” (FH 5). Describing a new mobile market, one food hub manager also described how it “has a lot of potential, but it has taken a lot of flexibility and movement. ... You have to really give something a go to know if it is going to work.” In this sense, especially if given the financial backing to do so, food hubs may serve a larger, public purpose, to generate innovative solutions that could eventually be scaled up as one manager put it:

The for-profit model is better for serving the needs of our growers. ... Their aim is to have the triple bottom line. Their primary goal is profit, as it should be. Those hubs that are beholden to grant dollars have state and federal obligations to fulfill the objectives of making sure that all socioeconomic groups have equal access. ... I think we have a great responsibility to use state and federal dollars to run programs, take chances, dream big, and to wrap our brain around bigger issues. (FH 7)

Another argument for subsidizing food hubs is that so many are doing what should be the role of the public sector to address food insecurity. During a Food Hub Network discussion, for instance, one attendee asked, “How can we improve access to local food in northeast, lower, Michigan? We felt that a food hub is *only* one way to do that... One thing we need to do is more advocacy as it relates to food and food hubs.” Several food hub partners (P 1, 2, 6) also pointed out that the farmer capacity-building most food hubs do should be the

work of publicly funded agriculture extension workers; as one explained, “Food hubs’ main role is to drive markets. ... All the technical assistance that we add on tends to blur the focus of a food hub. They typically aren’t staffed for all that. That’s what [Cooperative] Extension *should* do” (P 2). Another partner who is launching a food hub similarly argued:

I think there is a broad-level question about how we think about food as a basic service at a municipal level. Food systems planning is starting to happen but it’s still not happening that much, so instead we deal with it as a public health crisis. ... The nonprofit sector exists in part because of where government stops. [We are] doing in some ways what ... Extension should do. Nonprofits [including food hubs] have stepped up for years to help fill that gap, although I think that ultimately it is a government responsibility. (P 6)

Finally, rather than think about support for food hubs as subsidies, one food hub partner argued that the support for food systems interventions, including food hubs, should be seen as an investment: “Cities have resources for economic development. As more people begin to understand that food systems are an economic driver ... we are working on [ensuring that] food systems be identified as an asset for public financing” (P 4).

Discussion

Our findings suggest that Michigan’s food hubs are still emerging in the current food system landscape, so the role they may eventually play in addressing equitable food access is still uncertain. All food hub managers we spoke to, however, were aware of and concerned about the inequitable food access issues facing communities that surround them, and on average they engage in four different food access activities—at least two that have a direct impact on food access in low-income communities and two with more indirect effects.

Contrary to other arguments that food hubs are best equipped to serve their social missions once they become more established and financially viable (Cleveland et al., 2014; Feldstein & Barham,

2017; Fischer et al., 2015), our findings suggest the opposite. Food hubs in our study that had been operating for a year or less and were moderately or highly dependent on external funding were carrying out the highest number of food access activities. These hubs were also most likely to state clearly in written mission statements or in our survey that they do not simply focus on food access “for all,” but prioritize food access in economically disadvantaged communities. On the other hand, most interviewees also admitted that many of their food access activities are still small-scale and tentative experiments, and all food hubs still find it a challenge to balance their need to become financially viable with their desire to offer affordable food and pay farmers a fair price.

Our findings are complicated by the fact that the newest and most financially dependent food hubs were nonprofits and sometimes mixed-model hubs, making it difficult to disentangle whether it was their funding base, legal model, or time in operation that influenced their work on food access. At the same time, food hubs in this study that appeared most committed to equitable food access also fit the pattern that Stroink and Nelson (2013) suggest, where food hubs in the early stages of development often “spread themselves too thin,” (p. 628) attempting to address all the problems they see in the food system while facing a “poverty trap” (p. 628) that limits their impact. A recent USDA analysis of six food hubs that closed their operations similarly found that, “One of the common pitfalls of food hubs is trying to fill all of the gaps in the local and regional food system. This is a rather large and extremely challenging, if not impossible, task, especially for an enterprise that is just starting out. Food hubs often operate within very thin profit margins; taking on too many extraneous projects can quickly drain resources” (Feldstein & Barham, 2017, p. 60).

Despite the challenges they face, food hub managers and partners we spoke to still see at least five pathways for addressing twin social and economic goals. All discussed, for instance, working more intentionally with institutions that often serve meals to a large number of low-income populations such as hospitals and schools, an argument scholars have also made (Stahlbrand, 2017). Many

interviewees also spoke about needing to work even more on building the capacity of farmers to meet the institutional demand for local food, working further with programs that subsidize the cost of fresh, local food, such as Double Up Food Bucks, and the need for mechanisms to simplify the process of accepting federal food assistance, especially virtually. Two food hubs are also “cross-subsidizing” their food access work, either by expanding their base of wealthier customers or by incorporating non-local foods, while two food hub partners also suggested a wider scope—to continue working with food hubs but also long-established, local food distribution operations—to further address equitable food access in many places.

Finally, in addition to the number of ways food hubs could attempt on their own to scale up efforts to address food access, others suggested that equity-oriented food hubs should be subsidized. Much like Stroink and Nelson (2013) argue, many interviewees in this study believe that the tradeoff food hubs often face between meeting their social missions and addressing their financial hurdles is not a reflection of the failure of the food hub model, but rather a reflection of the current economic and political system that creates food insecurity alongside economic uncertainty among midscale producers and distributors. Subsidizing access-focused food hubs located in the poorest communities is justified, interviewees argued, based on the variety of public goods food hubs provide, from innovating ways to address access to healthy food, to educating and engaging communities in wider food systems change, and providing what essentially amounts to agriculture extension—all services that other food hub scholars have also documented (Berti & Mulligan, 2016; Cohen & Derryck, 2011; Le Blanc, Conner, McRae, & Darby, 2014; Levkoe & Wakefield, 2011).

In part, public financing could be one means to help food hubs move out of the poverty trap while maintaining their commitment to equitable food access. Continuing to operate outside the state to fix food systems failures like food insecurity, Levkoe and Wakefield (2011) imply, is akin to justifying further retrenchment of the welfare state. Daftary-Steel, Herrera, and Porter (2015) draw a similar conclusion about urban agriculture, arguing

that urban agriculture organizations are expected to be financially self-sustaining while also providing fresh, healthy food to low-income populations, leadership opportunities for marginalized groups, and jobs and income for small-scale producers. They argue that together, these are an “unattainable trifecta...the myth that urban agriculture can and should, alone and *without long-term funding investments*, simultaneously achieve these three goals” (emphasis added, p. 21).

Conclusion

Like the assumption that local food is inherently sustainable, healthy, and fair (Born & Purcell, 2006), similar claims have been made about food hubs: that food hubs can and should increase healthy food access in marginalized communities (Barham, Tropp, Enterline & Farbman, 2012; Hardy et al., 2016). Our study suggests that while many food hubs can successfully integrate food access activities into their operations, a food hub’s commitment to food access—especially in low-income communities—is not a given, and even less certain is just how much impact they can have. Food hubs may be one means of increasing affordable, healthy food access in certain scenarios, but it may be unrealistic and unsustainable for many to prioritize local sourcing, farm viability, and equitable food access simultaneously—unless they can figuratively “put on their own mask before helping others,” ensuring their own financial stability.

The alternative to long-term public investment in food hubs, urban agriculture, or other local food initiatives is for the public sector to commit to a more comprehensive strategy to address food system failures. Stahlbrand (2017), for instance, argues that rebuilding the “infrastructure of the middle” will not be possible unless “legislation, restructuring of markets, and use of public funds [especially for public-sector food procurement] ... correct imbalances in market power” (p. 83), such as “one size fits all” agribusiness funding (Stroink & Nelson, 2013, p. 632) and infrastructure, subsidies and policy that cater to industrial agriculture models (Spittler, Ross, & Block, 2011). These arguments are reinforced by the broader call to rebuild the food systems planning function that many local governments in the U.S. performed at

the start of the 1900s (Pothukuchi & Kaufman, 2000; Vitiello & Brinkley, 2014). As some participants in this study stated, the key is to ensure that governments recognize that public support for food system interventions, such as food hubs, is likely to yield economic, public-health, environmental, and social returns on investment (Roberts, 2014) and is just as critical as their work on housing, roads, schools, and other basic services (Levkoe et al., 2018).

As food hubs mature, there are signs that they are becoming more financially secure and playing a number of important roles in rebuilding the middle of the food system (Barham, 2012; Colasanti et al., 2018), but more robust evidence of their impact on equitable food access is still needed. Considering the nascence of the food hubs in this study, the limited geographic focus, and the small sample size, our findings should not be seen as definitive. Rather, this study should be seen as a point of departure to investigate the geographic, economic, and political scenarios that pose different enabling or limiting factors when food hubs attempt to meaningfully address inequitable food access.

In addition, food hub scholars may need to be clearer about the type of food hubs they are studying. Most research has focused on or assumed that food hubs fit the “instrumental” and “producer-centric” definition of the USDA (Horst, Ringstrom, Tyman, Ward, Werner, & Born, 2011, p. 211), which Berti and Mulligan (2016) refer to as “values-based agri-food supply chain” (p. 7) hubs that tend to be for-profits focused on linking small and mid-sized farmers to regional buyers. Our

findings tended to show greater commitments to food access among food hubs that fit Horst et al.’s (2011) definition of “community and health-centric” (p. 211), or what Berti and Mulligan (2016) refer to as “sustainable food community development” (p. 7) models, which tend to be nonprofits and consumer-driven. Food hubs clearly often blend these approaches, but research that is more explicit about a hub’s primary focus could help devise more appropriate expectations and conclusions about how to support different food hubs (Horst et al., 2011).

Future research should also examine in more detail the frequency, reach, and duration of food access activities and determine how often and to what extent food hubs are becoming the de facto food systems planners and agriculture extensionists in some communities, as some interviewees in this study implied. Longitudinal case studies would also be useful to investigate how food hub advocates may be attempting to influence local food policy agendas and what happens to their autonomy, innovation, and scale of food-access activities if and when governments begin to invest in food hubs (Levkoe & Wakefield, 2011).

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References

- Abdalla, C. W. (2002). The industrialization of agriculture: Implications for public concern and environmental consequences of intensive livestock operations. *Penn State Environmental Law Review*, 10(2), 175–192. Retrieved from <https://elibrary.law.psu.edu/pselr/>
- Atkinson, R., & Flint, J. (2001). Accessing hidden and hard-to-reach populations: Snowball research strategies. *Social Research Update*, 33(Summer), 1–8. Retrieved from <http://citizenresearchnetwork.pbworks.com/f/accessing%2Bhard%2Bto%2Breach%2Bpopulations%2Bfor%2Bresearch.doc>
- Barham, J. (2010, December 14). Getting to scale with regional food hubs [Blog post]. Retrieved from the USDA website: <https://www.usda.gov/media/blog/2010/12/14/getting-scale-regional-food-hubs>
- 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/publications/content/regional-food-hub-resource-guide>

- Berti, G., & Mulligan, C. (2016). Competitiveness of small farms and innovative food supply chains: The role of food hubs in creating sustainable regional and local food systems. *Sustainability*, 8(7), 616. <https://doi.org/10.3390/su8070616>
- Born, B., & Purcell, M. (2006). Avoiding the local trap: Scale and food systems in planning research. *Journal of Planning Education and Research*, 26, 195–207. <https://doi.org/10.1177/0739456X06291389>
- Centers for Disease Control and Prevention [CDC]. (2016). *Michigan: State nutrition, physical activity, and obesity profile*. Atlanta, GA: Author. Retrieved from <https://www.cdc.gov/nccdphp/dnpao/state-local-programs/profiles/michigan.html>
- Cleveland, D. A., Müller, N. M., Tranovich, A. C., Mazaroli, D. N., & Hinson, K. (2014). Local food hubs for alternative food systems: A case study from Santa Barbara County, California. *Journal of Rural Studies*, 35, 26–36. <https://doi.org/10.1016/j.jrurstud.2014.03.008>
- Cohen, N., & Derryck, D. (2011). Corbin Hill Road Farm Share: A hybrid food value chain in practice. *Journal of Agriculture, Food Systems, and Community Development*, 1(4), 85–100. <https://doi.org/10.5304/jafscd.2011.014.011>
- Colasanti, K., Cantrell, P., Cocciarelli, S., Collier, A., Edison, T., Doss, J., ... Smalley, S. (2010). *Michigan Good Food Charter*. East Lansing: Michigan State University Center for Regional Food Systems. Retrieved from <https://www.canr.msu.edu/michiganfood/uploads/files/Charter.pdf>
- Colasanti, K., Hardy, J., Farbman, J., Pirog, R., Fisk, J., & Hamm, M. W. (2018). *Findings of the 2017 National Food Hub Survey*. East Lansing: Michigan State University Center for Regional Food Systems & The Wallace Center at Winrock International. Retrieved from <http://foodsystems.msu.edu/2017foodhubsurvey>
- Cooper, D. (2018). Reframing food hubs: Food hubs, racial equity and self-determination in the South. Atlanta, GA: Center for Social Inclusion. Retrieved from <https://www.centerforsocialinclusion.org/wp-content/uploads/2018/04/Reframing-Food-Hubs-Report-by-Dara-Cooper-for-Race-Forward-and-Center-for-Social-Inclusion.pdf>
- Daftary-Steel, S., Herrera, H., & Porter, C. M. (2015). The unattainable trifecta of urban agriculture. *Journal of Agriculture, Food Systems, and Community Development*, 6(1), 19–32. <https://doi.org/10.5304/jafscd.2015.061.014>
- DeLind, L. B., & Benitez, J. S. (1990). The reindustrialization of Michigan agriculture: An examination of state agricultural policies. *The Rural Sociologist*, 10(3), 29–41.
- Feenstra, G., & Hardesty, S. (2016). Values-based supply chains as a strategy for supporting small and mid-scale producers in the United States. *Agriculture*, 6(3), 1–17. <https://doi.org/10.3390/agriculture6030039>
- Feldstein, S., & Barham, J. (2017). Running a food hub: Learning from food hub closures (Service Report 77, Vol. 4). Washington, D.C.: USDA. Retrieved from https://www.rd.usda.gov/files/publications/SR77_FoodHubs_Vol4_0.pdf
- Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods*, 5(1), 80–92. <https://doi.org/10.1177/160940690600500107>
- Fischer, M., Pirog, R., & Hamm, M. W. (2015). Food hubs: Definitions, expectations, and realities. *Journal of Hunger and Environmental Nutrition*, 10(1), 92–99. <https://doi.org/10.1080/19320248.2015.1004215>
- Franklin, A., Newton, J., & McEntee, J. C. (2011). Moving beyond the alternative: Sustainable communities, rural resilience and the mainstreaming of local food. *Local Environment*, 16(8), 771–788. <https://doi.org/10.1080/13549839.2011.574685>
- Glaza, T. (2013). *Building a community-based food system: Green economic development in central Illinois* (Capstone project report). Normal: Illinois State University. Retrieved from <https://ir.library.illinoisstate.edu/cppg/4/>
- Gundersen, C., Dewey, A., Crumbaugh, A., Kato, M., & Engelhard, E. (2018). *Map the meal gap 2018: A Report on County and Congressional District Food Insecurity and County Food Cost in the United States in 2016*. Washington, D.C.: Feeding America. Retrieved from <http://map.feedingamerica.org/>
- Hardesty, S., Feenstra, G., Visher, D., Lerman, T., Thilmany-McFadden, D., Bauman, A., ... & Rainbolt, G. N. (2014). Values-based supply chains: Supporting regional food and farms. *Economic Development Quarterly*, 28(1), 17–27. <https://doi.org/10.1177/0891242413507103>

- 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 & The Wallace Center at Winrock International. Retrieved from <http://foodsystems.msu.edu/resources/2015-food-hub-survey>
- Healthy Food Access Portal. (n.d.). Food Hubs. Retrieved from <http://healthyfoodaccess.org/retail-strategies/food-hubs?destination=node/321>
- Hendrickson, M., Heffernan, W. D., Howard, P. H., & Heffernan, J. B. (2001). Consolidation in food retailing and dairy. *British Food Journal*, 103(10), 715–728. <https://doi.org/10.1108/00070700110696742>
- Hodgins, K. J., & Fraser, E. D. G. (2018). “We are a business, not a social service agency.” Barriers to widening access for low-income shoppers in alternative food market spaces. *Agriculture and Human Values*, 35(1), 149–162. <https://doi.org/10.1007/s10460-017-9811-y>
- Horst, M., Ringstrom, E., Tyman, S., Ward, M., 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>
- Jablonkski, B. B. R., Schmit, T. M., & Kay, D. (2016). Assessing the economic impacts of food hubs on regional economies: A framework that includes opportunity cost. *Agricultural and Resource Economics Review*, 45(1), 143–172. <https://doi.org/10.1017/age.2016.9>
- Kirschenmann, F., Stevenson, G. W., Buttel, F., Lyson, T. A., & Duffy, M. (2008). Why worry about the agriculture of the middle? In T. A. Lyson, G. W. Stevenson, & R. Welsh (Eds.), *Food and the mid-level farm: Renewing an agriculture of the middle* (pp. 3–22). Cambridge, MA: MIT Press.
- Le Blanc, J. R., Conner, D., McRae, G., & Darby, H. (2014). Building resilience in nonprofit food hubs. *Journal of Agriculture, Food Systems, and Community Development*, 4(3), 121–135. <http://dx.doi.org/10.5304/jafscd.2014.043.005>
- 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>
- 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>
- Lovejoy, S. B., Buhler, D., & Hanson, S. (2010). *Michigan agricultural statistics 2010/2011*. East Lansing: Michigan Department of Agriculture and Rural Development (MDARD), Michigan State University, and USDA. Retrieved from https://www.nass.usda.gov/Statistics_by_State/Michigan/Publications/Annual_Statistical_Bulletin/stats11/agstat11.pdf
- MacDonald, J. M., & Hoppe, R. A. (2018, March 14). Examining consolidation in U.S. agriculture. Washington, D.C.: USDA Economic Research Service. Retrieved from <https://www.ers.usda.gov/amber-waves/2018/march/examining-consolidation-in-us-agriculture/>
- MacDonald, J. M., Hoppe, R. A., & Newton, D. (2018). *Three decades of consolidation in U.S. agriculture* [EIB No. 189]. Washington, D.C.: USDA. Retrieved from <https://www.ers.usda.gov/publications/pub-details/?pubid=88056>
- Michigan Department of Agriculture & Rural Development [MDARD]. (2018). Facts about Michigan agriculture. Retrieved from <http://www.michigan.gov/mdard/0,4610,7-125-1572-7775--,00.html>
- Michigan State University Center for Regional Food Systems [MSU CRFS]. (2017). Michigan Food Hub Learning and Innovation Network [Information sheet]. East Lansing: Author. Retrieved from https://www.canr.msu.edu/michigan_food_hub_learning_and_innovation_network/
- Pothukuchi, K., & Kaufman, J. (2000). The food system: A stranger to the planning field. *Journal of the American Planning Association*, 66(2), 113–124. <https://doi.org/10.1080/01944360008976093>
- Qu, S. Q., & Dumay, J. (2011). The qualitative research interview. *Qualitative Research in Accounting and Management*, 8(3), 238–264. <https://doi.org/10.1108/11766091111162070>
- Roberts, W. (2014). *Food for city building. A field guide for planners, actionists & entrepreneurs*. Toronto: Hypenotic.
- Rose, N. (2017). Community food hubs: An economic and social justice model for regional Australia? *Rural Society*, 26(3), 225–237. <https://doi.org/10.1080/10371656.2017.1364482>

- Spittler, J., Ross, R., & Block, W. (2011). The economic impact of agricultural subsidies in the United States. *The Journal of Social, Political, and Economic Studies*, 36(3), 301–317. <http://www.jspes.org/index.html>
- Stahlbrand, L. (2017). Can values-based food chains advance local and sustainable food systems? Evidence from case studies of university procurement in Canada and the UK. *International Journal of Sociology of Agriculture and Food*, 24(1), 77–95. <http://www.ijsfa.org/index.php/ijsaf>
- Stevenson, G. W., Clancy, K., King, R., Lev, L., Ostrom, M., & Smith, S. (2011). Midscale food value chains: An introduction. *Journal of Agriculture, Food Systems and Community Development*, 1(4), 27–34. <https://doi.org/10.5304/jafscd.2011.014.007>
- Stroink, M. L., & Nelson, C. H. (2013). Complexity and food hubs: Five case studies from Northern Ontario. *Local Environment*, 18(5), 620–635. <https://doi.org/10.1080/13549839.2013.798635>
- Surdna Foundation. (2014). Surdna launches \$18M program related investment fund [Press release]. Retrieved from <http://www.surdna.org/>
- Union of Concerned Scientists [UCS] & Johns Hopkins Center for a Livable Future [CLF]. (2014). *Hospitals and healthy food: How health care institutions can help promote healthy diets* [Policy brief]. Retrieved from <https://www.ucsusa.org/sites/default/files/attach/2014/08/hospitals-and-healthy-food.pdf>
- U.S. Department of Agriculture [USDA]. (2010). *Slaughter establishment availability—updated maps*. Washington, D.C.: Author. Retrieved from https://www.fsis.usda.gov/shared/PDF/Slaughter_Estab_Maps_080910.pdf
- USDA. (2015). *Typology*. Retrieved from https://www.agcensus.usda.gov/Publications/2012/Online_Resources/Typology/typology13.pdf
- USDA (2016). New markets, new opportunities: Strengthening local food systems and organic agriculture. Retrieved from <https://medium.com/usda-results/new-markets-new-opportunities-strengthening-local-food-systems-and-organic-agriculture-17b529c5ea90>
- Veeck, G., Che, D., & Veeck, A. (2006). America's changing farmscape: A study of agricultural tourism in Michigan. *The Professional Geographer*, 58(3), 235–248. <https://doi.org/10.1111/j.1467-9272.2006.00565.x>
- Vitalist Health Foundation. (n.d.). Food hubs. Retrieved from <http://vitalisthealth.org/healthy-community-toolkit/local-agriculture/food-hubs/>
- Vitiello, D., & Brinkley, C. (2014). The hidden history of food system planning. *Journal of Planning History*, 13(2), 91–112. <https://doi.org/10.1177/1538513213507541>
- Woods, M. (2014). Family farming in the global countryside. *Anthropological Notebooks*, 20(3), 31–48. Retrieved from http://cadair.aber.ac.uk/dspace/bitstream/handle/2160/30255/Anthropological_Notebooks_XX_3_Woods.pdf
- Zepeda, L., & Deal, D. (2009). Organic and local food consumer behavior: Alphabet theory. *International Journal of Consumer Studies*, 33(6), 697–705. <https://doi.org/10.1111/j.1470-6431.2009.00814.x>

Economic analysis of local food procurement in Southwest Florida's farm-to-school programs

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Abstract

Farm-to-school (F2S) programs aim to educate people about food and farming, to increase the availability of fresh, nutritious foods, and to improve health outcomes among children. Nationally, all states have school districts that self-identify as farm-to-school program participants. National and regional food procurement systems account for the majority of food purchased by National School Lunch Program participants, but school foodservice authorities (SFA) who purchase food from farmers often do so in the context of strengthening their farm-to-school program (U.S.

Department of Agriculture [USDA], n.d.-b). A greater number of local supply chain participants benefit when food is sourced in state (locally) rather than out-of-state because more money ends up in the pockets of local producers and distributors. Local fruit and vegetable producers and SFAs interested in developing business partnerships for local procurement would benefit from recommendations on menu-appropriate fresh market products, volume, and purchase prices. However, detailed data sets from SFAs are uncommon, limiting opportunities to advance procurement

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efforts. The objective for this project was to begin developing local procurement recommendations for other Florida school districts based on the purchasing history and experiences of the Sarasota County School District (SCSD).

In 2014, Sarasota County, Florida, received a USDA F2S implementation grant, affording it the opportunity to develop its local procurement efforts. One deliverable from that project was a robust data set of school food purchases over a two-year period. With permission SCSD, we analyzed seasonal purchase variations and market prices of local and out-of-state fresh fruits, vegetables, and egg purchases for 38 public schools in the SCSD. In this paper, we present an approach to estimate the potential of local procurement viability in the context of an emerging districtwide F2S program and recommend system changes based on the success of procurement efforts in SCSD and surrounding school districts in Southwest Florida.

Keywords

Community Development, Farmers, Farm to School, Florida, Food Systems, Local Food Procurement, Seasonal Availability, Specialty Crops, Title I Schools

Introduction and Literature Review

Farm to school (F2S) is a national movement with the goals of educating persons, particularly children, on where and how their food is grown, improving nutrition, reducing childhood obesity, increasing physical activity, enhancing community development, and supporting local farmers (Izumi, Wright, & Hamm, 2010; National Farm to School Network, n.d.-b; Winston, 2011). As is often the case across the nation, school districts in the state of Florida procure a large portion of their food from government programs, including the Department of Defense Fresh Fruit and Vegetable Program or USDA Foods in Schools, at low cost. These monetary incentives have been federal policy in the U.S. since the creation of the National School Lunch Act of 1946 (2010). This act provides federal funds to purchase and distribute food among participating schools. SFAs receive a specified reimbursement from the federal government for every meal served free or at a reduced price to

children whose households' limited incomes qualify them for support. At the time of this study (2014), the threshold for reduced price lunch was 185% of the poverty line (a maximum of US\$44,123 for a family of four), while the threshold for free lunch was 130% of the poverty line (a maximum of US\$31,005 for a family of four).

Although Department of Defense and USDA Foods in Schools provide the necessary minimum requirements for the student's nutrition, much of the food is dried, frozen, or canned in addition to being procured from other states. Fruits and vegetables represent significant expenditures by the school district and are often not eaten by children, contributing to plate waste, or the edible portion of food served that is uneaten and discarded. In a study by Cohen, Richardson, Austin, Economos, and Rimm (2013), 73.3% of vegetables and 46.8% of fruit per meal component on average were wasted, accounting for annual waste costs of US\$100,393 and US\$33,532, respectively, for Boston Public Schools. Transportation of these products over long distances also has an environmental impact. While in some cases it may be more environmentally desirable to transport food rather than degrading local resources (Morgan & Sonnino, 2008) or spending greater energy to grow it locally, in other cases there is opportunity. Florida has an ideal climate for year-round production of a wide variety of products as well as the support industries for processing these products (e.g., citrus).

Historically, these policies have benefited schools by assisting them with access to affordable food and have acted as a price support for producers during times when market conditions were unfavorable or when food prices were low. Additionally, farm policy in the United States has focused increasingly on driving down the price of commodity products like corn and soybean, with very little support for the production of fruits and vegetables and other specialty crops (Schoonover & Muller, 2006). Today, many schools participating in National School Lunch Program (NSLP) buy food in prearranged volumes, and in recent years little of the product represents actual surplus. In 2015, less than 1% of total federal cost for school food purchases represented bonus or surplus in the

market (USDA Food & Nutrition Service, 2017). While these farm policies may have benefited many producers financially, in many other ways they have been unsuccessful. Supports for commodities such as corn and soybeans, often used in producing animal feeds and other processed foods, have driven down the cost of meat products as well as other fattening, sweet, or salty foods such as prepackaged snacks, ready-to-eat meals, fast food, and soft drinks (Fields, 2004). The cost of fresh fruits and vegetables remains significantly high relative to an SFA's food budget; however, in some cases, fruits and vegetables purchased locally may eliminate some handling and transportation costs associated with land-distance suppliers, helping to cut costs for schools (Izumi, Rostant, Moss, & Hamm, 2006).

The Dietary Guidelines for Americans clearly state that throughout their lifespan, optimal nutrition plays an important role in a child's growth development (USDA & U.S. Department of Health and Human Services, 2010). Studies suggest that F2S programs have the potential to be an effective strategy that communities and schools can implement to improve children's health (Berlin, Norris, Kolodinsky, & Nelson, 2013; Bontrager Yoder, 2014). Indeed, schools are a natural setting for influencing a child's activity and play an important role in influencing the eating patterns and behavior of children (Dehghan, Akhtar-Danesh, & Merchant, 2005). It is estimated that school-aged children eat between 19% and 50% percent of their total daily calories at school (Gleason & Sutor, 2001). Unfortunately, food offerings at schools are often high in sodium, sugar, and fats and low in vitamins and nutrients (Centers for Disease Control and Prevention, 2009). However, it should be noted that there have been some positive changes. Under the Obama administration, the 2015–2020 Dietary Guidelines were revised to (1) follow a healthy eating pattern across the lifespan; (2) focus

on variety, nutrient density, and quantity; (3) limit calories from added sugars and saturated fats, and reduce sodium intake; (4) shift to healthier food and beverage choices; and (5) support healthy eating patterns for all (U.S. Department of Health and Human Services & USDA, 2015). As such, "school staff members supervising cafeteria time should model healthy habits and use appropriate supervisory techniques for managing the school cafeteria" (Centers for Disease Control and Prevention, 2011, p. 52).

Low-income or impoverished families are at a major disadvantage when it comes to purchasing healthy food such as fresh fruits and vegetables, resulting in infrequent consumption of these foods by children from these families. Indeed, poverty and food insecurity are associated with lower food expenditures, low fruit and vegetable consumption, and lower-quality diets (Drewnowski & Specter, 2004). In addition, children from low-income families are often less knowledgeable about nutrition. Hall, Chai, and Albrecht (2016) found differences in nutrition knowledge and behavior outcomes between students surveyed at Title I and non-Title I schools.¹ Nutrition education at home, or the lack thereof, is not the entire problem. Although parental involvement in conjunction with communitywide programs and policies are essential to developing healthful eating habits in children (Lindsay, Sussner, Kim, & Gortmaker, 2006), cost, difficulty getting children to eat healthy foods, and easy access to fast foods remain significant barriers (Slusser et al., 2011).

Finkelstein, Hill, and Whitaker (2008) concluded that as students move to higher grade levels, à la carte and competitive foods sold through vending machines become more readily available and their eating habits become less healthy. Consumption of these unhealthy foods by adolescents is associated with decreased consumption of school lunch servings and decreased nutrient intake as well

¹ Title I schools are local educational agencies (LEAs) and schools with high numbers or high percentages (at least 40% of enrollment) of children from low-income families. When a certain percent of the school's student population meets the requirement for a free or reduced lunch, the school is designated as Title I and is eligible to receive special funding. Schools with 75% of students whose families are classified as impoverished are automatically allocated Title I funds, while schools with 35% (or higher than the country's average) of students who qualify for reduced price or free of charge lunches are also eligible. Ultimately, it is the discretion of the school district as to the number of schools it serves.

as increased contribution to plate waste (Templeton, Marlette, & Panemangalore, 2005). The availability of competitive foods is associated with lower consumption of fruits and vegetables and higher intakes of total fat and saturated fat (Kubik, Lytle, Hannan, Perry, & Story, 2003). Because students spend such a large portion of their day in schools, schools are in a unique position to influence the dietary habits of school-children (Story, Kaphingst, & French, 2006). The need for healthy school cafeteria food is great, but prohibitive costs, budgetary and personnel constraints, and limited alternatives for procurement force many school districts to make difficult decisions.

Until recently, very few researchers have looked at schools procuring fresh foods from local sources through traditional distribution channels. In 1996 and 1997, the first F2S pilot programs were established in California (Santa Monica-Malibu USD and The Edible Schoolyard, Berkeley) and in Florida as the New North Florida Marketing Cooperative (National Farm to School Network, n.d.-a). The Santa Monica program's fruit and vegetable salad bar offered children from low-income families a replacement to cafeteria offerings; due to its popularity, the salad bar became standard at every school in the district (Vallianatos, Gottlieb, & Haase, 2004). The program in North Florida eventually reached parts of Georgia and Alabama; however, the results of those efforts were mixed due to issues regarding distribution, logistics, and quality control. Both programs were important steps for the growing F2S movement and the creation of a national F2S network.

Some tools exist to assist producers and schools in the procurement process. Holcomb and Vo (n.d.) developed an F2S distribution cost template that incorporates vehicle operating costs, fuel economy, maintenance, repairs, and insurance, as well as depreciation and labor. Watson, Treadwell, Prizzia, and Brew (2014) developed a farm-to-school procurement calculator to assist specialty crop producers and school foodservice staff in converting bulk units (bushels, crates, etc.) into 1/4-, 1/2-, and 1-cup serving sizes. These tools can aid in procurement transaction decision-making by easily converting units and estimating costs.

While the F2S movement is popular, and the concepts and ideas are sensible, the successful implementation of many activities has proven to be challenging. The economies of scale regarding school food, as well as local, state, and national food and farm policies have made local procurement quite difficult (Joshi, Azuma, & Feenstra, 2008). Despite these challenges, the procurement of local and regional foods by schools, and the education of children and communities about local products, are important factors in creating demand for such products, and are critical to the goals of F2S activities (Joshi, Henderson, Ratcliffe, & Feenstra, 2014). Schools operate on limited budgets, and so maintaining low costs is extremely important to ensure cafeterias continue to operate and serve children. Some studies have suggested that, in addition to strategies to reduce the cost of local food, the creation of programming that builds relationships between school foodservice buyers has the potential to result in increased local procurement (Roche, Conner, & Kolodinsky, 2015). The National Farm to School Network, for example, has a number of tools, including its State Farm to School Networks Toolkit that includes information for establishing a robust network structure (National Farm to School Network, 2018).

During the 2014–2015 school year, the SCSD made positive headway in its effort to create a successful F2S procurement strategy and expand local food offerings in its cafeterias. Indeed, expenditures for local food purchases by the SCSD more than doubled from the previous school year, and small farm producers heralded the progress as a positive step for those interested in direct sales to institutions like schools (Benson, Russell, & Kane, 2015). Further evidence includes testimony from personnel in the Food and Nutrition Services of the Sarasota County School Board, stating that much of this success is due to the factors including (1) passionate people (i.e., champions) who believe in the vision of F2S and who advocate its benefits, (2) commitment of dedicated personnel responsible for procurement coordination efforts with producers and school foodservice, and (3) an investment in financial resources to support personnel, such as a dedicated coordinator to

synchronize F2S efforts between the school district and local producers. While it is important to view these strides positively, it is equally important to recognize that much more work is necessary.

Like many urbanized areas in Florida, Sarasota County has experienced significant growth due to the demands of increased population. Large tracts of land that were once used for agricultural production are now zoned for commercial, industrial, or residential use. From 2007 to 2012, the number of farms in Sarasota County decreased 7.2%, from 305 to 283 total farms, while average farm size has increased 41.5% from 200 to 283 acres (81 to 115 hectares) (USDA, n.d.-a). This trend of consolidation of farmland is like other areas in Florida and throughout the U.S. As patterns of land use in the county shift, so too do people's access to fresh, locally sourced food products, as well as their interactions with local producers. While patterns of land use (agricultural and urban) and the associated boundaries of food systems can shift rapidly, political boundaries change less frequently. This is important because researchers and policy-makers often have different definitions of what is local, and most are guided by political or geographic boundaries. This reality, coupled with nonstandardized food ordering and procurement systems, leads to a complex network of relationships with SFAs, distributors, and producers with no one-size-fits-all analytical approach (Watson, 2016).

In many cases, development and urbanization, as well as race and class issues, have created areas where access to fresh food products is difficult. These areas, known as food deserts, are often located in proximity to schools, as seen in Appendix A. Many households in these urban areas also have a greater number of children whose families are eligible for Supplemental Nutrition Assistance Program (SNAP), commonly known as food stamps. This issue is greater for children from minority groups, as nonwhite families with children compose 52.3% of households participating in SNAP nationwide (USDA Food & Nutrition Service, 2016). As with Sarasota County, many schools in Florida are in urban areas where a larger number of SNAP-eligible children reside (Appendix B).

In 2014, the Food and Nutrition Services of

the Sarasota County School Board was awarded a US\$100,000 USDA Farm to School implementation grant. Those funds partially supported the hiring of a dedicated farm-to-school coordinator tasked with enhancing communication between SFA, distributors, and local producers. Contact between SCSD and researchers at the University of Florida's Farm to School Program was made and resulted in a collaboration. That collaboration provided us as researchers at the University of Florida with a rare opportunity to analyze local food purchases of an entire school district. Our analysis offered insight into the types, volume, and price of commodities purchased by the SCSD during the 2014–2015 school year, compared to the previous school year. In addition, researchers analyzed and compared differences in the percentages of local food purchased by Title I and non-Title I schools in the district. It is believed these analyses will help SFA create more effective procurement strategies and assist local food producers in making better marketing decisions.

The need for more nutritious, locally produced foods, particularly by children from low-income families at Title I schools, presents a unique marketing opportunity for producers. Watson, Treadwell, and Bucklin (2018) present survey data and interviews from producers of different farm sizes in the Southwest Florida area regarding production, distribution, and transportation capabilities; markets served; and interest in organizing a cooperative to serve institutions like schools. Producers agreed that selling to schools is an important marketing opportunity, and small producers expressed strong interest in forming a cooperative to sell fresh fruits and vegetables to schools. However, most expressed concern and frustration about compliance from distributors. One producer who had previously won a bid to sell to a school district indicated that their product never arrived at the schools, and that the lack of traceability and accountability in the system discouraged them further working with the school district. Certainly, incidents like these can stifle the development and success of F2S programs as farmers feel sidelined. While issues with distribution are a major obstacle in and of themselves, identifying the quantity, type, and price paid for local products is a necessary

initial step in establishing relationships and coordinating transactions among producers and school districts.

The goal of this work is to present a method for estimating the potential for local procurement by describing, analyzing, and reporting local food procurement in the context of an emerging F2S program in Sarasota County, Florida. Previous research describes the benefits of F2S, but often lacks a detailed account of specific procurement activities that aid decision-making. While there are studies that use a qualitative case study approach (Izumi, Alaimo, & Hamm, 2010), or a survey (Colasanti, Matts, & Hamm, 2012), most do not provide a detailed analysis of all the procurement activity for specific products at the district level over time. Therefore, the research objectives of this paper are to:

1. Summarize total fresh and locally produced food products by the Sarasota County School District during the 2014–2015 academic year;
2. Describe trends and seasonal patterns of total fresh food and local food purchases by the Sarasota County School District during the 2014–2015 academic year; and
3. Identify opportunities to expand local procurement of fresh fruits and vegetables in Southwest Florida.

Methods

We as researchers at the University of Florida analyzed purchase report data acquired from distributor invoice lists of food purchased by the SCSD after USDA implementation grant funds were used to hire a dedicated F2S coordinator. Data for school food purchases from the SCSD during the 2014–2015 academic school year ranged from July 7, 2014, to May 20, 2015. Products included fresh fruits, vegetables, and eggs, purchased by 38 public elementary, middle, and high schools within the county. Each weekly purchase report contained an invoice number, the name of the school where the product was delivered, an invoice date, and a school identification number. Additionally, the same line provided a description of the product purchased (commodity name and

pack size), the quantity of the product ordered (unit), the price per unit, the line-ordered amount (price per unit times the number of units ordered), the quantity delivered, the price per unit delivered, and the total dollar amount of the product delivered.

The data were analyzed using Microsoft Office Excel 2016. The software made it possible to aggregate, sort, and compile meaningful statistics for an entire academic calendar year. Columns containing total dollar amount spent were searched and aggregated using a SUMIF function statement in Excel. The function searches the column and sums or aggregates all values from the array that meet only the criteria or argument specified. In this case, that criterion is the production description (e.g., “oranges”). The SUMIF function assists with extrapolating the total market value and weight of each commodity from the purchase report data. With this method, it is relatively easy and efficient to sort through hundreds of line items and aggregate only those values that match the argument. This allows for easy calculation of market value per unit as well as the price per serving with USDA conversion factors considered.

Just analyzing the total amount of fresh food purchases by each of the schools within the district reveals very little useful information. This is because the amount spent by each school on average will be proportional to the number of students who attend. In other words, the larger the student body, the greater the amount spent on fresh fruits and vegetables by that school. Regarding F2S, it is more appropriate to analyze the quantity of locally sourced product. Again, because this amount depends on the number of students enrolled at each school, it is more appropriate to calculate the amount of Florida-sourced products as a percent of the school's total food fresh food purchases. This allows us to determine which schools, in relation to others in their district, are more proactive at (or better equipped for) sourcing locally produced fresh food products.

Segmenting schools based on socioeconomic factors, student enrollment, and location to make meaningful comparisons is problematic when the sample size (i.e., the number of schools in the district) is small and certain data sets are not

available. We analyzed data on local food purchases from with Title I schools and compared those figures to non-Title I schools. We employed a Wilcoxon Rank-Sum Test, as it is quite suitable for handling data when small sample sizes are present. In the Wilcoxon Rank-Sum Test, the goal is to calculate, with a specific certainty, whether there is a statistical difference in the median between the samples in study. The null hypothesis of the test assumes there are no statistical differences in the median difference between Title I and non-Title I schools, such that:

$$H_0: \text{Median (difference)} = 0$$
$$H_A: \text{Median (difference)} \neq 0$$

The alternative hypothesis in this study assumes with at least 99% ($\alpha=0.01$) certainty that there is a statistically significant difference between the median values of the two groups. The two samples compared test the hypotheses of differences between Title I schools and non-Title I schools in the SCSD regarding the amount spent on Florida-grown products by each school in the district, as a percent of their total fresh fruit and vegetables purchases.

The Wilcoxon Rank-Sum Test is conducted by organizing all data points for Florida-grown products as a percent of total purchases for each sample containing both Title I and non-Title I schools into a single column. Each sample is then counted where Title I schools are classified as sample 1 (n_1) and non-Title I schools are classified as sample 2 (n_2). An adjacent column uses binary values where “1=Title I” and “0=non-Title I” to distinguish between the two types of schools. The data points are sorted from smallest to largest and ranked in ascending order. In the Wilcoxon Rank-Sum Test, samples that have the same value are assigned an average of that rank. The samples are then re-sorted to signify Title I or non-Title I to calculate N1 and N2 (not n_1 and n_2), where N1 is the sum of the ranks of all samples in the first group and N2 is the sum of the ranks of all samples in the second group. The next step in the test requires calculating the value for R , which in the Wilcoxon Sum-Rank Test is equal to either N1 or N2, whichever has the smaller sample size.

Once the value of R is established, it is

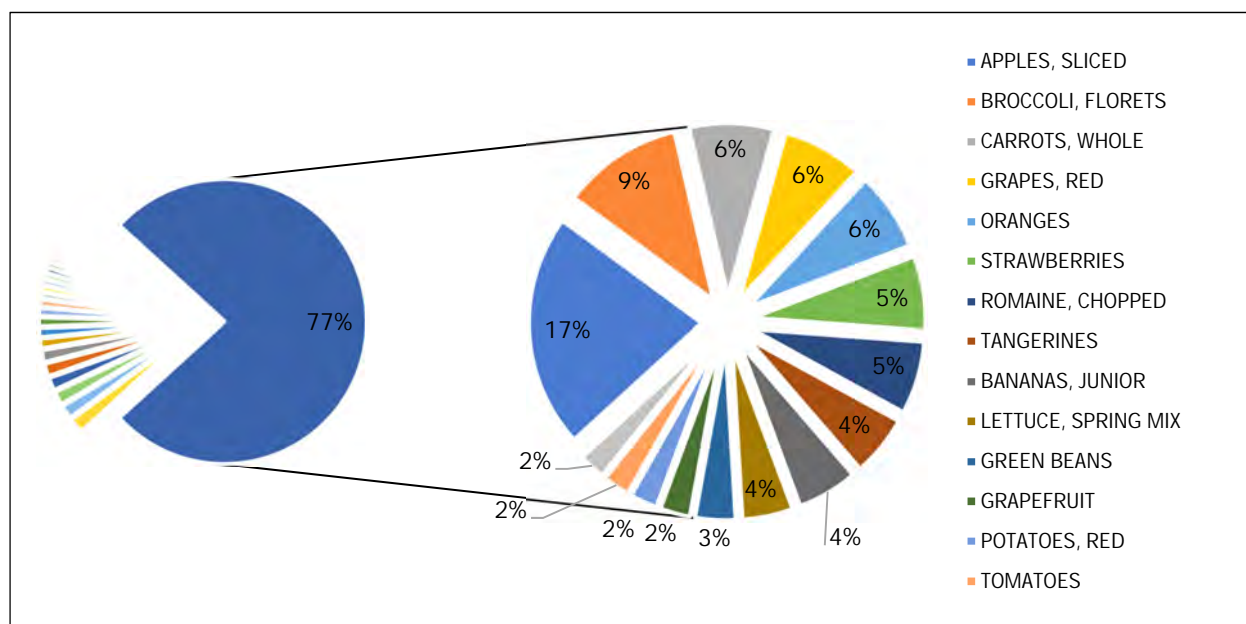
necessary to calculate the Z score and Z critical values to determine if sample groups exhibit differences in their median values. It is necessary to first obtain μ_R (Equation 1) and σ_R (Equation 2), where μ_R is the estimate of the mean for the population, and σ_R is an estimate of the standard deviation. Then the Z score (Equation 3) can be determined so that it can be compared to the critical value. A summary of equations and variables used in the analysis can be found in Appendix C. The counts of the samples for n_1 and n_2 are used in the calculation of μ_R and σ_R .

Results and Discussion

The total market value, and therefore the total cost to the SCSD for all fresh fruit and vegetable products purchased regardless of origin, was US\$855,102. Total fresh fruit and vegetable purchases, excluding eggs, totaled US\$849,817. A detailed list of the market value, weight, cost per pound, and cost per serving for all food products purchased by Sarasota County is in Appendix D. The top 15 products accounts for US\$653,307, or 77.0% of the total expenses thus far for the county (Figure 1). Sliced apples ranked first in terms of market value, accounting for US\$142,982 of purchases or approximately 17.0% of total cost. Broccoli florets, which ranked second, and whole carrots, which ranked third, were also significant sources of expenses, with US\$73,796 (9.0%) and US\$51,798 (6.0%) spent, respectively.

Of all products purchased during the 2014–2015 school year, fresh herbs were by far the most expensive products per pound. Fresh sage, oregano, dill, thyme, basil, rosemary, and mint were the top seven most expensive products per pound, in that order. Excluding herbs, snack pack blueberries were the most expensive product, averaging US\$12.72/lb. However, the school district only purchased 163 lb. (74 kg) of snack pack blueberries, which represented a rather insignificant quantity. Sliced mango was also quite expensive at US\$9.24/lb. with 81 lb. (37 kg) purchased. Similarly, snack pack pumelo averaged US\$5.15/lb. with 346 lb. (157 kg) purchased. The expense of these products is likely attributed to the value-added processing, packaging, and convenience. Spring-mix lettuce averaged US\$4.80/lb., ranking

Figure 1. Top 15 Products as Percentage of Total Annual Cost



thirteenth of all products purchased. Additionally, pineapple chunk snack packs at US\$4.56/lb. and honeydew snack packs at US\$4.40/lb. ranked fourteenth and fifteenth, respectively; however, they too are purchased in low volume. The most expensive products per serving were mango slices, snack pack blueberries, and pineapple chunks at US\$1.22/serving, US\$1.19/serving, and US\$0.71/serving respectively. Again, value-added products are significantly more expensive than minimally processed fruits and vegetables.

Sarasota County purchased 36 different Florida-grown fruit and vegetable products with a market value of US\$269,379. Florida-grown products represented 31.7% of the total market value of all food spent by the SCSD for the academic year. Of all Florida-grown fruits and vegetable products purchased, strawberries had the largest market value of US\$44,896 (Table 1). Local strawberries account for 16.4% of total local purchases and 98.8% of all strawberries purchased during the entire school year. Locally sourced strawberries cost US\$2.27/lb. or US\$0.29 per ¼ cup (32 g) serving. Florida-grown oranges ranked second with US\$33,978 spent, accounting for 12.4% of total local purchases, with 70.6% of all oranges purchased being sourced from within the state. Red

potatoes, grapefruit, grape tomatoes, tomatoes (slicers), cucumbers, watermelon, cherry tomatoes, fingerling potatoes, broccoli florets, and zucchini squash accounted for significant sources of local food purchases during the 2014–2015 academic year. These top 15 products purchased represent 92.2% of all Florida-grown produce, with a market value of US\$248,416. A complete list of all local products including their total market value, total weight, cost per pound, and cost per serving is in Appendix E.

The top three local food products by total, local, and potential purchase for fruit and vegetable subgroups are in Table 2. For fruit, locally produced strawberries accounted for the largest purchase with US\$44,896, but oranges have the greatest potential for local sourcing with US\$14,125. Within the dark green subgroup, locally produced spring-mix lettuce was the largest purchase with US\$30,851, whereas broccoli florets have the largest potential within the category at US\$68,319. Tomatoes (slicers) had the largest potential purchase of all red/orange vegetables with US\$5,271, even though local grape tomatoes accounted for the largest purchase by product within the category with US\$11,176. For starchy vegetables, red potatoes were the top local product purchased within

Table 1. Top 15 Local Food Products

Local Product	Total Purchases (US\$)	% of Total Local Purchases	% of Total Product Purchases	Cost per Pound (US\$)	Cost per Serving (¼ cup or 32 g)
Strawberries	\$44,896	16.4%	98.8%	\$2.27	\$0.29
Oranges	\$33,978	12.4%	70.6%	\$0.57	\$0.16
Tangerines	\$33,903	12.4%	91.3%	\$0.64	\$0.08
Lettuce, Spring Mix	\$30,851	11.2%	99.7%	\$4.83	\$0.22
Green Beans	\$19,968	7.3%	100.0%	\$1.80	\$0.08
Potatoes, Red	\$15,826	5.8%	100.0%	\$0.56	\$0.06
Grapefruit	\$11,855	4.3%	64.7%	\$0.59	\$0.09
Tomatoes, Grape	\$11,176	4.1%	75.3%	\$2.16	\$0.18
Tomatoes	\$11,119	4.1%	67.8%	\$0.88	\$0.12
Cucumbers	\$7,076	2.6%	52.8%	\$0.73	\$0.07
Watermelon	\$5,848	2.1%	47.4%	\$0.43	\$0.003
Tomatoes, Cherry	\$5,745	2.1%	64.9%	\$2.23	\$0.18
Potatoes, Fingerlings	\$5,499	2.0%	100.0%	\$1.17	\$0.12
Broccoli, Florets	\$5,477	2.0%	7.4%	\$3.50	\$0.12
Zucchini, Squash	\$5,201	1.9%	61.9%	\$1.09	\$0.09

Table 2. Fresh Food Purchases by Market Value for Fruit and Vegetable Subgroups for 2014–2015 Academic School Year

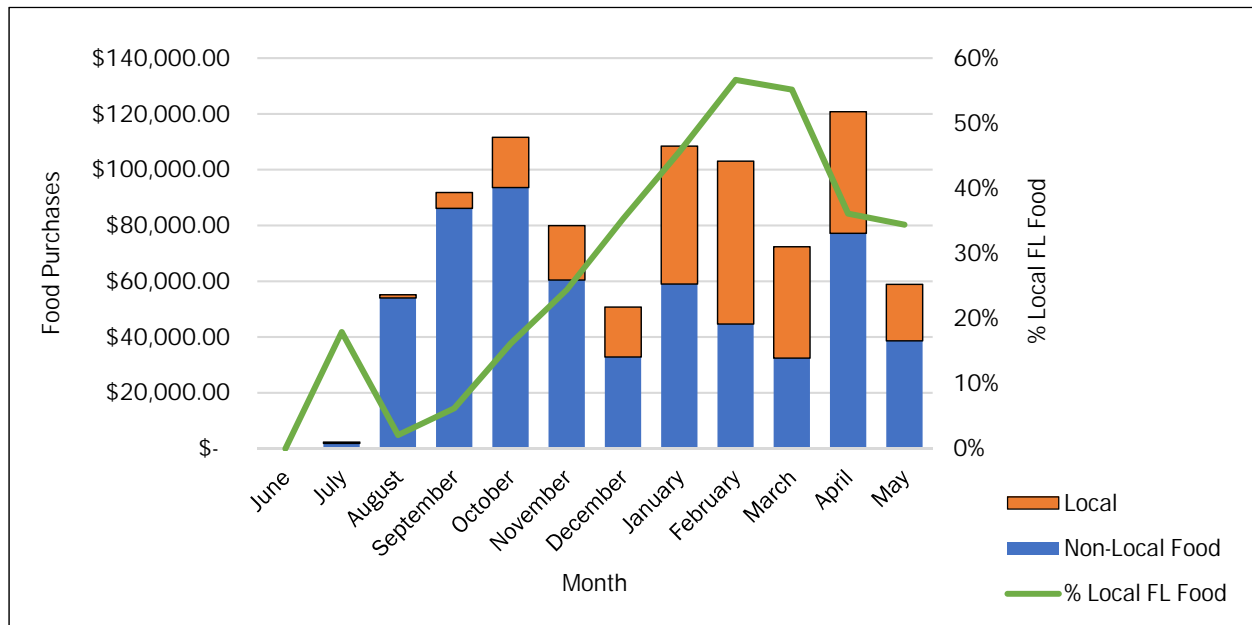
Subgroup	Product	Total Purchase (US\$)	Local Purchase (US\$)	Potential Purchase (US\$)
Fruit	Strawberries	\$45,454	\$44,896	\$557
	Oranges	\$48,103	\$33,978	\$14,125
	Tangerines	\$37,148	\$33,903	\$3,245
Dark green	Lettuce, Spring Mix	\$30,929	\$30,851	\$78
	Broccoli, Florets	\$73,796	\$5,477	\$68,319
	Romaine, Whole	\$4,479	\$1,302	\$3,177
Red/Orange	Tomatoes, Grape	\$14,843	\$11,176	\$3,667
	Tomatoes	\$16,389	\$11,119	\$5,271
	Tomatoes, Cherry	\$8,856	\$5,745	\$3,111
Starchy	Potatoes, Red	\$16,742	\$15,826	\$916
	Potatoes, Fingerling	\$5,499	\$5,499	\$ -
	Corn, Cob	\$13,263	\$ -	\$13,263
Other	Green Beans	\$24,591	\$19,968	\$4,623
	Cucumbers, Whole	\$13,393	\$7,076	\$6,317
	Squash, Zucchini	\$8,400	\$5,201	\$3,199
Unclassified	Eggs, Large	\$5,285	\$4,882	\$403
	Dill, Fresh	\$359	\$355	\$4
	Oregano, Fresh	\$310	\$306	\$4

the category with US\$15,826; however, the starchy product with the greatest potential purchase was sweet corn on the cob, as none of the corn purchased in the 2014–2015 academic year was local.

to producing a wide variety of fruits and vegetables, particularly during the late fall, winter, and early spring months when schools are in session. Figure 2 shows local and non-local fresh food

For other vegetables produced locally, green beans were the top product with US\$19,968, while the potential purchase was greatest for whole cucumbers with US\$6,317.

F2S procurement covers a wide variety of locally sourced food products, such as meats, dairy products, and baked goods; however, most procurement activity focuses on purchasing fruits and vegetables. In contrast to other areas in the United States, Florida's climate is well suited

Figure 2. Sarasota County (Florida [FL]) School District Monthly Purchases of Fresh Local and Non-Local Food, 2014–2015 Academic Year

purchases by the SCSD for the 2014–2015 academic year. Florida’s commercial production season is aligned with serving markets that are incapable of producing food, most notably in winter months. In general, small amounts of local fresh food purchases (e.g., watermelon) are available during late summer months from July going well into November and December. Holiday breaks ensure that food expenditures in general are limited, particularly during the winter break in late December. However, as Florida’s commercial season progresses, crops such as winter greens (kale, collards, mustards), oranges, strawberries, cabbage, and potatoes become available to schools for purchase.

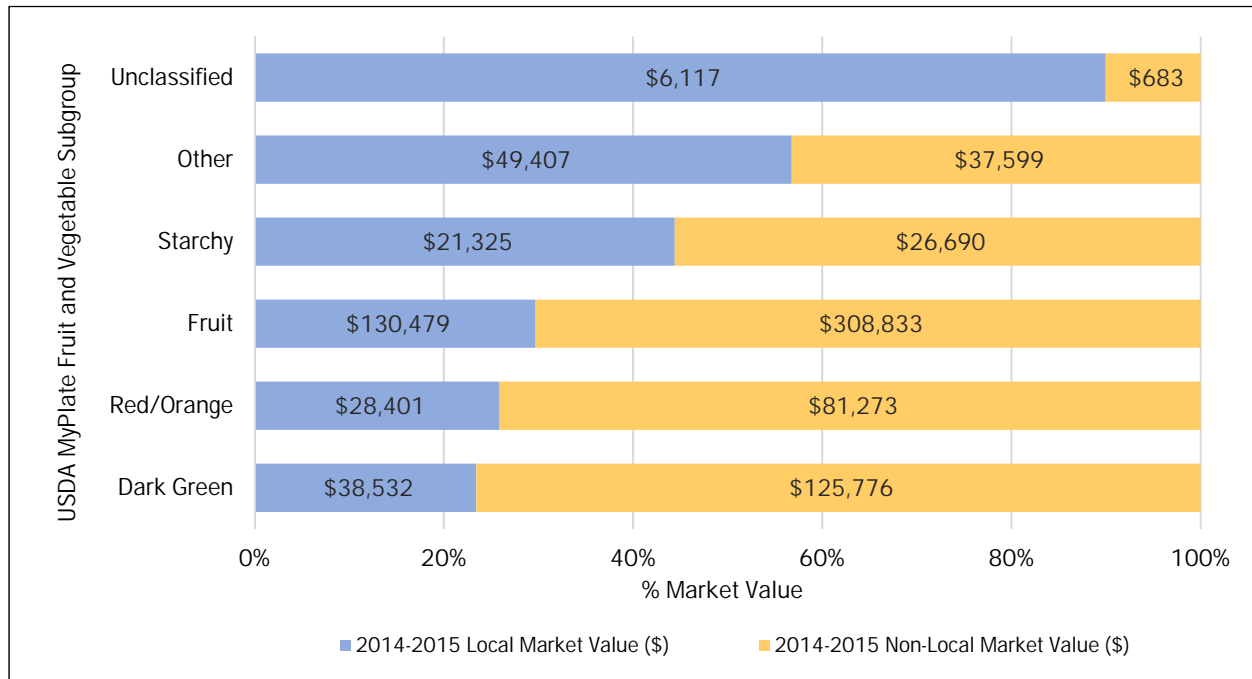
The USDA’s MyPlate nutrition guide suggests a focus on making healthy food and beverage choices from all five food groups including fruits, vegetables, grains, protein foods, and dairy to get the essential nutrients (USDA & U.S. Department of Health and Human Services, 2010). MyPlate also suggests that 50% of a meal consists of fresh whole fruits and a variety of vegetables. Vegetables are further classified into five subgroups: (1) dark green, (2) red/orange, (3) starchy, (4) peas and beans, and (5) other. Examples of dark green vegetables include kale, collards, and spinach;

red/orange vegetables include carrots, pumpkin, and red peppers; starchy vegetables include potatoes and sweet corn; peas and beans include black-eyed peas and lima beans; and other vegetables include summer yellow and zucchini squash varieties, green peppers, and celery.

The fresh food category with the highest expenditure by far is fruit, with US\$439,312 in total purchases, of which US\$130,479 (29.7%) was local food (Figure 3). Dark green vegetables total US\$164,308 with US\$38,532 (23.5%) sourced from Florida. Red/orange vegetables accounted for US\$109,674, with \$28,401 (25.9%) sourced from the state. Vegetables categorized as other or starchy totaled US\$87,005 and US\$48,015, respectively, while the locally produced share of each was US\$49,407 (56.8%) for other and US\$21,325 (44.4%) for starchy. Sarasota County did not purchase any peas or beans, but there were additional vegetables purchased—primarily herbs—that did not correspond to any of the recognized MyPlate vegetables subgroups. These were categorized as “unclassified” and totaled US\$6,514, of which US\$6,117 (93.9%) were locally produced.

Fruits and vegetables were categorized by MyPlate subgroups according to their weight. Total fruit weight was 406,003 lb. (184,160 kg) with

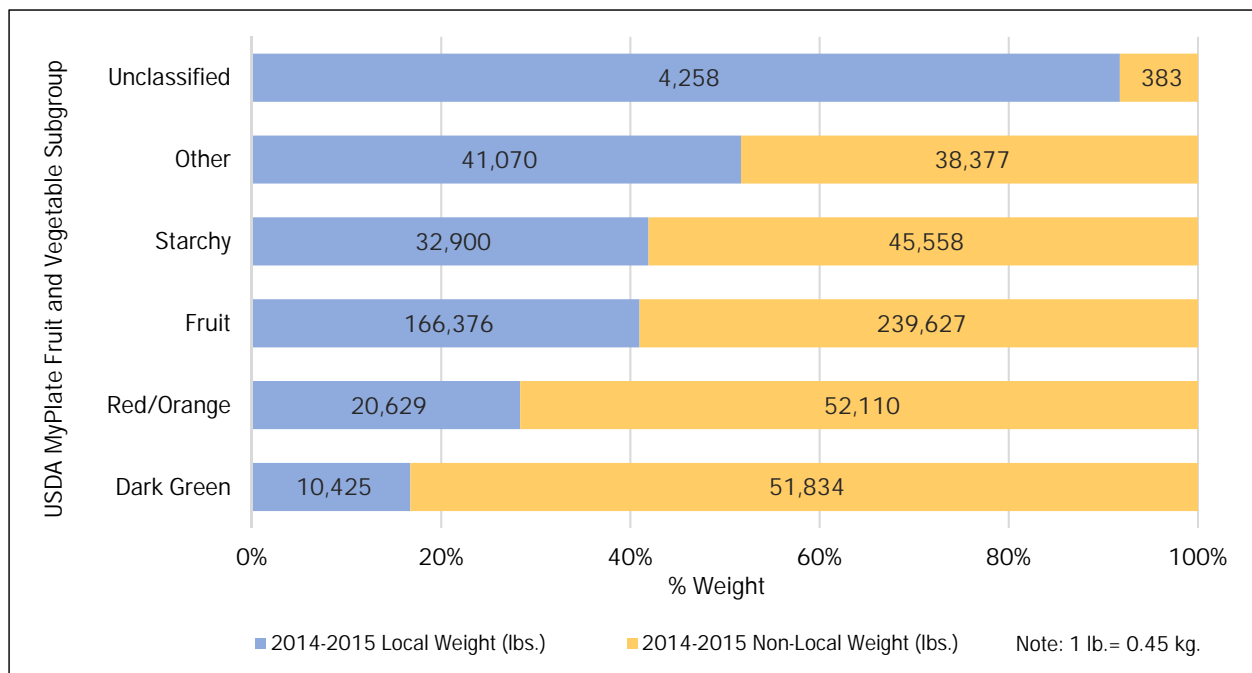
Figure 3. Local and Non-Local Fresh Food Purchases by Market Value and Percent, Sarasota County (Florida) School District, 2014–2015 (all currency in US\$)



166,376 lb. (75,467 kg) (41.0%) representing local fruit. Total dark green vegetables weighed 62,258 lb. (28,240 kg) with 10,425 lb. (4,729 kg) (16.7%)

being from Florida (Figure 4). Red/orange vegetables had a total weight of 72,739 lb. (32,994 kg), of which 20,629 lb. (9,357 kg) (28.4%) were

Figure 4. Percent of Weight for Local and Non-local Fresh Food Purchases by Subgroup, Sarasota County (Florida) School District, 2014–2015



sourced locally. Vegetables categorized as other and starchy totaled 79,447 lb. (36,037 kg) and 78,458 lb. (35,588 kg) respectively, with other vegetables from local sources weighing 41,070 lb. (18,629 kg) (51.7%) and starchy vegetables from local sources weighing 32,900 lb. (14,923 kg) (41.9%). Vegetables not categorized under MyPlate subgroups were “unclassified” with a total weight of 4,624 lb. (2,097 kg), of which 4,258 lb. (1,931 kg) (92.1%) originated from producers in Florida.

For the entire SCSD, approximately 32.1% of all food products purchased were from Florida. The five schools within the district that purchased the highest percentage of their fresh fruits and vegetables from Florida were Brookside Middle, Oak Park School, Garden Elementary, Phillippi Shores Elementary, and Laurel-Nokomis with 41.3%, 40.6%, 36.8%, 36.7%, and 36.7%, respectively. A complete list of all schools within the district ranked by the amount of Florida sourced products is in Appendix F. While it is useful to compare schools within the district regarding the percent of Florida-sourced products, not all schools are equal. Many schools have socioeconomic differences in their student population. In some schools, a high proportion of students' families are disadvantaged financially and thus these schools have a large share of the student population that are eligible to purchase reduced price lunches or are provided meals free of charge.

Separating the Title I schools from non-Title I schools allowed for a Wilcoxon Rank-Sum test. This test is appropriate when comparing two independent samples when you cannot assume that the data is normally distributed. In this instance, we are interested in the median differences of Title I schools versus non-Title I schools regarding the percent of Florida-sourced fresh fruits and vegetables as a proportion of all fresh food purchases.

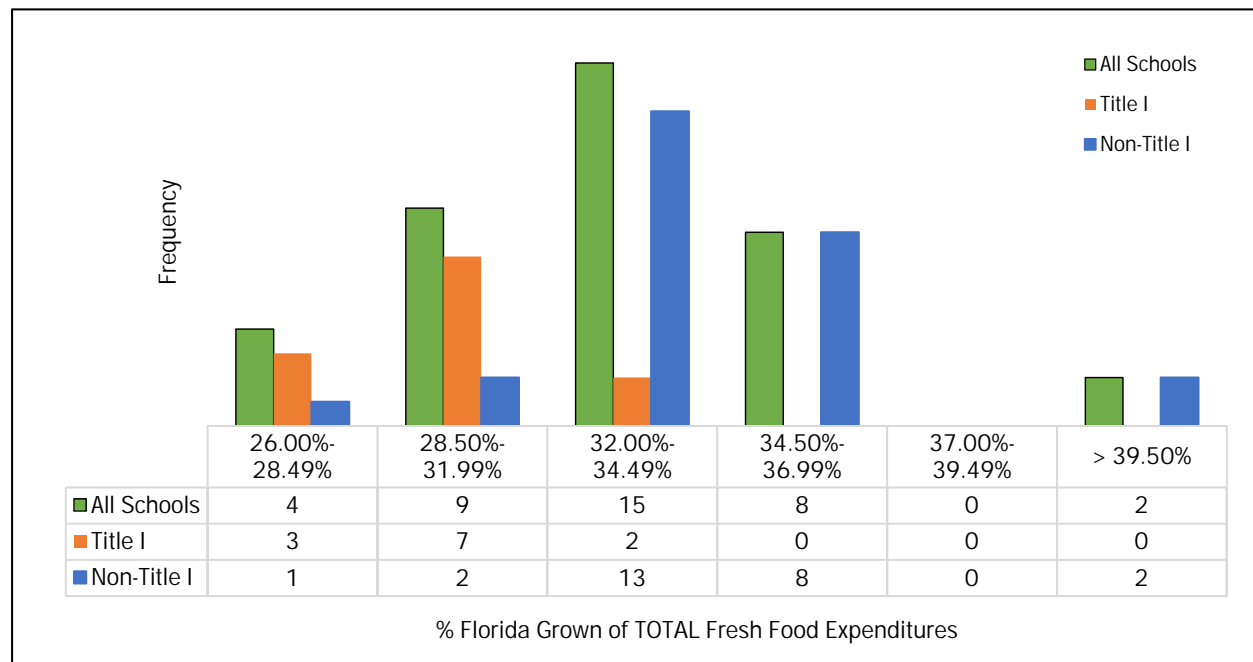
The Wilcoxon Rank-Sum test for two independent samples is a non-parametric alternative to other sample tests such as the t-test, often used with the assumption of a normally distributed data, particularly in the case with small samples sizes where $n \leq 30$ or the measurement level of the data is less than interval. These factors can render t-test

results unreliable; therefore, the Wilcoxon Rank-Sum test is a viable alternative of hypothesis testing. This test has non-overlapping hypotheses of the null and the alternative with the former indicating no effect and the latter suggesting some supplementary effect regarding differences in the median population.

In total, there are 38 schools with measurable data in the SCSD, of which 12 (n_1) are considered Title I and 26 (n_2) are non-Title I. Therefore, since our sample size in both samples is less than 30, we cannot assume they are normally distributed; however, each of the observations in the sample data set is independent. Indeed, a histogram of the percent of local food purchases of the schools is skewed for both Title I and non-Title I schools (Figure 5).

In the analysis, the absolute value of the Z score was greater than the absolute of the Z critical value at $\alpha=0.01$. Therefore, we can reject the null hypothesis that the median difference in locally sourced food purchases as a percent of total food purchases between Title I and non-Title I schools in Sarasota County is equal to zero. The average Title I school in Sarasota County spent 29.6% of its fresh fruit and vegetable budget on Florida-grown products, while non-Title I schools in the district spent 34.1%. Statistically significant differences in these two groups of schools likely indicate the existence of potential barriers to successful local procurement activities for Title I schools. Alternatively, these results may also reflect the effects that government support programs such as the Fresh Fruit and Vegetable Program have on local food procurement for Title I schools. In many cases, larger quantities of fresh food from these government programs are purchased by Title I schools, and the selections are much broader than the items served at lunch or breakfast, so the effect of non-local items may dilute the overall F2S local percentage. This should not necessarily be surprising given the financial resources in many Title I schools and the opportunity to participate in such programs. Nevertheless, future research should place greater focus on Title I schools to identify specific needs that will benefit these schools to procure locally sourced food products.

Figure 5. Histogram for Locally Sourced Fresh Florida Products in 2014–2015 Academic Year for All Schools Segmented by Title I and Non–Title I Classification in Sarasota County



Conclusions

This article summarizes total and local food purchases, describes trends and seasonal patterns of local food purchases made by the SCSD during the 2014–2015 academic year, and identifies challenges and opportunities for expanding local procurement. Vegetables from the dark green and red/orange categories and fruit, specifically oranges, broccoli florets, tomatoes, and cob corn, are products that show promising potential for expanding local food procurement. The seasonal nature of Florida’s commercial crop production might create challenges for some producers (e.g., large producers) and opportunities for other (e.g., small producers) who otherwise might not have access to these institutional markets.

This research contributes to the literature by providing an analysis of procurement activities including type, volume, and price of select specialty crops used in an area with a high population and socioeconomic differences. While this study provides an analysis of these activities at a basic economic level, it also highlights important differences in procurement activities at schools with varying socioeconomic demographics. Title I schools in the

district source fewer local products as a percent of their total food purchases compared to their non–Title I counterparts. Ironically, it is specifically these students that F2S programs are designed to benefit the most. From the literature we found that students at Title I schools are often less knowledgeable about the importance of nutrition, and in many cases food from school represents a major percentage of their caloric intake. Given these findings, we recommend that SFA provide greater support and funding to Title I schools so that they are better prepared and equipped to procure local products. Future research projects should focus on procurement strategies that assist Title I schools in maximizing their local food purchases at minimum costs.

While federal and state policies are in effect to provide funding for administrative leadership and research to expand procurement, there is little direct support at the local level. Many states, including Florida, have a statewide coordinator responsible for expanding the growth of F2S programs and helping to train educators and nutrition staff, as well as for facilitating other necessary activities. However, few school districts

have a dedicated support staff person responsible for leading F2S procurement activities in their area. A few school districts such as Sarasota County have a dedicated F2S coordinator who acts as a point of contact for the school district administrators, producers, teachers, students, and families to strengthen the connection of local fresh food products and the community. Other school districts are not so fortunate, and while some individuals have been proactive champions—essential to the development and implementation of many F2S activities—procurement issues are likely to require additional support and assistance from trained personnel. A dedicated F2S coordinator at the district level can leverage existing relationships and facilitate the creation of new partnerships. Additionally, we recommend greater capital investment in equipment and facilities to expand access, particularly for small farmers, to this market. This includes facilities to aggregate and store product as well as equipment to minimally process products in a manner that is adequate for school foodservice and kitchen staff. The USDA offers competitive grants for implementation and planning, equipment assistance, and community facilities in addition to loans and grants authorized by the Health Hunger-Free Kids Act of 2010 and the Richard B. Russell National School Lunch Act to eligible school districts. These funds can serve multiple functions by helping to establish farm to school programs, assisting schools in feeding kids, providing healthy, local meals, teaching students about food, farming, and nutrition, and supporting local agricultural communities. Program administrators can seek additional resources from the USDA Food and Nutrition Service's Farm to School Grant Program.²

The information in this article has a wide range of implications for F2S procurement activities and policies. However, some of the most difficult obstacles to successful F2S procurement relate to distribution. Most schools rely on one or a few broadline distributors to provide them with a wide variety of products for their cafeterias. These broadline distributors often prioritize quality and volume over other differentiating characteristics

such as being locally produced. School districts may attempt to coordinate delivery of local products, but in many cases, producers lack adequate transportation or the necessary time to deliver fresh food directly to schools. Schools also may lack the equipment or personnel necessary to pick up food directly from producers. Additionally, both producers and schools may be ill equipped to transport, handle, and minimally process fresh local food products. Hence schools often resort to relying on the broadline distributor to facilitate those functions, which creates a new set of problems (e.g., transparency, fewer dollars retained in the local economy, difficulty establishing long-term relationships, etc.) of which local producers have expressed frustration that stifles further F2S development. Ideally, policy would reflect the greater investment in time, money, and resources necessary to provide these stakeholders with the means to coordinate their efforts. Future research efforts should focus on coordination strategies to help farmers pool their resources, lower their costs, and provide quality products in the necessary volumes so they can directly access schools and other institutional markets.

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² See the Community Food Systems page at <https://www.fns.usda.gov/farmtoschool/farm-school-grant-program>

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References

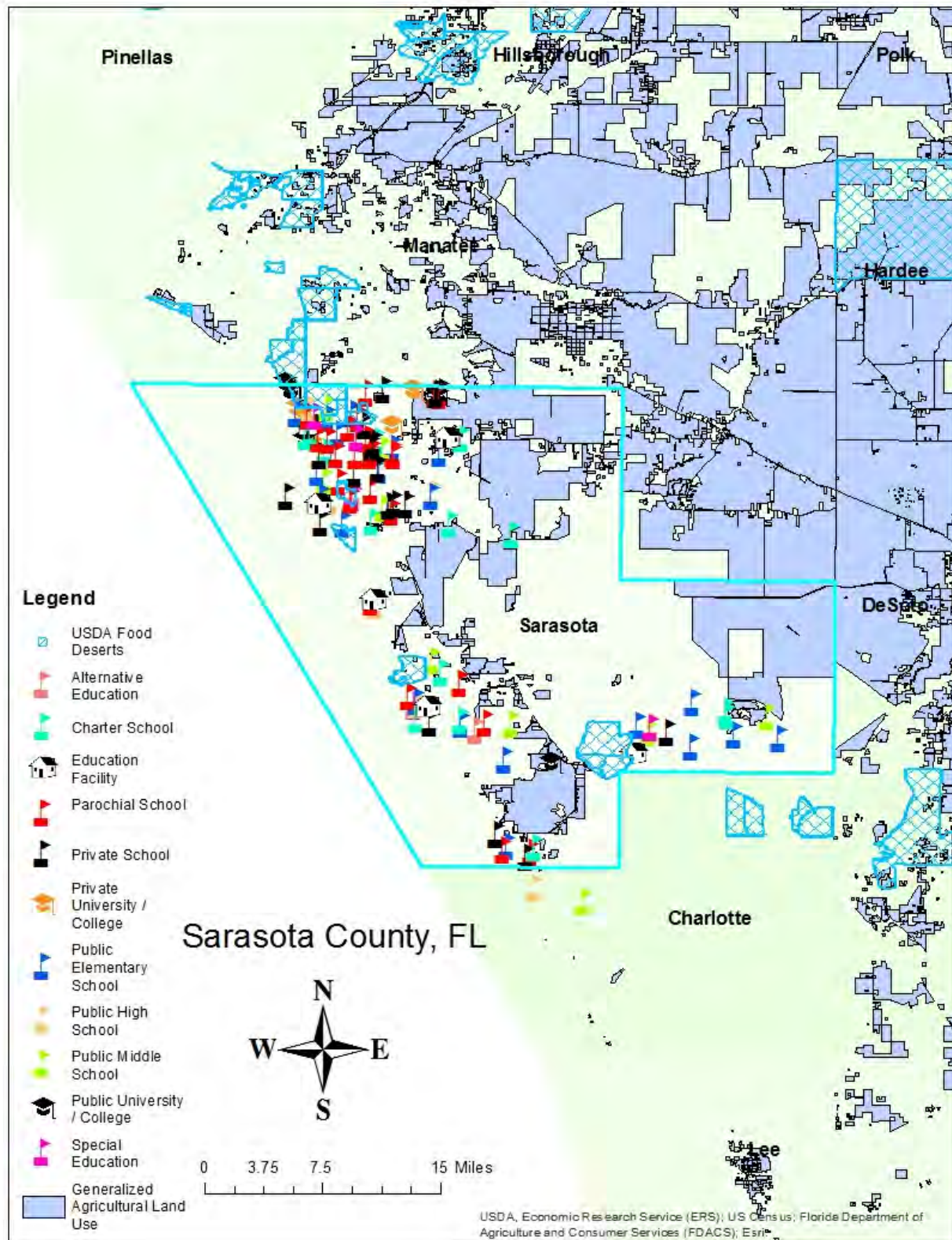
- Benson, M., Russell, M., & Kane, D. (2015). *USDA Farm to School Grant Program FY 2013—FY 2015 summary of awards*. Retrieved from https://fns-prod.azureedge.net/sites/default/files/f2s/F2S_Grant_Summary_Report.pdf
- Berlin, L., Norris, K., Kolodinsky, J., & Nelson, A. (2013). The role of social cognitive theory in farm-to-school-related activities: Implications for child nutrition. *Journal of School Health, 83*(8), 589–595. <https://doi.org/10.1111/josh.12069>
- Bontrager Yoder, A. B. H. (2014). *Wisconsin farm to school programs: Dietary outcomes in elementary students* (Doctoral dissertation, University of Wisconsin–Madison). Retrieved from <https://search.proquest.com/docview/1551526416?pq-origsite=gscholar>
- Centers for Disease Control and Prevention. (2009). Nutrition standards for foods in schools: Recommended nutrition standards for foods outside of school meal programs. Retrieved from https://www.cdc.gov/healthyschools/nutrition/pdf/nutrition_factsheet_parents.pdf
- Centers for Disease Control and Prevention. (2011). School health guidelines to promote healthy eating and physical activity. *MMWR. Recommendations and Reports: Morbidity and Mortality Weekly Report, 60*(RR-5), 1. Retrieved from <https://www.cdc.gov/mmwr/pdf/rr/rr6005.pdf>
- Cohen, J. F. W., Richardson, S., Austin, S. B., Economos, C. D., & Rimm, E. B. (2013). School lunch waste among middle school students: Nutrients consumed and costs. *American Journal of Preventive Medicine, 44*(2), 114–121. <https://doi.org/10.1016/j.amepre.2012.09.060>
- Colasanti, K. J. A., Matts, C., & Hamm, M. W. (2012). Results from the 2009 Michigan farm to school survey: Participation grows from 2004. *Journal of Nutrition Education and Behavior, 44*(4), 343–349. <https://doi.org/10.1016/j.jneb.2011.12.003>
- Dehghan, M., Akhtar-Danesh, N., & Merchant, A. T. (2005). Childhood obesity, prevalence and prevention. *Nutrition Journal, 4*, 24. <https://doi.org/10.1186/1475-2891-4-24>
- Drewnowski, A., & Specter, S. E. (2004). Poverty and obesity: The role of energy density and energy costs. *American Journal of Clinical Nutrition, 79*(1), 6–16. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/14684391>
- Fields, S. (2004). The fat of the land: Do agricultural subsidies foster poor health? *Environmental Health Perspectives, 112*(14), A820. <https://doi.org/10.1289/ehp.112-a820>
- Finkelstein, D. M., Hill, E. L., & Whitaker, R. C. (2008). School food environments and policies in US public schools. *Pediatrics, 122*(1), e251–e259. <https://doi.org/10.1542/peds.2007-2814>
- Gleason, P., & Sutor, C. (2001). *Food for thought: Children's diets in the 1990s* [Policy brief]. Retrieved from <https://eric.ed.gov/?id=ED463829>
- Hall, E., Chai, W., & Albrecht, J. A. (2016). Relationships between nutrition-related knowledge, self-efficacy, and behavior for fifth grade students attending Title I and non-Title I schools. *Appetite, 96*, 245–253. <https://doi.org/10.1016/j.appet.2015.09.033>
- Holcomb, R., & Vo, A. (n.d.). Farm-to-school templates: Tools for participating producers and schools. Retrieved from <http://okfarmtoschool.com/wp-content/uploads/section3-FTS-templates-2.pdf>
- Izumi, B. T., Alaimo, K., & Hamm, M. W. (2010). Farm-to-school programs: Perspectives of school food service professionals. *Journal of Nutrition Education and Behavior, 42*(2), 83–91. <https://doi.org/10.1016/j.jneb.2008.09.003>
- Izumi, B. T., Rostant, O. S., Moss, M. J., & Hamm, M. W. (2006). Results from the 2004 Michigan farm-to-school survey. *Journal of School Health, 76*(5), 169–174. <https://doi.org/10.1111/j.1746-1561.2006.00090.x>

- Izumi, B. T., Wright, D. W., & Hamm, M. W. (2010). Farm to school programs: Exploring the role of regionally-based food distributors in alternative agrifood networks. *Agriculture and Human Values*, 27(3), 335–350. <https://doi.org/10.1007/s10460-009-9221-x>
- Joshi, A., Azuma, A. M., & Feenstra, G. (2008). Do farm-to-school programs make a difference? Findings and future research needs. *Journal of Hunger & Environmental Nutrition*, 3(2–3), 229–246. <https://doi.org/10.1080/19320240802244025>
- Joshi, A., Henderson, T., Ratcliffe, M. M., Feenstra, G. (2014). Evaluation for transformation: A cross-sectoral evaluation framework for farm to school. National Farm to School Network. Retrieved from <http://www.farmtoschool.org/resources-main/evaluation-framework>
- Kubik, M. Y., Lytle, L. A., Hannan, P. J., Perry, C. L., & Story, M. (2003). The association of the school food environment with dietary behaviors of young adolescents. *American Journal of Public Health*, 93(7), 1168–1173. <https://doi.org/10.2105/AJPH.93.7.1168>
- Lindsay, A. C., Sussner, K. M., Kim, J., & Gortmaker, S. L. (2006). The role of parents in preventing childhood obesity. *The Future of Children*, 16(1), 169–186. <https://doi.org/10.1353/foc.2006.0006>
- Morgan, K., & Sonnino, R. (2008). *The school food revolution: Public food and the challenge of sustainable development*. London: Routledge.
- National Farm to School Network. (n.d.-a). Home page. Retrieved July 27, 2017, from <http://www.farmtoschool.org/>
- National Farm to School Network. (n.d.-b). About National Farm to School Network. Retrieved April 30, 2018, from <http://www.farmtoschool.org/about>
- National Farm to School Network. (2018). *State Farm to School Networks Toolkit*. Retrieved from <http://www.farmtoschool.org/resources-main/state-farm-to-school-network-toolkit>
- National School Lunch Act of 1946, 42 U.S.C. §§ 1751–1769j (2010). Retrieved from <https://www.gpo.gov/fdsys/granule/USCODE-2011-title42/USCODE-2011-title42-chap13-sec1751>
- Roche, E., Conner, D., & Kolodinsky, J. (2015). Increasing local procurement in farm-to-school programs: An exploratory investigation. *Journal of Agriculture, Food Systems, and Community Development*, 5(2), 81–90. <https://doi.org/10.5304/jafscd.2015.052.019>
- Schoonover, H., & Muller, M. (2006). *Food without thought: How U.S. farm policy contributes to obesity*. Institute for Agriculture and Trade Policy. Retrieved from <https://www.iatp.org/documents/food-without-thought-how-us-farm-policy-contributes-obesity>
- Slusser, W., Prelip, M., Kinsler, J., Erasquin, J. T., Thai, C., & Neumann, C. (2011). Challenges to parent nutrition education: A qualitative study of parents of urban children attending low-income schools. *Public Health Nutrition*, 14(10), 1833–1841. <https://doi.org/10.1017/S1368980011000620>
- Story, M. P. D., Kaphingst, K. M., & French, S. (2006). The role of schools in obesity prevention. *The Future of Children*, 16(1), 109–142. <https://doi.org/10.1353/foc.2006.0007>
- Templeton, S. B., Marlette, M. A., & Panemangalore, M. (2005). Competitive foods increase the intake of energy and decrease the intake of certain nutrients by adolescents consuming school lunch. *Journal of the American Dietetic Association*, 105(2), 215–220. <https://doi.org/10.1016/j.jada.2004.11.027>
- U.S. Department of Agriculture [USDA]. (n.d.-a). *2012 Census of Agriculture: County Profile: Sarasota County, Florida*. Retrieved from https://www.nass.usda.gov/Publications/AgCensus/2012/Online_Resources/County_Profiles/Florida/cp12115.pdf
- USDA. (n.d.-b). 2015 USDA Farm to School Census Data Explorer Tool. The Farm to School Census. Retrieved March 22, 2018, from <https://farmtoschoolcensus.fns.usda.gov/data-explorer>
- USDA Food & Nutrition Service. (2016). *Characteristics of Supplemental Nutrition Assistance Program Households: Fiscal Year 2015*. Alexandria, VA. Retrieved October 24, 2018, from <https://www.fns.usda.gov/ops/supplemental-nutrition-assistance-program-snap-research>
- USDA Food & Nutrition Service. (2017). Federal Cost of School Food Program Data. Retrieved July 28, 2017, from <https://catalog.data.gov/dataset/federal-cost-of-school-food-program-data>
- USDA & U.S. Department of Health and Human Services. (2010). *Dietary guidelines for Americans, 2010* (7th Ed.). Washington, D.C.: U.S. Government Printing Office Retrieved from <https://health.gov/dietaryguidelines/dga2010/DietaryGuidelines2010.pdf>

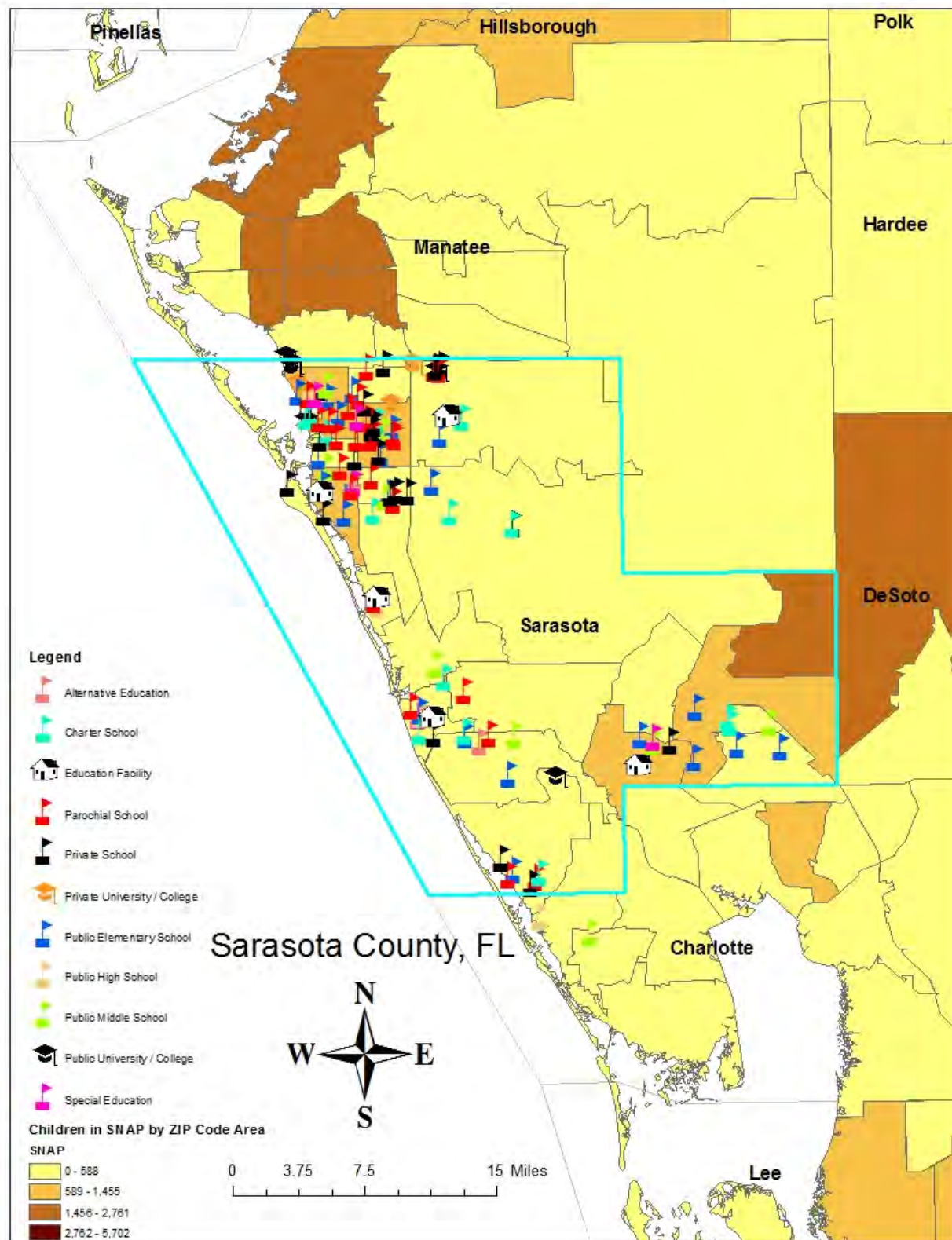
- U.S. Department of Health and Human Services & USDA. (2015). *2015–2020 dietary guidelines for Americans* (8th Ed.). Retrieved from <http://health.gov/dietaryguidelines/2015/guidelines/>
- Vallianatos, M., Gottlieb, R., & Haase, M. A. (2004). Farm-to-school: Strategies for urban health, combating sprawl, and establishing a community food systems approach. *Journal of Planning Education and Research*, 23(4), 414–423. <https://doi.org/10.1177/0739456X04264765>
- Watson, J. A. (2016). *Creating successful farm to school programs in Florida: A countywide feasibility study of direct procurement* (Doctoral dissertation, University of Florida). Retrieved from <http://uf.catalog.fcla.edu/permalink.jsp?20UF035102863>
- Watson, J. A., Treadwell, D. D., & Bucklin, R. A. (2018). *The feasibility of local food cooperatives to support farm to school procurement in Southwest Florida*. Manuscript in preparation.
- Watson, J. A., Treadwell, D., Prizzia, A., & Brew, K. (2014). A farm to school procurement calculator for specialty crop producers and school food service staff. University of Florida. Retrieved from <http://edis.ifas.ufl.edu/hs1250>
- Winston, A. (2011). Farm to school. *Maine Policy Review*, 20(1), 233–236. Retrieved from <https://digitalcommons.library.umaine.edu/mpr/vol20/iss1/37/>

Appendices

Appendix A. Food Deserts, Schools, and Agricultural Land Use for Sarasota County, Florida, 2017



Appendix B. Schools and Number of Children Enrolled in SNAP for Sarasota County, Florida, 2017



Appendix C. Equations and Variables Used for Analyzing Data

Variable/equation	Equation number	Description/notes
$\mu_R = \frac{n_1(n_1 + n_2 + 1)}{2}$	1	Mean for the population
$\sigma_R = \sqrt{\frac{n_1 n_2 (n_1 + n_2 + 1)}{12}}$	2	Estimate of the standard deviation
$Z = \frac{(R - \mu_R)}{\sigma_R}$	3	Z-score normally distributed with mean of 0 and standard deviation of 1
n_1		Sample 1 (Title I schools)
n_2		Sample 2 (non–Title I schools)
$N1$		Sum of the ranks for sample 1
$N2$		Sum of the ranks for sample 2
R		The sum of the ranks of the smallest sample size

Appendix D. All Food Products Purchased by Sarasota County (Florida) School District, 2014–2015 Academic Year

Product	Annual Total				Annual Average		\$/Serving
	Cost (\$)	Rank	Weight (lbs.)	Rank	\$/lb.	Rank	(1/4 cup)
APPLES, SLICED	\$ 142,982	1	62,428	2	\$ 2.29	30	\$ 0.20
APPLES, WHOLE (RED DEL.)	\$ 16,254	15	13,364	19	\$ 1.22	43	\$ 0.08
BANANAS	\$ 4,252	34	8,080	20	\$ 0.53	77	\$ 0.10
BANANAS, JUNIOR	\$ 37,135	9	57,600	4	\$ 0.64	70	\$ 0.09
BASIL, FRESH	\$ 298	64	18	77	\$ 16.77	5	-
BLUEBERRIES, SNACK PACK	\$ 2,067	43	163	57	\$ 12.72	8	\$ 1.19
BROCCOLI, FLORETS	\$ 73,796	2	20,858	12	\$ 3.54	23	\$ 0.12
BROCCOLI, WHOLE HEAD	\$ 32	75	23	71	\$ 1.38	41	\$ 0.14
CABBAGE, GREEN	\$ 374	60	800	43	\$ 0.47	80	\$ 0.03
CABBAGE, RED	\$ 15	78	30	69	\$ 0.50	78	\$ 0.04
CANTALOUPE	\$ 1,687	45	2,890	36	\$ 0.58	74	\$ 0.10
CARROTS, BABY	\$ 7,971	25	5,990	27	\$ 1.33	42	\$ 0.10
CARROTS, WHOLE	\$ 51,798	3	26,635	10	\$ 1.94	34	\$ 0.19
CAULIFLOWER, FLORETS	\$ 2,415	40	610	48	\$ 3.96	19	\$ 0.22
CAULIFLOWER, HEAD	\$ 887	49	320	53	\$ 2.78	28	\$ 0.22
CELERY, STICKS	\$ 3,168	36	970	40	\$ 3.27	24	\$ 0.23
CELERY, STICKS SNACK PACK	\$ 624	57	163	57	\$ 3.84	21	\$ 0.27
CELERY, WHOLE	\$ 11,602	21	13,880	17	\$ 0.84	65	\$ 0.07
CILANTRO, FRESH	\$ 252	68	43	68	\$ 5.82	11	-
CORN, COB	\$ 13,263	18	16,968	16	\$ 0.78	67	\$ 0.23
CUCUMBERS	\$ 13,393	17	18,828	15	\$ 0.71	68	\$ 0.06
CUCUMBERS, SLICED	\$ 2,847	37	650	46	\$ 4.38	17	\$ 0.35
CUCUMBERS, SLICED SNACKS	\$ 712	56	163	57	\$ 4.38	16	\$ 0.35
DILL, FRESH	\$ 359	62	21	74	\$ 16.87	3	-
EGGPLANT	\$ 871	50	740	45	\$ 1.18	45	\$ 0.18
EGGS, LARGE	\$ 5,285	30	4,523	32	\$ 1.17	47	-
GARLIC	\$ 133	71	53	67	\$ 2.50	29	-
GRAPEFRUIT	\$ 18,316	12	28,411	7	\$ 0.64	71	\$ 0.10
GRAPES, RED	\$ 49,138	4	29,736	6	\$ 1.65	37	\$ 0.16
GRAPES, WHITE	\$ 7,227	26	4,769	30	\$ 1.52	39	\$ 0.14
GREEN BEANS	\$ 24,591	11	13,780	18	\$ 1.78	35	\$ 0.08
GREENS, COLLARD	\$ 10	79	18	76	\$ 0.53	76	\$ 0.09
HONEYDEW	\$ 27	76	25	70	\$ 1.07	51	\$ 0.22
HONEYDEW, SNACK PACK	\$ 715	55	163	57	\$ 4.40	15	-
KALE	\$ 989	48	910	41	\$ 1.09	50	\$ 0.03
LEMONS	\$ 159	70	106	64	\$ 1.50	40	\$ 0.48
LETTUCE, HEAD	\$ 23	77	23	72	\$ 1.01	58	\$ 0.05
LETTUCE, SALAD CUT	\$ 114	72	110	63	\$ 1.03	55	\$ 0.05
LETTUCE, SHREDDED	\$ 2,143	42	2,495	37	\$ 0.86	62	\$ 0.04
LETTUCE, SPRING MIX	\$ 30,929	10	6,450	25	\$ 4.80	13	\$ 0.22
MANGO, SLICED	\$ 751	52	81	66	\$ 9.24	10	\$ 1.22
MINT, FRESH	\$ 4	81	0	80	\$ 14.00	6	-
ONIONS, RED	\$ 240	69	215	56	\$ 1.12	48	\$ 0.12
ONIONS, YELLOW	\$ 3,499	35	7,710	23	\$ 0.45	81	\$ 0.05
ORANGES	\$ 48,103	5	79,245	1	\$ 0.61	73	\$ 0.17

OREGANO, FRESH	\$ 310	63	18	75	\$ 16.96	2	-
PARSLEY, FRESH	\$ 256	67	22	73	\$ 11.64	9	-
PEACHES, YELLOW	\$ 368	61	435	51	\$ 0.84	64	\$ 0.15
PEARS, GREEN	\$ 1,028	47	1,163	39	\$ 0.88	60	\$ 0.11
PEARS, RED	\$ 759	51	803	42	\$ 0.95	59	\$ 0.12
PEPPERS, GREEN	\$ 4,284	33	4,160	34	\$ 1.03	57	\$ 0.11
PEPPERS, RED	\$ 409	59	258	55	\$ 1.58	38	\$ 0.16
PINEAPPLE	\$ 4,887	31	6,129	26	\$ 0.80	66	\$ 0.11
PINEAPPLE, CHUNKS SNACK	\$ 741	53	163	57	\$ 4.56	14	\$ 0.71
PLUMS, BLACK	\$ 2,455	39	2,380	38	\$ 1.03	56	\$ 0.21
PLUMS, RED	\$ 726	54	616	47	\$ 1.18	44	\$ 0.24
PLUOT, (MANGO TANGO)	\$ 295	65	280	54	\$ 1.05	52	\$ 0.21
POTATOES, FINGERLING	\$ 5,499	28	4,700	31	\$ 1.17	46	-
POTATOES, IDAHO	\$ 12,511	19	26,740	9	\$ 0.47	79	\$ 0.05
POTATOES, RED	\$ 16,742	13	30,050	5	\$ 0.56	75	\$ 0.06
POTATOES, SWEET	\$ 5,463	29	7,888	22	\$ 0.69	69	\$ 0.10
PUMELO, SNACK PACK	\$ 1,780	44	346	52	\$ 5.15	12	-
PUMPKIN, CHUNKS	\$ 2,326	41	600	49	\$ 3.88	20	-
RADISH, RED	\$ 103	73	99	65	\$ 1.04	54	\$ 0.08
ROMAINE, CHOPPED	\$ 44,534	7	25,548	11	\$ 1.74	36	-
ROMAINE, WHOLE	\$ 4,479	32	5,131	29	\$ 0.87	61	\$ 0.03
ROSEMARY, FRESH	\$ 4	81	0	80	\$ 14.00	6	-
SAGE, FRESH	\$ 5	80	0	80	\$ 18.00	1	-
SPINACH	\$ 9,285	22	3,299	35	\$ 2.81	27	\$ 0.09
SQUASH, BUTTERNUT	\$ 1,620	46	510	50	\$ 3.18	26	\$ 0.42
SQUASH, YELLOW	\$ 5,960	27	5,445	28	\$ 1.09	49	\$ 0.15
SQUASH, ZUCCHINI	\$ 8,400	24	8,043	21	\$ 1.04	53	\$ 0.09
SQUASH, Z&Y SNACK	\$ 611	58	163	57	\$ 3.76	22	-
STRAWBERRIES	\$ 45,454	6	19,989	13	\$ 2.27	31	\$ 0.29
TANGERINES	\$ 37,148	8	57,915	3	\$ 0.64	72	\$ 0.08
THYME, FRESH	\$ 286	66	17	78	\$ 16.79	4	-
TOMATOES	\$ 16,389	14	19,199	14	\$ 0.85	63	\$ 0.11
TOMATOES, CHERRY	\$ 8,856	23	4,172	33	\$ 2.12	32	\$ 0.18
TOMATOES, GRAPE	\$ 14,843	16	7,486	24	\$ 1.98	33	\$ 0.16
WATERMELON	\$ 12,325	20	27,946	8	\$ 0.44	82	\$ 0.00
WATERMELON, SNACK PACK	\$ 2,535	38	780	44	\$ 3.25	25	-
TOTAL FRESH FOOD	\$ 855,102		703,555				
TOTAL FRESH PRODUCE	\$ 849,817		699,032				

Appendix E. Local Food Products Purchased by Sarasota County (Florida) School District, 2014–2015 Academic Year

Product	Annual Total				Annual Average		\$/Serving
	Cost (\$)	Rank	Weight (lbs.)	Rank	\$/lb.	Rank	(1/4 cup)
BASIL, FRESH	\$ 293	30	17	34	\$ 17.00	1	-
BROCCOLI, FLORETS	\$ 5,477	14	1,563	20	\$ 3.50	10	\$ 0.12
BROCCOLI, WHOLE HEAD	\$ 420	25	603	23	\$ 0.70	29	\$ 0.07
CABBAGE, GREEN	\$ 374	26	800	21	\$ 0.47	35	\$ 0.03
CABBAGE, RED	\$ 15	36	30	30	\$ 0.50	34	\$ 0.04
CAULIFLOWER, FLORETS	\$ 2,392	20	604	22	\$ 3.96	8	\$ 0.22
CAULIFLOWER, HEAD	\$ 882	22	314	24	\$ 2.81	11	\$ 0.22
CELERY, STICKS	\$ 624	24	163	27	\$ 3.84	9	\$ 0.27
CELERY, WHOLE	\$ 4,799	18	6,770	10	\$ 0.71	28	\$ 0.06
CUCUMBERS	\$ 7,076	10	9,672	9	\$ 0.73	27	\$ 0.07
CUCUMBERS, SLICED	\$ 712	23	163	27	\$ 4.38	7	\$ 0.35
DILL, FRESH	\$ 355	28	21	31	\$ 16.90	4	-
EGGS, LARGE	\$ 4,882	16	4,185	16	\$ 1.17	20	-
GRAPEFRUIT	\$ 11,855	7	20,194	4	\$ 0.59	31	\$ 0.09
GREEN BEANS	\$ 19,968	5	11,100	8	\$ 1.80	15	\$ 0.08
KALE	\$ 230	33	193	26	\$ 1.19	18	\$ 0.03
LETTUCE, HEAD	\$ 16	35	13	36	\$ 1.28	17	\$ 0.06
LETTUCE, SPRING MIX	\$ 30,851	4	6,392	11	\$ 4.83	6	\$ 0.22
ORANGES	\$ 33,978	2	59,940	1	\$ 0.57	32	\$ 0.16
OREGANO, FRESH	\$ 306	29	18	33	\$ 17.00	1	-
PARSLEY, FRESH	\$ 252	32	21	31	\$ 12.00	5	-
PEPPERS, GREEN	\$ 2,407	19	2,316	18	\$ 1.04	23	\$ 0.11
PEPPERS, RED	\$ 361	27	228	25	\$ 1.58	16	\$ 0.16
POTATOES, FINGERLING	\$ 5,499	13	4,700	14	\$ 1.17	19	\$ 0.12
POTATOES, RED	\$ 15,826	6	28,200	3	\$ 0.56	33	\$ 0.06
RADISH, RED	\$ 75	34	80	29	\$ 0.94	24	\$ 0.07
ROMAINE, WHOLE	\$ 1,302	21	1,653	19	\$ 0.79	26	\$ 0.03
SQUASH, YELLOW	\$ 4,867	17	4,285	15	\$ 1.14	21	\$ 0.16
SQUASH, ZUCCHINI	\$ 5,201	15	4,763	13	\$ 1.09	22	\$ 0.09
STRAWBERRIES	\$ 44,896	1	19,809	5	\$ 2.27	12	\$ 0.29
TANGERINES	\$ 33,903	3	52,965	2	\$ 0.64	30	\$ 0.08
THYME, FRESH	\$ 281	31	17	35	\$ 17.00	1	-
TOMATOES	\$ 11,119	9	12,638	7	\$ 0.88	25	\$ 0.12
TOMATOES, CHERRY	\$ 5,745	12	2,579	17	\$ 2.23	13	\$ 0.18
TOMATOES, GRAPE	\$ 11,176	8	5,184	12	\$ 2.16	14	\$ 0.18
WATERMELON	\$ 5,848	11	13,468	6	\$ 0.43	36	\$ 0.00
TOTAL FRESH FOOD	\$ 274,261		275,657				
TOTAL FRESH PRODUCE	\$ 269,379		271,472				

Appendix F. Total and Local Fresh Fruit And Vegetable Purchases of Sarasota County (Florida) School District by School, 2014–2015 Academic Year

School	Totals				Title I School
	ALL	Florida	% Sourced from Florida	Rank	Yes/No
Alta Vista Elementary-Sarasota	\$ 59,053	\$ 17,550	29.7%	32	Yes
Ashton Elementary	\$ 16,167	\$ 5,398	33.4%	16	No
Atwater Elementary	\$ 25,343	\$ 7,417	29.3%	33	Yes
Bay Haven School	\$ 14,857	\$ 5,090	34.3%	11	No
Booker High	\$ 19,071	\$ 6,422	33.7%	13	No
Booker Middle	\$ 22,906	\$ 7,375	32.2%	24	Yes
Brentwood Elementary	\$ 21,230	\$ 7,098	33.4%	15	Yes
Brookside Middle	\$ 12,834	\$ 5,299	41.3%	1	No
Cranberry Elementary	\$ 23,926	\$ 6,898	28.8%	35	Yes
Emma E Booker Elementary	\$ 46,266	\$ 12,410	26.8%	37	Yes
Englewood Elementary	\$ 13,657	\$ 4,448	32.6%	21	No
Fruitville Elementary	\$ 14,782	\$ 5,377	36.4%	6	No
Garden Elementary	\$ 19,025	\$ 6,992	36.8%	3	No
Glenallen Elementary	\$ 31,760	\$ 8,416	26.5%	38	Yes
Gocio Elementary	\$ 19,353	\$ 5,790	29.9%	31	Yes
Gulf Gate Elementary	\$ 17,546	\$ 5,642	32.2%	25	No
Heron Creek Middle	\$ 21,028	\$ 7,486	35.6%	8	No
Lakeview Elementary	\$ 25,789	\$ 8,422	32.7%	20	No
Lamarque Elementary	\$ 37,616	\$ 11,527	30.6%	29	Yes
Laurel-Nokomis	\$ 27,647	\$ 10,148	36.7%	5	No
McIntosh Middle	\$ 15,147	\$ 5,281	34.9%	10	No
North Port High	\$ 33,563	\$ 10,871	32.4%	22	No
Oak Park School	\$ 18,158	\$ 7,372	40.6%	2	No
Phillippi Shores Elementary	\$ 18,162	\$ 6,669	36.7%	4	No
Pine View School	\$ 17,700	\$ 4,647	26.3%	39	No
Riverview High	\$ 26,112	\$ 7,631	29.2%	34	No
Sarasota High	\$ 28,222	\$ 10,035	35.6%	9	No
Sarasota Middle	\$ 18,385	\$ 6,176	33.6%	14	No
Southside Elementary	\$ 11,451	\$ 4,082	35.7%	7	No
Tatum Ridge Elementary	\$ 25,133	\$ 8,475	33.7%	12	No
Taylor Ranch Elementary	\$ 17,424	\$ 5,712	32.8%	19	No
Toledo Blade Elementary	\$ 21,238	\$ 6,435	30.3%	30	Yes
Tuttle Elementary	\$ 20,408	\$ 6,337	31.0%	28	Yes
Venice Elementary	\$ 13,478	\$ 4,202	31.2%	27	No
Venice High	\$ 22,549	\$ 7,514	33.3%	17	No
Venice Middle	\$ 11,573	\$ 3,728	32.2%	23	No
Wilkinson Elementary	\$ 18,187	\$ 4,894	26.9%	36	Yes
Woodland Middle	\$ 28,363	\$ 9,399	33.1%	18	No
TOTAL	\$ 855,103	\$ 274,664			

Farm Direct at five years: An early assessment of Oregon's farm-focused cottage food law

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Abstract

In 2011, the Oregon legislature passed the Farm Direct Marketing Law (FDML), which took effect in 2012. The law clarified licensing and food safety requirements for direct-to-consumer sales at farmers markets, farm stands, and similar venues. It also included a “cottage food” provision allowing farms to make and sell certain low-risk, value-added products from farm-grown ingredients, direct to consumer, without a food processor's license. Advocates predicted enhanced small farm viability through new products and revenue streams, market season extension, reduced

processing costs, test marketing opportunities, and other avenues. Detractors warned the deregulation would cause outbreaks of foodborne illness. In 2016, the law's fifth year, we explored these predictions and early outcomes. We conducted a focus group with stakeholders and semistructured interviews with two key informants, 18 farmers, and 24 farmers market managers around Oregon. We found farmers making and selling a variety of value-added products under the FDML. We found no foodborne illness linked to FDML products. Interviewees described multiple benefits resulting from the law, many corresponding to predicted benefits. They also described unanticipated benefits at the community level. Interviewees identified barriers and recommended changes related to the law and related education. We discuss the feasibility of these recommendations as well as the long-term potential of the cottage food provision. We end by reflecting on the FDML as a whole, as it supports Oregon's direct market farming sector.

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Keywords

Farm Direct Marketing, Cottage Food, Value-Added Food, Small Farms, Local Food, Food Policy, Producer-Processed, Farmers Market, Food Safety, Oregon, Direct-to-Consumer Sales

Introduction

In this paper, we provide an early-stage look at the impact of Oregon's Farm Direct Marketing Law (FDML) five years after it went into effect in 2012. The FDML was designed to resolve ambiguity about how direct-to-consumer sales of fresh produce should be regulated with regard to food safety. In addition, a cottage food provision created an exemption which allowed farmers to process their own farm-grown produce into low-risk, value-added foods and sell them direct to consumers without a food processor's license. At the time of its passage, the FDML was considered an important victory for the direct-market farming sector and a recognition that local food and "knowing your farmer" were valued by Oregonians (Brekken, 2012). Those in favor of the law predicted it would not only ease farmer concerns about regulatory ambiguity and burden, but would generate new enterprises and income streams to support overall farm profitability (Bauer, 2011; Brekken, 2012; Lies, 2011; Terry, 2011; Love, 2011). Those who argued against the law predicted increased risk and prevalence of foodborne illness (Brekken, 2012; Lies, 2011; Terry, 2011).

Five years after the law took effect, we interviewed farmers and farmers market managers about their experiences with the FDML, focusing on the cottage food provision that exempts some producer-processed products from food safety licensing and inspection. We heard from farmers who are making and selling these products that their farming businesses had benefited in a variety of ways, as predicted. We also heard from farmers and farmers market managers about unpredicted ripple effects at the community level. We heard about imperfections in the law and associated rules, as well as a need for additional education and outreach. Regarding food safety concerns, we found no foodborne illness outbreaks that were linked to FDML products.

These findings are useful on three levels. First,

while 48 states in the U.S. have some type of cottage food law, there is little direct research on these laws. Our study fills this gap by providing an early assessment of the perceived benefits and risks of Oregon's foray into cottage foods. In this way, we are dipping a toe into an expanding literature on scale, direct marketing, cottage foods, and food safety risk. Second, by identifying both farm- and community-level benefits that may be emerging, our study lays the groundwork for further exploration of how cottage food laws might benefit not just farm viability—the primary focus of the law—but also rural economies and community food security. Finally, our findings provide initial insights for practitioners and policymakers considering how to support direct marketing farming without risking consumer safety. Our findings are most relevant to Oregon but have application to any state with or considering cottage food laws.

This paper has five sections. First, we provide summary data on direct to consumer marketing in Oregon as important context for the FDML and then briefly describe the law itself. We then situate the law and our study in the context of existing research, beginning with the legal landscape for small, direct, processed food sales. We then turn to the political and scientific landscape for such sales, centering on the arguments for and against the law at the time of passage. At the end of the introduction, we outline our study and our questions. In the second section, we describe our methods. In the third section, we present our results, structured around our research questions. In the fourth section, we discuss those results by exploring possible next steps for Oregon's direct marketing farming sector and related research. We conclude in the final section by reflecting on the FDML as a whole.

Small, Direct, Processed: Balancing Economic Benefits and Food Safety

Oregon has been in the forefront of local and direct-to-consumer (DTC) marketing in the U.S. The 2015 USDA Local Food Marketing Practices Survey found that about 5.5% of all US farms reported US\$3 billion in DTC sales, with two-thirds occurring at on-farm stores and farmers markets (U.S. Department of Agriculture National Agricultural Statistics Service [USDA-NASS],

2016). In Oregon, about 12% of farms—more than double the national rate—engage in DTC marketing, with sales of over US\$53 million from an estimated 4,252 farms in 2015; this accounts for almost half of the total US\$114.4 million value of local sales in the state, with 81% of local food farms selling DTC (USDA-NASS, n.d.). Nationally, Oregon ranks 11th in number of farms with local sales, 19th in total value of local sales, and 8th for local sales of fresh produce (Oregon Department of Agriculture, 2016), even though it ranks 28th in total value of agricultural products sold (USDA-NASS, 2017). While we know that approximately 3,000 Oregon farms and ranches reported value-added sales of US\$43.5 million through all local marketing channels, data on the portion of value-added sales that were sold DTC are not available (USDA-NASS, n.d.). Given the high interest in local production and consumption, especially for fresh produce, analysts have suggested there is room to expand value-added processing (Sorte & Rahe, 2015). This can boost both returns to producers and the overall economic impact of agriculture, even at a small, local scale (Alonso, 2011; Alonso & Northcote, 2013; Miller, 2015; Tarr, 2011).

The strategies to expand DTC and value-added processing and sales could take many forms, including establishing public and private initiatives to form value-added businesses, investing in infrastructure such as commercial kitchens, creating buy-local programs, or offering training and education (Alonso, 2011; Alonso & Northcote, 2013; Alonso & O'Neill, 2011; Tarr, 2011). Cottage food laws are one avenue to lower or reduce regulatory hurdles and the costs of value-added processing, and these laws are now in place in 48 states (Leamy, 2017). Oregon's Farm Direct Marketing Law (ORS 616.683) was passed by the Oregon Legislature in May 2011 and went into effect January 1, 2012. The Oregon Department of Agriculture (ODA) finalized regulations on June 1, 2012 (OAR 603-025-1215 to 603-025-0275). The FDML, described in detail by Brekken (2012), is specific to DTC sales and has three provisions. The first provision and primary goal was to resolve ambiguity surrounding the state's jurisdiction over "food establishments" by clarifying that the

physical spaces for DTC farm sales—farmers market sites, CSA drop sites, farm stands—are excluded from the definition of "food establishments" subject to licensing laws. The farm direct marketer is solely responsible for any regulatory or licensing requirements. The second provision legally distinguished farm direct marketers from "produce peddlers" that primarily buy and resell produce. The third is the cottage foods provision, which deregulated certain low-risk, value-added products processed by farmers for DTC sales. This third provision is the focus of this study.

The Legal Landscape for Small, Direct, Processed Food Sales

In 2011, the same year the Oregon Legislature passed the FDML, President Obama signed the federal Food Safety Modernization Act (FSMA). The purpose of the FSMA was to establish and expand food safety regulation for produce farmers, food manufacturers, and related supply chain businesses (Boys, Ollinger, & Geyer, 2015; Miller, 2015; Tarr, 2011). These two laws are very different in that the federal FSMA creates new rules and Oregon's FDML prevents new rules and relaxes existing rules. Yet, they are both shaped by the idea that scale—defined by sales, geographic reach, and the number of links in the supply chain—is linked to the risk of foodborne illness. For FSMA, this is embodied in the fact that farms with less than US\$25,000 in annual sales are not covered by the Produce Rule (the "de minimis" exemption, i.e., these sales are too minor to merit consideration by the law). This idea that scale is linked to the risk of foodborne illness is also supported by the Tester Amendment to FSMA, which created a "qualified exemption" for produce farmers who sell the majority of all food they produce to consumers, restaurants, or retailers—either within the state or a 275-mile radius—and sell less than US\$500,000 per year (Boys et al., 2015; Miller, 2015; National Sustainable Agriculture Coalition, 2016). Proponents of the Tester Amendment and Oregon's FDML argued against a "one size fits all" approach to food safety, based not only on food safety risk but on the risk of unnecessarily burdening small farms with compliance costs. These proponents justified their argument by citing the

closer relationship between producers and consumers geographically and in the supply chain (Boys et al., 2015; Miller, 2015).

The Tester Amendment rests, in part, on the idea that states and localities can better regulate these smaller operations (Miller, 2015). States have historically retained the ability to regulate for the health, safety, and welfare of citizens within their borders; however, they have adopted the U.S. Food & Drug Administration's (FDA) Food Code, in whole or in part, to harmonize across state lines (US FDA, 2017). To date, all but two states (Hawaii and New Jersey) have amended their food codes by adopting cottage food laws that allow in-state sales of low-risk foods prepared in a home kitchen without a food processing license (Leamy, 2017). The justification for cottage food laws is the same as that of the Tester Amendment to FSMA:

removing barriers to low-risk value-added processing to expand microenterprise opportunities for small-scale producers and food entrepreneurs—with concomitant benefits to communities—while protecting public health by narrowly defining the exemption and adding labeling requirements (Condra, 2013; Leamy, 2017; Miller, 2015; Tarr, 2011).

There is a wide variation in state cottage food laws; Oregon's FDML is a "middle of the road" law compared to other states in its coverage of the five typical aspects of cottage food laws, see Table 1 (Condra, 2013; Leamy, 2017). The most restrictive aspect of Oregon's law, which made it unique, is that it applies only to farmers using their own farm-grown ingredients (Oregon Revised Statute § 616.683).

Table 1. Comparison of Oregon with Other State Cottage Food Laws

Aspect of Law	Oregon Farm Direct Marketing Law (FDML)	Other State Cottage Food Laws
Type of food	Non-potentially hazardous foods (pickles, jams, dried products, etc.) made by the farmer from farm-grown produce (except certain nonprincipal ingredients, e.g., salt, vinegar, pectin, lemon juice, and sugar) using a recipe from a recognized process authority such as USDA's <i>Complete Guide to Home Canning</i> or a recipe pre-approved by a recognized process authority.	"Non-potentially hazardous" foods that do not require refrigeration, with a pH level below 4.6, and/or a low moisture content; some states have a list of allowed foods. Typically pickles, jam, dried food, and baked goods are allowed. Only four states allow potentially hazardous food (e.g., dairy); Wyoming allows any homemade food product except red meat.
Who and where	Sales must be direct from the producer/processor to a consumer at any direct sales venue (e.g., farmers market).	Sales must be direct to consumer; many states restrict sales to farmers markets, farm, or home (or some combination thereof).
Sales cap	Gross sales of producer-processed foods must not exceed US\$20,000 per year.	Half of state laws have no upper limit; the other half range from US\$5,000 to US\$50,000 in sales per year.
Registration and licensing	None required, but farmers must keep processing records (e.g., recipes, pH testing) and are subject to inspections and licensing by the state agriculture department if a food safety question arises.	Twenty states have no registration or requirements, and eight have no registration but some requirements. The remainder have registration and requirements, 13 of which have registration with heavy obligations such as food safety certification.
Labeling requirements	Products must be labeled with product identity, name and address of producer, net weight, list of ingredients (including any major allergens), and "THIS PRODUCT IS HOMEMADE AND IS NOT PREPARED IN AN INSPECTED FOOD ESTABLISHMENT" and "NOT FOR RESALE" in all capital, boldface type no less than 1/8" (3.175 mm).	Forty-six out of 48 states require labeling such as the common name of the food, name of the producer, contact information for the producer, information on weight or quantity of food being sold, and ingredients. Two states have no labeling requirements.

Source: Leamy, 2017.

The Political and Scientific Landscape for Small, Direct, Processed Food Sales

The FDML passed with strong support, with only 16 of 90 legislators opposing (The Oregonian, n.d.). However, getting there was not easy, largely because of debate about the cottage food provision. In this section, we describe the political arguments and scientific evidence in favor of cottage food laws in general and in favor of the FDML in particular. We also describe the political arguments and scientific evidence against them. We conclude with a summary of the tradeoffs faced by policy makers and then introduce our research questions.

Arguments and evidence in favor of cottage food laws

The primary argument for the FDML cottage food provision, echoed in the literature, was that it would support farm economic viability through multiple, interlinked mechanisms: removing ambiguity about on-farm post-harvest handling of direct-marketed foods; reducing fixed and per-unit processing costs; creating new products and new income streams; turning excess or unsold harvest into marketable product; extending the market season with shelf-stable products; test marketing before investing in infrastructure; and processing quantities too small for a co-packer to handle (Bauer, 2011; Brekken, 2012; Lies 2011; Love, 2011; Terry, 2011). Research on food safety regulation impacts on small food businesses and value-added processing indicates that increasing fees and requirements can add costs and barriers that keep some small-scale firms out of the market, while value-added processing has benefits such as using produce that would otherwise go to waste (Alonso, 2011; Alonso & O'Neill, 2011; Alonso & Northcote, 2013; Antle, 2000; DeLind & Howard, 2008; Worosz, Knight, Harris, & Conner, 2008). Conversely, others have argued that regulations can provide operational benefits for small food processors (Buckley, 2015; Fairman & Yapp, 2005; Mensah & Julien, 2011). In a 2017 report, a survey of U.S. cottage food producers finds that the cost of constructing or renting a commercial kitchen is a barrier to starting a value-added business (Leamy, 2017); other research has pointed to the lack of commercial kitchens in rural areas (Alonso, 2011; Alonso & O'Neill, 2011;

Leamy, 2017; Tarr, 2011). A review of states that require registration of cottage food businesses finds that thousands of new businesses have been formed since the laws were passed (Leamy, 2017).

An auxiliary argument in favor was that the provision would reduce the regulatory burden on the state without taking away regulatory oversight altogether. By exempting small-scale, non-potentially hazardous products, the public sector could focus limited enforcement resources on high-risk, high-volume foods that are more likely to sicken many people (Brekken, 2012; Leamy, 2017; Love, 2011; Terry, 2011). This is a general argument in the literature on scale and food safety regulation (e.g., DeLind & Howard 2008).

Benefits to local economies and food security are also prevalent arguments in support of cottage food laws and increasing value-added processing or DTC sales in general (Alonso, 2011; Alonso & Northcote, 2013; Alonso & O'Neill, 2011; Miller, 2015; Tarr, 2011). These arguments were not at the forefront during the debate on the FDML; however, they emerged in Oregon in 2015 during debate of the state's second cottage food law, the Home Baking Bill (SB320) (Leamy, 2017; Thomas, 2015). This law allows the unlicensed production and DTC sale of baked goods, candies, and confections by any home baker from any ingredients, not just farmers using their own farm-grown produce (Gwin, 2018). Studies in Oregon and elsewhere have identified economic impact related to local food, though not specifically for DTC sales or cottage food (Rahe, Van Dis, Weiland, & Gwin, 2017). As Jablonski, Hendrickson, Vogel, and Schmit (2017) explain in a recent review article, local food systems can generate rural economic development, but social, cultural, physical, political, and other forms of wealth that contribute to community well-being are also meaningful outcomes that deserve more attention. For example, researchers have suggested that farmers markets and other DTC venues can increase healthy food access in rural communities (Johnson et al., 2014). However, there is still little empirical evidence of these claims, especially related to direct sales of processed foods. Our study begins to fill this research gap.

Arguments and evidence against cottage food laws

The argument made against the cottage food provision in the FDML was that reduced regulatory scrutiny would allow unsanitary production practices that in turn would cause foodborne illness outbreaks, even for non-potentially hazardous products sold in small quantities. The Northwest Food Processors Association and the Oregon Farm Bureau opposed it on these grounds (Bauer, 2011; Leamy, 2017; Lies, 2011; Terry, 2011). Empirical research on actual food safety outcomes resulting from small-scale farms, direct marketing, or cottage food laws is limited but emerging (Miller, 2015; Young, Thaivalappil, Reimer, & Greig, 2017). A 2017 meta-analysis of food safety at farmers markets in the U.S. and Canada found not only that foodborne illness resulting from farmers market sales is rare but also that many studies have only investigated farmer, market manager, and regulator practices, knowledge, or experience related to food safety protocols rather than outcomes (Young et al., 2017). Research on scale and food safety concludes that different scales generate different food safety challenges; thus, regulation and education must emphasize scale-appropriate interventions (Buckley, 2015; Clayton, Griffith, Price, & Peters, 2002; DeLind & Howard, 2008; Fairman & Yapp, 2005; Parker, DeNiro, Ivey, & Doohan, 2016; Yapp & Fairman, 2006). Only one study was identified that specifically focused on cottage food laws, in which surveyed state regulatory officials and food safety educators nationwide reported their perceptions of existing knowledge and capital gaps of cottage food producers rather than actual outcomes (Harrison, Critzer, & Harrison, 2016). Our study, by exploring the actual food safety outcomes related to a specific cottage food law, adds to the currently limited empirical research on this topic.

One challenge in the design of cottage food laws is that the restrictions on products, locations, ingredients, recipes, sales caps, and labelling can make them operationally unfeasible, such that users struggle to follow the rules (Brekken, 2012; Leamy, 2017). This could result in fewer eligible producers taking advantage of the opportunity to engage in value-added sales, or it could lead to violations of the law that undermine the credibility of FDML

products. After the law passed, advocates were concerned that the FDML cottage food provision was too narrow, limiting who could benefit, too complex, and too difficult to communicate and follow (Brekken, 2012). Another concern was that farmers markets might require vendors to have liability insurance at a level that would cost more than the profits made from value-added or DTC sales (e.g., Boys et al., 2015). Existing studies of the operational feasibility of cottage food laws focus on how the laws are written. Our study provides an empirical look at this issue for users, in practice.

Policy tradeoffs and continuing debate about cottage food laws

Food safety regulation that requires licensing, inspections, and labeling is generally justified as a way to ensure the visibility, reliability, accountability, and traceability of foods sold to the public (Stearns, 2010). The literature on farm direct marketing in general—and cottage food laws in particular—articulates the inherent tension between reducing food safety regulation to expand food and farm entrepreneurship and the public interest in food safety (Boys et al., 2015; Brekken, 2012; Condra, 2013; Leamy, 2017; Miller, 2015; Tarr, 2011). Overall, the empirical research indicates that small firms and direct sales of fresh or processed foods can create foodborne illness, but the total risk of harm to the public is small due to the design of cottage food laws and the small number of processors and consumers (Brekken, 2012; Condra, 2013; Leamy, 2017; Young et al., 2017). Oregon and 47 other states have weighed the benefits to individual farmers, entrepreneurs, and their communities against the increased risk of foodborne illness and have passed cottage food laws.

Study Purpose and Research Questions

To provide insights into the actual outcomes of Oregon's FDML provision, we conducted an early-stage assessment in 2016 to probe whether any of the predicted outcomes—positive and negative—of the FDML's cottage food provision had emerged in the law's first five years. We expected that it was still fairly early to see extensive evidence of any of these outcomes. We therefore designed

our assessment as exploratory and open-ended, not for statistical generalization, with the goal of laying the groundwork for a more comprehensive future study when more time had passed (Buckley, 2015). We structured our study around five specific questions:

1. Are farmers making and selling products under this provision, and if so, which products?
2. Has the FDML resulted in any food safety outbreaks?
3. How has the FDML benefitted farmers, the direct marketing sector, and communities?
4. What barriers do farmers face when using the FDML?
5. How could the law be improved?

On a practical level, these questions were designed to provide policymakers and stakeholders with information about how this law is working in practice. We had been asked these questions not only in Oregon but by local food organizations in other states with interest in similar opportunities for farmers in their states. On a broader level, these questions were designed to allow us to contribute to research on cottage food laws and direct sales of processed food, as noted above, by describing actual outcomes of a specific law.

Study Methods

For this exploratory, qualitative study, we began with a focus group and then conducted semistructured interviews with farmers, farmers market managers, and two additional key informants (Bernard, 2011). Farmers markets are only one possible market channel for producer-processed products, but starting at markets gave us access to many farmers at one time and allowed us to observe the different products labelled as being processed and sold under the FDML. Before beginning the

study, we received approval from our university's institutional review board.

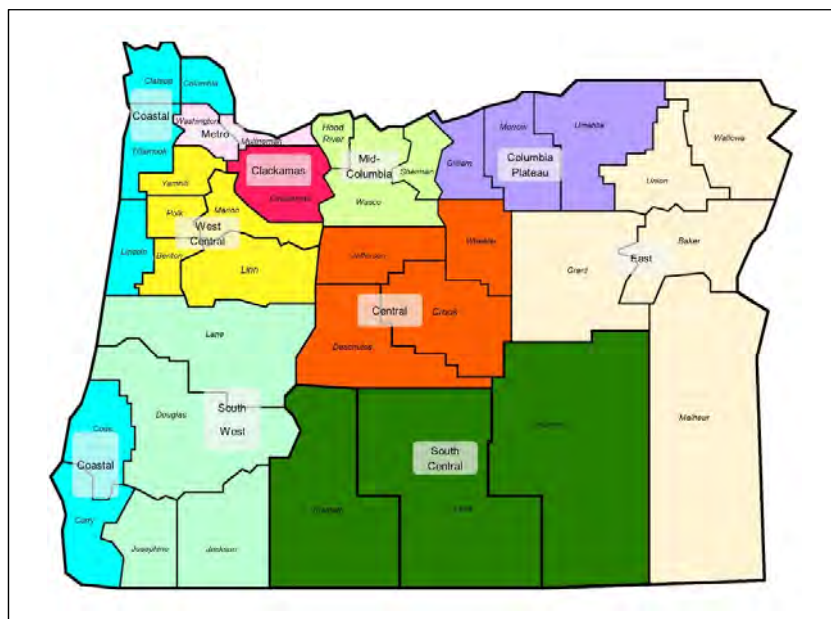
Focus Group and Key Informant Interviews

We began this research project by convening a two-hour focus group of five people active during the legislative and regulatory process that led to the FDML (Bernard, 2011). We asked a series of open-ended questions to elicit their opinions and experiences regarding how the law has affected Oregon farmers and local food systems. We used their answers to refine our research questions, our research design, and our interview questions. We then conducted semi-structured interviews with an ODA employee involved with implementation and an Oregon legislator who provided key support for the bill during passage. We asked open-ended questions relevant to those specific roles.

Farmer and Market Manager Interviews

We conducted 42 semistructured interviews with farmers ($n=18$) and farmers market managers ($n=24$). We aimed for a geographically diverse set of interviews around Oregon, using the 2016 map of Oregon State University (OSU) Extension regions (Figure 1) as a sampling matrix. Most of our interviewees were located in regions that support most of Oregon's farmers markets: the

Figure 1. Oregon State University Extension Regions (as of 2016)



population centers of the Portland Metropolitan region (Metro), Willamette Valley (Clackamas, West Central), Coastal Oregon, and South West Oregon. However, we also interviewed farmers and market managers in less populous areas, including the Columbia Basin, Eastern Oregon, and Central and South Central Oregon. Table 2 lists attempted and successful interviews by Extension region.

To recruit farmers, we visited 20 farmers markets in eight of the ten regions (except Columbia Plateau and South Central), located farmers selling FDML-labeled products, and asked them to participate in our study. In all, we contacted 30 farmers, and 18 chose to participate. To recruit market managers, we began with the Oregon Farmers Market Association's market directory. This directory is voluntary, but it is still the most comprehensive public list of markets and managers. We contacted every manager on the list by phone, email, or both, except in regions where we already had sufficient interviews. In all, we contacted 66 managers, and 24 chose to participate. We also found some farmers and market managers through a purposive snowball method from other farmer and market manager interviews (Bernard, 2011).

We developed an interview guide with open-ended questions corresponding to four of our five research questions (Bernard, 2011); we answered the foodborne illness question separately, as described below. Interview questions were open-ended to allow unexpected themes and patterns to emerge. We did not ask about specific predicted benefits but instead asked about benefits in general.

We conducted nearly all of the interviews

during the 2016 market season (July to September); most were by phone, five were in person, and two were by email. Interviews lasted between 30 and 60 minutes. We transcribed the interviews and coded them using the qualitative analysis software, Dedoose, using open, axial, and selective coding methods, developing codes in a constant comparative process (Robson 2011). We did not start with pre-determined codes—e.g., codes for the specific arguments for and against the law.

Limitations

As noted above, our qualitative assessment is exploratory and not designed for statistical generalization. We do not claim to be able to estimate what percentage of direct-market farmers in Oregon use this law in all direct-to-consumer venues. Our purposive, exploratory approach was more appropriate than attempting a representative sample (e.g., through a survey) for two reasons. First, there is no defined population to sample: the FDML provides an exemption from licensing, and no list of users exists. Second, our goal was to learn if and how the law was being used and to what effect, not to measure the number of farmers,

Table 2. Market Manager and Farmer Interviews by Oregon State University Extension Region

Region	Market Managers		Farmers	
	Contacted	Interviewed	Contacted	Interviewed
<i>More populous regions with more farmers markets</i>				
Metro	18	6	1	1
Clackamas	7	2	3	2
West Central	11	3	12	6
South West	6	3	7	5
Coastal	14	5	2	1
<i>Less populous regions with fewer farmers markets</i>				
Mid-Columbia	2	1	1	0
Columbia Plateau	2	0	0	0
Eastern	4	2	4	3
South Central	1	1	0	0
Central	1	1	0	0
Total	66	24	30	18

products, or sales. Our study provides the first glimpse of the impacts of this policy.

Food Safety Outbreak Data

Based on guidance we received from the Oregon Health Authority (OHA) and ODA, we examined the Center for Disease Control (CDC) database of foodborne illnesses to learn of any outbreaks attributable to FDML-allowed products since the law's passage. Oregon has a strong history of investigating and reporting foodborne illness to the U.S. Center for Disease Control (CDC) and is one of six states designated as a CDC Integrated Food Safety Center of Excellence (Center for Science in the Public Interest, 2015; OHA, n.d.). Oregon's system requires clinicians and laboratories who treat and test presumptive and confirmed foodborne illness cases to report to their county health departments, which then investigate and report to the OHA. OHA then investigates and reports outbreak data from all counties to the CDC FoodNet (Center for Science in the Public Interest, 2015; OHA, n.d.). The CDC database then reports all known foodborne illness outbreaks and details (if known) including the month and year, state, genus species and serotype or genotype, etiology status, location of preparation, number of illnesses, hospitalizations and deaths, the food product, and the contaminated ingredient. This is the most complete foodborne illness data in the United States. We reviewed CDC data on foodborne illness in Oregon from 2012 to 2016, the most recent data available (CDC, 2016; search results on file with authors). We analyzed this data to find sources that could be FDML foods through the location of preparation and the food product information.

Results

We present our results for each of our research questions, first listing the themes that emerged for each and then describing each theme based on interviewees' experiences. In summary, farmers around the state are using the FDML to sell value-added foods made in their home kitchens. The main argument against the FDML does not appear to have materialized: we found no evidence of widespread or acute foodborne illness resulting

from FDML foods. The farmers and market managers we interviewed reported most of the anticipated benefits and some additional, less expected benefits. They also described barriers to using FDML and made suggestions for improving the law.

Are farmers making and selling products under this provision, and if so, which products?

At 18 of the 20 markets we visited, farmers were selling value-added products under FDML. These products were clearly identifiable by their required labels. Several market managers said they had seen a steady increase over the years since the law was passed in the number of farmers using it and the number and variety of products. Managers are accurate reporters on this point because they collect and keep vendor records, including what products vendors are selling. The farmers we interviewed were making and selling a wide variety of products, including jams, jellies, and preserves; canned fruit and applesauce; pickled vegetables; relishes; sauerkraut; dried fruit; seasonings and seasoning salts; dried herbs and herbal teas; kale chips; soup mixes; kimchi; hot sauces; salsas; honey; granola; and homemade vinegars. Some farmers had one or two products, while others had more than a dozen.

Has FDML resulted in any food safety outbreaks?

We found no foodborne illness outbreaks that could be definitively traced to FDML foods. We found three instances in the "fair, festival, other temp or mobile services" category that were traced to catering or restaurants, neither of which is allowed to source and serve FDML foods. We found no outbreaks listed in the "farm/dairy" preparation site category. All illness outbreaks from food sources that could possibly have been a FDML product (e.g., "pickles," "berries," "salsa," "sauce," etc.) were traced to production at private residences, restaurants, or banquet facilities (CDC, 2016; search results on file with authors).

While the lack of cases in the CDC database does not unequivocally prove that FDML foods have not caused any foodborne illness, it is reasonably strong evidence that FDML foods have not caused a reportable outbreak. While not all

foodborne illnesses are reported and only about one-third of Oregon's reported cases identified both a pathogen and food source from 2003 to 2012, 45% of those outbreaks affected between 2 and 10 people. This demonstrates Oregon's investigation of small outbreaks, even from limited food sources (Center for Science in the Public Interest, 2015). It is also worth repeating that FDML does not undercut the ODA's authority to change or add rules as needed if foodborne illnesses become a problem. As a farmer who participated in our initial group discussion said, "If there is an issue, I believe the statute and rules give [ODA] the authority to deal with an unsanitary situation." In an interview with an ODA food safety specialist, we learned that ODA does not keep any formal records of illnesses related to the FDML, but that there were no known illness complaints associated with the FDML. Furthermore, the person explained, ODA does receive questions and complaints—such as requests for clarification of the rules—primarily from farm direct marketers who are monitoring other farm direct marketers. This creates a form of self-monitoring in the sector (W. Fargo, personal communication, April 9, 2018).

How has the FDML benefitted farmers, the direct marketing sector, and communities?

We asked farmers and market managers what the FDML has meant for them and their businesses, specifically the cottage foods provision.

Unprompted, responses clustered into seven general themes (Table 3) and included many benefits anticipated by the advocates of the FDML (described above), specifically those related to the economic viability of small farms. Farmers and market managers also identified community-level benefits that were not anticipated at the time of passage. We discuss each of the reported benefits, first discussing the anticipated benefits mentioned most, then the unanticipated benefits.

Create New, Supplemental Income Streams (Anticipated)

As noted earlier, one of the primary arguments for the passage of FDML was that it would boost farm income by creating new market opportunities and new, supplemental revenue streams. We learned from our interviews that this has indeed happened. It was one of the top two benefits that emerged from the interviews; it was raised by 10 farmers and three market managers. For example, a market manager observed that, in the years since the passage of FDML, her vendors had become "more creative about the number of products they can bring to market, which ultimately puts more money in their pocket." A farmer in Southern Oregon, who sold about US\$10,000 of FDML products annually, said this was, "a huge boon to our farm because, boy, it would be difficult at [US]\$10,000 to afford the flat infrastructure cost it would take to have a facility, but you know a small amount like

Table 3. Benefits Related to Using the Farm Direct Marketing Law (FDML) (N=42)

BENEFIT	Farmer (n=18)	Market Manager (n=24)	Total
<i>Anticipated</i>			
Create new, supplemental income streams	10 (56%)	3 (13%)	13 (31%)
Turn excess harvest and seconds into revenue, reduce waste and cost	9 (50%)	4 (17%)	13 (31%)
Add variety to market stall	5 (28%)	2 (8%)	7 (17%)
Test marketing, batches too small to co-pack, reduced per-unit cost	5 (28%)	0 (0%)	5 (12%)
Extend marketing season beyond availability of fresh produce	4 (22%)	1 (4%)	5 (12%)
<i>Unanticipated</i>			
Benefits to farms and communities in isolated rural regions	5 (28%)	1 (4%)	6 (14%)
Food security	2 (11%)	2 (8%)	4 (10%)

[US]\$10,000 really helps out our farm for the year.”

Turn Excess Harvest and Seconds into Revenue and Reduce Waste (Anticipated)

The opportunity to turn surplus harvest, unsold fresh products, and seconds into saleable, value-added products was the other benefit most often mentioned. One farmer said that this option, “helps me guard against a lot of product loss, like stuff that I would have had to either been composting or it would have been more jam than I could have used personally.” Another farmer uses otherwise unsalable culls from one crop in a recipe: “If I have a byproduct from, let’s say, planting garlic, I can use my small bulbs or small cloves and make an array of different flavored pickles,” for which, he added, he can get a higher price. Similarly, he uses his B-grade carrots and garlic in his kimchi.

Market managers also spoke to the value of using unsold produce. One manager explained, “It’s really good for the farmers...let’s say they have a bunch of strawberries and they can’t sell them all because it rained or something happened and people couldn’t come [to the market]. They can go home and make jam with it. Otherwise, they’d have to throw it in the compost pile... it’s a money loss.” While compost has economic value to the farm, both farmers and market managers equate product loss not only with financial loss but with unnecessary food waste. And although converting perishable produce into non-perishable value-added products has additional costs—including time, energy and materials—those per-unit costs are reduced significantly due to the FDML.

Add Variety to Market Stall (Anticipated)

An additional benefit of adding new product lines is variety itself. That is, the new products fill out the market booth, and that variety attracts different customers. As one farmer said, “It’s a guaranteed seller... You can have a day where the market is flat and you hardly sell any vegetables and so it sort of helps balance that.” Similarly, a market manager said, “When you have a lot at your booth, maybe a lot of produce that day, getting out several cases of canned things or dried things makes your booth

look full. That’s really helpful, because I’ve noticed that people tend to buy in booths that look more abundant than other booths... Humans gravitate toward abundance.”

Farmers also use value-added products as a lure. A market manager described a rancher who primarily sells meat but also a small amount of cucumbers and tomatoes. A frozen cut of meat that costs US\$10 per pound can seem expensive, but “if they put out a small jar of pickles that costs [US]\$5, people will buy the pickles before they buy the meat, and I think that helps them build trust in that farmer.” The manager reported that, for this rancher, that customer had come back to buy meat and was now a regular customer. As we discuss in more depth later, booths with preserved foods may also attract tourists.

Extend the Marketing Season (Anticipated)

Processed products can extend a farm’s marketing season into times when fresh product is less abundant, both supplementing income and smoothing out cash flow. A farmer explained that they now have something to sell at the early season and late fall markets, as well as a winter market. He described, “It keeps our cash flow more stable... it’s really helped to increase our shoulder season and create a more stable season for the farm altogether.”

Farmers are also able to market highly seasonal crops over a longer period. A tree fruit and berry farmer remarked, “It gave us a chance to give our crops shelf life... We need to be able to sell them for more than a few weeks of the year.” A third farmer noted that while her marketing season was not longer, it kicked off more successfully with FDML products on the table: “It doesn’t change the number of markets we attend but makes our table look much more full in the early weeks of the market.”

Reduce Financial Risk through Test Marketing (Anticipated)

Our fifth theme combined three predicted benefits of FDML: that producers could (a) test market products in small batches before investing in expensive licensing and infrastructure, or (b) process batches that are too small for co-

packing, (c) at a lower per-unit cost. Test marketing not only encourages small business development—and potential job creation if the business scales up—but also prevents significant financial loss for a farm if the product idea fails. While using a co-packer can be a successful and low-risk way to develop and test-market new products (Gwin & McCann, 2017), our interviews confirmed that many farmers in Oregon are not located near a co-packer or simply do not have enough raw product to meet a co-packer's minimum batch size. FDML allows farms to test-market, in very small batches, from their own kitchens, often at a per-unit cost lower than a co-packer would charge.

Test marketing serves several purposes, often simultaneously. First, a farm that sells FDML products can find out what customers like, allowing them to plan production and processing in future years. Then they can scale up or shift production and processing to focus on the few products that are top-sellers. At least four farmers we interviewed were using FDML with this in mind. "It gave us an opportunity to see what would work for us," a farmer said. Another explained that "there were some varieties of fruit spreads that we did that didn't sell as well as others, so it was really helpful to be able to not have to invest all our money [into the costs of a licensed facility]...that way we were able to branch out starting the second and third year knowing what we needed to grow more of."

If successful, the scaling up process can take farms above the FDML sales limit. A mid-scale, diversified produce farm selling mostly fresh produce into both direct and wholesale markets had recently added a small retail store on the farm with a wide variety of FDML products. The farmers have no intention of maintaining such a diverse product line: "We are trying things out to see what consumers respond to," said one of the farm owners. Each year, they plan to identify four top-selling products for scaled-up production in a licensed commercial kitchen.

Several farmers also made it clear that test-marketing on a small scale was their path to scaling up to larger volumes and wholesale marketing. "This is sort of a foothold for us to move in that direction," one farmer said, "so we can start to develop those [products], get good recipes, test our

marketing, and then step it up eventually. Then we can do wholesale marketing." A market manager shared a story about a farm selling dried beans and grains, grown in a region not normally known for those products: "They were having trouble with marketing, but [FDML] made it feasible to have a little bit of those products in markets and get some acceptance of locally raised grains." The farm has since expanded its production volume and market channels to include wholesale customers, outside of the FDML exemption. In a variation on this theme, another farmer envisions a scaled-up value-added food business that would source from her and other farmers who want to stay small. She explained, "Our biggest product by far is hot sauce, and it's small, 500 bottles last year, [US]\$8 or [US]\$9 per bottle. Our hot sauce is really popular ... if it's really that good, someone may want to scale that up."

However, not all farms are looking to grow. Some farmers said FDML allows them to stay small and not outstrip the capacity of both their farm and their community. A small-scale farmer in a rural area said that he did not expect to exceed the US\$20,000 limit. He explained, "I would have to have [on-farm] help, and I would probably have to be charging a lot more for my stuff, and people in this community and our area cannot afford a lot of the higher priced stuff."

Benefits to Farms and Communities in Isolated Rural Regions (Unanticipated)

Our research suggests that FDML may have particular significance for rural Oregon, which has a low population density, lower per capita income than urban areas of the state, has experienced a loss of rural grocery stores and access to fresh foods, and has a less favorable climate for growing fresh produce (Lurie & Brekken, 2017). A farmer in Eastern Oregon explained, "That's how everything is, this side of the state versus that side with agriculture...it's just so different here than it is over there." Farmers and market managers spoke to this in a variety of ways, and three stood out in particular: FDML has alleviated a lack of commercial kitchens, fits well within agritourism, and has the potential to generate community-level benefits beyond the farm.

Lack of commercial kitchens

Small food processors often start by renting time in a licensed commercial kitchen, but isolated rural areas often lack this infrastructure for local businesses. A farmer who now sells a popular line of fermented products and pickles said that FDML made legal what was practically impossible before. He was already making the products for his personal use, but lacked the capital to build his own licensed kitchen and was not sure he could produce enough to support such an investment. His rural community, and the surrounding area, had no commercial kitchen. He explained, “This is one of the least prosperous parts of Western Oregon... It’s miles away from anything and there’s no economy. ... The school closed down, the tavern closed down, the store closed, everything closed down. This is rural Oregon.” In his experience, FDML had created space to alleviate some of these challenges, though he hoped more would be done.

Another rural farmer described a similar situation: she would like to scale up beyond the US\$20,000 limit into licensed production, but she lacks the capital to build her own facility and the few available buildings in her small community would be very expensive to retrofit. She explained, “We’d have to leave and go to a different town... being rural, you know... those facilities are generally urban.”

Agritourism

As mentioned earlier, farmers can now make products that are an easier sell for “agritourists.” The state of Oregon is actively promoting agritourism as an economic development opportunity for rural communities and, more broadly, a way to strengthen rural-urban connections (Lurie & Brekken, 2017). One farmer in a coastal community said that the FDML had made it possible to make small batches of value-added products to sell as souvenirs or gifts, not groceries. His local farmers market, he said, “has a lot of tourists. Tourists don’t want to buy plant starts or bouquets, but they love to take jam home to Aunt Martha in Minneapolis. So it was a great outlet. ... Half of the jams and jellies that I sell are to tourists.”

Community benefits

FDML can generate economic benefits not only for farmers but for their communities. One market manager noted that, “every product that can be created in a community and sold at the market or a farm stand or CSA is one more thing that can actually be bought there, in rural communities that lack grocery stores.” And most rural stores, she continued, “aren’t going to have these jams, pickles, dried beans and grains.” These local products and businesses are also “creating a community where people want to be ... which is far more significant than the economic development,” said one farmer in an isolated part of Oregon.

Food Security (Unanticipated)

Because of our target interviewees and questions, most benefits raised were about farmers, as expected. However, increasing food security—specifically by making nutritious foods more available and affordable in isolated or low-income areas—was mentioned in our initial focus group and in four interviews as a potential benefit of the FDML. Value-added foods are not, by definition, nutritious, but the types of food farmers are making under the FDML contain whole foods, such as jams, pickles, dried beans, and grains.

A manager of a market in a low-income area between two more affluent cities said, “You have two ends of the spectrum... If you are in a more affluent neighborhood, it’s more of the foodie side of it, that they like the idea and they like having local fresh options, whereas on our side of it it’s just having more options.” Similarly, as noted in the test marketing section above, a farmer in a low-income rural area is keeping his costs low so his community can afford his products. Another farmer said, “Where we’re at, we’re in what they call a food desert, you know, it’s pretty sparse out there.”

In summary, we found evidence that the cottage foods provision of the Farm Direct Marketing Bill is working as advocates had hoped, in both urban and rural areas of Oregon. While the full extent of these impacts is beyond the scope of this paper, and potential long-term benefits (e.g., farm viability and rural economic development) will take time to materialize, we expect that more farmers will take advantage of this opportunity.

What barriers do farmers face when using the FDML? How could it be improved?

In our interviews, we asked whether there were any barriers to using the law and then asked, separately, how the law might be improved. Answers to these two questions, not unexpectedly, converged enough that we present these results together. In stark contrast to benefits, far fewer barriers were mentioned by farmers and market managers. In fact, three market managers and five farmers named no barriers or improvements at all, even when prompted two or more times. Market managers responded with their own opinions and also with what they had heard from their farmer vendors.

The barriers and improvements that were mentioned (Table 4) fall into two basic themes related to the law's operational feasibility: unclear rules and too many restrictions. We discuss each of these barriers and improvements below. As we discuss later in this paper, the list of suggested improvements includes those possible now and those requiring changes to the administrative rules, the interpretation of those rules, or the law itself.

Improving Clarity and Information

The barrier most often mentioned, by four market managers and two farmers, was not about the law itself but about a real or perceived lack of clear

information about the rules. This clearly echoes the concerns expressed when the law was passed, that the many qualifications made the exact requirements difficult to communicate to farmers and consumers. Farmers, for example, said that what counted as "approved" in "approved recipe" was not clear.

Interestingly, while the market managers also sought clarity on aspects of the law, they were equally concerned that farmers were not finding or using existing information. For example, one manager said, "the education, the resources, and the materials are out there," for example, from OSU Extension and the ODA. However, he continued, "I think bandwidth and capacity on a farm is a barrier."

Parallel to this, clarifying requirements and providing more information were together the most cited suggested improvements, named by two farmers and ten market managers. One farmer asked for the rules to be provided in a format "simpler than the legal version," referring to resources posted on the ODA website; market managers echoed this and also asked for Spanish-language versions in addition to English. Another farmer asked for clarification about a specific category of products that he believed the rules allowed but his county health inspector did not. Managers also asked for clarity about products that the rules

Table 4. Barriers and Suggested Improvements (N=42)

Barriers	Suggested Improvements	Farmer (n=18)	Market Manager (n=24)	Total
Unclear requirements and more information needed		2 (11%)	4 (17%)	6 (14%)
	Clarify rules; provide more information	2 (11%)	10 (42%)	12 (29%)
	Allow more product types	3 (17%)	1 (4%)	4 (10%)
Exemptions are too narrow	Allow more market channels	3 (17%)	0	3 (7%)
	Expand ingredients allowed	2 (11%)	0	2 (5%)
	Raise annual sales revenue cap	1 (6%)	0	1 (2%)
Labeling and recordkeeping requirements		2 (11%)	0	2 (5%)
Approved recipe requirement		0	1 (4%)	1 (2%)
Liability insurance*		1 (6%)	2 (8%)	3 (7%)

* Liability insurance is not mandated by the Farm Direct Marketing Law (FDML) but is required by some markets.

did not directly name but might actually allow, for example, frozen fruit, fruit vinegars, and kombucha. As one manager said, “None of us are looking for a way out of following the rules.... We just want it to be clear and science-based too.”

Managers also asked for more food safety education for farmers, for example on pH testing, sources of approved recipes, and food safety practices relevant to these products and their scale of production. One manager said, “Hand in hand with this kind of policy, states need to make sure there is adequate education for farmers.” Another noted that food preservation knowledge had “skipped a couple generations, so you gotta bone up on your skills. ... Their mothers didn’t do it, and maybe their grandmothers didn’t do it, and maybe they didn’t learn.”

Finally, six market managers and one farmer also suggested that more information about the law and its requirements be made available to the public. Managers want the public to know that FDML products are both safe and legal. The farmer asserted that if the public knew the rules, they would be less likely to buy from farmers who broke those rules. However, as one manager pointed out, consumers are much more likely to understand “farm direct” as a concept versus the FDML cottage food provision as a specific legal exemption: “I think it’s hard from a consumer perspective to know that those pickles are something that wouldn’t be available five years ago.”

Expanding the FDML Exemption

Other suggested improvements fall under the general category of “expand the exemption.” One farmer said FDML “is a step in the right direction....I’d like to see those restrictions loosened a bit more.” Their specific objections mirror the concerns raised at the time of passage, and most of their suggestions would require changes in the rules or the law. None of these suggestions were particularly surprising, given that the farmers we interviewed have already seen some success with these products and would like additional opportunities.

Three farmers wanted to make a broader range of products, from a pesto made of garlic greens or scapes that would not meet the acidity requirements of raw milk and cheese. Three farmers also

wanted to expand to more market channels, such as retail stores, restaurants, and through other farmers by consignment. Two farmers wanted to expand allowed ingredients, such as buying ingredients from a farmer at the same market with extra berries but no time to make jam. Only one farmer wanted to raise the sales cap.

Some farmers and market managers also felt that the labeling, recordkeeping, and approved recipe requirements were too strict. For farmers, labeling and recordkeeping were doable but an extra “hassle factor.” As one farmer said, “it’s not a big deal, but still, it takes time.” These objections to fairly simple requirements echoed what a market manager said she heard from farmers about having to use approved recipes. She remarked, “I think sometimes that can feel like a barrier, when in reality, I don’t really know that it is so much, but... I think there’s a perception that with [FDML] the concept is removing some of the rules... Then to find out that there’s certain t’s to cross and i’s to dot....” Part of this, she observed, was that farmers are often fiercely independent business owners and, “feel fortunate to have an opportunity not to be told what to do.” Ultimately, she said, even if a requirement is not truly a barrier in practice, “it can be a perceived barrier,” which she believed was “just as strong as [being] a barrier.”

Finally, one farmer and two managers discussed the need for liability insurance, which is not required by the law but rather by many markets, whether vendors sell processed or only fresh products. The two managers who mentioned this had heard it from a few farmers but doubted it was a common problem due to the relatively low cost of a policy and the risk management value.

In summary, farmers are processing and selling a wide variety of products under the FDML exemption. Based on the available data, no food-borne illness outbreaks have been linked to products made and sold under the law. Farmers and market managers described a range of benefits—primarily for farmers, but also for communities. Most of these benefits match the “pro” arguments during the passage of the law. Farmers and market managers identified barriers and suggested changes related to policy, education, and information.

Discussion

Our study explored early outcomes of Oregon's Farm Direct Marketing Law during its first five years. As such, our study provides a rare look at a cottage food law in practice, from the perspective of people actually using it. We provide much needed, albeit preliminary, empirical evidence about the farm- and community-level benefits, food safety outcomes, and operational feasibility of cottage food laws.

It appears that the cottage food portion of the FDML is working well so far. In summary, we found that many of the anticipated benefits and several that were unanticipated had occurred for at least some farmers and may be happening in some communities. This aligns with the purpose of the law and broadens its relevance.

The suggestions for improvements to the law echo some recommendations made by Leamy (2017) in his comparison of cottage food laws across the country and his survey of cottage food producers. For example, some interviewees proposed raising or removing the sales cap of US\$20,000 for producer-processed products. Leamy reasons that the limit on sales is practically imposed by the amount of product that can be made in a home kitchen. More than half of the states with cottage food laws have no limit on sales. While this might benefit farmers and their communities, the political feasibility of this in Oregon is uncertain, due to ongoing concern about foodborne illness. Licensed food processors might also object to increased competition from businesses that would be less regulated and have lower compliance costs.

Other suggestions for expanding the FDML could be more politically feasible because they more closely align with the goals of the law. For example, expanding the exemption to allow farmers to use produce from neighboring farmers could potentially expand the benefits of the law without compromising food safety. That assumes, however, that the farm doing the sourcing knows and trusts the neighbor's on-farm food safety practices.

Our study also revealed that existing education and information resources have been useful but need to reach a broader audience and address additional questions and topics. As of this writing,

OSU Extension and the ODA have responded to this with new workshops and publications (e.g., Runkel, Gwin, & Streit, 2018). To reach a broader audience, educational program design and outreach is being done by these entities in partnership with the state farmers market association, other community food system organizations, and farmers' own social and business networks.

If the range of benefits our interviewees identified are occurring more broadly for other farmers and communities around the state, and if those benefits grow over time, the FDML could have important long-term impacts on several levels, as discussed earlier. First, it could improve the long-term economic viability of small to mid-scale farms across the state. Second, this type and scale of food production and marketing could, more broadly, contribute to economic development and rural wealth creation. This can also happen in conjunction with other activities such as agritourism (Lurie & Brekken, 2017). Third, if the law actually increases access to value-added foods that are nutritious, the law could contribute to community food security. At the same time, food safety practices that are appropriate to the scale and type of these enterprises will be necessary to protect consumers from foodborne illness (Buckley, 2015; Condra, 2013; DeLind & Howard, 2008; Harrison, Critzer, & Harrison, 2016; Leamy, 2017; Yapp & Fairman, 2006).

Achieving the long-term potential of FDML for farms and communities requires action at different levels by different actors. At the most basic level, this begins with the market transaction: more farmers making and selling more products, and more consumers knowing about and purchasing these products. Yet, more is needed than farm entrepreneurship and consumer demand. Outreach and education have already expanded, including a focus on best practices related to food safety for the scale and type of farm, processing, and product. As noted already, additional research is needed to validate our initial suggestions about the benefits of the FDML while at the same time continuing to monitor for foodborne illness outbreaks or other negative outcomes. Longer-term empirical evidence, if positive, could allow advocates to push for regulatory or legislative changes to the existing

law and rules. Yet, advocates can also pursue public investment in commercial kitchens and business incubation services, if demand for these were sufficient, to support farmers and other small businesses interested in larger-scale, licensed production. Finally, rural communities and food security advocates also have a role to play if the FDML is conceived more broadly to achieve rural food security goals.

The success of such efforts will depend on the continued importance of the farm direct marketing sector to Oregonians, which was strongly signaled in 2011 by the passage of FDML. This holds true today; as a high-level ODA employee who typically focused on export markets and larger-scale agriculture said recently, “We have so many advocates and so much interest by people for the movement, sale, and purchase of Oregon food and agricultural products, that I would expect direct farm marketing to significantly expand in the near and long-term future” (ODA, 2016). Farmers and other local food system stakeholders, building on this influence, can use this study and the growing body of applied research about Oregon’s local food and direct market farming sector (e.g., Brekken, Parks, & Lundgren, 2017; Horst & Gwin, 2018; Lurie & Brekken, 2017; Rahe, Van Dis, Weiland, & Gwin, 2017; Trant, Brekken, Lev, & Gwin, 2018) to advocate for supportive public policy, from laws and regulations to the allocation of public resources.

In the course of our research, we heard several stories that support the idea that FDML was not simply a one-time win. For example, one market manager who participated in our group discussion pointed to a new seat at the table where regulatory agencies make critical administrative decisions:

In 2005, there was a reallocation of the license fees from ODA. We were not at the table, and we were hurt very badly. Small farms, farm direct marketing people ... got hit with higher fees ... [which] started a bad cycle in the regulatory relationship. This year, I’m on the food safety advisory committee. At the first mention of the new fees [in 2017], I walked up to the new Food Safety director and said we weren’t at the table last time and got screwed, so can we be at the

table, and now I’m there and have had a voice.


The FDML also provided a protective framework when new FSMA regulations appeared to have the potential to undo the exemptions for FDML products (Gwin & Landis, 2017). The vastly improved relationship between the state agricultural agency and farm direct marketing advocates was critical to maintaining the FDML in the face of pressure to tighten food safety regulations.

Conclusion

We conclude this paper by stepping back to consider Oregon’s Farm Direct Marketing Law as a whole. FDML has achieved what it was designed to do: resolve significant regulatory ambiguity for direct market sales of fresh produce and create a cottage food opportunity for Oregon farmers. While the cottage foods provision created space for farmers to develop new product lines and income streams, the other elements of the FDML were essential to the continued growth of farm direct marketing in Oregon because they prevented an anticipated *expansion* of regulations on the farm direct marketing sector by clarifying existing food safety laws. Without those provisions, farm direct sales might have been significantly curtailed in Oregon; instead, they have continued to grow.

Although Oregon has a large number of farms involved in direct marketing, a small number were predicted to take advantage of the FDML opportunities, and it was understood that it would take some time before consumers began to see producer-processed products at the market (Brekken, 2012). Similarly, it will take time for benefits to scale up to more farmers and communities. As one manager said, “what’s allowed under Farm Direct ... that was just what happened a hundred years ago, people made sauerkraut and they sold it at markets [laughs], we’re kind of reinventing a wheel in a way that I think it might take some time for it to actually settle into a really valuable and viable opportunity for farmers.”

Direct sales of small batches of value-added foods are unlikely, on their own, to guarantee a farm’s long-term success, community food

security, or rural economic development. However, these innovative, entrepreneurial farmers and their products are key ingredients in the recipe for long-term viability for farms and their communities. 

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References

- Alonso, A. D., & O'Neill, M. A. (2011). Interest in maximisation and value-added produce: a preliminary study from Chilton County, Alabama. *British Food Journal*, 113(5), 637–655. <https://doi.org/10.1108/00070701111131746>
- Alonso, A. D. (2011). Farmers' involvement in value-added produce: The case of Alabama growers. *British Food Journal*, 113(2), 187–204. <https://doi.org/10.1108/00070701111105295>
- Alonso, A. D., & Northcote, J. (2013). Investigating farmers' involvement in value-added activities: A preliminary study from Australia. *British Food Journal*, 115(10), 1407–1427. <https://doi.org/10.1108/BFJ-04-2011-0104>
- Antle, J. M. (2000). No such thing as a free safe lunch: The cost of food safety regulation in the meat industry. *American Journal of Agricultural Economics*, 82(2), 310–322. <https://doi.org/10.1111/0002-9092.00027>
- Bauer, K. (2011, February 9). Farm bulletin call to action. *Good Stuff NW*. Retrieved from <http://www.goodstuffnw.com/2011/02/farm-bulletin-call-to-action.html>
- Bernard, H. R. (2011). *Research methods in anthropology: Qualitative and quantitative approaches* (5th Ed.). Lanham, MD: AltaMira Press.
- Boys, K. A., Ollinger, M., & Geyer, L. L. (2015). The Food Safety Modernization Act: Implications for U.S. small scale farms. *American Journal of Law and Medicine*, 41(2-3), 395–405. <https://doi.org/10.1177/0098858815591524>
- Brekken, C. A. (2012). Can we have our (safe and local) cake and eat it too? Oregon re-crafts food safety regulations for farm direct marketed foods. *Journal of Agriculture, Food Systems, and Community Development*, 3(2), 95–108. <https://doi.org/10.5304/jafscd.2013.032.003>
- Brekken, C. A., Parks, M., & Lundgren, M. (2017). Oregon producer and consumer engagement in regional food network: Motivations and future opportunities. *Journal of Agriculture, Food Systems, and Community Development*, 7(4), 1–25. <https://doi.org/10.5304/jafscd.2017.074.008>
- Buckley, J. A. (2015). Food safety regulation and small processing: A case study of interactions between processors and inspectors. *Food Policy*, 51, 74–82. <https://doi.org/10.1016/j.foodpol.2014.12.009>
- Centers for Disease Control and Prevention (CDC). (2016). Foodborne Outbreak Online Database (FOOD Tool). Retrieved August 25, 2016, from <https://wwwn.cdc.gov/foodborneoutbreaks/Default.aspx> (Search results on file with authors.)
- Center for Science in the Public Interest (2015). *All over the map: A 10-year review of state outbreak reporting*. Retrieved from <https://cspinet.org/sites/default/files/attachment/all-over-the-map-report-2015.pdf>
- Clayton, D. A., Griffith, C. J., Price, P., & Peters, A. C. (2002). Food handlers' beliefs and self-reported practices. *International Journal of Environmental Health Research* 12(1), 25–39. <https://doi.org/10.1080/09603120120110031>
- Condra, A. (2013). Cottage Food Laws in the United States. *Harvard Food Law and Policy Clinic*. Retrieved from https://www.chlpi.org/wp-content/uploads/2013/12/FINAL_Cottage-Food-Laws-Report_2013.pdf
- DeLind, L. B. & Howard, P. H. (2008). Safe at any scale? Food scares, food regulation, and scaled alternatives. *Agriculture and Human Values* 25(3), 301–317. <https://doi.org/10.1007/s10460-007-9112-y>
- Fairman, R., & Yapp, C. (2005). Enforced self-regulation, prescription, and conceptions of compliance within small businesses: The impact of enforcement. *Law and Policy*, 27(4), 491–519. <https://doi.org/10.1111/j.1467-9930.2005.00209.x>
- Gwin, L. (2018). *Oregon's home baking bill: Residential kitchen exception for baked goods and confectionary items* (#EM 9192). Corvallis, OR: Oregon State University.

- Gwin, L., & Landis, R. (2017). *Farm Direct and FSMA: Why Oregon's pioneering farm direct law is (mostly) not affected by the federal Food Safety Modernization Act*. OSU Small Farms Technical Report. Corvallis: Extension Small Farms Program, Oregon State University. Retrieved from http://smallfarms.oregonstate.edu/sites/default/files/small-farms-tech-report/farm_direct_and_fsma.pdf
- Gwin, L., & McCann, N. (2017). Use it or lose it: Local food, regional processing and the perils of unused capacity. In Federal Reserve Bank of St. Louis, Board of Governors of the Federal Reserve System, and the U.S. Department of Agriculture (Eds.), *Harvesting Opportunity: The Power of Regional Food System Investments to Transform Communities* (pp. 151–171). Retrieved from https://www.stlouisfed.org/community-development/publications/~/_media/Files/PDFs/Community-Development/Harvesting-Opportunity/Harvesting_Opportunity.pdf?la=en#page=151
- Harrison, J. A., Critzer, F. J., & Harrison, M. A. (2016). Regulatory and food safety knowledge gaps associated with small and very small food businesses as identified by regulators and food safety educators—implications for food safety training. *Food Protection Trends*, 36(6), 420–427.
- Horst, M. & Gwin, L. (2018). Land access for direct market farmers in Oregon, USA. *Land Use Policy*, 75, 594–611. <https://doi.org/10.1016/j.landusepol.2018.01.018>
- Jablonski, B., Hendrickson, M., Vogel, S., & Schmit, T. (2017). Local and regional food systems driving rural economic development. In A. Dumont, D. Davis, J. Wascalus, T. Cheeks-Wilson, J. Barham, & D. Topp (Eds.), *Harvesting opportunity: The power of regional food system investments to transform communities* (pp. 57–77). St. Louis, MO: Federal Reserve Bank of St. Louis, Board of Governors of the Federal Reserve System, & the U.S. Department of Agriculture. Retrieved from https://www.stlouisfed.org/~/_media/Files/PDFs/Community-Development/Harvesting-Opportunity/Harvesting_Opportunity.pdf?la=en
- Johnson, D. B., Quinn, E., Sitaker, M., Ammerman, A., Byker, C., Dean, W. ... Sharkey, J. (2014). Developing an agenda for research about policies to improve access to healthy foods in rural communities: a concept mapping study. *BMC Public Health* 14, 592. <https://doi.org/10.1186/1471-2458-14-592>
- Leamy, N. (2017). *Can you make your cake and sell it too? Considering public value in private food production* (Master's thesis). Cambridge, MA: Harvard University. Retrieved from https://books.google.com/books/about/Can_You_Make_Your_Cake_and_Sell_it_Too.html?id=rrmaswEACAAJ
- Lies, M. (2011, February 11). Food safety exemption bill moves to floor. *Capital Press*. Retrieved from <http://www.capitalpress.com/content/ml-food-safety-bill-021111>
- Love, D. (2011, April 19). States advocate for legislation and regulation to support home-based micro-processing. *Farmers Market Coalition*. Retrieved from <https://farmersmarketcoalition.org/states-advocate-for-legislation-and-regulation-to-support-home-based-micro-processing/>
- Lurie, S., & Brekken, C. A. (2017). The role of local agriculture in the new natural resource economy (NNRE) for rural economic development. *Renewable Agriculture and Food Systems*, 1–11. <https://doi.org/10.1017/S174217051700062X>
- Mensah, L. D., & Julien, D. (2011). Implementation of food safety management systems in the UK. *Food Control*, 22(8), 1216–1225. <https://doi.org/10.1016/j.foodcont.2011.01.021>
- Miller, S. R. (2015). A coordinated approach to food safety and land use law at the urban fringe. *American Journal of Law & Medicine*, 41(2-3), 422–446. <https://doi.org/10.1177/0098858815591526>
- National Sustainable Agriculture Coalition. (2016). Understanding FDA's FSMA rule for produce farms. Retrieved from <http://sustainableagriculture.net/wp-content/uploads/2008/08/FSMA-PRODUCE-RULE-FINAL.pdf>
- Oregon Department of Agriculture (ODA) (2016, December 21). Local markets a vital part of Oregon agriculture. Oregon Department of Agriculture News. Retrieved from <http://odanews.wpengine.com/local-markets-a-vital-part-of-oregon-agriculture/>
- Oregon Health Authority (OHA) (n.d.). Foodborne disease and gastroenteritis outbreaks, Oregon Public Health Division. Retrieved from <http://www.oregon.gov/oha/PH/DISEASES/CONDITIONS/COMMUNICABLEDISEASE/OUTBREAKS/GASTROENTERITIS/Pages/index.aspx>

- Oregon Revised Statute § 616.683. (2017). Text available at <https://www.oregonlaws.org/ors/616.683>
- Oregon Senate Bill 320 (Enrolled). (2015). Text available at <https://olis.leg.state.or.us/liz/2015R1/Downloads/MeasureDocument/SB320/Enrolled>
- Oregonian, The/OregonLive. (n.d.). Your Government, 2011 Session, House Bill 2336. Retrieved from <https://gov.oregonlive.com/bill/2011/HB2336/>
- Parker, J. S., DeNiro, J., Ivey, M. L., & Doohan, D. (2016). Are small and medium scale produce farms inherent food safety risks? *Journal of Rural Studies*, 44, 250–260. <https://doi.org/10.1016/j.jrurstud.2016.02.005>
- Rahe, M., Van Dis, K., Weiland, J., & Gwin, L. (2017). *Economic impact of local food producers in Central Oregon*. Corvallis: Oregon State University. Retrieved from https://appliedecon.oregonstate.edu/sites/agscid7/files/economicimpact_localfoods_centraloregon.pdf
- Robson, C. (2011). *Real world research: A resource for users of social research methods in applied settings* (3rd ed.). Hoboken, NJ: John Wiley & Sons.
- Runkel, S., Gwin, L., Streit, L. (2018). *Oregon's Farm Direct Marketing Law: Producer-processed value-added products*. Corvallis: Oregon State University.
- Sorte, B. & Rahe, M. (2015). Oregon agriculture, food and fiber: An economic analysis. Oregon State University Extension Service. Retrieved from http://agsci.oregonstate.edu/sites/agsci.oregonstate.edu/files/oregon_agriculture_2015.pdf
- Stearns, D. W. (2010). On (cr)edibility: Why food in the United States may never be safe. *Stanford Law & Policy Review*, 21(2), 245–275.
- Tarr, N. W. (2011). Food entrepreneurs and food safety regulation. *Journal of Food Law and Policy*, 7(1), 35–68.
- Terry, L. (2011, February 16). Rules for Oregon farmers markets, formerly homegrown, could soon be law. *The Oregonian*. Retrieved from http://www.oregonlive.com/health/index.ssf/2011/02/rules_for_oregon_farmers_marke.html
- Thomas, C. (2015, June 10). Oregon legislature passes home baking bill. Public News Service. Retrieved from <https://www.publicnewsservice.org/2015-06-10/hunger-food-nutrition/oregon-legislature-passes-home-baking-bill/a46617-1>
- Trant, L., Brekken, C. A., Lev, L., & Gwin, L. (2018). Implications of the 2016 Oregon minimum wage increase for direct market farmers, farmworkers, and communities. *Sustainability*, 10(2), 370. <https://doi.org/10.3390/su10020370>
- U.S. Department of Agriculture, National Agricultural Statistics Service [USDA-NASS]. (n.d.). 2015 Local Food Marketing Practices Survey Quick Stats: Oregon. Retrieved from <https://quickstats.nass.usda.gov/results/F56FD130-F71A-3904-9490-E7610683DFE0>
- USDA-NASS. (2017). 2017 State Agricultural Overview: Oregon. Retrieved from https://www.nass.usda.gov/Quick_Stats/Ag_Overview/stateOverview.php?state=oregon
- USDA-NASS. (2016, December). *Direct Farm Sales of Food: Results from the 2015 Local Food Marketing Practices Survey*. Retrieved from https://www.agcensus.usda.gov/Publications/2012/Online_Resources/Highlights/Local_Food/LocalFoodsMarketingPractices_Highlights.pdf
- U.S. Food and Drug Administration. (2017). Food Code 2017. Retrieved from <https://www.fda.gov/Food/GuidanceRegulation/RetailFoodProtection/FoodCode/ucm595139.htm>
- Worosz, M. R., Knight, A. J., Harris, C. K., & Conner, D. S. (2008). Barriers to entry into the specialty red meat sector: The role of food safety regulation. *Southern Rural Sociology*, 23(1), 170–207. Retrieved from <http://journalofruralsocialsciences.org/pages/Articles/SRS%202008%2023/1/SRS%202008%2023%201%20170-207.pdf>
- Yapp, C., & Fairman, R. (2006). Factors affecting food safety compliance within small and medium-sized enterprises: Implications for regulatory and enforcement strategies. *Food Control*, 17(1), 42–51. <https://doi.org/10.1016/j.foodcont.2004.08.007>
- Young, I., Thaivalappil, A., Reimer, D., & Greig, J. (2017). Food safety at farmers markets: A knowledge synthesis of published research. *Journal of Food Protection*, 80(12), 2033–2047. <https://doi.org/10.4315/0362-028X.JFP-17-193>

Perspectives on a local food access and nutrition education program from Cooperative Extension nutrition educators

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Abstract

Innovative programming is needed to improve diets among low-income individuals. Incorporating a healthy food access program within existing Extension community nutrition education

programming at the local government level may be an effective approach to improve access and eating behaviors. Program development should be informed by the community nutrition program educators (herein educators) who would implement this type of program. We sought to understand educators' perspectives as part of a formative evaluation to guide the development of a program

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pairing reduced price community supported agriculture (CSA) membership with tailored educational programming. Educators from four U.S. states (one southeastern, two northeastern, and one northwestern) participated in in-depth interviews and focus groups. These were audio-recorded with detailed hand-written notes, transcribed verbatim, independently double-coded using a detailed codebook, and analyzed for themes and salient quotes. Feedback was linked with the Diffusion of Innovations model and RE-AIM framework. Educators had mostly positive initial thoughts of the proposed food access program, suggesting that it would complement current education programming. Educators suggested making the CSA shares reasonably priced. They also suggested offering pickup and education classes at a convenient location. Educators wanted additional training and resources in order to facilitate the program, but thought the existing infrastructure and resources of Extension and local government would help in implementation and sustainability. Local government priorities should seek to meet educator interests and needs given the potential for more successful program outcomes. These findings could be used to inform the development of food access programming within community nutrition education programs.

Keywords

Food Access, Nutrition Education, Behavioral Theory, Formative, Low-income

Introduction and Literature Review

Low-income individuals, particularly those in non-metropolitan areas, have comparatively low levels of financial and physical access to fresh produce. They also may lack the knowledge and skills needed to successfully integrate these foods into typical food preparation (Dammann & Smith, 2009; Drewnowski & Specter, 2004; Haynes-Maslow, Parsons, Wheeler, & Leone, 2013; Leone et al., 2012; Treiman et al., 1996). These barriers highlight a need for innovative programming to improve healthy eating behaviors. Community nutrition educators who work with these populations may be uniquely positioned to inform the development of new programming aimed at

overcoming these obstacles.

Two of the largest nation-wide nutrition education programs are the U.S. Department of Agriculture (USDA)–funded Expanded Food and Nutrition Education Program (EFNEP) (USDA NIFA, n.d.-a) and the Supplemental Nutrition Assistance Program-Education (SNAP-Ed) (USDA, 2012). These programs utilize National Institute of Food and Agriculture (NIFA) Cooperative Extension staff as nutrition educators to deliver a series of interactive lessons of evidenced-based messages to hundreds of thousands of adults per year (NIFA, n.d.b). Cooperative Extension staff are located within the Cooperative Extension System (CES), a nationwide network led by state-designated land-grant universities. These universities provide agriculture and nutrition education and learning activities to communities in partnership with federal, state, and local governments. Community EFNEP and SNAP-Ed nutrition educator staff are located in local CES offices at the county and regional (multicounty) level, and thus are often closely partnered with local county government (USDA NIFA, n.d.-c).

Extension educators teach limited-resource audiences about food choices, selecting and buying food that meets the nutritional needs of their family, physical activity, and health. They also teach skills in food production, preparation, storage, and food budgeting (USDA NIFA, n.d.-a; n.d.-b). Educators may also play a role in connecting low-income community residents to local food systems to improve food access. They do so by providing education to increase familiarity with local foods and local food systems, providing knowledge of access points to local food, raising awareness of and connecting residents to government assistance programs such as the Women Infants and Children Farmers Market Nutrition Program, providing tours of local food direct marketing outlets such as farmers markets, and emphasizing the importance of supporting the local food economy (Abel, Thomson, & Maretzki, 1999; Sharp, Imerman, & Peters, 2002).

Despite the potential to connect low-income individuals to healthier food opportunities, Extension community nutrition efforts to improve community food security have historically focused

more on education and research and less on community policy, projects, and programs aimed at directly improving food access to create a more equitable food system (Hamm & Bellows, 2003). This could be due to the fact that many Extension educators do not think that they can influence those who have the authority to modify the food system in a way that would best address the needs in the communities they reach. It could also be due to the fact that they are discouraged from being change agents because of the perception of being too political for an organization that tries to remain politically neutral (Clark, Bean, Raja, Loveridge, Freedgood, & Hodgson, 2017). Consequently, this lack of food system programming may have limited the effectiveness of the nutrition education programs because many program participants lack access to the healthy foods needed to improve their diet (Bertoni, Foy, Hunter, Quandt, Vitols, & Whitt-Glover, 2011; Hosler, Rajulu, Fredrick, & Ronsani, 2008; Larson, Story, & Nelson, 2009; Story, Kaphingst, Robinson-O'Brien, & Glanz, 2008). Thus, there is a need for new approaches that complement the teaching of knowledge and skills in the classroom while directly improving access to fresh fruits and vegetables.

One approach may be to directly link these established educational programs with the local food system, including the use of a community supported agriculture (CSA) model (Center for Integrated Agricultural Systems, n.d.; Vasquez, Sherwood, Larson, & Story, 2017; Wharton, Hughner, MacMillan, & Dumitrescu, 2015). CSA is a partnership between agricultural producers and customers where customers receive fresh, nutrient-dense local fruits and vegetables, often desired because of perceived increased quality and flavor (McGuirt, Ward, Elliott, Bullock, & Jilcott Pitts, 2014; Thomas & McIntosh, 2013). In this model, members of the CSA pay for the whole season of fruits and vegetables from a local farm upfront and then receive a weekly share (or portion) of fresh fruits and vegetables from the farm. Those participating in CSA shares have reported improved dietary behaviors, including increased fruit and vegetable consumption and decreased consumption of processed foods (Allen, Rossi, Woods, & Davis, 2017; Vasquez et al., 2017).

Modifications of this model have been made to reach lower-income populations, typically using the following approaches: (1) a weekly or monthly payment rather than paying in full at the beginning of the season, (2) the ability to use SNAP benefits, and (3) having a cost subsidy or "offset" to make the produce more affordable. The cost of the USDA Thrifty Food Plan (TFP), a low-cost and nutritious food plan that serves as the basis for maximum food stamp allotments, ranges between US\$128 to US\$147.40 per month for a family of four with two children (based on child age) (USDA, 2015). In this plan, vegetables and fruit account for 22-29% and 17-21% of the TFP market basket, respectively (costing \$16-\$18.37 per week) (Carlson, Lino, Juan, Hanson, & Basiotis, 2007). This potential cost is in line with the typical weekly cost of a CSA in the United States of US\$17.88 (Tegtmeier & Duffy, 2005). Additionally, the average amount of produce in a CSA (North Carolina Cooperative Extension, n.d.) matches typical produce consumption for the TFP reference family of 4 (two kids) (Carlson et al., 2007); therefore, it may represent a viable alternative to typical produce purchasing for low-income families. The potential of this approach has led to the emergence of reduced-priced CSA programs for low-income individuals across the United States (Local Food Research Center, 2013; LocalHarvest, 2008). Many of these programs are run solely by farms or nonprofits, or as a partnership between the two entities.

The growing attention (Vasquez et al., 2017) given to using CSA as an approach to dietary intervention and health improvement warrants consideration of how these potential programs might be successfully implemented with community nutrition education programs. There have been a few successful examples of the integration of CSA programs into Cooperative Extension programming. One of the more formalized examples is the Healthy Food For All program, a nonprofit program of Cornell Cooperative Extension that provides low-income families in New York with access to CSA shares and education resources (Healthy Food For All, 2018). While the few existing programs may serve as models, there remains a gap in the literature of how this type of

program might be viewed by community nutrition educators who may be strategic partners in implementing, facilitating access to, or helping publicize programs like this. Thus, having their input early during program development may improve Extension center uptake, implementation, and overall program effectiveness.

This approach is based on the Diffusion of Innovations model (Glanz, Rimer, & Viswanath, 2015; Rogers, 2003), where innovation development is based on market input in order to design and implement a new program based on the needs and current attitudes of potential adopters. Important factors that influence how rapidly innovations diffuse include (1) attributes of the innovation, (2) environmental context and/or features of the setting, and (3) the characteristics of the individual innovators (Greenberg, 2006). Attributes of the innovation, and their relationship to this project, include (a) relative advantage (is the nutrition education plus CSA program perceived as better than current education-only options?), (b) compatibility (does the new program fill a need for low-income individuals and fit the values of the organizations?), and (3) complexity (is the new CSA plus education program easy to use with participants and implement by the organization?). Environmental context includes spatial and temporal differences, as well as cultural norms and values. Characteristics of the individual innovators include where they land on the adoption spectrum, ranging from innovators and early adopters to late adopters and laggards.

Our approach is also informed by the RE-AIM framework (Glasgow, McKay, Piette, & Reynolds, 2001) for public health planning to improve program implementation and sustainability. This included the following steps: *Reach* (participation of population of interest), *Effectiveness* (impact on participants and program implementers), *Adoption* (organizational support for adoption), *Implementation* (implementation fidelity, time, and cost), and *Maintenance* (institutionalization of program and behavior change).

While a few studies have asked Extension educators about their needs and thoughts regarding general programming (Chapman-Novakofski et al., 1997; Dickin, Dollahite, & Habicht, 2005; Murphy,

Coleman, Hammerschmidt, Majewski, & Slonim, 1999; Clark et al., 2017), to the best of our knowledge, no studies in the literature have sought the perspectives of nutrition educators to inform the development and implementation of a new food access intervention that includes a nutrition education component along with traditional and CSA-oriented nutrition education. Thus, this research aimed to gain an in-depth understanding of the perceptions of Extension educators on the attributes of the innovation and environmental context surrounding diffusion and implementation within the community nutrition education setting using qualitative interviews and focus groups. The ultimate goal was to guide counties and communities in developing such a cooperative program in their own communities.

Applied Research Methods

A purposive heterogeneous sample of Extension educators ($n=5$ per state, $N=20$) from nonmetropolitan areas of four U.S. states (one in the southeast (SE), two in the northeast (NE1 and NE2), and one in the northwest (NW)) were recruited as part of a larger research project (Seguin et al., 2017). The aim of this larger project was to develop and evaluate the impact of a cost-offset community supported agriculture (CO-CSA) intervention. This included the effect of tailored nutrition education (skill-based, CSA-tailored, extension-delivered education curriculum) on dietary intake and weight status among low-income families with children in nonmetropolitan (populations <50,000) communities (U.S. Census Bureau, n.d.). Educators were recruited from each of the four study sites in order to gain a broad understanding from different geographical and cultural perspectives. The goal was to recruit the educators and paraprofessionals who would deliver the educational component of the CO-CSA intervention in each state, plus two to three Extension educators in different geographic regions of each state. Educators were recruited by phone and e-mail to participate in the qualitative research and indicated their willingness by completing an online pre-interview survey. The pre-interview survey asked demographic questions (age, self-reported race via investigator derived checklist, gender, title), as well as questions regarding years of

experience in Extension, direct involvement in educational programming, personal advocacy for local foods, and whether local foods should be a priority for Extension.

Individual in-depth qualitative interviews and focus groups were conducted over the phone (Cooper, Jorgensen, & Merritt, 2003; Krueger & Casey, 2008). Distinct questions were asked in the interview and focus groups. The goal of asking distinct questions within each method was to elicit the richest answers possible based on the topic of interest. Questions seeking in-depth individual feedback were included in the interview script, and questions about topics seeking group discussion and an interchange of ideas were included in the focus group script. One question, regarding “Initial thoughts on the program,” was asked in both to see if responses changed due to the group dynamic. For both approaches, we provided a description of the program to the educators, and then the educators were asked to respond to the accompanying semi-structured interview guides. The Cornell University Institutional Review Board and the University of Vermont Review Board reviewed and approved the study. Informed consent was obtained from all educators.

In-depth Interviews

In November 2015, educators completed interviews ($n=20$) by phone with trained and experienced interviewers ($n=6$) who lived in the state where the educator was located. Topics included their perceptions of a CO-CSA enhanced nutrition education program, the role of Extension in conducting these types of programs, potential barriers and facilitators to implementation and sustainability, and how best to integrate a hypothetical CO-CSA program into existing Extension systems. The interviews lasted 30–45 minutes.

Focus Groups

In February 2016, the same sample participating in the interviews participated in focus group discussions ($n=4$) over the telephone (5 per group, $n=20$), with at least one representative from each state during each focus group for geographic diversity. A trained moderator and note taker led each of the groups. Topics included thoughts on the program,

how to best engage participants in these types of programs, whether it could be sustainable, factors that would improve sustainability, and potential community partners. The focus groups lasted 30–45 minutes. Questions were sent to the educators in advance of the interviews and focus groups to ensure understanding of the goals of the research and willingness to answer questions. It also allowed educators to thoughtfully prepare their responses.

Analysis

The interviews and focus groups were audio-recorded, supplemented with detailed hand-written notes, transcribed verbatim, independently double-coded using a detailed codebook in NVivo 11 (QSR International Pty Ltd., 2015), and analyzed for themes and salient quotes. Data-rich transcripts were reviewed to develop a codebook for both the interviews and the focus groups, complete with operational definitions. Transcripts were coded independently using the codebook. Coders ($n=2$) met to revise the codebook, to resolve disagreements on how to apply the codes, and to add and delete codes. Transcripts were then coded to identify relevant themes and salient quotes. Data reduction was accomplished with deductive (based on study questions) and inductive (based on emerging observations) analysis. A code matrix was used for cross tabulation across characteristics to assess for features of the setting and individuals that might impact diffusion. These characteristics included *Region* (SE, NE1, NE2, NW) and *Years of experience* (5 or more years; 5 or fewer years). Summary tables including illustrative quotes were developed to present findings on themes.

Results

Educator Characteristics

Characteristics of the educators, collected from the pre-interview survey, are displayed in Table 1. The average age was 48 years, with a range of 24–67 years. All were female, and most were white (16/20=80%). Educators had, on average, nine years of experience in Extension. Two (2/20=10%) educators did not currently deliver programs directly but acted in a supervisory role. Two (2/19=11%) of the educators did not personally

Table 1. Nutrition Educator Characteristics

Participant Characteristics	
Number of participants (total)	20
Northeast state 1 (NE1)	5
Southeast state (SE)	5
Northeast state 2 (NE2)	5
Northwest state (NW)	5
Age in average years (range)	48 (24–67)
Race	
White	16 (80%)
Black	1 (5%)
Hispanic	1 (5%)
Asian	1 (5%)
Native American	1 (5%)
Gender	Female (100%) Male (0%)
Experience in Extension, Years (avg.)	9 years (0.5–40)
Local Foods Advocate	17/19 (out of 20, with 1 No Answer)
Local Foods a Priority	17/19 (out of 20, with 1 No Answer)
Currently Deliver Educational Program	18/20

advocate for local foods, and two (2/19=11%) did not believe promotion of local foods should be a priority for Extension.

Diffusion of Innovations

Educators spoke to how the program would address the Diffusion of Innovations framework. A summary of how findings relate to the Diffusion of Innovations framework can be found in Table A3.

Attributes of the Innovation

In-depth interviews. Educators mostly shared positive initial thoughts about the program concept, including the two educators who did not think promoting local foods should be a priority for Extension. The complementary nature of both learning about healthy eating while also having improved access to local fruits and vegetables was a frequently mentioned positive aspect of the program:

I think that will fit into what we're already doing...because I think it's important for people to eat healthier and to eat fresh fruits and vegetables. If we can provide a way to get that, and get local, then I think that's great....

I'm super excited...
(SE PT6)

Educators were also intrigued by the thought of connecting program participants to local foods and eating seasonally: "I think it's wonderful ... People don't know what's grown locally sometimes. And they don't know how to use it...." (NE2 PT1). The educators did share some initial concerns about participation due to lack of interest and attendance: "More difficult than anything is getting people to attend [these types of programs]...." (NE2 PT3).

Perception of factors believed to make low-income participation easier. The top factors educators proposed to make participation easier for low-income clients were "convenient location for pick-ups," "learning preparation skills," "learning new recipes," "offering education on healthy eating," and "SNAP-EBT acceptance" (see Table A1). "Convenient location" was the top factor in every state except NE2, where "preparation skills" was most important. Educators frequently identified low-income housing communities as being a good location for this type of program.

Educators frequently mentioned the value of children being involved in the process, or the importance of childcare being provided so the parents can participate in the educational classes: "...if you can get the children really engaged so that they're nagging their parents to attend and are clearly getting a lot out of the programming, I think that would be really good" (NW PT1).

Focus groups. In the focus groups, there were mixed reactions when educators were asked their initial thoughts on the program in the focus group setting. Many liked the idea calling it "positive" and "needed"; however, a few were concerned the

participants might be overwhelmed by the CSA share, and some thought the program was nice but not necessarily needed in light of other goals.

Suggestions for getting people to participate. The top suggestions for getting people to participate in the program were as follows: making the program “accessible or convenient” for low-income housing communities, providing “child involvement or childcare” to help parents attend, and “surveying potential participants to learn of their interests and desires” so that we learn what participants want and not what others want for them.

Best way to engage low-income populations on diet and nutrition topics. The most commonly mentioned suggestion to get people engaged included parent-child dual involvement, demographically appropriate program delivery, and the use of incentives (particularly food). “If you can get the adults and children together, it’s a lot more beneficial because they work together on it, which brings it into the home.” In regards to demographically appropriate program delivery: “Elderly folks love classes, millennials don’t...[they] prefer to do everything through social media, look things up online. They are not as interested in the classroom settings.”

Environmental Context

In-depth interviews. Incorporating a CO-CSA program into Extension. A summary of quotations to illustrate themes for incorporating a CO-CSA program into Extension can be found in Table A2. Educators overwhelmingly expressed a high level of organizational support from higher level Extension staff for programs like this, including support from supervisors, directors, and state-level staff. The only comments suggesting low organizational support had to do “with having to start the program from scratch,” and “communication issues with the state Extension office.”

Similar existing programs. Most of the educators said they did not know of a CO-CSA program. However, a few educators knew of, or were a part of, similar CO-CSA programs in their community. For example, one participant was part of a similar program: “I would bring samples and then we

would talk about it...Later on in the year when we had the CSA...they would see that and just get excited” (NE2 PT1).

The most commonly mentioned existing Extension resources that could enhance the proposed program included the “other staff within Extension,” the “facilities and equipment” available for use, “existing connections with farmers,” and “knowledge and experience with nutrition education programs.” Educators identified several types of staff members who would be most helpful, including those inside and outside of family and consumer sciences: “[Having] not just the FCS agent being involved in that piece, but if the county has a horticulture agent, or the ag agent, or small farms agent...Because I could see this being an integrated program for Extension...” (SE PT6).

Perceived advantages of running the CO-CSA program within Extension. The “current programming being implemented through Extension” was by far the most frequently mentioned advantage of running the program within Extension. According to one participant, “I think it’s a continuation of what we’re already doing...We’re doing nutrition education where we support our farmers. Let’s put the two together with our low-income families... it’s a natural progression to me” (NE2 PT1). Other advantages were the “existing relationships with farmers and low-income clientele” and the “availability of trained and experienced nutrition educators.”

Perceived disadvantages of running the CO-CSA program within Extension. The main factors stated as disadvantages of running the program within Extension were “logistics of running the program,” “staff time and availability,” “working within the parameters of current federally funded programming,” “recruitment,” and “attendance.” Educators spoke of the many responsibilities Extension staff members have given budget cuts that have reduced the workforce. They also mentioned that adding another program could be “challenging” and “time-consuming,” and educators might lack the time and resources required to participate.

The most frequently mentioned incorporation problems varied by state, but “logistics of running

the program,” “time,” and “administrative burden” were frequently mentioned across states. Those with less than five years of experience seemed more concerned with attendance and recruitment, whereas those with more than five years of experience seemed more concerned with having enough time for the program.

Focus groups. *Long-term sustainability of the CO-CSA program.* The educators had mixed reactions on whether the program is sustainable. Some thought the program would “absolutely” be sustainable due to its fit with current programming. Others thought it could maybe be sustainable given certain conditions, including allowing time for the program to develop and become known in the community. For those who thought it would not be sustainable, there was a concern that this program might be getting ahead of where program participants are at currently in their movement toward healthier eating, as many had unhealthy diets and lacked basic knowledge of nutrition and food preparation, which may make participation in the program challenging.

Potential community partners seen as important by educators. The educators mentioned several community partners to help with the program, including food banks, community centers, health departments, housing projects, and community development councils. Educators also stressed the importance of collaborating as an interagency team; one suggested, “Get everyone to be on board and everyone to promote it, everyone to help educate” (NW PT2).

Characteristics of Individual Innovators

In-depth interviews. *Perceptions on whether low-income clients would be interested in the CO-CSA program.* Most educators thought the low-income participants would be interested in the program because of a general increase in interest in healthier and local foods, interest in fresh produce, and the potential price savings on produce: “I think a lot of people are paying more attention to having fresh local foods... The cost-offset part of it is wonderful. They’re gonna be getting the fresh, local items at a deal” (NE2 PT1).

The educators often qualified their answers by saying this interest would be conditional, based on factors like having the program at a convenient location or the boxes being affordable. According to one participant, participation would be based on whether “that’s somethin’ that they could afford. Because some folks around here, really they are counting their pennies” (SE PT5). The educators also mentioned that, while there might be interest, getting participants to actually utilize the program might be the challenge: “It’s just a matter of getting those folks to commit, and then to actually follow through” (NE1 PT1).

Perception of factors making participation difficult for low-income clients. The most frequently mentioned factors making participation in the CO-CSA program difficult for low-income participants were (Table A1) “not having enough money and/or having limited finances,” “transportation issues,” “spoilage of produce,” “chaos and/or unpredictability of life,” and “unfamiliar produce.” As one participant expressed, “Yeah, most of the folks live week to week...so having a large amount of cash that they would be investing in for the future would be really difficult” (SE PT4). Across all states, educators frequently mentioned limited financial resources and transportation issues.

Additional skills needed by educators to implement a CO-CSA program. Educators mentioned several additional skills needed to implement this type of program successfully. The most frequently mentioned answers included “training” on the program implementation and CSAs in general, a “manual/curriculum” to guide implementation, “access to new recipes” to match the new foods participants were being exposed to through the boxes, and more knowledge about produce. According to one participant, there should be “Some resource, like some very easy to read, simple attractive resources [about] the vegetables and fruits...so more knowledge about the farm side [of things]” (NW PT1).

RE-AIM

Educators spoke to how the program would address the RE-AIM framework steps of Reach,

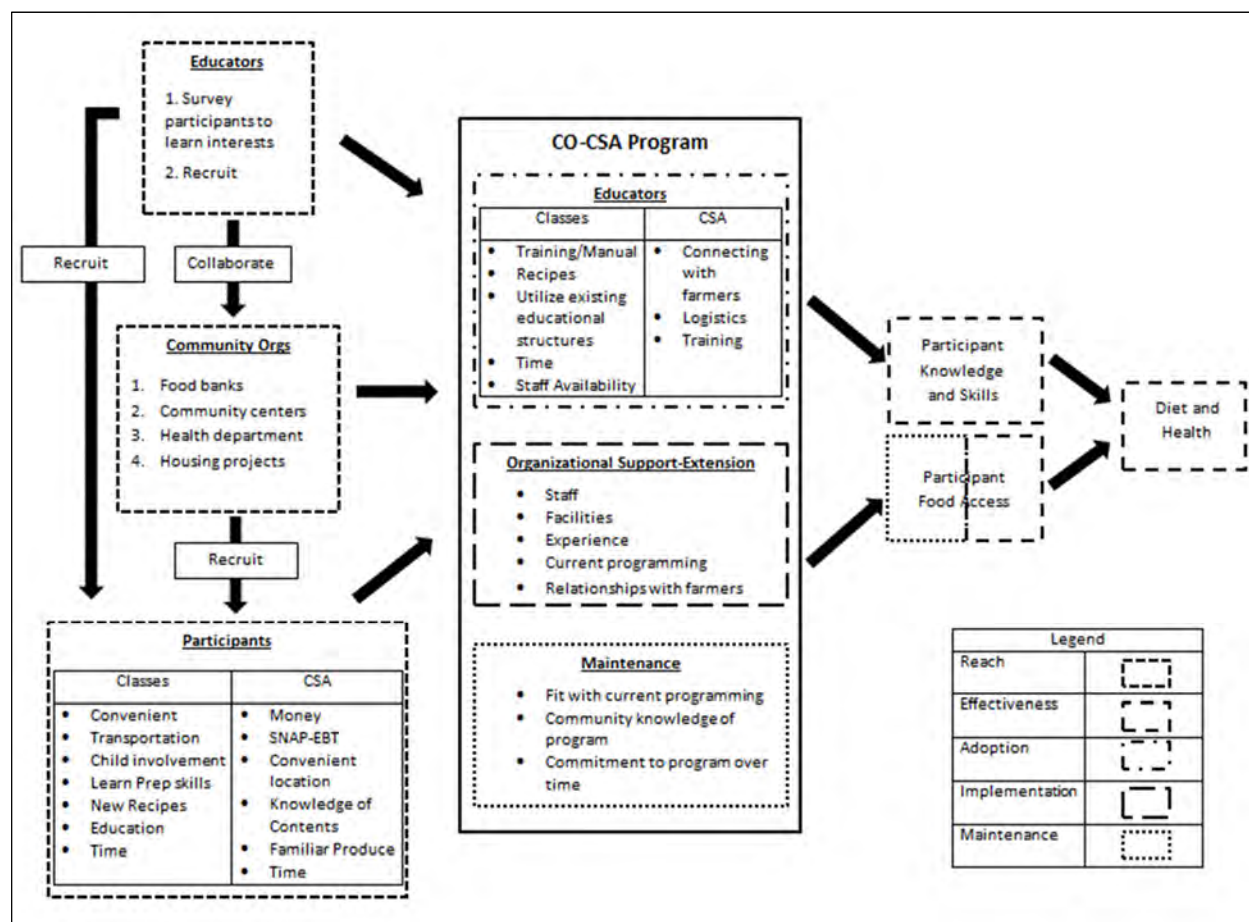
Effectiveness, Adoption and Implementation, and Maintenance. A summary can be found in Table A3 and Figure 1.

Reach. Educators suggested that the program could reach the target population, but it would have to be made it as participant-centered as possible and that certain needs would have to be met to ensure participation. For example, one suggested, “You have to meet people where they are...you have to make it as drop-dead easy as you can” (NW PT1). Another suggested the importance of not only meeting their needs, but also advocating for involving participants in the planning of the intervention: “I would say it’s also about...what do they want? Not what we want to give them. So, if you can engage them at the beginning even before the beginning on what that

community wants from you in terms of nutrition education...I think we really have to focus on meeting people where they’re at” (NW PT3).

Effectiveness. Educators often mentioned that this type of program would address participant’s need for access to healthier foods. For example, one expressed, “I think it’s incredibly exciting...You are addressing some of the biggest barriers that exist for most families...You’re making it cost effective for them...which is a challenge for most families...You’re putting together healthy food for them so they don’t have to go to the grocery store and kind of be puzzled by what, what should I be buying? What is healthy? This is gonna automatically address that. They’re gonna be increasing their fruit and vegetable consumption” (NE2 PT1).

Figure 1. Conceptual Diagram of How Extension Educator Findings Relate to the RE-AIM (Reach, Effectiveness, Adoption, Implementation, Maintenance) Framework



Adoption and Implementation. Educators mentioned a few important factors to enhance uptake and fidelity, including being provided with adequate training, a detailed manual, and having the right people in place. According to one participant, “It would be a challenge just because it’s something new, you know. But I’m assuming that if I were gonna do this, there would be some kinda trainin’ with it for me...I think I would need training on the program. What your expectations are, what our goals are” (SE PT1).

Maintenance. Educators had mixed reactions on whether they believed that the program could be sustainable over a long term. Those who thought it could be sustainable mentioned the “natural” fit with the program; for example, “I absolutely do think it can easily be sustainable and integrated in. I think it’s a very natural progression and a natural fit” (NE2 PT1). Some, however, suggested the importance of giving it time to develop: “You’re gonna at least have to have it in place for five years to see a really good impact on that and by then, it will be well known in the community” (SE PT1).

Discussion

Given the strong initial educator interest in the proposed program, additional work should be done to more critically examine the integration of this type of program into current Extension programming and into local government nutrition education efforts. Dickin et al. (2005) found that at sites where front-line nutrition educators valued the program, there was higher nutrition behavior change among EFNEP participants. Similarly, our findings regarding educator interest in and need for innovative programming to improve participant fruit and vegetable consumption, and the desire to receive appropriate training, have been found previously among Extension nutrition educators (Murphy et al., 1999). Thus, federal nutrition education program strategies and priorities should seek to meet these interests and needs given the potential for successful outcomes.

Previous research has found that Extension educators are interested in becoming more involved in food system change to reduce inequity, but may not feel empowered to do so, even though

they have the knowledge, skills, and connections to make a meaningful impact (Clark et al., 2017). We found that Extension community educators mostly felt that they had adequate support for programming from upper administration; however, in some cases they perceived that upper administration lacked interest in starting new programs and that communication issues within Extension may make program development challenging. Providing additional supports for empowering community nutrition educators to develop and lead innovative programming at the local level, and improving communication channels for the development and support of new and innovative food system programs, may improve local food system and food access issues.

Linking the feedback provided by Extension nutrition educators with behavioral frameworks, including the Diffusion of Innovations model and RE-AIM, may improve program implementation and effectiveness (Glanz et al., 2015). Overcoming attributes of the innovation that may be challenging, including program cost and complexity, may be particularly important for the adoption and sustainability of the proposed program, given Extension staff and resource constraints. Environmental context, including community partner support (i.e., who can assist with program recruitment, implementation, and logistics), adhering to program parameters, and gaining the support of higher level administration may be critical to the success of any efforts to diffuse and implement this type of intervention within community nutrition programs.

Based on our findings, it may be important to identify early organizational and participant adopters to facilitate the diffusion process, given that certain characteristics of organizations (resources, priorities, support) and low-income participants (financial constraints, skill level) may determine successful diffusion. Future research efforts should also try to assess other factors in the diffusion process, including the trialability and observability of outcomes related to the program. While certain aspects of success or failure may be site-specific, certain themes regarding successful implementation emerged across educators from geographically and demographically diverse sites; therefore, we believe that the findings of this

research are important and likely meaningful across most Extension community nutrition programs. Future research should aim to understand better how organizational readiness for change (Weiner, 2009)—including the factors of change commitment, change efficacy, and organizational capacity (Handler, Issel, & Turnock, 2001; Meyer, Davis, & Mays, 2012) might influence the implementation of this type of program. Future research should also examine the few similar programs incorporating community nutrition education programs with CSA programs to examine factors that led to success and failure.

This research focused on the Extension educator as a key implementer of this type of program. The role of the Extension educator is important given that proper implementation and delivery of this program is likely vital to its success. Further examination of the ideal role of educators and Extension staff in developing and sustaining these types of programs is likely needed given the range of education level and experience across this group, particularly in aspects which may be outside their normal duties, including program development, grant-writing, and some business and operational activities. This may further support the educator-suggested need for a detailed program manual and training to help those who may be less comfortable with taking an active role with certain aspects of the program. Assessing individual educator and Extension staff strengths and weaknesses, as well as those of potential partners, may help properly identify appropriate roles and responsibilities to help this type of program be successful implemented and maintained.

In the few studies looking at the participation of low-income consumers in CSAs, financial and physical access were also commonly cited factors (Forbes & Harmon, 2008; Quandt, Dupuis, Fish, & D'Agostino, 2013). In a previously evaluated program (Quandt et al., 2013), food items unfamiliar to participants were emphasized, which was something the nutrition educators in our study discouraged. Children were commonly cited as important factors in a participant's interest in the program. Other research has similarly found the importance of including children in nutrition education given their influence on their parents

(Lytle, 1994; Slusser, Prelip, Kinsler, Erausquin, Thai, & Neumann, 2011). Overall, the similarities and differences in perceived factors influencing program participation and implementation across geographic areas support the usefulness of both broad and localized programmatic approaches.

Strengths

Using both in-depth interviews and focus groups allowed for a more complete understanding of the topic, including identifying more skepticism about the program in the focus groups than in the interviews. The educators were diverse in age, experience, and location, which may allow for more generalizability and meaningful translation of our findings across Extension community nutrition education. The use of phone focus groups potentially created more independent answers (the result of less social pressure, group-think, and desirability bias) and allowed for greater participation (Krueger & Casey, 2008). The use of thematic matrices allowed for cross-tabulation of ideas across different factors. Linking findings to behavioral theory and frameworks helped frame results to better inform future program implementation.

Limitations

The inability to witness nonverbal communication in the focus groups was a weakness. The sample of educators, while fairly geographically diverse, may not capture all experiences and opinions from this nationwide program given our relatively small sample size; however, data saturation was reached, and this sample size is similar to other qualitative studies. Qualitative studies typically need smaller sample sizes due to data saturation, concern for meaning, and the fact that they do not make generalized hypothesis statements (Mason, 2010; Ritchie, Lewis, Nicholls, & Ormston, 2013).

Conclusions

This research aimed to understand the perceptions of community nutrition educators on a proposed cost-offset CSA-plus-nutrition-education program for low-income individuals. The findings from this research, may be used to inform the design, integration, and implementation of a CSA-style healthy food access program alongside within existing

federal nutrition education programs at the county level. Designing the program based on formative findings may improve program fit and impact, including improving fresh fruit and vegetable access and consumption. Local government officials and agencies, including county Extension offices and other related agencies, can use these findings to help justify the need for and usefulness of this type of program in order to support low-income residents, enhance current nutrition education efforts, support local farmers, and strengthen local economies by promoting local foods. These findings may also clarify the needs of local government staff to successfully implement these types of programs so that local government funds and time

are not wasted on programs lacking proper support. Collaborations should be considered within and across local government and community agencies to assemble a support network to efficiently and cost-effectively implement this type of program. Local government officials may use the timeframes suggested by the program educators in this study to inform the appropriate amount of time that should be dedicated to program development and implementation. Local governments implementing these types of programs should consider focusing on increasing the awareness of these programs to gain participation among residents and potential collaborators.



References

- Abel, J., Thomson, J., & Maretzki, A. (1999). Extension's role with farmers' markets: Working with farmers, consumers, and communities. *Journal of Extension*, 37(5), Art. 5FEA4. Retrieved from <https://joe.org/joe/1999october/a4.php>
- Allen, J. E., Rossi, J., Woods, T. A., & Davis, A. F. (2017). Do Community Supported Agriculture programmes encourage change to food lifestyle behaviours and health outcomes? New evidence from shareholders. *International Journal of Agricultural Sustainability*, 15(1), 70-82. <https://doi.org/10.1080/14735903.2016.1177866>
- Bertoni, A. G., Foy, C. G., Hunter, J. C., Quandt, S. A., Vitolins, M. Z., & Whitt-Glover, M. C. (2011). A multilevel assessment of barriers to adoption of dietary approaches to stop hypertension (DASH) among African Americans of low socioeconomic status. *Journal of Health Care for the Poor and Underserved*, 22(4), 1205-1220. <https://doi.org/10.1353/hpu.2011.0142>
- Carlson, A., Lino, M., Juan, W., Hanson, K., & Basiotis, P. (2007). *Thrifty Food Plan, 2006*. (CNPP-19). Washington, D.C.: U.S. Department of Agriculture, Center for Nutrition Policy and Promotion. Retrieved from https://www.cnpp.usda.gov/sites/default/files/usda_food_plans_cost_of_food/TFP2006Report.pdf
- Center for Integrated Agricultural Systems. *Community supported agriculture: growing food...and community* (Research Brief #21). (n.d.). Retrieved from <https://www.cias.wisc.edu/community-supported-agriculture-growing-foodand-community>
- Chapman-Novakofski, K., Boeckner, L. S., Canton, R., Clark, C. D., Keim, K., Britten, P., & McClelland, J. (1997). Evaluating evaluation—What we've learned. *Journal of Extension*, 35(1). Retrieved from <https://www.joe.org/joe/1997february/rb2.php>
- Clark, J. K., Bean, M., Raja, S., Loveridge, S., Freedgood, J., & Hodgson, K. (2017). Cooperative extension and food system change: Goals, strategies and resources. *Agriculture and Human Values*, 34(2), 301-316. <https://doi.org/10.1007/s10460-016-9715-2>
- Cooper, C. P., Jorgensen, C. M., & Merritt, T. L. (2003). Report from the CDC. Telephone focus groups: an emerging method in public health research. *Journal of Women's Health*, 12(10), 945-951. <https://doi.org/10.1089/154099903322643866>
- Dammann, K. W., & Smith, C. (2009). Factors affecting low-income women's food choices and the perceived impact of dietary intake and socioeconomic status on their health and weight. *Journal of Nutrition Education and Behavior*, 41(4), 242-253. <https://doi.org/10.1016/j.jneb.2008.07.003>
- Dickin, K. L., Dollahite, J. S., & Habicht, J.-P. (2005). Nutrition behavior change among EFNEP participants is higher at sites that are well managed and whose front-line nutrition educators value the program. *The Journal of Nutrition*, 135(9), 2199-2205. <https://doi.org/10.1093/jn/135.9.2199>
- Drewnowski, A., & Specter, S. E. (2004). Poverty and obesity: The role of energy density and energy costs. *The American Journal of Clinical Nutrition*, 79(1), 6-16. <https://doi.org/10.1093/ajcn/79.1.6>

- Forbes, C. B., & Harmon, A. H. (2008). Buying into community supported agriculture: Strategies for overcoming income barriers. *Journal of Hunger & Environmental Nutrition*, 2(2-3), 65–79.
<https://doi.org/10.1080/19320240801891479>
- Glanz, K., Rimer, B. K., & Viswanath, K. (Eds.) (2015). *Health behavior: Theory, research, and practice* (5th ed.). San Francisco: Jossey-Bass.
- Glasgow, R. E., McKay, H. G., Piette, J. D., & Reynolds, K. D. (2001). The RE-AIM framework for evaluating interventions: What can it tell us about approaches to chronic illness management? *Patient Education and Counseling*, 44(2), 119–127. [https://doi.org/10.1016/S0738-3991\(00\)00186-5](https://doi.org/10.1016/S0738-3991(00)00186-5)
- Greenberg, M. R. (2006). The diffusion of public health innovations. *American Journal of Public Health*, 96(2), 209–210.
<https://doi.org/10.2105/AJPH.2005.078360>
- Hamm, M. W., & Bellows, A. C. (2003). Community food security and nutrition educators. *Journal of Nutrition Education and Behavior*, 35(1), 37–43. [https://doi.org/10.1016/S1499-4046\(06\)60325-4](https://doi.org/10.1016/S1499-4046(06)60325-4)
- Handler, A., Issel, M., & Turnock, B. (2001). A conceptual framework to measure performance of the public health system. *American Journal of Public Health*, 91(8), 1235–1239. <https://doi.org/10.2105/AJPH.91.8.1235>
- Haynes-Maslow, L., Parsons, S. E., Wheeler, S. B., & Leone, L. A. (2013). A qualitative study of perceived barriers to fruit and vegetable consumption among low-income populations, North Carolina, 2011. *Preventing Chronic Disease*, 10, E34. <https://doi.org/10.5888/pcd10.120206>
- Healthy Food for All. (2018). Healthy Food for All [Home page]. Retrieved from <http://www.healthyfoodforall.org/>
- Hosler, A. S., Rajulu, D. T., Fredrick, B. L., & Ronsani, A. E. (2008). Assessing retail fruit and vegetable availability in urban and rural underserved communities. *Preventing Chronic Disease*, 5(4), A123.
<https://www.ncbi.nlm.nih.gov/pubmed/18793511>
- Krueger, R. A., & Casey, M. A. (2008). *Focus groups: A practical guide for applied research* (4th ed.). Thousand Oaks, CA: SAGE.
- Larson, N. I., Story, M. T., & Nelson, M. C. (2009). Neighborhood environments: Disparities in access to healthy foods in the U.S. *American Journal of Preventive Medicine*, 36(1), 74–81. <https://doi.org/10.1016/j.amepre.2008.09.025>
- Leone, L. A., Beth, D., Ickes, S. B., Macguire, K., Nelson, E., Smith, R. A., ... Ammerman, A. S. (2012). Attitudes toward fruit and vegetable consumption and farmers' market usage among low-income North Carolinians. *Journal of Hunger & Environmental Nutrition*, 7(1), 64–76. <https://doi.org/10.1080/19320248.2012.651386>
- Local Food Research Center. (2013). *CSAs as a strategy to increase food access: Models of success*. Asheville, NC: Appalachian Sustainable Agriculture Project. Retrieved from <http://asapconnections.org/downloads/csas-as-a-strategy-to-increase-food-access.pdf>
- LocalHarvest. (2008, January 30). A CSA option for the poor. *LocalHarvest Newsletter*, January. Retrieved from <https://www.localharvest.org/newsletter/20080130/csa-for-the-poor.html>
- Lytle, L. A. (1994). *Nutrition education for school-aged children: A review of research*. Washington, D.C.: U.S. Department of Agriculture Food and Consumer Service. Retrieved from <https://eric.ed.gov/?id=ED428061>
- Mason, M. (2010). Sample size and saturation in PhD studies using qualitative interviews. *Forum: Qualitative Social Research*, 11(3), Art. 8. <http://dx.doi.org/10.17169/fqs-11.3.1428>
- McGuirt, J. T., Ward, R., Elliott, N. M., Bullock, S. L., & Jilcott Pitts, S. B. (2014). Factors influencing local food procurement among women of reproductive age in rural eastern and western North Carolina, USA. *Journal of Agriculture, Food Systems, and Community Development*, 4(4), 143–154. <https://doi.org/10.5304/jafscd.2014.044.004>
- Meyer, A. M., Davis, M., & Mays, G. P. (2012). Defining organizational capacity for public health services and systems research. *Journal of Public Health Management and Practice*, 18(6), 535–544.
<https://doi.org/10.1097/PHH.0b013e31825ce928>
- Murphy, A., Coleman, G., Hammerschmidt, P., Majewski, K., & Slonim, A. (1999). Taking the time to ask: An assessment of home economics agents' resource and training needs. *Journal of Extension*, 37(6), Art. 6RIB3. Retrieved from <https://joe.org/joe/1999december/rb3.php>
- North Carolina Cooperative Extension. (n.d.). *Community supported agriculture (CSA) resource guide for farmers*. Retrieved from <https://growingsmallfarms.ces.ncsu.edu/growingsmallfarms-csaguide>

- Quandt, S. A., Dupuis, J., Fish, C., & D'Agostino, R. B. (2013). Feasibility of using a community-supported agriculture program to improve fruit and vegetable inventories and consumption in an underresourced urban community. *Preventing Chronic Disease*, 10, E136. <https://doi.org/10.5888/pcd10.130053>
- Ritchie J, Lewis J, Nicholls CM, & Ormston R. (Eds.) (2013). *Qualitative research practice: A guide for social science students and researchers*. Thousand Oaks, CA: SAGE.
- Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York: Free Press.
- Seguin, R. A., Morgan, E. H., Hanson, K. L., Ammerman, A. S., Pitts, S. B. J., Kolodinsky, J.,...& McGuirt, J. T. (2017). Farm Fresh Foods for Healthy Kids (F3HK): An innovative community supported agriculture intervention to prevent childhood obesity in low-income families and strengthen local agricultural economies. *BMC Public Health*, 17(1), Art. 306. <https://doi.org/10.1186/s12889-017-4202-2>
- Sharp, J., Imerman, E., & Peters, G. (2002). Community supported agriculture (CSA): Building community among farmers and non-farmers. *Journal of Extension*, 40(3), Art. A3. Retrieved from <https://www.joe.org/joe/2002june/a3.php>
- Slusser, W., Prelip, M., Kinsler, J., Erausquin, J. T., Thai, C., & Neumann, C. (2011). Challenges to parent nutrition education: a qualitative study of parents of urban children attending low-income schools. *Public Health Nutrition*, 14(10), 1833–1841. <https://doi.org/10.1017/S1368980011000620>
- Story, M., Kaphingst, K. M., Robinson-O'Brien, R., & Glanz, K. (2008). Creating healthy food and eating environments: policy and environmental approaches. *Annual Review of Public Health*, 29, 253–272. <https://doi.org/10.1146/annurev.publhealth.29.020907.090926>
- Tegtmeier, E., & Duffy, M. (2005). Community supported agriculture (CSA) in the Midwest United States: A regional characterization. Ames: Iowa State University, Leopold Center for Sustainable Agriculture. Retrieved from https://lib.dr.iastate.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=1151&context=leopold_pubs
- Thomas, L. N., & McIntosh, W. A. (2013). “It just tastes better when it’s in season”: Understanding why locavores eat close to home. *Journal of Hunger & Environmental Nutrition*, 8(1), 61–72. <https://doi.org/10.1080/19320248.2012.761572>
- Treiman, K., Freimuth, V., Damron, D., Lasswell, A., Anliker, J., Havas, S., ... Feldman, R. (1996). Attitudes and behaviors related to fruits and vegetables among low-income women in the WIC program. *Journal of Nutrition Education*, 28(3), 149–156. [https://doi.org/10.1016/S0022-3182\(96\)70050-X](https://doi.org/10.1016/S0022-3182(96)70050-X)
- U.S. Census Bureau. (n.d.). *Metropolitan and Micropolitan*. Retrieved from <https://www.census.gov/programs-surveys/metro-micro.html>
- U.S. Department of Agriculture [USDA]. (2012). *Supplemental Nutrition Assistance Program Education (SNAP-Ed) Facts* [Factsheet]. Washington, D.C.: United States Department of Agriculture, Food and Nutrition Service. Retrieved from <http://www.nal.usda.gov/snap/SNAP-EdFactsheet2012.pdf>
- USDA. (2015). *Official USDA Food Plans: Cost of food at home at four levels, U.S. average, January 2015*. Retrieved from <https://www.cnpp.usda.gov/sites/default/files/CostofFoodDec2015.pdf>
- USDA National Institute of Food and Agriculture [USDA NIFA]. (n.d.-a) *Expanded Food and Nutrition Education Program (EFNEP)*. Retrieved from <https://nifa.usda.gov/program/expanded-food-and-nutrition-education-program-efnep>
- USDA NIFA. (n.d.-b). *Extension*. Retrieved from <https://nifa.usda.gov/extension>
- USDA NIFA. (n.d.-c). *Cooperative Extension System*. Retrieved from <https://nifa.usda.gov/cooperative-extension-system>
- Vasquez, A., Sherwood, N. E., Larson, N., & Story, M. (2017). Community-supported agriculture as a dietary and health improvement strategy: A narrative review. *Journal of the Academy of Nutrition and Dietetics*, 117(1), 83–94. <https://doi.org/10.1016/j.jand.2016.09.029>
- Weiner, B. J. (2009). A theory of organizational readiness for change. *Implementation Science*, 4, 67. <https://doi.org/10.1186/1748-5908-4-67>
- Wharton, C. M., Hughner, R. S., MacMillan, L., & Dumitrescu, C. (2015). Community supported agriculture programs: A novel venue for theory-based health behavior change interventions. *Ecology of Food and Nutrition*, 54(3), 280–301. <https://doi.org/10.1080/03670244.2014.1001980>

Appendix

Table A1. Nutrition Educators' Perceived Facilitators and Barriers to Low-Income Individual's Participation in a Cost-Offset CSA Program, from Interviews

CO-CSA Facilitators	Illustrative quotes
Convenient location	NW PT1: "The drop-off point is the most important thing. Getting in your car to pick up a box during a limited time window on a specific day, week after week, definitely gets to be a little bit of an inconvenience...make it extremely convenient...."
Learning preparation skills	NE2 PT3: "It's a matter of can you give them skills in that period of time, that they can truly go home and duplicate it...When we talked to families in homes, we found out that, 'I don't know what to do with a cauliflower. I don't even know how to cut it up. What am I supposed to do with this thing?'"
Learning new recipes	NE1 PT5: "If they had recipes that would help them use what they are getting, [recipes] that are very simple, have very few ingredients."
Offering education on healthy eating	NE2 PT2: "People feel more and more these days uncertain about how to cook food at home, so if we can address that through the education...with the educational component, with some added support to help them identify the things that they're gonna find in their CSA box"
SNAP-EBT Acceptance	SE PT4: "It might be very important for them to use their SNAP benefits....I think that it needs to be a possibility for folks."
CO-CSA Barriers	Illustrative quotes
Not having enough money and/or having limited finances	SE PT3: "I think they would be afraid to commit that much money. What if they realize it wasn't for them, or they could not fit that into their budget, somebody lost their job..."
Transportation issues	NE1 PT1: "Transportation in a lot of different ways impacts people. A lot of people live rurally and it's really hard to get in from somewhere."
Spoilage of produce	NW PT2: "Possibly a lot of food going to waste especially if people aren't able to utilize the fruits and vegetables that are given to them... And also I would worry about the quality of it if it's going to spoil fast..."
Chaos and/or unpredictability of life	SE PT4: "Many of my participants don't even know where they'll be living in a couple months... or what their circumstance might be... if they will have a job. So planning that far ahead is something that is really challenging for my participants."
Unfamiliar produce	SE PT6: "In the beginning, until they are exposed to different types of produce [through educational sessions], then they might be hesitant to be involved in it. Because they can go to the grocery store and buy the same thing that they're used to having or cooking or eating year-round...I think that could be an issue."
Time and commitment	SE PT1: "They talk about time a lot when it comes to scheduling classes...it's like, 'Well I can't meet until after 5:30, whenever I get off.' And it could be an issue as far as pickin' up the boxes, unless it's done in the evening or morning, or a time like that. Or on Saturday."

Table A2. Summary of Thoughts on Incorporating a Cost Offset-CSA program into Extension

Organization Support	Illustrative quotes
High support	SE PT6: "I think we have the support there, as long as Extension is heavily involved...like I've said, local foods is one of our flagship programs with Extension."
Low support	NW PT2: "As far as if we were to introduce something to our state office...it's pretty difficult to get a response back if we have questions from them... And there's always communication issues that might be difficult... It's always a little bit hard trying to establish... to see if they're gonna take on another curriculum."
Additional Skills Needed	Illustrative quotes
Training	NW PT2: "Just be more informed about how CSAs work... how we would collaborate with the farmer on that...If we had a curriculum to follow, and had training on how to teach the curriculum, that would be good to have."
Manual and/or curriculum	NW PT2: "Definitely all of the components of the curriculum that we would need to conduct the program successfully... And having it in an organized manner that's easy to follow."
Access to new recipes	SE PT4: "It's always great to have a good resource for lots of different recipes, so that if you do have different ethnic groups or dietary needs or requirements... You can pull from that. It's also pretty important for those recipes to have few ingredients, or at least have common ingredients that are inexpensive. So developing that I think is going to be key."
Advantages of Extension	Illustrative quotes
Current programming	NE2 PT1: "I think it's a continuation of what we're already doing...We're doing nutrition education where we support our farmers. Let's put the two together with our low-income families...I mean it's a natural progression to me."
Existing relationships with farmers and low-income clientele	SE PT4: "We already have a lot of partnerships in our relationships with area farmers... We also have relationships with the client base, with the limited resources... So in a lot of ways, it is really easy to connect the provider with the consumer... because we know both."
Trained and experienced nutrition educators	NE2 PT4: "We already have federally funded nutrition education programs, so that's huge. We have the staff who is trained in facilitated dialogue and adult education and nutrition basics, and so that's a huge advantage that we have."
Disadvantages of Extension	Illustrative quotes
Staff time and availability	SE PT6: "I feel like it would be very time consuming...that could be a huge disadvantage... not being able to put enough of the time into this program that may be required... Starting next year, it's just gonna be one [nutrition educator] for every two counties...[the] need for maybe a program assistant...."
Logistics of running the program	NE2 PT3: "It might be a bit challenging, and I'd have to work it out...you might not have enough families near that farmer ...We'd have to think about how we would connect something with the farmer ...there's a lot of things to nutrition programming in our county."
Working within the parameters of current federally funded programming	NW PT3: "I have one program where I've got pretty strict parameters, [it is] harder to make sure I fall within all those guidelines."

Table A3. Relation of Findings to Diffusion of Innovations Model and RE-AIM Framework

Diffusion of Innovations		
Factors in the Diffusion Process	Constructs	Illustrative Quotes
Attributes of the Innovation	Cost	<i>Participant Level</i> SE PT5: "If that's somethin' that they could afford. Because some folks around here, really they are counting their pennies. So I suppose it would probably depend on what the cost of it would be."
		<i>Organizational Level</i> SE PT6: "The disadvantage is time consumption. I feel like it would be very time consuming."
	Relative advantage	NE1 PT4: "Having a program that's starting off with education along with access to the foods they're being educated about is a positive thing, and needed at least where we are."
	Complexity	<i>Easy</i> NE2 PT4: "We already have nutrition program...[and] staff who's trained in adult education and nutrition basics...Our agricultural program help people get connected to local foods, so we have a lot of resources in place." <i>Not Easy</i> NE2 PT3: "It might be a little challenging...There are a lot of things...It would take resources and commitment beyond what most associations would have."
	Compatibility	SE PT6: "I think it fits nicely...it's an extension of what we are already doing...We teach people this is what we need to be eating, and here is an opportunity for us to actually provide access to those healthy foods."
Characteristics of the setting	Geographic settings	NE2 FG1: "[Combining education and agriculture] has been challenging here in [NE2] ...and needed at least where we are." NE 1 FG4: "Some of our counties don't have nutrition staff anymore, and the agriculture has gone regional, so it will depend from county to county on the emphasis on this. I see an important need for it, but it could change and vary depending on the association and their staffing and funding."
	Political conditions	NE2 FG3: "Maybe coordinate with the EFNEP national standards because there's kind of a conflict here...It might not fit into this mold [of] strict guidelines, so maybe the guidelines need to come within alignment with each other."
Characteristics of Individuals	Low-income participants	SE PT3: "Some would, some would not. I have one mom that doesn't eat any fruits and vegetables, and was very clear on that, that she would not be eating fruits and vegetables, so it just depends on the person." NE2 FG2: "If we can remove the barriers that are difficult for people to get through, like child care and transportation [they have to feel like it's worth the financial commitment because for these folks it's tough to even come up with fifty dollars...really, really hard."
	Extension educators	NW PT1: "Some resource, like some very easy to read, simple attractive resources [about] the vegetables and fruits...so more knowledge about the farm side [of things]."

RE-AIM	
Dimension	Illustrative Quote (s)
Reach	<p>NW PT1: "You have to meet people where they are...You have to make it as drop-dead easy as you can."</p> <p>NW PT3: "I would say it's also about...what do they want? Not what we want to give them. So, if you can engage them at the beginning even before the beginning on what that community wants from you in terms of nutrition education...I think we really have to focus on meeting people where they're at."</p>
Effectiveness	<p>NE2 PT1: "I think it's incredibly exciting...You are addressing some of the biggest barriers that exist for most families...You're making it cost effective for them...which is a challenge for most families...You're putting together healthy food for them so they don't have to go to the grocery store and kind of be puzzled by what, what should I be buying? What is healthy? This is gonna automatically address that. They're gonna be increasing their fruit and vegetable consumption."</p>
Adoption	<p>SE PT1: "It would be a challenge just because it's something new, you know. But I'm assuming that if I were gonna do this, there would be some kinda trainin' with it for me...I think I would need training on the program. What your expectations are, what our goals are."</p>
Implementation	<p>NW PT3: "Making sure you have the right person to do the education piece, and the right space, and are you able to provide child care? Um, so that, you know, at some point the parents can just be engaged in the education, but then you could bring the kids to it too. I think you're gonna have to find a day and time that works for your participants, and hopefully then that will also work for the farmer."</p>
Maintenance	<p><i>Yes</i> NE2 PT1: "I absolutely do think it can easily be sustainable and integrated in. I think it's a very natural progression and a natural fit."</p> <p><i>Maybe</i> SE PT1: "You're gonna at least have to have it in place for five years to see a really good impact on that and by then, it will be well known in the community...People know where to access it, how to access it, what it's about...[otherwise] it would just be a waste of money and time."</p> <p><i>No</i> NW PT3: "My initial reaction is no...I don't think it's necessarily addressing the true needs...I just think there's something that's gotta happen before this..."</p>

Toward a community impact assessment for food policy councils: Identifying potential impact domains

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Abstract

Food policy councils (FPCs) are collaboratives that work to strengthen food systems. Over 300 FPCs exist in the United States, Canada, and Tribal Nations. In 2015, we surveyed the types of initia-

tives FPCs undertook and identified food sector targets and domains of potential impact in an effort to inform comprehensive FPC impact assessments. FPCs ($N=66$) reported 317 policy, systems, and environmental initiatives. At least half

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of these were focused on food production, and many were focused on institutional food service and the food assistance sectors. Commercial food service, food processing, and food waste were less often the focus. Potential impacts of their initiatives were classified into six domains: supporting resilient food systems (235, 74%); increasing access to healthy foods (171, 54%); supporting economic development (115, 36%); promoting equity in the food system (94, 30%); promoting environmental sustainability (82, 26%); and increasing knowledge of or demand for healthy foods (27, 9%). Many initiatives were likely to impact multiple domains.

Keywords

Food Policy Council, Food System, Food Policy, Equity, Nutrition, Sustainability, Economic Development, Local Agriculture, Natural Resources, Collaboration

Introduction and Literature Review

Food policy councils (FPCs) are collaboratives that bring together representatives from across the food system in order to identify food system issues, coordinate programs, and inform policy (Harper, Shattuck, Holt-Giménez, Alkon, & Lambrick, 2009). Food systems are complex, adaptive systems that are composed of the individuals, organizations, inputs, and outputs (and the interactions between them) that are required to produce, process, distribute, sell, purchase, consume, and dispose of food (Nesheim, Oria, & Tsai Yih, 2015). Food systems vary in scale. They can be examined at many levels, from communities to global food systems (Godfray et al., 2010). In the United States and Canada, food systems' structures can give rise to complex problems, including hunger, obesity, degradation of natural resources, and equity concerns (Neff, Palmer, McKenzie, & Lawrence, 2009). FPCs serve as an arena where members can develop a holistic view of a food system and take action to address food-related problems in their communities (Schiff, 2008). For example, in 2011 the Centers for Disease Control and Prevention (CDC) recommended FPCs as a strategy to increase fruit and vegetable consumption because councils aim to increase individuals' access to produce through policy and programs (CDC,

2011). Moreover, by soliciting community input and empowering members to champion food system issues, FPCs allow groups to practice "food democracy," defined as "the idea that people can and should be actively participating in shaping the food system, rather than remaining passive spectators on the sidelines. In other words, food democracy is about citizens having the power to determine agro-food policies and practices locally, regionally, nationally, and globally" (Hassanein, 2003, p.79). Cross-sector collaborations, such as FPCs, have the potential to influence environments such that healthy foods are broadly available, affordable, and produced using methods that protect natural resources (Schiff, 2008).

There are over 300 FPCs in the U.S. and Canada (Food Policy Network, 2015), yet research on the impact FPCs have on policy, systems, and environmental-level change (PSE) is limited. The CDC recognizes that individuals' environments influence their health behaviors, and thus recommend strategies that promote PSE change as a promising approach to reduce obesity and promote public health (Honeycutt et al., 2015; Lyn et al., 2013). Existing FPC literature describes council and network structures (Freedman & Bess, 2011; Harper et al., 2009), activities and food system priorities (Scherb, Palmer, Frattaroli, & Pollack, 2012), and developing partnerships as a mechanism to facilitate food system change (Clayton, Frattaroli, Palmer, & Pollack, 2015). Several case studies describe how individual FPCs influence policies and suggest impacts those policies could have on their communities (McCartan & Palermo, 2017; Walsh, Taggart, Freedman, Trapl, & Borawski, 2015). However, there are no studies that systematically evaluate the impact that a large sample of FPCs are likely to have on policies, systems, and environments within their communities. Capwell and colleagues identified the following six reasons why evaluation is useful for community public health initiatives: "i) to determine achievement of objectives related to improved health status; ii) to improve program implementation; iii) to provide accountability to funders, community, and others; iv) to increase community support for initiatives; v) to contribute to the scientific base for community public health interventions; and vi) to inform

policy decisions” (Capwell, Butterfoss, & Francisco, 2000, p. 15). Additionally, council initiatives may produce unintended negative consequences that may go undetected if they are not captured in impact evaluations (Chavis, 2001).

While evaluating the impacts FPCs have on PSEs in their communities is critical, doing so is challenging. Community collaboratives impact communities directly through programs and policies and indirectly through the efforts of their members, their organizations, and other stakeholders (Javdani & Allen, 2011; Roussos & Fawcett, 2000). One FPC coordinator explained, “Because much of our work is indirect, facilitative, and collaborative, it’s difficult to isolate the impacts of our specific efforts” (MacRae & Donahue, 2013, p.17). Moreover, FPCs are working to influence food systems, which are complex. Ascertaining cause and effect is complicated by time delays and feedback loops, which are hallmarks of complex systems (Vennix, 1996). Identifying the broad domains and sectors that FPCs influence can help organize the challenging task of evaluating change in the complex food system (Anderson Steeves, Martins, & Gittelsohn, 2014).

In this study, we suggest a classification system for categorizing the potential impacts FPCs may have in their communities as an initial step toward a comprehensive, systematic FPC impact assessment. The categories we identified are domains of potential impact. Identifying domains, or constructs, is an early step in item and scale development (DeVellis, 2012). Constructs are ideas that are not directly observable; thus, they are measured using items that are thought to reflect that construct (DeVellis, 2012). Scales are a method of data collection for evaluation and research. We employed directed content analysis, a qualitative method where researchers use existing theories or frameworks to develop initial codes, and then iteratively analyze text (Hsieh & Shannon, 2005). In this case, we analyzed the text of 317 PSE initiatives reported by FPCs to develop a coding scheme for potential impact domains. We then iteratively coded the text and reported the frequency and types of initiatives in each domain. The potential impact domains could inform FPC community impact assessments.

Applied Research Methods

Data Collection

In 2015, members of 278 FPCs throughout the United States, Canada, and Tribal Nations were invited to complete a survey using the Food Policy Council Self-Assessment Tool (FPC-SAT) (Calancie et al., 2017). The assessment tool was adapted from a study of intimate partner violence prevention councils (Allen, Javdani, Lehrner, & Walden, 2012). The Institutional Review Board at the University of North Carolina at Chapel Hill exempted this study. Experts in survey development, FPCs, nutrition, public health, and law reviewed the assessment tool. Cognitive response interviews were conducted with a convenience sample of four FPC leaders or members to elicit feedback on the questions and to verify that potential participants would accurately interpret FPC-SAT questions. The experts and interviewees suggested shortening the assessment tool, using consistent question stems within question blocks, and rephrasing several questions. Those changes were made and then the assessment tool was pilot-tested with members from 17 FPCs before it was used to collect data from a large sample of FPCs. All active FPCs whose contact information listed in the Food Policy Network’s Food Policy Council Directory in 2015 (Food Policy Network, 2015) were asked to participate in this study via a recruitment email. The email contained a study description and an electronic link to the FPC-SAT. Contact persons at FPCs were asked to complete the survey and to share the survey link with their council members. Each participant was eligible for a US\$5 gift card as an incentive, and councils where eight or more members completed the assessment tool received a feedback report summarizing their members’ perception of the council. Members’ perceptions were aggregated and presented anonymously in the feedback reports. Three reminders were sent to FPC contact persons, asking them to complete the assessment tool and to remind their members to complete the tool.

The FPC-SAT included an item asking participants to report PSE initiative with which their council was involved (Question text: “Please list and describe changes in: policy e.g., bee keeping

ordinance, zoning for community gardens; systems e.g., connected food-related organizations; environments e.g., influenced menus in hospital cafeterias; and/or organizational practices e.g., use of local foods in schools; that your council helped facilitate over the last 12 months"). Participants recorded their responses in an open text field. Since FPC members each completed an FPC-SAT, members within the same FPC frequently reported the same PSE initiatives. In those cases, each PSE was only counted once per council.

Data Analysis

Members of the CDC Nutrition and Obesity Policy Research and Evaluation Network (NOPREN) FPC Working Group (Blanck & Kim, 2012) conducted a directed content analysis of the open-ended assessment item described above. The Working Group includes researchers and practitioners with expertise in law, public policy, public health, food systems, cross-sector collaboration, nutrition, community interventions, food policy, equity, and FPCs. The Working Group reviewed all of the initiatives reported by FPCs and developed coding procedures for food system sectors and potential impacts of reported PSE initiatives. All study authors worked in pairs to categorize the reported initiatives into potential impact domains or food system sectors. More than one potential impact domain was applied if there was sufficient information provided to do so. Those with insufficient information to infer potential impacts were coded as such. Pairs of coders reviewed their initiative codes and discrepancies were resolved through discussion until a consensus was reached. One researcher reviewed all coded initiatives for quality and consistency.

Initiatives by food system sectors and topics

We used a variety of food system descriptions and frameworks, particularly those described by Sobal, Kettel Khan, and Bisogni (1998) and Heywood and Lund-Adams (1991), to guide the development of relevant and practical classifications of FPC initiatives into sectors of the food system, as follows: (1) local agriculture and/or food production, (2) food processing, (3) food retailing, (4) institutional food service, (5) commercial food service,

(6) food assistance and charitable foods, (7) food waste, and (8) other initiatives. Reported initiatives that were not specific to a particular sector or for which insufficient information was provided were classified as "other." Initiatives could be classified into more than one sector. FPC reported initiatives were also grouped into topics, which were developed inductively.

Initiatives by potential impact domains

The coding scheme for potential impacts of reported initiatives was informed by the Healthy Food Policy Project framework that is under development by the Public Health Law Center, the University of Connecticut's Rudd Center for Food Policy and Obesity, and the Vermont Law School's Center for Agriculture and Food Systems. The following six domains of potential impact were identified by the NOPREN working group.

(1) *Increase access to healthy food* (such as fruits, vegetables, and whole grains) refers to initiatives that aim to increase availability (supply of food), affordability (cost), food safety, and cultural appropriateness of food (Caspi, Sorensen, Subramanian, & Kawachi, 2012). Healthy foods contribute to eating patterns that emphasize fruits, vegetables, beans, legumes, whole grains, dairy, seafood and plant-based protein, minimally processed meats and poultry, eggs, nuts, seeds, and non-hydrogenated oils. Healthy foods also contribute to eating patterns that limit the consumption of refined grains, sugar, trans fats, and sodium (Guenther et al., 2013; Salas-Salvado et al., 2011; U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015). These eating patterns are associated with a decreased risk for developing diet-related chronic disease (Mozaffarian, 2016). Actions that lowered the price of healthy foods or beverages were included in this category.

(2) *Increase knowledge of and/or demand for healthy foods* refers to initiatives that increase community members' motivation and capacity to consume healthy foods by providing information, marketing, and other consumer-directed strategies. Actions that influenced knowledge or demand for products,

such as marketing campaigns, were categorized here.

(3) *Promote equity in the food system* refers to initiatives that reduce disadvantage and disparities in outcomes (such as food security, nutrition, employment opportunities, and health), regardless of one's race or ethnicity, religion, socioeconomic status, gender, age, or mental health; cognitive, sensory, or physical disability; sexual orientation or gender identity; and/or geographic location (Office of Disease Prevention and Health Promotion, 2008; Ransom, Greiner, & Kochtitzky, 2011).

(4) *Support economic development* refers to initiatives that increase or promote opportunities to generate income for individuals and communities.

(5) *Promote environmental sustainability* refers to approaches that increase the likelihood that natural resources such as clean water, clean air, biodiversity, and productive soil will exist for future generations (Thompson & Ikerd, 2009). Examples of

sustainable food production methods include aquaponics, organic farming, and non-toxic pesticide use.

(6) *Support a resilient food system* includes initiatives that allow food systems and their component sectors to withstand shocks and disturbances, both human-caused and natural, over time (Toth, Rendall, & Reitsma, 2016). Resilience also includes the ability of food system actors to respond to disruptions by activating social networks to which they belong (Toth et al., 2016). Initiatives that connect groups and sectors to support and build infrastructure for the local food system are regarded as having the potential to promote resilience because they may shorten distribution networks and supply chains and provide food to nearby populations, should national or international food distribution networks be disrupted (Toth et al., 2016).

Results

Members of 66 FPCs (24% of those contacted) from the U.S., Canada, and Tribal Nations

responded to the survey. This is comparable to the geographic distribution of FPCs listed in the most recent FPC Directory (Table 1) (Sussman & Bassarab, 2017). In our sample, 27% of councils were from the Western U.S., 17% from the Midwest, 23% from the South, and 15% from the Northeast. In the 2016 FPC Directory, 22% were from the Western U.S., 24% from the Midwest, 21% from the South, and 13% from the Northeast. Three percent of our sample was from Tribal Nations; 1% of those listed in the 2016 FPC Directory were from Tribal Nations. Two percent of our sample was from the Canadian West, none from the Prairies, 11% from Central Canada, and 3% from the Canadian Atlantic provinces. In the 2016 Directory, 7% were from the Canadian West, 2% from the Prairies, 12% from Central Canada, and 1% from the Canadian

Table 1. Food Policy Councils (FPCs); Regional Distribution of Respondents to 2015 Survey (N=66) Compared with Those Listed in the 2016 Food Policy Council Directory

Country and Region	FPCs reporting initiatives in this study; n (%)	FPCs listed in the 2016 Food Policy Network Directory ^a ; n (%)
United States		
West	18 (27%)	68 (22%)
Midwest	11 (17%)	69 (24%)
South	15 (23%)	65 (21%)
Northeast	10 (15%)	40 (13%)
Tribal Nations (US)	2 (3%)	4 (1%)
Canada		
West	1 (2%)	21 (7%)
Prairies	0	7 (2%)
Central	7 (11%)	39 (12%)
Atlantic	0	3 (1%)
Unknown	2 (3%)	0
TOTAL	66	316

^a Source: Sussman & Bassarab, 2017.

Atlantic provinces. The average FPC had been in place for 6.7 years (range 1–33 years). The most frequently reported FPC age was three years. The average council age listed in the 2016 Directory is six years (range 1–34 years), and the most frequently reported age was four years.

FPC Initiatives by Food System Sectors

FPCs reported a total of 317 PSE initiatives over the 12 months prior to the survey. Table 2 shows the initiatives classified by the sectors of the food system they influence or target. Initiatives could apply to a single sector or a combination of sectors.

Table 2. Policy, Systems, and Environment Initiatives (PSE) by Topic and Sector of the Food System Reported by Members of 66 Food Policy Councils in 2015

PSE initiative topic by food system sector ^a	Example initiatives reported by food policy council members
LOCAL AGRICULTURE AND/OR FOOD PRODUCTION SECTOR (<i>n</i>=159, 50%)	
Urban agriculture: <ul style="list-style-type: none"> • Land use policies • Zoning • Permits and regulations 	<ul style="list-style-type: none"> • Supported city regulations to preserve and protect local agricultural land • Revised urban agriculture zoning code (bees, chickens, goats and farm stand permits), and farm-gate sales
Enact “local food” procurement policies in schools ^b	<ul style="list-style-type: none"> • Worked with the largest urban school district to create local food procurement guidelines
Enact “local food” procurement policies in other settings	<ul style="list-style-type: none"> • Advocated for “buy local” county policy • Helped adopt workplace local food policy
Support farmers markets (including acceptance of food assistance benefits for purchases)	<ul style="list-style-type: none"> • Removed state regulatory barrier for farmers markets • Established farmers market and community fairs with multiple partners for low-income, food desert areas • Implemented a grant program to help farmers markets accept food stamps
Support community gardens	<ul style="list-style-type: none"> • Encouraged donation of private land into community gardens through the limitation of legal liability
FOOD PROCESSING SECTOR (<i>n</i>=16, 5%)	
Support the cottage food industry	<ul style="list-style-type: none"> • Supported city ordinance to permit the sale of home-grown fresh produce and cottage foods from residences
Support local processing, preparation and distribution facilities	<ul style="list-style-type: none"> • Established a community kitchen • Established a meat-processing plant and investigated the feasibility of a poultry-processing facility • Conducted a feasibility study for establishing a food hub
FOOD RETAIL SECTOR (<i>n</i>=43, 14%)	
Conduct and/or support promotions of the sale and/or use of “local foods”	<ul style="list-style-type: none"> • Conducted a campaign with several grocery stores and dozens of local farmers, including public outreach and creation of a wholesale local food directory to connect buyers and farmers • Promoted/pilot tested healthy food and fresh produce in retail store
Increase the number of healthy food outlets	<ul style="list-style-type: none"> • Legalized mobile grocery stores (Mobile food stores ordinance)
INSTITUTIONAL FOOD SERVICE SECTOR (<i>n</i>=63, 20%)	
Improve school food	<ul style="list-style-type: none"> • Installed 20 salad bars in the district’s public schools
Enact “local food” procurement policies	<ul style="list-style-type: none"> • Passed a resolution to procure at least 50% local foods for use in the local school system. • Passed a policy for institutional purchasing from local farms
Support the development and/or implementation of school wellness policies	<ul style="list-style-type: none"> • Convened school wellness seminars for local school districts to implement/adopt wellness policies

(continued)

Table 2, continued

COMMERCIAL FOOD SERVICE SECTOR (n=13, 4%)	
Advocate for zoning changes (excluding urban agriculture zoning policies)	<ul style="list-style-type: none"> Passed mobile vending policies and/or ordinances near schools at the city and county level
FOOD ASSISTANCE & CHARITABLE FOODS SECTOR (n=45, 14%)	
Increase access to free or low-cost foods through programs and SNAP use	<ul style="list-style-type: none"> Helped start a farmers market in food-insecure neighborhood that takes EBT marketplace and partners with WIC Included local produce in Meals on Wheels Promoted "please give nutritiously" Organized a gleaning program with local growers
Raise community awareness	<ul style="list-style-type: none"> Held event to raise community awareness of the need to end hunger
FOOD WASTE SECTOR (n=3, <1%)	
Raise community awareness and remove barriers to composting	<ul style="list-style-type: none"> Held community event to raise awareness of the need to reduce food waste Eased requirements to increase composting
OTHER INITIATIVES (n=74, 23%)	
Improve and support FPC functioning: <ul style="list-style-type: none"> Building connections, networking Changing FPC structure, governance 	<ul style="list-style-type: none"> Connected a remote rural region to other community food system organizations across the state through the new statewide food system network.
Facilitate food system assessments, food charters, or general food planning	<ul style="list-style-type: none"> Sought endorsement of food charter by municipalities and committees
Raise public education and awareness about food system issues	<ul style="list-style-type: none"> Created TED Talks in public places about food policy Conducted "Eat, Think, Vote" campaign
Promote communitywide nutrition or healthy living initiatives	<ul style="list-style-type: none"> Conducted nutrition and cooking classes for single mothers

^a Initiatives can target more than one sector.

^b Schools are a unique setting because they are subject to federal nutrition standards.

The most common sector targeted by the initiatives was local agriculture and/or food production (159, 50%), followed by other initiatives (74, 23%), institutional food service (63, 20%), food assistance & charitable foods (45, 14%), food retail (43, 14%), food processing (16, 5%), commercial food service (13, 4%), and food waste (3, <1%). Among the most common initiatives were those related to the preservation of a viable local food production system including advocacy for ordinances, policies and plans to preserve agricultural land in urban areas, creation of community gardens, and easing regulations to permit more backyard farming. Institutional food service initiatives frequently addressed school meal programs and procurement policies for hospitals and government buildings. Initiatives targeting the food retail sector included mobile grocery store policies and activities to increase the availability and appeal of local farms within retail settings such as grocery stores. Many

food assistance and charitable food initiatives focused on increasing the supply of donated foods for distribution through community food drives and gleaning programs; others focused on raising awareness about hunger in the community. Food processing initiatives included instituting policies permitting the sale of certain home grown and homemade goods, establishing a community kitchen, and investigating the feasibility of food hubs and processing facilities. Commercial food service initiatives included mobile food vending policies and menu labeling in restaurants. Food waste policies and initiatives were uncommon (<1%), but those few that reported initiatives in this sector focused on composting education, easing composting requirements, and raising community awareness of the need to reduce food waste.

Potential Impacts of FPC Initiatives

Most frequently reported were initiatives with the

potential to promote resilience in the food system (235, 74%), increase access to healthy foods (171, 54%), and support economic development (115, 36%) (Table 3). Less often reported were those that aim to promote equity within the food system (94, 30%), promote environmental sustainability (82, 26%), and increase consumer knowledge of and/or demand for healthy foods (27, 9%). Many PSE initiative topics were considered to have multiple potential impacts (Table 4). For example, farmers markets that promoted products from farms that use sustainable farming practices were regarded as having the potential to promote environmental sustainability and increase access to healthy foods. Some initiatives, such as those addressing urban agriculture, promoting local food procurement in schools, and supporting farmers markets had potential impacts in most of the six impact categories. For example, of the 38 urban agriculture PSE initiatives that FPC members reported, nearly all had a potential impact on increasing access to healthy foods, promoting environmental sustainability, and supporting a resilient food system.

Discussion

FPCs have the opportunity to work in all sectors of the food system to influence policies, systems, and environments in their communities that affect health, economic prosperity, equity, environmental sustainability, and resilience of the local food system (Nesheim et al., 2015). In this study, FPCs reported PSE and other initiatives that were predominantly within the local agriculture and/or food production sector, including initiatives for its preservation, promotion, growth, and use of sustainable practices. Many FPC initiatives also contributed to the food assistance and/or charitable food sector and to institutional food services.

There were many potential benefits of initiatives reported by FPCs, including resilience of the local food system, improving access to healthful foods, and contributing to local economic development. Several initiatives supporting farmers markets had the potential to increase access to healthy foods (Ruelas, Iverson, Kiekel, & Peters, 2012; Sadler, 2016), support economic development (Hughes, Brown, Miller, & McConnell, 2008),

Table 3. Potential Impacts of Policy, Systems, and Environment Initiatives (N=317) Reported by Members of 66 Food Policy Councils in 2015

PSE Initiative Category	Number of reported initiatives; <i>n</i> (%)	Examples
Support a resilient food system	235 (74%)	<ul style="list-style-type: none"> Proposed farmland trust initiative Facilitated relationships between food-related organizations
Increase access to healthy food	171 (54%)	<ul style="list-style-type: none"> Supported zoning for farm stands Facilitated EBT machine use at farmers markets
Support economic development	115 (36%)	<ul style="list-style-type: none"> Passed cottage food industry laws Increased the number of healthy food outlets, farmers markets, and food hubs, and promoting local food procurement at schools and institutions (thus creating markets for local farmers)
Promote equity in the food system	94 (30%)	<ul style="list-style-type: none"> Passed staple food ordinance that requires all stores with a grocery store license to sell a greater quantity of healthy foods, including fruits and vegetables Improved public school food programs
Promote environmental sustainability	82 (26%)	<ul style="list-style-type: none"> Supported zoning for community gardens and urban agriculture (thus increasing biodiversity in an area) Supported city pollinator resolution
Increase knowledge of and/or demand for healthy foods	27 (9%)	<ul style="list-style-type: none"> Supported buy fresh buy local initiatives Facilitated farm-to-school and school nutrition collaboration among agencies^a

^a Farm-to-school has a nutrition education component.

Table 4. Number of Policy, Systems, and Environmental (PSE) Initiatives in Each Topic Categorized by Potential Impact; *n*=66 Food Policy Councils; Heat Map ^a

Topic of PSE change		Potential impact category					
		Increase access to healthy food	Increase knowledge of and/or demand for healthy foods	Promote equity in the food system	Support economic development	Promote environmental sustainability	Support a resilient food system
1	School wellness programs	3	0	0	0	0	0
2	Cottage food industry	0	0	0	2	0	0
3	Local food campaign	0	7	0	0	0	1
4	Increasing the number of healthy food outlets	8	0	4	8	0	8
5	Food hubs, processing facility, or community kitchen	0	2	2	10	0	7
6	Food system assessments, food charters, or general food planning	2	0	5	1	1	20
7	Urban agriculture	37	2	1	6	38	38
8	Building connections between organizations or supported another organization, or activities related to how the council functions (structure, governance, etc.)	10	1	8	9	2	44
9	Increasing access to free or low-cost foods through programs and SNAP use	14	0	14	5	7	9
10	Supporting community gardens	21	0	0	2	21	21
11	Promoting local food procurement in schools	21	12	21	21	0	21
12	Supporting farmers markets	25	1	17	25	0	25
13	Influencing institutional purchasing	7	0	1	14	0	15
14	Improving school food	11	0	11	0	0	0
15	Zoning (excluding urban agriculture zoning policies)	0	0	0	0	0	0
16	Public education or awareness raising about food system issues	6	0	6	0	1	1

17	Direct engagement with policy makers or government departments	4	0	3	5	3	8
18	Influencing agriculture and general land use	0	0	1	7	7	15
19	Promoting community-wide nutrition or healthy living initiatives	1	2	0	0	0	0
20	Other	1	0	0	0	2	2
Total		171	27	94	115	82	235

^a Shading occurs across rows such that the cells containing the highest number of initiatives within the row are the darkest, and the cells with the fewest initiatives within that row are the lightest.

and support a resilient food system by diversifying the types of food outlets in a community (Gillespie, Hilchey, Hinrichs, & Feenstra, 2007). Additionally, several initiatives to assist farmers markets to locate in low resource areas and/or accept EBT benefits were classified as promoting equity (Buttenheim, Havassy, Fang, Glyn, & Karpyn, 2012; Jones & Bhatia, 2011).

Promoting equity within the food system was less often associated with reported initiatives; yet equity is an area where FPCs, as multisector collaboratives, could become more influential (National Academies of Sciences, Engineering, and Medicine, 2017). FPCs can promote equity by several means including recruiting socioeconomically and demographically diverse groups to join their councils and participate in policy development; undertaking policy work that will maximize benefits for those groups that experience health and economic disparities; and considering the social determinants of health in all their policy work in food systems (e.g., food system worker conditions, living wage) (Thornton et al., 2016).

Evaluation research on PSE interventions is relatively new, and evidence is limited for identifying which approaches are “best bets.” The information and criteria that FPCs use for ‘envisioning’ and articulating their desired impacts, as well as selecting PSEs and sectors of the food system for their work are unclear and likely vary between councils. Systematic approaches to setting priorities could be useful for informing and enhancing FPC work. Similar to the


approach used in this paper; FPCs could conduct an analysis of their initiatives (and those of community partners) by food system sectors and potential impacts to highlight strengths and gaps. In addition, greater economic constraints on public funding place more importance on selecting actions that are most effective, or show the most promise in achieving the desired impacts. Moreover, public health practitioners report limited access to digestible research evidence on what is most effective to do and how to do it most effectively. Timely and distilled information about promising interventions has been identified as key to its usefulness in decision making (Leeman et al., 2015). Future surveys could include questions about certain details of FPC initiatives and intended impacts, as well as the need for research evidence and training for setting priorities.

This study has limitations. Coding teams assigned potential impacts to reported FPC initiatives, but the outcomes and impacts of FPC initiatives were not evaluated, and indeed, outcome studies of FPCs are rare. Others have called for such studies as an important basis for informing future work (Harper et al., 2009; Scherb et al., 2012). While FPC survey respondents were representative of the regional distribution of all FPCs, the response rate of 24% may affect the representativeness of our findings. However, this study serves as an initial investigation to identify domains of potential impact FPCs can have in their communities. Additional research should be conducted with a larger sample of FPCs to determine if the domains

identified here capture the breadth of domains that FPCs work to influence. We may also have misclassified or undercounted the food system sectors or potential impacts of some initiatives due to insufficient detail provided. For example, many local food initiatives were reported that were not coded as 'promoting environmental sustainability' because there was no mention of production practices. Those initiatives may be intended to promote sustainability, but the research team did not have enough detail about them to code them as such. Future FPC impact assessments should gather enough detail about FPC initiatives to determine their impact across multiple domains. Finally, several FPC members described their councils' efforts to support the internal work of their FPC, including gaining official recognition, developing by-laws, expanding membership, and developing working groups. While these initiatives are certainly critical functions in building the capacity of FPCs, they were not the focus of this analysis and were, therefore, excluded.

Conclusions and Recommendations for Research and Practice

The purpose of this study was to develop and apply a classification system to broadly categorize the potential impacts that FPCs' policy, systems, and environmental initiatives have in their communities. This is an initial step toward developing a comprehensive impact assessment for FPCs. Such an assessment could be completed independently, or integrated into existing assessment tools, such as the FPC-SAT (Calancie et al., 2017). Moreover, the broad impact categories we identified in this study

may help councils identify and communicate how their activities have the potential to impact factors that are important to representatives from diverse organizations, both internal and external to the council. For example, communicating that using local food in school meals programs can impact health equity, access to healthy foods, support the local economy, and promote resilient food systems could engender support from a variety of funders, community organizations, partners, and decision-makers who might not otherwise appreciate the broad value of such an initiative. Multisector support for food system change can lead to sustainable funding streams, increased influence with policy and decision-makers, and engagement from a broad range of community organizations. Finally, the broad impact domains of the FPCs reflect the Institute of Medicine's characterization of the food system as a complex system that influences health, natural resources, the economy, and the social fabric of society (Nesheim et al., 2015). Strengthening food systems is, therefore, a strategy that may help address complex problems in the U.S., Canada, and Tribal Nations. 

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References

- Allen, N. E., Javdani, S., Lehrner, A. L., & Walden, A. L. (2012). "Changing the text": Modeling council capacity to produce institutionalized change. *American Journal of Community Psychology*, 49(3–4), 317–331. <https://doi.org/10.1007/s10464-011-9460-z>
- Anderson Steeves, E., Martins, P. A., & Gittelsohn, J. (2014). Changing the food environment for obesity prevention: Key gaps and future directions. *Current Obesity Reports*, 3(4), 451–458. <https://doi.org/10.1007/s13679-014-0120-0>
- Blanck, H. M., & Kim, S. A. (2012). Creating supportive nutrition environments for population health impact and health equity: An overview of the Nutrition and Obesity Policy Research and Evaluation Network's efforts. *American Journal of Preventive Medicine*, 43(3), S85–S90. <https://doi.org/10.1016/j.amepre.2012.06.005>
- Buttenheim, A., Havassy, J., Fang, M., Glyn, J., & Karpyn, A. E. (2012). Increasing supplemental nutrition assistance program/electronic benefits transfer sales at farmers' markets with vendor-operated wireless point-of-sale terminals. *Journal of the Academy of Nutrition and Dietetics*, 112(5), 636–641. <https://doi.org/10.1016/j.jand.2011.12.021>

- Calancie, L., Allen, N. E., Weiner, B. J., Ng, S. W., Ward, D. S., & Ammerman, A. (2017). Food Policy Council self-assessment tool: Development, testing, and results. *Preventing Chronic Disease*, 14, 160281. <https://doi.org/10.5888/pcd14.160281>
- Capwell, E. M., Butterfoss, F., & Francisco, V. T. (2000). Why Evaluate? *Health Promotion Practice*, 1(1), 15–20. <https://doi.org/10.1177/152483990000100103>
- Caspi, C. E., Sorensen, G., Subramanian, S. V., & 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>
- Centers for Disease Control and Prevention. (2011). *Strategies to Prevent Obesity and Other Chronic Diseases: The CDC Guide to Strategies to Increase the Consumption of Fruits and Vegetables*. Atlanta: U.S. Department of Health and Human Services.
- Chavis, D. M. (2001). The paradoxes and promise of community coalitions. *American Journal of Community Psychology*, 29(2), 309–320. <https://doi.org/10.1023/A:1010343100379>
- Clayton, M. L., Frattaroli, S., Palmer, A., & Pollack, K. M. (2015). The role of partnerships in U.S. Food Policy Council policy activities. *PLoS One*, 10(4), e0122870. <https://doi.org/10.1371/journal.pone.0122870>
- DeVellis, R. (2012). *Scale development: Theory and applications* (3rd ed.). Sage Publications.
- Food Policy Network. (2015). Food Policy Council Directory. Retrieved from <http://www.jhsph.edu/research/centers-and-institutes/johns-hopkins-center-for-a-livable-future/projects/FPN/directory/online>
- Freedman, D. A., & Bess, K. D. (2011). Food systems change and the environment: Local and global connections. *American Journal of Community Psychology*, 47(3–4), 397–409. <https://doi.org/10.1007/s10464-010-9392-z>
- Gillespie, G., Hilchey, D., Hinrichs, C., & Feenstra, G. (2007). Farmers' markets as keystones in rebuilding local and regional food systems. In C. Hinrichs & T. Lyson (Eds.), *Remaking the North American food system: Strategies for sustainability* (pp. 65–83). Lincoln, NE: University of Nebraska Press
- Godfray, H. C. J., Beddington, J. R., Crute, I. R., Haddad, L., Lawrence, D., Muir, J. F., ... Toulmin, C. (2010). Food security: The challenge of feeding 9 billion people. *Science*, 327(5967), 812–818. <https://doi.org/10.1126/science.1185383>
- Guenther, P. M., Casavale, K. O., Reedy, J., Kirkpatrick, S. I., Hiza, H. A. B., Kuczyński, K. J., ... Krebs-Smith, S. M. (2013). Update of the Healthy Eating Index: HEI-2010. *Journal of the Academy of Nutrition and Dietetics*, 113(4), 569–580. <https://doi.org/10.1016/j.jand.2012.12.016>
- Harper, A., Shattuck, A., Holt-Giménez, E., Alkon, A., & Lambrick, F. (2009). Food policy councils: Lessons learned. *Institute for Food and Development Policy*, 1–63.
- Hassanein, N. (2003). Practicing food democracy: A pragmatic politics of transformation. *Journal of Rural Studies*, 19(1), 77–86. [https://doi.org/10.1016/S0743-0167\(02\)00041-4](https://doi.org/10.1016/S0743-0167(02)00041-4)
- Heywood, P., & Lund-Adams, M. (1991). The Australian food and nutrition system: A basis for policy formulation and analysis. *Australian Journal of Public Health*, 15(4), 258–270. <https://doi.org/10.1111/j.1753-6405.1991.tb00345.x>
- Honeycutt, S., Leeman, J., McCarthy, W. J., Bastani, R., Carter-Edwards, L., Clark, H., ... Kegler, M. (2015). Evaluating policy, systems, and environmental change interventions: Lessons learned from CDC's prevention research centers. *Preventing Chronic Disease*, 12, 150281. <https://doi.org/10.5888/pcd12.150281>
- Hsieh, H.-F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, 15(9), 1277–1288. <https://doi.org/10.1177/1049732305276687>
- Hughes, D., Brown, C., Miller, S., & McConnell, T. (2008). Evaluating the economic impact of farmers' markets using an opportunity cost framework. *Journal of Agricultural and Applied Economics*, 40(1), 253–265. <https://doi.org/10.1017/S1074070800028091>
- Ikerd, J. (2009). *Crisis and opportunity: Sustainability in American agriculture*. Lincoln: University of Nebraska Press.
- Javdani, S., & Allen, N. E. (2011). Councils as empowering contexts: Mobilizing the front line to foster systems change in the response to intimate partner violence. *American Journal of Community Psychology*, 48(3–4), 208–221. <https://doi.org/10.1007/s10464-010-9382-1>
- Jones, P., & Bhatia, R. (2011). Supporting equitable food systems through food assistance at farmers' markets. *American journal of public health*, 101(5), 781–783. <https://doi.org/10.2105/AJPH.2010.300021>

- Leeman, J., Calancie, L., Hartman, M. A., Escoffery, C. T., Herrmann, A. K., Tague, L. E., ... Samuel-Hodge, C. (2015). What strategies are used to build practitioners' capacity to implement community-based interventions and are they effective?: A systematic review. *Implementation Science*, 10, 80. <https://doi.org/10.1186/s13012-015-0272-7>
- Lyn, R., Aytur, S., Davis, T. A., Eyler, A. A., Evenson, K. R., Chiqui, J. F., ... Brownson, R. C. (2013). Policy, systems, and environmental approaches for obesity prevention: A framework to inform local and state action. *Journal of Public Health Management and Practice*, 19, S23–S33. <https://doi.org/10.1097/PHH.0b013e3182841709>
- MacRae, R., & Donahue, K. (2013). *Municipal food policy entrepreneurs: A preliminary analysis of how Canadian cities and regional districts are involved in food system change*. Toronto Food Policy Council.
- McCartan, J., & Palermo, C. (2017). The role of a food policy coalition in influencing a local food environment: An Australian case study. *Public Health Nutrition*, 20(5), 917–926. <https://doi.org/10.1017/S1368980016003001>
- Mozaffarian, D. (2016). Dietary and policy priorities for cardiovascular disease, diabetes, and obesity. *Circulation*, 133(2), 187–225. <https://doi.org/10.1161/CIRCULATIONAHA.115.018585>
- National Academies of Sciences, Engineering, and Medicine. (2017). *Communities in action: Pathways to health equity*. Washington D.C.: National Academies Press.
- Neff, R., Palmer, A., McKenzie, S., & Lawrence, R. S. (2009). Food Systems and Public Health Disparities. *Journal of Hunger & Environmental Nutrition*, 4(3–4), 282–314. <https://doi.org/10.1080/19320240903337041>
- Nesheim, M., Oria, M., & Tsai Yih, P. (eds.) (2015). *A framework for assessing effects of the food system*. Washington, D.C.: The National Academies Press.
- Office of Disease Prevention and Health Promotion. (2017). Disparities. Retrieved from <https://www.healthypeople.gov/2020/about/foundation-health-measures/Disparities>
- Ransom, M., Greiner, A., & Kochtitzky, C. (2011). Pursuing health equity: Zoning codes and public health. *The Journal of Law, Medicine & Ethics*, 39(suppl. 1), 94–97. <https://doi.org/10.1111/j.1748-720X.2011.00576.x>
- Roussos, S. T., & Fawcett, S. B. (2000). A review of collaborative partnerships as a strategy for improving community health. *Annual Review of Public Health*, 21, 369–402. <https://doi.org/10.1146/annurev.publhealth.21.1.369>
- Ruelas, V., Iverson, E., Kiekel, P., & Peters, A. (2012). The role of farmers' markets in two low income, urban communities. *Journal of Community Health*, 37(3), 554–562. <https://doi.org/10.1007/s10900-011-9479-y>
- Sadler, R. (2016). Strengthening the core, improving access: Bringing healthy food downtown via a farmers' market move. *Applied Geography*, 67, 119–128. <https://doi.org/10.1016/j.apgeog.2015.12.010>
- Salas-Salvado, J., Bullo, M., Babio, N., Martinez-Gonzalez, M. A., Ibarrola-Jurado, N., Basora, J., ... Ros, E. (2011). Reduction in the incidence of Type 2 Diabetes with the mediterranean diet: Results of the PREDIMED-Reus nutrition intervention randomized trial. *Diabetes Care*, 34(1), 14–19. <https://doi.org/10.2337/dc10-1288>
- Scherb, A., Palmer, A., Frattaroli, S., & Pollack, K. (2012). Exploring food system policy: A survey of food policy councils in the United States. *Journal of Agriculture, Food Systems, and Community Development*, 2(4), 3–14. <https://doi.org/10.5304/jafscd.2012.024.007>
- Schiff, R. (2008). The role of food policy councils in developing sustainable food systems. *Journal of Hunger & Environmental Nutrition*, 3(2–3), 206–228. <https://doi.org/10.1080/19320240802244017>
- Sobal, J., Kettel Khan, L., & Bisogni, C. (1998). A conceptual model of the food and nutrition system. *Social Science & Medicine*, 47(7), 853–863. [https://doi.org/10.1016/S0277-9536\(98\)00104-X](https://doi.org/10.1016/S0277-9536(98)00104-X)
- Sussman, L., & Bassarab, K. (2017). *Food Policy Council Report 2016*. Baltimore, MD: Johns Hopkins Center for a Livable Future. Retrieved from <http://www.foodpolicynetworks.org/food-policy-resources/?resource=933>
- Thornton, R. L. J., Glover, C. M., Cene, C. W., Glik, D. C., Henderson, J. A., & Williams, D. R. (2016). Evaluating strategies for reducing health disparities by addressing the social determinants of health. *Health Affairs*, 35(8), 1416–1423. <https://doi.org/10.1377/hlthaff.2015.1357>
- Toth, A., Rendall, S., & Reitsma, F. (2016). Resilient food systems: A qualitative tool for measuring food resilience. *Urban Ecosystems*, 19(1), 19–43. <https://doi.org/10.1007/s11252-015-0489-x>
- U.S. Department of Health and Human Services and U.S. Department of Agriculture. (2015). *Dietary Guidelines for Americans 2015-2020. 8th Edition*. Retrieved from <https://health.gov/dietaryguidelines/2015/>

- Vennix, J. A. M. (1996). *Group model building: Facilitating team learning using system dynamics*. West Sussex, England: John Wiley & Sons.
- Walsh, C. C., Taggart, M., Freedman, D. A., Trapl, E. S., & Borawski, E. A. (2015). The Cleveland–Cuyahoga County Food Policy Coalition: “We have evolved.” *Preventing Chronic Disease*, 12, 140538.
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The Local Food System Vitality Index: A pilot analysis to demonstrate a process for measuring system performance and development

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Abstract

Identifying successful development priorities for local food systems (LFSs) is a challenge for producers, LFS advocates, Extension agents, and policymakers. Consumer perceptions and preferences regarding what constitutes an active, healthy, and vibrant LFS often differ within and between diverse communities. Producers, development entities, and others would benefit from rapid assessment processes that provide detailed information on consumer preferences and

potential market opportunities within their LFS.

In this paper, we introduce the analytic possibilities of our Local Food System Vitality Index (LFSVI). Using data collected from a pilot survey in Lexington, Kentucky, we rapidly assess the performance of 20 different components of our LFS. The LFSVI differs from most other food system and quality-of-life indices by focusing on the perceptions of resident food consumers.

In our analysis, we identify that Lexington residents generally associate farmers markets, farm-to-fork restaurants, local product diversity, and retail sourcing of local food with high overall vitality of the local food system. While residents score the first three components as high performing, they perceive the retail component to be less functional. We use results such as these to compare which aspects of the LFS are valued versus which are high performing. We do this comparison across different resident food consumer segments in and between geographic locations. Throughout our analysis, we discuss how this index method is generally applicable and conducive to identifying LFS development priorities.

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Keywords

Local Food Systems, Performance Indices, Food System Vitality, Food System Development

Introduction

Local food systems (LFSs) are created through relationships between multiple individuals, institutions, and environments. The specific constellation of actors¹ shape the place-specific attributes, market channels, and culture surrounding a locality's food system (Feagan, 2007; Selfa & Qazi, 2005). While certain decision-makers have more power to shape and define how LFSs develop and change, it is critical to engage with the perceptions of diverse actors within the system. Producers, intermediaries, and buyers interact according to logics of market exchange and perceived consumer demand. Development personnel design LFS promotion strategies using success stories from other communities and discussions with stakeholders. Residents make decisions based on personal values, income, and proximity to market channels.

Because these actors engage with different components of the system, they often have divergent perspectives, perceptions, and preferences regarding what constitutes an active, healthy, and vibrant LFS. For instance, farmers markets have increased in popularity across the U.S. over the past 20 years (Low et al., 2015). Many local food advocates view farmers markets as an entry point to developing relationships between producers and consumers—and, by extension, developing local food systems (Brown & Miller, 2008). Farmers markets are undoubtedly a popular LFS venue that provides room for market transactions, the development of social bonds, and unique cultural experiences (Gillespie, Hilchey, Hinrichs, & Feenstra, 2007; Hinrichs, 2000); however, they are not sufficient to produce a sustainable, resilient LFS. In certain communities, especially rural areas, farmers markets may not have a large enough consumer base to attract or convince producers to divert resources to diversified production strategies that generally have small sales volumes (Rossi, Meyer, & Knappage, 2018). Additionally, residents in certain

areas may value different local food system components, attributes, or elements that do not cohere with national trends. In short, LFS development requires in-depth consideration of place-specific production resources and resident interests.

Our focus in this article is to introduce a methodology for quickly evaluating residents' perceptions of their LFS. Producers and LFS development stakeholders lack a systematic approach for measuring residents' perceptions of how certain inherently valued LFS aspects are performing and/or meeting expectations. These and other community decision-makers (including food councils, agricultural businesses, and local food coordinators) would benefit from a process to quickly assess how different groups of residents perceive the functioning of multiple components of their LFS. Understanding broad perspectives on LFS performance within a particular community, as well as those for smaller segments within the population, would allow for food system development that is locally specific and meets the needs of diverse groups.

In this article, we introduce the *Local Food System Vitality Index* (LFSVI). This index identifies place-specific stakeholder perceptions regarding the *performance* of different components of an LFS. Using data collected from a pilot survey of residents in Lexington, Kentucky, we illustrate how the LFSVI provides insights into how different stakeholders within and between communities differentially perceive and value certain LFS aspects. We analyze residents' perceptions of LFS component performance in different geospatial and demographic segments of the community. Using this analysis, we provide LFS decision-makers baseline information for further exploration into how capital and labor resources may be most effectively enrolled to create structurally diverse and resilient food systems that address broader community needs and aspirations.

We envision this methodology as a starting point for further inquiry and analysis and as a complement to other LFS assessment tools such as *The Economics of Local Food Systems Toolkit* (Thilmany McFadden et al., 2016). Rather than providing

¹ That is, producers, residents, distributors, processors, retail buyers, foodservice providers, LFS advocates, and other LFS participants.

estimated economic impacts of specific LFS interventions, our LFSVI identifies what aspects of an LFS may be favored by residents in different consumer segments within and between cities. As such, our analysis of Lexington is primarily used as an example of how our methodology can be employed, rather than a comprehensive analysis of the LFS. The strength of this methodology is its analytic flexibility, and we present different ways in which the performance of an LFS can be measured and benchmarked against other communities.

Background: Local Food System Performance Assessments are a Stated Need of LFS Development Entities

We developed the LFSVI to meet a recognized need for rapid performance assessment tools related to LFSs. Since LFSs in different locales have unique characteristics (Feagan, 2007; Hinrichs, 2000; Selfa & Qazi, 2005), effective LFS marketing, distribution, and development strategies should be based on place-specific characteristics. Many regional and local community economic development organizations are searching for ways to better understand these characteristics in order to set priorities that would strengthen and create economic opportunities for producers and local food businesses (Goodwin, 2013; Lamie, Dunning, Bendfeldt, Lelekacs, Velandia, & Meyer, 2013; Thilmany McFadden et al., 2016; North, Lamie, & Crosby, 2017). For instance, the USDA Southern Risk Management Education Center (SRMEC), the Southern Rural Development Center (SRDC), and Southern Sustainable Agriculture Research & Education (SARE) all have convened research and Extension professionals to help identify LFS priorities particularly for Land Grant Universities in the South (Goodwin, 2013; North et al., 2017). These entities recommend research and extension projects that assess what products, market channels, and aspects of the local food experience are valued by different consumer segments in multiple geographic locations (Palma, Morgan, & McCoy, 2013). Similarly, the USDA Agricultural Marketing

Service (AMS) has created The Economics of Local Food Systems Toolkit, which allows LFS stakeholders to quantify the impact of different local food system projects or investments (Thilmany McFadden et al., 2016).

The LFSVI addresses these needs and complements existing LFS assessment tools by providing an analytical framework to assess place-based stakeholder preferences, relationships, and values related to local food activity, marketing, and production. By understanding what aspects of an LFS residents value, producers and policymakers can prioritize the development and support of programs, strategies, infrastructure, and resources that aid the creation of more targeted expansion and development initiatives.

While our article presents data from a single pilot survey in Lexington, Kentucky, we illustrate how the LFSVI can be used generally to

1. understand potential areas of strength and weakness in an LFS that, if addressed, may enhance economic opportunities for producers and food-related businesses and
2. evaluate policies, institutions, and infrastructure that are integral to the vitality of specific local food systems.

The LFSVI emerged, in part, as a response to the authors' experiences with LFS assessment requests. Over the past three years, the authors were asked to assess the performance of multiple LFSs by their mayor's office, local and state community development organizations, and other research universities. In one local food demand study, we encountered a complex set of consumer and producer preferences for improving Lexington, Kentucky's LFS (Rossi, Hyden, Woods, Davis, Brislen, & Allen, 2015).² While consumer demand was high for local food in general, growth in local markets has been slow due to (1) distribution and processing infrastructure not being oriented to local markets and (2) mismatches between producer and buyer expectations. Insights

² This Local Food Demand Assessment study was conducted separately from and prior to the development of the LFSVI. However, we revisited the results of this food demand study as a way to validate and interpret some of the quantitative results of the subsequent LFSVI survey.

generated from this food demand study were valuable for producers, the city's local food coordinator, and other stakeholders; however, the process was extremely time and resource intensive and required nearly 50 in-depth interviews. Additionally, it provided only a snapshot of the current LFS conditions as well as second-hand, mediated data on the perspectives of residents. For instance, many restaurateurs felt that their sourcing of local products was critical to attracting and maintaining loyal customers. Without understanding the degree to which general consumers (or different segments of the city) value 'restaurants sourcing local ingredients,' it is difficult to know how effective local sourcing or its promotion would be as a business strategy for restaurants. This study would have benefitted from a repeatable analytic process that quickly and directly assessed resident perceptions of the LFS performance across a wide spectrum of related markets, programs, and agencies.

By developing a rapid assessment method, we can provide a baseline of LFS dynamics over time (if the LFSVI is repeatedly used) that may subsequently inform a more efficient and directed use of interviewing and assessment resources. The LFSVI quickly provides a number of insights into the areas of the LFS that are most visible and important to everyday residents. With a baseline of stakeholder perceptions regarding the LFS, we could have narrowed our focus in our interview questions to see how residents' perceptions of their LFS correspond to perceptions of stakeholders more directly connected to flows, transactions, and changes within the LFS (e.g., producers, distributors, retailers, restaurateurs, etc.). We could have also provided resident perception data to LFS stakeholders in interviews to see whether these data matched their understanding of the LFS. By comparing stakeholder interview responses to resident consumer data generated by the LFSVI, we could have produced a deeper and richer discussion about potential obstacles to and resources for LFS development. Unfortunately, we had already conducted a number of LFS assessments before developing this LFSVI methodology. Nevertheless, we will revisit some of the key points of this assessment when presenting the results from our LFSVI.

Literature Review: Local Food Systems, Indices, and Quality of Life Measures

Indices can be tools for social engagement. They often help inform policy recommendations by providing quick information on places or phenomena of interest. This policy-oriented use of indices has recently achieved prominence in the global economic development literature (Florida, 2002; Hamilton, Helliwell, Woolcock, 2016; Morelix, Tareque, Fairlie, Russell, & Reedy, 2016; Stiglitz, Sen, & Fitoussi, 2010). In some indices, lifestyle amenities and other cultural and/or social place attributes of place are promoted to support local investment and business development initiatives (Pittman, Pittman, Phillips, & Cangelosi, 2009). The logic associated with these index approaches is that places must compete for hypermobile investment funds through strategies that simultaneously 1) enhance 'quality of life' (QOL) attributes and 2) provide infrastructures that facilitate social relationships and the rapid exchange of information (Ateljevic & Doorne, 2003; Chang & Huang, 2005; Jessop & Sum, 2000; Yeoh, 2005). Indices, rankings, and other metrics allow localities to benchmark the performance of different characteristics of place. By identifying where a locality holds a perceived advantage (or deficiency) in terms of place characteristics such as livability (*The Economist*, 2017), entrepreneurship (Morelix et al., 2016), and sustainability and/or green space (Arcadis, 2016; Siemens, 2012), local policymakers can differentiate their place from others to strategically market or improve aspects of their city or region. As such, policymakers are keenly interested in metrics that identify place attributes to leverage for economic development (Diener & Suh, 1997; Florida, 2002).

At the same time, when index approaches focus too much on QOL attributes and amenities, they privilege particular types of labor and citizens. Richard Florida's (2002) work, in particular, prioritized the 'creative class' as a driver of robust urban economic growth. Indices such as those developed by Florida were used for re-envisioning urban space and setting development priorities. These tasks were accomplished by using indicators which measured phenomena such as 'coolness,' 'talent,' and 'diversity' as predictors of (and prerequisites

for) high-tech economic development (Florida, 2002). Indeed, cities (including Lexington, KY—the focus of this case study) invited Florida to consult on or promote strategies for making places more appealing to tech-oriented investment and the creative class through modifications of urban space (Eblen, 2010).

As these amenities-oriented indices prioritize bringing diversity and technocentric forms of economic activity to cities, they outline a vision of place-based development that is only applicable to a small class of potential residents and workers. They ignore local conditions, contingencies, and resources of and for development. This type of approach also diminishes the contributions of other types of economic activity, such as food production (Krätke, 2010). Despite the popularity of the QOL-oriented index approaches for assessing development priorities, most existing indices do not consider the relative activity and vitality of LFSs. As LFSs are sites of novel social exchange and engagement (Hinrichs, 2000), their omission from QOL indicators is puzzling. Researchers and analysts have yet to develop an index that effectively measures LFS performance from diverse residential perspectives, or one which presents a quick overview of LFSs.

There are only four indices, to our knowledge, which quantify local food activity; each has limitations for providing LFS development personnel with actionable data. The Food Relocalization Index assesses production and marketing indicators in the United Kingdom (Ricketts Hein, Ilbery, & Kneafsey, 2006). The Locavore Index (Strolling of the Heifers, n.d.) and a similar index developed for Hungary (Benedek & Balázs, 2014) rely on indicators drawn from secondary data. For instance, both indices measure food activity in each state or county through LFS attributes that can be counted such as the ‘# of CSAs,’ ‘# of farmers markets,’ ‘# of certification schemes,’ and ‘# of producer entries in local food directories.’ These indices may overvalue numerous smaller-scale operations; but, more importantly, they only infer LFS performance from attribute counts. Our index directly asks residents how they view the functioning of attributes

such as CSAs, farmers markets, and certification schemes. As such, LFS vitality is not limited to countable entities. Finally, the Local Agrifood System Sustainability and Resilience Index has a unique emphasis on stakeholder relationships and system stability (Green, Worstell, & Canarios, 2017; Worstell & Green, 2017). This index provides compelling production-side portraits of LFSs by using readily accessible secondary data—an approach we find may be complementary, but not directly related to our LFSVI’s emphasis on resident perceptions of system performance and vitality.

While indices based on secondary data provide rapid assessments, most local food indices are too coarse-grained to capture novel social arrangements and preferences that would be useful for stakeholders to develop place-specific recommendations for LFS development. Additionally, certain census data (e.g., CSA numbers) may not reflect the ground-level realities or rapid changes of an LFS (Galt, 2011). Food policy activities require supplemental local data collection. For instance, our interview-based study on local food demand (Rossi et al., 2015)³ was commissioned by the city because publicly available secondary data did not provide sufficient information on LFS activity.

Our local food system vitality index addresses the limitations of more general surveys by collecting primary data directly from local residents. By engaging directly with residents, we can provide insights on how individuals and groups in varied geographic locations and subpopulations differentially value certain attributes of their LFS. We use survey responses to measure LFS vitality for 20 specific LFS components. Because our index is analytically flexible, we can evaluate which LFS components are valued by different consumer segments within and between LFSs in numerous ways. We will present, for instance, how residents (1) from locales of different sizes and (2) of different income levels differentially prioritize LFS components. It would also be possible to compare perceptions within and between zip codes, though we do not present this type of analysis in this manuscript. Understanding the heterogeneity of

³ Conducted prior to and independent of our LFSVI survey.

residential views of an LFS is critical in designing targeted investments and interventions to encourage diverse residential engagements with the food system.

Methods

The LFSVI represents the vitality of a local food system through the evaluation and perception of resident food consumers. Recognizing place-specific LFS characteristics is critical to the growth of local food marketing activities (Goodwin, 2013; North et al., 2017; Palma et al., 2013). We engaged in a series of resident focus groups in the Lexington, Kentucky, area to identify important components in residents' overall assessments of their LFS. Lexington was chosen because the authors had experience conducting research in this city and the surrounding regions. These experiences provided context for evaluating the LFSVI in its development. The components identified by focus group participants were refined down to 20 distinct measures. These measures are organized in three broad groups—food market performance, community engagement performance, and local food promotion performance. These 20 components became the foundation of a pilot survey instrument to assess resident perceptions about the performance each of these LFS components.

We sent a blended mail and web-based survey to a randomized sample of 1,500 Lexington residents via the residential property transaction database in the Spring of 2017. This database contained the addresses of property transactions conducted between 2012 and 2017. Prior to random selection, individuals were segmented by property value within each zip code. We sought equal representation across zip codes and property values. We received approximately 300 paper surveys from respondents. Fifty respondents chose to take the online version of the survey provided in the original mailing. Each participant was asked to evaluate 20 LFS components in Lexington for performance on a 5-point Likert scale. The question was stated as follows: "How would you rate the following aspects of the local food scene in Lexington? Feel free to select 'don't know' if you

don't feel comfortable answering." Figure 1 presents the questions relating to individual component performance.

Residents rated these same 20 LFS components and overall vitality for a second community—the place they lived prior to Lexington if they moved to the city after 2006. Component scores for the previous communities became the base against which we compared Lexington's component scores in our index methodology. Respondents were subsequently asked to assess the overall "vitality of Lexington's local food scene" (Figure 2).

We deliberately targeted addresses with recent changes in ownership to oversample individuals that may have moved to Lexington from other communities. This approach provides a larger sample of individuals with previous community evaluations to serve as a baseline to index and contextualize Lexington LFS component scores. This sampling approach does limit our ability to generalize perceptions of LFS performance for all residents (see demographics in Figure 3). Lexington is a rapidly growing city (10% increase in population from 2010-2017) that draws in residents from around the state and country. It is also home to a land grant university, a large research hospital, and several large national and global companies. It also has internationally regarded equine and bourbon industries and is considered one of the highest educated cities in the United States.⁴ As such, many survey participants had a recent previous community of LFS reference. One-third of these respondents moved to Lexington from other communities in Kentucky within the past 10 years. Survey participants were predominantly degree-holding, middle class, women with a medium to strong interest in local food systems. Our sampling focus on more recent arrivals to the city provides insights into which LFS components are valued by individuals that have detailed experiences of how these components perform in different geographic contexts.

Many respondents (37%), however, are long-term Lexington residents and were not asked to evaluate a previous community. The LFSVI can be

⁴ Ranked 13th in 2014 census for percentage of population with at least a bachelor's degree (40%).

Figure 1. Individual LFS Component Rating Questions

How would you rate the functioning of the following aspects of your local food scene?						
	Very Poor	Poor	Avg.	Good	Excellent	Don't Know
Element	1	2	3	4	5	0
FOOD MARKET PERFORMANCE						
Farmers markets quality	0	0	0	0	0	0
Retail cooperative food stores offer food from local farms	0	0	0	0	0	0
Grocery stores offer food from local farms	0	0	0	0	0	0
Restaurants serve local food	0	0	0	0	0	0
Community supported agriculture (CSA) program quality	0	0	0	0	0	0
Schools engage with local farms	0	0	0	0	0	0
Food trucks use local ingredients	0	0	0	0	0	0
COMMUNITY ENGAGEMENT PERFORMANCE						
Low-income neighborhoods have access to fresh food	0	0	0	0	0	0
Community food festivals	0	0	0	0	0	0
Food banks are accessible and offer fresh food	0	0	0	0	0	0
On-farm events	0	0	0	0	0	0
Community gardens	0	0	0	0	0	0
Cooking, food preservation, and consumer education programs	0	0	0	0	0	0
LOCAL FOOD PROMOTION PERFORMANCE						
Label that identifies locally grown or raised items	0	0	0	0	0	0
Overall diversity of local food items	0	0	0	0	0	0
Microbreweries and distilleries promote local food	0	0	0	0	0	0
Local government support of the food scene	0	0	0	0	0	0
Local food is competitively priced	0	0	0	0	0	0
Private investment in local food businesses	0	0	0	0	0	0

Figure 2. Overall LFS Rating Question

Rate the vitality of your local food scene. Vitality is defined as 'the strength and activeness of the local food scene.'					
My community's local food scene is.....	Extremely Poor (1)	Poor (2)	Average (3)	Good (4)	Excellent (5)
	○	○	○	○	○

adjusted to view different resident segments in aggregate, in discrete units, or in a weighted model. While we decided to oversample recent arrivals, our dataset still provides insights on numerous subpopulations, including long-time residents. In future surveys, we will randomize mailings for all

residences and possibly oversample lower-income residents to ensure a more representative sample. A variety of oversampling approaches can be justified in cases where the preferences of a particular segment of the community need to be better understood or are otherwise difficult to access.

Analysis

This survey approach yielded a rich dataset. Below is a discussion of the analytic approaches we used

Figure 3. Respondent Demographic Information

	<i>N</i>			<i>N</i>	%
Male (%)	116	33%	Education	346	
Age (years)	348	39	High school diploma	23	7%
Household Income (US\$)	329	100,000	2 year degree	30	9%
<50K	64	20%	4 year degree	103	30%
50–99K	130	38%	Graduate or professional degree	190	54%
<100K	135	42%			
LFS Interest	350		No Previous Community	131	37%
Weak/Moderate	196	56%	Previous Community	224	63%
Strong	154	44%	under 50K	101	28%
			50–300K	65	18%
			over 300	58	16%

to make sense of these responses. Our first analytic approach was to examine the mean performance of each component for Lexington residents, regardless of income, zip code, or experience with a previous community. Mean component performance scores provide a general overview of how residents feel the system is performing overall and with respect to each of the 20 components. We removed 'Don't Know' responses from these means as we only wanted to account for the perceptions of individuals who knew enough about each component to evaluate it. The number of individuals who evaluated each component, however, provides insights into how visible each component is within the LFS.

Our second approach was to index these mean scores against the performance scores of residents' previous communities. While there are multiple ways to approach benchmarking, we chose to analyze how resident perceptions of performance are influenced by experiences with different local food systems. For this analysis, we developed index scores by dividing the mean of each component in Lexington by the corresponding component mean for the previous cities and then multiplied by 100. Scores higher than 100 represent areas where Lexington outperforms residents' previous communities. When baselining the Lexington score, we only included the resident evaluations of previous communities for individuals who moved to Lexington in the past five years.

This indexing approach also works when individuals are grouped according to demographic and

geographic differences. For instance, one could consider all of the Lexington residents recently moving from a large city, a small city, and a rural area as separate groups. We index the means of these individuals against their evaluations of their previous community.

The indexing approach is flexible and can yield comparisons of LFS component performance among different geographic and demographic groups. In future analyses, if we (and others) survey enough cities and regions, comparisons between places and resident groups with similar characteristics will be possible. In this way, we could compare Lexington, for example, to a place with a similar demographic composition in the same geographic region to better approximate relative performance. For this analysis, we chose to use the previous community scores from residents as an index baseline because we had an interest in how recent arrivals to Lexington contextualized LFS performance. Many other strategies are possible depending on the goals of the user. For index comparisons between subpopulations, we compared means for statistical significance by using a combination of ANOVA and Tukey Tests. The Tukey Test is an initial stage post-hoc multiple means test to determine which means are statistically different from each other at a 95% confidence level.

We used a third type of analysis, ordered logistic regression, to understand the relationship of each component to overall vitality. We regressed each score of overall vitality for Lexington against

each of the 20 individual component ratings. We also included demographic variables including sex (binary), age (continuous: years), income (continuous: log of thousands of dollars), and interest in local food (ordinal: 1–5 Likert scale, where 1 and 2=low interest, 3 and 4=medium interest, and 5=high interest). Regressions help illustrate which individual components consistently explain ratings of overall vitality. We interpret statistically significant components as critical to how Lexington residents view their food system. We present these results alongside index data because an interpretation of component performance requires the consideration of absolute (mean), comparative

(index), and contextual (regression) performance.

As with the index approach, we ran ordered logistic regressions on subgroups of Lexington residents based on their previous community, their age, their interest in local food, and their income. By segmenting the analysis in both index and regressions, we provide details into how different residents in the city perceive LFS performance and value specific components.

Results

In this section, we present the component performance data from a few different perspectives. Table 1 provides an overview of the general

Table 1. Lexington Resident Perceptions of Local Food Systems (LFS) Component Performance

	Previous Communities			Lexington				OLR
Components	N	Mean	Std. Dev.	N	Mean	Std. Dev.	Index	p>z
Market Channel Performance								
Farmers Market***	110	3.75	1.29	333	4.16	0.81	111	.000
CSAs	65	3.22	1.40	221	4.00	0.83	124	.191
Coop Grocery	95	3.20	1.30	310	3.91	0.80	122	.307
Food Truck	71	3.00	1.46	199	3.79	0.84	126	.591
Restaurants***	109	3.22	1.28	320	3.79	0.91	118	.003
Retail***	113	3.08	1.22	345	3.50	0.95	114	.011
Ethnic Markets	78	2.99	1.46	173	3.21	1.04	107	.154
Farm to School	81	2.75	1.25	144	3.03	1.17	110	.318
Community Measures Performance								
Food Festivals*	115	3.24	1.32	312	3.59	0.94	111	.062
On-farm Events	93	2.95	1.29	232	3.33	0.97	113	.930
Food Education	100	2.69	1.11	237	3.22	0.94	120	.603
Food Banks	85	2.98	1.16	186	3.19	1.07	107	.433
Community Gardens	102	2.68	1.25	265	3.12	1.03	117	.141
Low Inc. Comm.	91	2.60	1.20	229	2.72	1.02	104	.357
Local Food Promotion Performance								
Breweries Promote LFS*	91	3.15	1.48	291	4.08	0.98	129	.088
Local Food Label	115	3.13	1.26	320	3.93	3.06	126	.367
Local Product Diversity***	117	3.34	1.36	323	3.62	0.99	108	.001
Govt. Support of LFS	81	3.14	1.32	222	3.49	1.01	111	.375
Private Investment in LFS	66	3.11	1.31	168	3.47	1.07	112	.551
Price Competitive	105	3.30	1.13	314	3.40	0.92	103	.807
N=306								
Overall Vitality	125	3.44		354	3.89		113	Prob>chi2 =.000

Note: ***, **, and * represent component significance at the 99%, 95%, and 90% level in ordered logistic regressions (OLR) (see OLR p>z column). For performance scores, 'Don't Know' results were removed. As such, the N differs for each component.

performance of each component within Lexington's system. The first broad column to consider is the one that contains Lexington component means (third from the right). This provides a decontextualized snapshot of how residents feel individual components are performing on a 1–5 Likert scale. A score above or below three indicates whether a component scores above or below average respectively for respondents.

We deliberately left the definition of and criteria for evaluating 'performance' up to the respondent. This approach allows each resident to evaluate each component in reference to a constellation of other components—i.e., in reference to a system of relationships. The explanation for why 'farmers market quality' scores comparatively higher on average in Lexington than 'food banks are accessible and offer fresh food,' for example, requires more inquiry at a local level. The performance scores, however, when presented alongside other contextualizing data, give insights into the broader system perceptions and patterns.

For instance, the 'Previous Communities' column in Table 1 presents performance scores of a previous community for residents who moved to Lexington within the past five years (third from the left). The index score shows how each Lexington component mean is shaped by experiences with a previous community. Our contention is that new residents' experiences with previous LFSs influence their perceptions of Lexington LFS performance. Previous community experiences serve as a baseline to standardize the Lexington component performance. Index scores above and below 100 represent higher and lower performance respectively compared to the previous community baseline.

Finally, we indicate which component means are significant independent variables in ordered logistic regression analyses of overall system vitality. We place asterisks next to these significant component means in Table 1. Since the overall vitality score (i.e., the overall system performance)

is considered in relation to all individual components (as well as demographic indicators), these regression results provide a contextualization of each component in relation to the overall system. We interpret statistical significance as an indicator of the relative importance of that component to the respondents' understandings of the LFS.⁵ We give the performance of these significant components more consideration since they partly explain perceptions of overall vitality. Taken together, these different analyses (mean performance, index, and regression) provide a nuanced and contextualized portrait of the performance of different components according to diverse individuals with complex understandings of their LFS. Full regression results for the survey population are presented in the Appendix.

General Performance Evaluations

From this data, we have a few takeaways. First, for the general respondent, farmers markets have the highest mean performance score (4.2) and the most overall ratings (N=333). The high number of responses for this component shows that residents have knowledge about how the farmers markets in Lexington perform. If a respondent does not feel comfortable assessing a component, they would select 'Don't Know,'⁶ and we would remove this data point from the analysis. Farmers markets are quite visible in the food scene and well regarded. While performing better on average than previous communities' farmers markets, the index score is not dramatically higher. This may indicate that farmers markets are performing well in Lexington, but they may not constitute a distinguishing feature compared to others LFSs.

However, this component's significance in regression models illustrates that farmers markets are critical to respondents' overall evaluations of LFS performance, whereas other highly regarded components, such as local food labels (3.9), are not predictive of overall vitality (i.e., they are not significant in OLR models). The city government and/or LFS development entities might recommend continued or expanded support for farmers

⁵ Components that are significant in the OLR models are indicated in tables in the form of asterisks.

⁶ 'Don't Know' responses were removed from this part of the analysis thereby resulting in decreases in overall N.

markets⁷ but look for other lower performing elements in which to invest or intervene.

'CSA program quality' also scored well in general (4.0) and was one of the higher scoring components in relation to participants' previous communities (index=124). Despite there being only five CSA farms offering over 50 shares each in the Lexington area, this market channel has received positive attention recently.⁸ The city government, local university, and other employer organizations have recently started offering cost offsets for CSAs to their employees. While these scores suggest a compelling story to tell about Lexington's CSAs, this component was not significant in OLR models. CSAs' lack of significance in OLR models could be explained by their relative newness as a market channel in Lexington. CSAs are currently high performing, yet not completely integral to the overall perception of an LFS. We require further research to understand why CSAs are rated as such, and how this score (and significance level) are changing over time. This data is a starting point for further inquiries.

'Breweries/distilleries promote local food' scored highest on the index (129) as well as in its general performance score (4.1). Additionally, it is significant (at the 90% level) in the logistic regression model of overall vitality scores. A large number of residents also showed enough knowledge about brewery activities to rate this element ($N=291$). Together, breweries/distilleries score well in the absolute (mean performance), comparative (index), and contextual (regression) metrics in our model.

Due to its high performance along different measures, it is possible to theorize whether breweries are a distinguishing feature of Lexington's LFS. According to other studies by the authors, chefs and restaurant owners link increased consumer awareness of local food to the emergence of the city's microbreweries (Rossi et al., 2015).

Lexington opened its first brewery only six years ago. Since then, five more breweries and one cidery have opened. Most breweries partnered with food trucks and nearby restaurants rather than offering their own menu. At the same time, food-related businesses emerged in the same areas.

One brewery property, for example, was established at the site of an old bread factory. Throughout its existence, it has focused on community engagement and promoting local food. This property, called the Breadbox, has a number of food-related enterprises. It has a business that uses aquaculture techniques to simultaneously produce tilapia and microgreens, a fish and chips restaurant, and a certified kitchen for processing donated and/or gleaned seconds (i.e., edible produce that doesn't meet the aesthetic conventions of retailers) to help address the area's food insecurity. Additionally, the brewery holds a mini farmers market on-site, serves as a CSA pickup location, and holds local food events. While the brewery phenomenon is new in Lexington, the city has seen continued integration and cross-promotion with local food. A few other breweries have seen similar relationships develop.

Further, Central Kentucky's bourbon industry has played an important role in the development of the LFS in terms of creating an association between the region and craft processes. Distilleries are a popular draw for tourists. Bourbon, as an agricultural product, is an example of *terroir*—an association between the region, its environment, cultural know-how, and distinct consumable products (Bowen, 2010). This association has extended to food with distilleries also promoting regional cuisine and local products. As such, distilleries and breweries both seem to support LFS development in this community. While it is not possible to make this claim from the index data alone, the LFSVI provides a place to start determining the components that have a virtuous effect on LFS development and resilience.

⁷ The city has four farmers market locations (two separate market organizations): two in the center of the city, and two on the south side. The north side has no formal market, but is served by a community garden nonprofit and an innovative sliding-scale CSA project. Support for different components within the city is spatially heterogeneous. Authors compare spatial differences in component function in Table 7.

⁸ The current CSA share count for the central Kentucky region in 2018 is around 800. Many individuals share or split their shares with others. There is also considerable turnover every year in shareholders. Based on these numbers, we expect that survey respondents who rated the CSA component in our survey ($N=221$) likely participated in this market channel at some point in the past few years.

As these brewery/distillery resonances with local food are recent, and as our survey may have oversampled those predisposed to having a strong interest in this component, we intend to repeat this survey after a few years to see how within-Lexington scores of each component change, especially with broader representation of respondents. Repeatability and flexibility are strengths of the LFSVI methodology; it also allows for different benchmarking and sampling strategies, as discussed. For instance, if we were to conduct a larger national survey of places, or many intensive surveys of individual towns or cities, we could aggregate the component scores of small cities (i.e., 100–500K people) in the Southeast to provide a more contemporary comparison of brewery/distillery performance (as well as that of other components).⁹ In its current form, we must recognize the temporal limitations of using a previous community score as a benchmark, but we also argue that comparison to previous experiences allows respondents to better evaluate their experience in Lexington.

The local food label, as noted in Table 1, has a high overall index score (126), and scored well in general for Lexington (3.93). Residents may have provided such a score due to their strong awareness of the KY Proud logo. Around 69% of Kentuckians are familiar with the label (Think New, 2016). This logo indicates a product that is grown or processed in Kentucky. The label also finds middle ground between University of Louisville 'Cardinal Red' and the University of Kentucky 'Wildcat Blue.' It also may be that restaurants, stores, etc. are identifying farm sources on menus and labels. At the same time, this component was not significant in ordered logistic regressions (OLRs), so it is not a consistent predictor of overall vitality for the general resident. While the regression data may make this component less suitable for understanding overall system function, the index and mean data still give insights into how this component functions in other contexts. Again, this index gives us a good starting point for more detailed inquiries.

Retail sourcing of local products was extremely

important in the OLRs, but only moderately above average in the mean scores (3.50). We know from other research projects that Kentucky has few producers that reach wholesale levels of production (Brislen, Rossi, & Stancil, 2016; Rossi et al., 2018). As such, we interpret these data as indicating consumer interest in local food in retail settings, but, the data indicate an underperformance on the part of retail outlets. These data suggest that there is unmet consumer demand in the retail sector; more investment and research on how to address this issue is important.

As mentioned above, this particular data point, when combined with further inquiries, may lead decision-makers to consider different strategies for improving farmers' access to wholesale markets. This access can be improved, for example, through aggregation or collective marketing strategies. In the process of deciding a particular course of action, decision-makers may employ the *Local Food Economics Toolkit* or another assessment method to identify economic and social impacts. The LFSVI complements other development approaches.

What is most compelling from our pilot index and OLR observations is that they align well with the results from other studies we have conducted—especially the local food demand study requested by Lexington's local food coordinator (Rossi et al., 2015). In that study, respondents indicated that restaurants sourcing locally, the emergence of breweries, and farmers markets were the three main drivers of the LFS. Each of these components scored highly in resident evaluations (in our index methodology) and was significant in OLRs of overall vitality. Our current index, however, points to components beyond those mentioned in our assessment that could aid LFS development decisions. Further, the LFSVI provided a more efficient approach to gathering LFS performance data compared to the food demand study that required 50 hour-long interviews.

Lexington Component Performance: Long-time Residents Compared to Recent Arrivals

While the data presented in Table 1 identify general perceptions of Lexington's food scene, the LFSVI

⁹ We are currently involved in a multistate project to create a larger baseline for indexing.

is useful for understanding how different groups of residents within the city (and between cities) evaluate LFS components. In the following section, we illustrate how perceptions of Lexington's LFS relate to individuals' experiences with previous communities.

We begin with Lexington residents who have been in the city for at least 10 years (Table 2). Of the 131 individuals from this group, many of them did not know enough about components such as CSAs, farm-to-school programs, food banks, and food trucks to evaluate their performance. Additionally, this group scored these LFS aspects much lower than all other groups. Long-term residents, then, were the least engaged group in terms of evaluating Lexington. Nevertheless, there are some important insights gained from their responses.

In OLRs of overall vitality for this group, a few components were significant to overall vitality scores, and thus more likely to be associated with this group's vision of a high-performing LFS. These components include consumer food education, food festivals, local product diversity, retail, and restaurants sourcing local. Because the first element performs below average (2.92), long-time residents may find food education (e.g., cooking, preserving, and gardening) programs important but in need of further investment, development, or diversification. Similarly, longer-term residents have an interest in finding local foods in retail spaces, yet this component has a mediocre mean performance. Based on this data, LFS development stakeholders might consider developing strategies for increasing wholesale level production among

Kentucky farmers.

Breweries and farmers markets scored the highest of all elements while farm-to-school and low-income food access scored the lowest. Many of the performance ratings are similar to the unsegmented means in Table 1, but components that are significant to overall vitality in OLRs differ. The differences in the components that are significant in OLRs indicate different priorities for resident segments within the LFS. Higher component ratings are associated with an increased likelihood of rating overall vitality higher. As we discuss throughout this section, the LFSVI can produce performance ratings for different subpopulations within the city.

When the long-time resident group is compared to residents who recently moved to the city from different locations, a few interesting patterns emerge. The most obvious pattern here is that Lexington's performance inversely relates to the size of a resident's previous community (Table 3).

Table 2. Long-time Resident Perceptions of Lexington's LFS

Components	Lexington with No Previous Community		
	N	Mean	Std. Dev.
Market Channel Performance			
Farmers Market	127	4.14	0.85
Coop Grocery	113	3.71	0.86
Retail	127	3.03	0.94
Restaurants	118	3.36	0.88
CSAs	83	3.76	0.88
Farm to School	56	2.38	0.93
Food Truck	73	3.49	0.87
Ethnic Markets	64	2.78	0.98
Community Measures Performance			
Low Income Food Access	97	2.42	1.00
Food Education**	103	2.92	0.91
Community Gardens	109	2.83	0.96
Food Festivals**	119	3.26	0.92
Food Banks	73	2.75	0.89
On-farm Events	101	3.05	0.85
Local Food Promotion Performance			
Local Product Diversity*	110	3.42	0.84
Local Food Label***	112	3.54	1.00
Price Competitive	112	3.12	0.91
Breweries Promote LFS	101	3.86	0.91
Govt. Support of LFS	90	3.21	0.93
Private Investment in LFS	68	3.12	0.95
Overall Vitality	131	3.72	

***, **, and * represent component significance at the 99%, 95%, and 90% level in ordered logistic regressions. Full regression results not shown for this segment.

The overall vitality of Lexington shifts between 4.11 (when residents come from rural communities), 3.92 (when residents come from small cities), and 3.82 (when residents come from large cities).

Critically, though, overall vitality ratings are all higher for these segments than for residents who have lived in Lexington for at least 10 years (3.72). We used post-hoc ANOVA techniques (Tukey Tests) to test the differences in means between groups. We found that overall vitality means are significantly different only between the smaller previous community and long-term resident groups. This statistical relationship is consistent for most of the components (small previous community residents are different from long-term residents). In some components, the medium and large previous community segments are also statistically different from and higher scoring than the long-term residents. A few notable components that exhibit this pattern are the retail, farm-to-school, and food banks components.

Residents moving from medium-sized cities (same size class as Lexington) had the highest scores for food trucks, community gardens, and private investment in the LFS. These scores had varying levels of statistical difference from the other resident categories; however, in each case, the scores were statistically higher than the long-term resident group. Finally, residents moving from

large cities rated the local food label and CSAs¹⁰ highest among the groups.

Together, these data illustrate that residents' perceptions of what works well in Lexington's LFS are shaped in part by their previous experiences. If residents recently moved to the city from another place, they are more likely to have a favorable view of each element compared to those who have been in the city for longer than 10 years. As such, long-term residents may be too embedded in food-related behavior patterns to see the more subtle evolution of the system. Or they have more

Table 3. Resident Perceptions of Lexington Based on Previous Community Size

	Lexington Index Summary: Previous Community Size			
	Small <50K	Medium 50–300K	Large >300K	LT Res.
Population <i>N</i>	96	64	58	131
Farmers Market	4.29	4.08	4.00	4.14
Coop Grocery	4.08 ^a	3.95 ^{a,b}	3.94 ^{a,b}	3.71 ^b
Retail	3.84 ^a	3.67 ^a	3.65 ^a	3.03 ^b
Restaurants	4.04 ^a	4.07 ^a	3.90 ^a	3.36 ^b
CSAs	4.14 ^a	4.08 ^{a,b}	4.15 ^a	3.76 ^b
Farm to School	3.44 ^a	3.43 ^a	3.43 ^a	2.38 ^b
Food Truck	3.93 ^{a,b}	4.24 ^a	3.65 ^{b,c}	3.49 ^c
Ethnic Markets	3.59 ^a	3.43 ^a	3.2 ^{a,b}	2.78 ^b
Low Income Food Access	3.03 ^a	2.95 ^a	2.73 ^{a,b}	2.42 ^b
Food Education	3.60 ^a	3.28 ^{a,b}	3.32 ^a	2.92 ^b
Community Gardens	3.29 ^a	3.52 ^a	3.12 ^{a,b}	2.83 ^b
Food Festivals	3.94 ^a	3.77 ^{a,b}	3.48 ^{b,c}	3.26 ^c
Food Banks	3.53 ^a	3.39 ^a	3.35 ^a	2.75 ^b
On-farm Events	3.53 ^a	3.60 ^a	3.52 ^a	3.05 ^b
Local Product Diversity	3.84 ^a	3.68 ^b	3.60 ^b	3.42 ^b
Local Food Label	3.91 ^a	3.75 ^{a,b}	4.07 ^a	3.54 ^b
Price Competitive	3.61 ^a	3.53 ^a	3.50 ^a	3.12 ^b
Breweries Promote LFS	4.29 ^a	4.15 ^{a,b}	4.14 ^{a,b}	3.86 ^b
Government Support of LFS	3.58 ^{a,b}	3.79 ^a	3.74 ^a	3.21 ^b
Private Investment in LFS	3.54 ^{a,b}	4.12 ^a	3.63 ^{a,b}	3.12 ^b
Overall Vitality	4.11 ^a	3.92 ^{a,b}	3.82 ^{a,b}	3.72 ^b

The superscripts represent whether a group mean is statistically the same or different from the other groups at a >95% confidence level. For instance, if 3 groups are 'a' and the last is 'b' that means all of the 'a' means are statistically the same as each other, but different from 'b' using Tukey Tests (Post-Hoc ANOVA).

¹⁰ This score is not statistically different than those of small and medium previous community residents.

nuanced understandings of the positive and negative aspects of each of these elements. More recent arrivals to Lexington may be more willing to explore different food system options as they adjust to their move. They may also be seeking experiences that align with their previous place of residence.

Revisiting components significant in OLR¹¹ from Table 2, food festivals, local retail, restaurants serving local products, and consumer food education programs were all critical to long-term residents' understanding of overall food vitality. A takeaway from Tables 2 and 3, then, is that LFS stakeholders should consider strategies and

programs to better market, educate, and engage long-term residents of Lexington in the LFS. The local food coordinator or community organization could draw from this data to focus on strengthening or diversifying these components to focus on long-term residents.

Lexington Component Performance: Previous Community Comparison

In this section, we delve deeper into how Lexington's performance scores from respondents coming from a previous community compare to the performance of that previous community. In Table 1, we presented an aggregate of all Lexington

scores indexed by all previous community scores. In Table 4, we index the mean Lexington component scores for each resident segment against ratings of their previous community in. To construct the index baseline, we only included the previous community scores from individuals who moved to Lexington within the past five years.¹² This approach gives a sense of how previous community experiences impact the perception of Lexington.

In the previous section, we noted that Lexington scores comparatively high among individuals coming from small towns compared to the other groups. When comparing Lexington to their previous community, individuals coming from smaller towns generally have the highest index scores among groups (Table 4). Lexington likely has a larger number of local food-oriented market channels, social institutions, and resources compared to smaller communities. As 60% of individuals in this segment came to Lexington from other small towns in Kentucky, these results are not surprising. In other projects, we have identified an interest in local food among rural Kentucky residents; but, inadequate distribution and/or processing infrastructure, supply, and market

Table 4. Index Scores based on Previous Community Size

	Small	Med	Large
Population	<50K	50–300K	>300K
<i>N</i>	46	39	40
Farmers Market	137	103	95
Coop Grocery	163	108	112
Retail	144	113	108
Restaurants	163	115	107
CSAs	169	114	114
Farm to School	156	111	113
Food Truck	202	144	98
Ethnic Markets	176	116	86
Low Income Food Access	132	111	96
Food Education	161	112	109
Community Gardens	169	115	101
Food Festivals	168	106	90
Food Banks	153	107	96
On-farm Events	142	116	106
Local Product Diversity	151	105	89
Local Food Label	149	123	110
Price Competitive	130	103	94
Breweries Promote LFS	200	131	105
Govt. Support of LFS	149	118	100
Private Investment in LFS	173	117	96
Overall Vitality	152	105	95

¹¹ A component's significance to overall vitality is represented as asterisks. Full analysis not shown.

¹² Residents that moved to Lexington in the past 5–10 years were included in the **Lexington performance score** for their associated previous community subgroup (i.e., small community, small city, large city), but these individuals were not included in the **previous community scores**.

opportunities makes it difficult to serve existing consumer demand for local food (Rossi et al., 2018; Brislen et al., 2016). Additionally, while LFS components such as food trucks, breweries, and food festivals all exist in these rural locations, they are not as widespread. The existence and concentration of these opportunities is part of Lexington's regional drawing power. At the same time, individuals in rural locations may have different ways of conceptualizing local food that differ from the components we have included in the LFSVI. In future iterations of this index, we may rework existing components to include aspects related to hunting, informal food exchange, gardening, and farm stands.

Lexington residents moving from similar-sized (medium population) cities also scored most components in Lexington favorably compared to their previous location; though, their scores were not as dramatic. In particular, breweries and food trucks again scored high on the index. In the small community segment, the high index scores are likely a product of the sparsity of such components in rural locations. In the medium-sized previous community, however, the same trend is evident. These two components perform better in Lexington than in comparable communities. As such, these index scores raise the question of why these components are so visible in Lexington. With more in-depth assessment, Lexington could provide lessons for others medium-sized cities looking to use components such as breweries and food trucks for local food promotion.

Residents with experience in larger cities may be more accustomed to an expanded set of LFS elements that do not exist in Lexington. This would explain index scores below 100 in comparison to their previous city and their overall low scores. Breweries and food trucks are slightly above or below the index score of 100 for this segment. These scores are not surprising; breweries and food trucks are more of a phenomenon in larger cities with longer histories. Lexington's recent adoption of these channels may explain the comparatively lower rating.

At the same time, as noted in Table 3, means for this group's component performance in Lexington are generally higher than for long-time

residents. Recent arrivals from large cities appear to value CSA programs in the region as well as the local-food label and co-op grocery stores. Additionally, the farm-to-school component scores high on the index. These index scores suggest that Lexington provides more opportunities to form producer-to-consumer relationships and/or opportunities to identify the provenance of food produced in the region. It is possible then that Lexington and similar-sized cities are large enough to provide robust local food market channels, but small enough to allow for greater confidence and transparency in the production and sourcing practices of 'local' foods.

Understanding these residential perception differences can be useful in LFS development. For instance, if Lexington is outperforming similar-sized cities along many elements, civic leaders and businesses (e.g., chambers of commerce, tourism boards, etc.) can highlight examples of these elements in their recruitment efforts. By having thriving farmers markets, CSAs, restaurants, breweries, and food festivals, Lexington may appeal to individuals deciding whether to relocate to the area. These scores may indicate that the city has many food-based amenities that are valued by potential residents. If important components score lower in Lexington, leaders can look to other similar-sized cities with a positive reputation to gain ideas for improving the LFS.

If LFS development personnel are interested in pulling in residents from larger cities, they might focus on improving elements that are regarded as statistically important in regressions (i.e., tied to overall vitality ratings), but which are underperforming compared to larger cities. Food festivals are one notable example where index scores are low (90), even though they are still rated better than average overall (3.48 and 3.60 respectively). Many other analytic options exist, such as segmenting residential perspectives by previous community region (e.g., Midwest, Pacific Northwest, Southeast, etc.) or by zip codes within a city. This analytic flexibility provides index users with a myriad of potential stories and perspectives.

Analysis of Broader Consumer Segments in the City
In addition to comparing mean scores among

different groups within the city, we use ordered logistic regressions to understand how different consumer segments within the city perceive component performance. The OLR approach identifies which LFS components are statistically related to residents' understandings of overall vitality. As discussed, we regressed overall vitality against the mean scores of each of the 20 LFS components for all respondents. In this analysis, we only considered the Lexington performance scores. The OLR approach, however, allows us to conduct an analysis for different resident segments within the city. For instance, we ran separate OLRs for individuals who previously lived in small, medium, and large communities to see what LFS components were

more likely to explain or predict the overall vitality ratings of Lexington. We also segmented Lexington residents by the following categories: interest in local food, income, and age. We present results from these segments below in Table 5, though many other segments are possible.

First, we used previous community size to segment our survey results. While we presented the mean performance of these segments in Table 3, we did not discuss the OLR results in depth. Mean performance gives a sense of absolute function, while OLR results provide information on which components are statistically and consistently tied to overall vitality ratings. For individuals coming from small towns, the only significant component in

Table 5. Logistic Regression Results by Resident Segment

LFS Components	Previous City Size			Interest in Local Food			Income (US\$)				Age		
	<50K	50–300K	>300K	Low	Medium	High	<50	50–100	100–150	>150	<31	31–46	>46
Market Channel Performance													
Farmers Market		***		***		***		**	***		***	***	*
Coop Grocery					***		**					*	
Retail				*	**		***			***	*		***
Restaurants					***	**		***	*		***	*	
CSAs				*	**	**				*			
Farm to School									**				
Food Truck	**												
Ethnic Markets													
Community Measures Performance													
Low-income Community												*	
Food Education			***					**		***			
Community Gardens									**	**		**	
Food Festivals			***	**	***	*			***				
Food Banks	**	**								**		*	*
On-farm Events							**	*	*				
Local Food Promotion Performance													
Local Product Diversity	*			***	***	*	***		**		***	**	
Local Food Label	*	*					*						
Price Competitive		**			***				**				**
Breweries Promote LFS		**						**	*		**		
Government Support of LFS					**		*		*				
Private Investment in LFS	**												
N	91	57	51	73	100	133	59	126	66	76	115	112	82

***, **, and * represent component significance at the 99%, 95%, and 90% level in ordered logistic regressions.

OLRs of overall vitality was food trucks. Individuals from smaller communities rated most of the 20 components higher on average than individuals from medium and large cities, and their index scores were quite high when rating components against their previous community (see Tables 2 and 3). This regression model, however, shows that scores for each component varied between individual residents in the segment; only the food truck component was consistently rated in the same way in terms of its contribution to overall vitality. The statistical relationship between food trucks and overall vitality scoring indicates that this component is critical to the small previous community segment's perceptions of overall vitality.

For residents moving to Lexington from similar-sized cities, farmers markets, local product diversity, local food labels, and private investment in the LFS are all elements that predict overall vitality ratings. These components are critical to this segment's understanding of the parts of an LFS that should be strong. Residents in this category scored all of these elements above 3.5 for means and over 110 for indexes (see Tables 2 and 3). As such, Lexington is viewed as functioning well compared to previous cities with respect to these elements.

Finally, for residents from large cities, food festivals, food banks, local food labels, and price competitiveness all factor into their view of LFS vitality. Of these elements, only the food label element scored above 100 on the index and each of these elements had mean scores around 3.5. Although residents gave rather consistent scores to these components with respect to overall vitality, their scores are rather mediocre.

Taken together, the regressions provide a starting point for telling a story about how individuals moving to Lexington from other locations disproportionately value different aspects of their new LFS. Knowing what components appeal to individuals from different locations (and combining these observations with index data like that presented in Tables 2 and 3) can inform strategies for promoting or investing in certain aspects of a food system that are broadly appealing to potential recruits.

A more compelling approach, perhaps, is to

examine the city based on individual interest in the local food scene (1–5 scale). We aggregated answers as follows: low interest (1 and 2), medium interest (3 and 4), and high interest (5). In this instance, we find it useful to examine what the medium interest individuals feel is important to LFS function. This group is most likely to exhibit growth in engagement with the LFS if certain changes occur. By improving LFS aspects that are important to them, a city might improve its overall LFS by including a broader resident base.

Medium-interest residents score retail, restaurants, food festivals, local product diversity, and price competitiveness consistently with respect to overall functioning. Farmers markets, though scoring high across all resident categories, are not statistically significant for the medium interest group. Retail and price elements are significant, but they receive lower scores. Taken together, these data suggest that farmers markets are performing well for all groups, but that more gains in LFS activity (through the medium interest LFS residents) would come from improving retail sourcing of local food products. Because Kentucky has infrastructural and supply deficiencies that limit the expansion of local food in the region at the wholesale level (Brislen et al., 2016; Rossi et al., 2018), LFS policymakers and NGOs can use LFSVI data to argue for and fund programs (e.g., subsidized greenhouses for season extension) to facilitate wholesale production.

Income segments provide different analytic opportunities. From the OLR data, a few observations are prominent. Both low- and high-income individuals are interested in local food in retail settings. The expansion of wholesale-level production for retail is an opportunity to make local foods more accessible to others beyond the core local food consumer groups. Retailers and institutions (e.g., schools, state parks, etc.) in Kentucky, especially in rural locations, consistently point to local products as an important area of customer interest; but, they note that local producers cannot consistently produce enough volume to satisfy demand (Brislen et al., 2016; Rossi et al., 2018). Based on existing knowledge of place-specific issues, LFS development personnel could use this data to suggest investments in (1) production equipment and training, (2) aggregation points, (3) distributors

dedicated to LFSs, or (4) lobbying governments to provide tax rebates or other incentives for producers to sell within the state.

Finally, regressions by age segments show that younger residents value farmers markets and retail; generation x/y residents have more varied priorities including community gardens and breweries; and respondents older than 45 years old place importance on local retail sourcing and price competitiveness. All of these data indicate heterogeneity of the resident food consumer within a city, while also showing measurable patterns of component affinity. Local food coordinators and LFS development personnel can use this data for various marketing and consumer education initiatives.

Conclusion


The local food system vitality index is a novel analytic process for understanding the performance of specific components of an LFS. It provides a rapid assessment of the LFS landscape and can be used by stakeholders to support arguments regarding local development priorities. In Lexington, this initial pilot survey provided us with a rich data set on residential perceptions of the LFS. It also confirmed many observations from in-depth interviews with stakeholders regarding the strengths and weaknesses of Lexington's LFS. This LFSVI also provides stakeholders with data to identify or justify development priorities. For instance, the analysis of survey data indicated that the retail market channel is statistically associated with respondents' perceptions of overall vitality and thus constitutes an important part of the system in general. Yet, it is underperforming according to mean performance scores. Local food coordinators or agriculture development organizations can point to this data to set priorities for strengthening relations between producers, distributors, and retailers.

Beyond this general approach, the LFSVI is a flexible process that can take into account the perceptions of individuals in different socioeconomic and geographic circumstances. While our pilot survey oversampled recent arrivals in the city, the sampling approach and analysis of data can be modified according to the assessor's needs and

according to different local contingencies. As such, the LFSVI can address market-oriented, social, and infrastructural aspects of what makes different LFSs vibrant and resilient.

In the future, we envision the LFSVI to be used by stakeholders in different locations to assess their own LFSs. We recognize that the 20 LFS components we used may not be the most optimal for many places; we expect to revise the survey tool as we get information and feedback from other locales, researchers, and stakeholders. It would be possible to have both a standardized set of LFS components to measure and compare across LFSs and a set of components designed to capture site-specific contingencies in different localities.

We expect that this approach will be straightforward enough to allow LFS development personnel to repeat performance evaluations every two to three years to measure the impact of different investments on LFS component performance. These iterative measurements would allow stakeholders to observe perceptual changes in the local food landscape.

Our long-term goal is to create a large database of observations from multiple LFS and to index certain locations against others with similar demographic, geographic, and size characteristics. Additionally, we would like to be able to pool data across LFSs to segment resident component priorities. For instance, this analysis would be similar to the one outlined in Table 5, but it would include pooled observations from across the country. It would then be possible to develop a typology of LFS priorities for different resident segments and regions. This data would be akin to traditional census data of element counts (i.e., # of farmers markets, CSAs, etc.) and could be analyzed as such; however, the data would represent a more intangible aspect of LFS dynamics. The direct input on LFS activity by residents is the novelty of this approach, especially in comparison to existing food-related and QOL indices. The LFSVI is more directly conducive to formulating system interventions than other index-based analytic approaches, and we look forward to working through its practical development and implementation. 

References

- Ateljevic, I. & Doorne, S. (2003). Culture, economy and tourism commodities: Social relations of production and consumption. *Tourist Studies*, 3(2), 123-141. <https://doi.org/10.1177/1468797603041629>
- Arcadis. (2016). *Sustainable Cities Index 2016*. Retrieved from <https://www.arcadis.com/en/middle-east/our-perspectives/2016/09/sustainable-cities-index-2016/>
- Benedek, Z. & Balázs, B. (2014) Regional differences in Hungary: The current stage of local food production at the county-level. Paper presented at 142nd European Association of Agricultural Economics (EAAE) Seminar: *Growing Success? Agriculture and rural development in an enlarged EU*, Budapest, Hungary.
- Bowen, S. (2010). Embedding local places in global spaces: Geographical indications as a territorial development strategy. *Rural Sociology*, 75(2), 209-243. <https://doi.org/10.1111/j.1549-0831.2009.00007.x>
- Brislen, L., Rossi, J. & Stancil, K. (2016). First processed produce in central Kentucky: A pre-feasibility study. *The Food Connection*, University of Kentucky. Retrieved from <https://foodconnection.ca.uky.edu/issues-research>
- 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), 1298-1302. <https://doi.org/10.1111/j.1467-8276.2008.01220.x>
- Chang, T. C. & Huang, S. (2005). Recreating place, replacing memory: Creative destruction at the Singapore River. *Asia Pacific Viewpoint*, 46(3), 267-280. <https://doi.org/10.1111/j.1467-8373.2005.00285.x>
- Diener, E., & Suh, E. (1997). Measuring quality of life: Economic, social, and subjective indicators. *Social Indicators Research*, 40(1-2), 189-216. <https://doi.org/10.1023/A:1006859511756>
- Eblen, T. (2010, April 11). Generating buzz by getting creative. *Lexington Herald-Leader*. Retrieved from [https://www.kentucky.com/](https://www.kentucky.com/Economist, The. (2017). The Global Liveability Report 2017. New York: The Economist Intelligence Unit.)
- Economist, The. (2017). *The Global Liveability Report 2017*. New York: The Economist Intelligence Unit.
- Feagan, R. (2007). The place of food: Mapping out the 'local' in local food systems. *Progress in Human Geography*, 31(1), 23-42. <https://doi.org/10.1177/0309132507073527>
- Florida, R. (2002). The economic geography of talent. *Annals of the Association of American Geographers*, 92(4), 743-755. <https://doi.org/10.1111/1467-8306.00314>
- Galt, R. E. (2011). Counting and mapping community supported agriculture in the United States and California: Contributions from critical cartography/GIS. *ACME: An International Journal for Critical Geographies*, 10(2), 131-162. Retrieved from <https://www.acme-journal.org/index.php/acme/article/view/892>
- Gillespie, G., Hilchey, D. L., Hinrichs, C. C., & Feenstra, G. (2007). Farmers' markets as keystones in rebuilding local and regional food systems. In Hinrichs, C. C. & Lyson, T. A. (Eds.), *Remaking the North American food system: Strategies for sustainability* (pp. 65-83). Lincoln, NE: University of Nebraska Press.
- Goodwin, H. L., Jr. (2013) Theme overview: Developing local food systems in the south. *Choices*, Quarter 4. Retrieved from <http://choicesmagazine.org/choices-magazine/theme-articles/developing-local-food-systems-in-the-south/theme-overview-developing-local-food-systems-in-the-south>
- Green, J. J., Worstell, J., & Canarios, C. (2017). The local agrifood system Sustainability/Resilience Index (SRI): Constructing a data tool applied to counties in the southern United States. *Community Development*, 48(5), 697-710. <https://doi.org/10.1080/15575330.2017.1370001>
- Hamilton, K., Helliwell, J. F., & Woolcock, M. (2016). Social capital, trust, and well-being in the evaluation of wealth (No. WPS 7707). National Bureau of Economic Research. Retrieved from <http://documents.worldbank.org/curated/en/249031468195550873/Social-capital-trust-and-well-being-in-the-evaluation-of-wealth>
- Hinrichs, C. C. (2000). Embeddedness and local food systems: Notes on two types of direct agricultural market. *Journal of rural studies*, 16(3), 295-303. [https://doi.org/10.1016/S0743-0167\(99\)00063-7](https://doi.org/10.1016/S0743-0167(99)00063-7)
- Jessop, B. & Sum, N.-L. (2000). An entrepreneurial city in action: Hong Kong's emerging strategies in and for (inter)urban competition. *Urban Studies*, 37(12), 2287-2313. <https://doi.org/10.1080/00420980020002814>

- Krätke, S. (2010). 'Creative Cities' and the rise of the dealer class: A critique of Richard Florida's approach to urban theory. *International Journal of Urban and Regional Research*, 34(4), 835-853. <https://doi.org/10.1111/j.1468-2427.2010.00939.x>
- Lamie, R. D., Dunning, R., Bendfeldt, E., Lelekacs J. M., Velandia, M., & Meyer, L. (2013). Local food systems in the south: A call for a collaborative approach to assessment. *Choices*, Quarter 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>
- Low, S. A., Adalja, A., Beaulieu, E., Key, N., Martinez, S., Melton, A., ...Jablonski, B. (2015). *Trends in U.S. Local and Regional Food Systems* (Report No. AP068). U.S. Department of Agriculture, Economic Research Service. Retrieved from <https://www.ers.usda.gov/publications/pub-details/?pubid=42807>
- Morelix, A., Tareque, I., Fairlie, R.W., Russell, J., & Reedy, E. J. (2016). *The Kauffman Index 2016: Main Street entrepreneurship: Metropolitan area and city trends*. Ewing Marion Kauffman Foundation. Retrieved from <https://www.kauffman.org/kauffman-index/reporting/main-street>
- North, E., Lamie, D., and Crosby, I. (2017). *SERA47: Strengthening the Southern Region Extension and research system to support local & regional foods needs and priorities*. Retrieved July 24, 2017, from <https://www.nimss.org/projects/view/mrp/outline/18318>
- Palma, M. A., Morgan, K., Woods, T., & McCoy, S. (2013). Response of land grant universities to the increase in consumer demand for local foods in the south. *Choices*, Quarter 4. Retrieved from <http://www.choicesmagazine.org/choices-magazine/theme-articles/developing-local-food-systems-in-the-south/response-of-land-grant-universities-to-the-increase-in-consumer-demand-for-local-foods-in-the-south>
- Pittman, R., Pittman, E., Phillips, R., & Cangelosi, J. (2009). The community and economic development chain: Validating the links between processes and outcomes. *Community Development*, 40(1), 80-93. <https://doi.org/10.1080/15575330902918956>
- Ricketts Hein, J., Ilbery, B., & Kneafsey, M. (2006). Distribution of local food activity in England and Wales: An index of food relocalization. *Regional Studies*, 40(3), 289-301. <https://doi.org/10.1080/00343400600631533>
- Rossi, J., Hyden, H., Woods, T., Davis, A., Brislen, L., & Allen, J., IV (2015). *Fayette County local food demand assessment*. Staff Paper No. 493, Lexington, KY: Department of Agricultural Economics, University of Kentucky. Retrieved from https://cedik.ca.uky.edu/files/full_report_-_fayette_co._local_food_demand.pdf
- Rossi, J., Meyer, A. L., & Knappage, J. (2018) Beyond farmers markets: Local foods opportunities in southeastern Kentucky's retail and institutional industry. *Kentucky Center for Agriculture and Rural Development, U.S. Economic Development Authority*. Retrieved from https://cedik.ca.uky.edu/research_publications
- Selfa, T. & Qazi, J. (2005). Place, taste, or face-to-face? Understanding producer-consumer networks in "local" food systems in Washington State. *Agriculture and Human Values*, 22(4), 451-464. <https://doi.org/10.1007/s10460-005-3401-0>
- Siemens AG. (2012). *The Green City Index*. Munich: Author. Retrieved from https://www.siemens.com/entry/cc/features/greencityindex_international/all/en/pdf/gci_report_summary.pdf
- Stiglitz, J. E., Sen, A., & Fitoussi, J.-P. (2010). *Report by the commission on the measurement of economic performance and social progress*. Paris: Commission on the Measurement of Economic Performance and Social Progress.
- Strolling of the Heifers (n.d.). The Locavore Index. Brattleboro, VT. Retrieved April 21, 2015, from <http://www.strollingoftheheifers.com/locavoreindex>
- Thilmany McFadden, D., Conner, D., Deller, S., Hughes, D., Meter, K., Morales, A., ...Tropp, D. (2016). *The economics of local food systems: A toolkit to guide community discussions, assessments, and choices*. U.S. Department of Agriculture, Agricultural Marketing Service. Retrieved from <https://www.rd.usda.gov/files/ILAMSToolkit.pdf>
- Think New. (2016). *Kentucky Proud consumer online survey and store visits key findings and recommendations report*. Used with permission of the Kentucky Department of Agriculture Marketing Division.
- 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>
- Yeoh, B. S. A. (2005). The global cultural city? Spatial imagineering and politics in the (multi)cultural marketplaces of South-East Asia. *Urban Studies*, 42(5/6), 945-958. <https://doi.org/10.1080/00420980500107201>

Appendix. Ordered Logistic Regression Output for All Lexington Residents

	Coef.	Std. Err.	z	P>z	Mrgnl. Eff. dy/dx
Market Channel Performance					
Farmers Market***	0.412	0.117	3.510	0.000	-0.001
Coop Grocery	-0.104	0.102	-1.020	0.307	0.000
Retail **	0.365	0.143	2.550	0.011	-0.001
Restaurants***	0.345	0.114	3.020	0.003	-0.001
CSAs	-0.093	0.071	-1.310	0.191	0.000
Farm to School	0.090	0.090	1.000	0.318	0.000
Food Truck	-0.041	0.076	-0.540	0.591	0.000
Ethnic Markets	-0.112	0.079	-1.430	0.154	0.000
Community Measures Performance					
Low Inc. Comm.	-0.084	0.092	-0.920	0.357	0.000
Food Education	0.044	0.085	0.520	0.603	0.000
Community Gardens	0.139	0.094	1.470	0.141	0.000
Food Festivals*	0.183	0.098	1.860	0.062	-0.001
Food Banks	0.064	0.081	0.780	0.433	0.000
On-farm Events	-0.008	0.085	-0.090	0.930	0.000
Local Food Promotion Performance					
Local Product Diversity***	0.402	0.120	3.340	0.001	-0.001
Local Food Label	0.110	0.122	0.900	0.367	0.000
Price Competitive	0.030	0.122	0.240	0.807	0.000
Breweries Promote LFS*	-0.173	0.101	-1.710	0.088	0.001
Govt. Support of LFS	-0.078	0.088	-0.890	0.375	0.000
Private Investment in LFS	-0.047	0.078	-0.600	0.551	0.000
Demographic Variables					
Sex.F	-0.307	0.269	-1.140	0.254	0.001
Age	0.008	0.011	0.790	0.429	0.000
income (log)	0.138	0.184	0.750	0.453	0.000
LFS Interest - Medium	0.384	0.343	1.120	0.264	-0.001
LFS Interest - High	0.271	0.339	0.800	0.424	-0.001
				N	306
Pseudo R2	0.174			LR chi2(28)	114.7
Log likelihood	-272.1			Prob > chi2	0.000

Note: ***, **, and * represent component significance at the 99%, 95%, and 90% level in ordered logistic regressions.

The Progressive Agriculture Index: Assessing the advancement of agri-food systems

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Abstract

Indicators and metric systems are crucial tools in efforts to reach societal objectives, and these systems are being employed increasingly in initiatives

to improve the environmental, economic, and social sustainability of agri-food systems. Indicators can help clarify values and objectives, providing assessment criteria useful for tracking movement toward or away from targets. Unfortunately, the application of indicators and metrics to agricultural

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systems has been hindered by conflicting definitions of agricultural sustainability and progress, leading to metrics that lack a holistic consideration of social, economic, and environmental factors. To address this shortcoming, we argue for a definition of progressive agriculture that includes all three of the abovementioned factors, stressing the need for multidimensional improvements in the impact of agri-food systems. Our proposed Progressive Agriculture Index (PAI) integrates data from the U.S. Census of Agriculture, the U.S. Census, and other databases to assess nine variables at the county level for the contiguous United States. Including data from both 2007 and 2012 permits analysis of time trends along with regional and county-level trends in individual and aggregate measures of progressivity. By ranking counties within their Farm Resource Regions (as defined by the U.S. Department of Agriculture [USDA] Economic Research Service [ERS]), as well as within their Urban Influence Categories, the PAI also makes it possible to compare counties with similar socio-economic and environmental contexts. Given the important goal of improving social, economic, and environmental conditions in concert, we present this index to draw attention back to the often-neglected social facets of progressivity and thus contribute to advancing more integrated, participatory approaches to measuring progress in agri-food systems.

Keywords

Agriculture, Sustainability, Progressive, Economics, Index, Indicator, Metrics, Environmental, Social

Introduction

Over the last ten thousand years, agriculture has significantly shaped the development of human society, in part by enabling a growing human population. However, agriculture has a checkered historical record of social and ecological impacts (see, e.g., Carter & Dale, 1974; Walker, 2004; Worster, 1979). A growing suite of social, economic, and environmental consequences of contemporary

agricultural practices and organizational forms are argued to be hindering progress toward a more sustainable and just future for people and the planet (Gliessman, 2015; Kiley-Worthington, 1980; Pretty, 2008; Tilman, 1999). In light of these problems, there have been a number of calls to pursue a “better” agriculture, namely, one that does not sacrifice human and ecological well-being for economic efficiency and maximum production at all costs (Allen, Van Dusen, Lundy, & Gliessman, 1991; Gliessman, 2015, ; Pretty, 2008). Yet the question remains: what exactly does “better” look like, and how do we get there?

The First Challenge: What Is Better?

Unfortunately, the task of agreeing upon a vision of a “better” agri-food system is complicated by the numerous and often contradictory ideas advanced by different sectors of society (Bell & Morse, 2008; Binder, Feola & Steinberger, 2010; Bockstaller, Guichard, Keichinger, Girardin, Galan, & Gaillarde, 2009; de Olde et al., 2016; National Research Council [NRC], 1999). One of the descriptors used most often to identify features of a more desirable agricultural model is “sustainability.” In the past, there has often been conflict over whether sustainability encompasses solely environmental concerns or whether it also includes social and economic factors. There has also been conflict over whether it should be defined as an approach or a property of systems (Elsaesser et al., 2012; Hansen, 1996). Since the 1987 Brundtland Commission,¹ the definition of sustainability has commonly included social and economic factors, but the degree to which these elements have been integrated into metrics claiming to measure sustainability varies greatly (de Olde et al., 2016). Some authors have suggested that the lack of an agreed-upon conception currently limits the usefulness of any concept of “agricultural sustainability”; however, this has inhibited, but not prevented, the development and application of the term by a range of important institutions (Blowers, Boersema, & Martin 2012; Hansen, 1996).

¹ The Brundtland Commission was established by the UN in the 1980s to bring countries together with the purpose of addressing human-environment relations. The commission published a report entitled “Our Common Future,” which discussed the new term “sustainable development” and establishing the concept of the three pillars of sustainability (environment, society, and economy).

Other terms related to the development of an improved agricultural system have also been proposed; this includes the idea of “resilience” advanced by Worstell and Green (2017) as a perspective on agricultural sustainability that supports adaptability and continued innovation stemming from local self-organization. The proliferation of terms like “resiliency” and others such as “biodynamic” agriculture moves forward the discussion of a “better” agriculture; however, it may further complicate efforts to conceptualize and agree upon the attributes of an agriculture that would be more beneficial for both people and the planet. Thus, we introduce a new term rather than adding to the many labels currently in use. In our work we have chosen to use the word “progressive” to characterize a multidimensional vision of agricultural systems that fosters the betterment of social and economic conditions in addition to the traditional focus on environmental conditions associated with sustainability. Our vision therefore parallels the goals outlined in Agenda 21 of the United Nations Conference on Environment and Development (UNCED) (Allen et al., 1991; Binder & Feola, 2012; Binder et al., 2010; Christen & O’Halloranetholtz, 2002; Clayton, 2016; Gliessman, 2015; UNCED, 1992). The breakdown of our definition of progressive agriculture into operationalized variables is presented in the Methodology section. Although different stakeholders may emphasize different elements of progressivity according to their own beliefs, values, and interests, achieving goals of social justice, environmental sustainability, and economic viability will require major shifts in agricultural practice and policy (Allen et al., 1991; Bell & Morse, 2008; Gliessman, 2015; Kiley-Worthington, 1980; Pretty, 2008; Tilman, 1999).

The Second Challenge: Measuring Progress

Developing multidimensional indicators for measuring changes in progressive agricultural arrangements and practices is important for understanding current conditions and trends related to the goals under this new vision of progress (Bell & Morse, 2008; Bockstaller, Feschet, & Angevin, 2015; de Olde et al., 2016). Binder, Feola, and Steinberger (2010) list indicators as only one of several

methods for assessing progress in agriculture; however, the use of these measurement tools in similar movements, such as sustainable development or corporate social justice, illustrates their usefulness in defining objectives and steering transformative efforts (Christen & O’Halloranetholtz, 2002; de Olde et al., 2016; NRC, 1999).

Appropriate standards and metrics can help social actors in a wide range of institutions clarify their values and desired outcomes; de Olde et al. (2016) assert that this process can be one of “joint learning and knowledge development” (p. 11) that enhances the ability to accept and reach a consensus on objectives. Indicators can provide baseline measures against which we can track progress and gauge our movement toward or away from goals, informing decision-making, and focusing attention on the areas in which performance is not advancing as quickly (McRae, Smith, & Gregorich, 2000; NRC, 1999).

Given the benefits provided by metrics and indicators, it is not surprising that there has been a recent growth in the number of indicator systems available. While some assert that this development has plateaued, it can be argued that indicators for progress in agriculture have been improving and becoming more common over the past decades (Clayton, 2016; de Olde et al., 2016; Marchand, Debruyne, Triste, Gerrard, Padel, & Lauwers, 2014). We do not assert that this process is complete, as current metrics are still far from the ideal agricultural assessment described by Gliessman (2015, pp. 292–293). His proposed indicators are categorized into soil resources, hydrological factors, biotic factors, ecosystem level characteristics, and socioeconomic parameters.

Gliessman’s (2015) goal was to highlight the environmental, social, and economic factors that require urgent attention if agriculture is to be developed to its fullest potential. While Gliessman provides quantitative metrics for biophysical factors such as soil organic matter, his assessment of the socio-economic elements of progressivity, including social justice, remains qualitative. However, quantitative metrics are easier to measure and track than qualitative ones, and may be more readily accepted by a variety of social actors. Since moving forward on goals for social and economic

equality has great potential to produce substantial benefits for farm-level workers, communities, animal welfare, and ecosystems, it is important to apply quantitative metrics for these areas, as well (Hansen, 1996). This sometimes requires the use of indicators with known flaws, including difficulties in implementation, low influence on policy, failure to consider the interaction between indicators, conflicting goals, and inadequate data. However, several authors argue that the most troubling limitation present in many indicator systems is their neglect of social elements in favor of ecological or economic dimensions (Binder & Feola, 2012; Binder et al., 2010; McRae et al., 2000; Rigby & Caceres, 1997).

Despite the shortcomings of many indicators, their potential usefulness and the need to illuminate change has led to continued development of metrics intended to quantify movement toward a “better” agricultural system. Below we offer an overview of the literature on existing indicators to provide context for our response to current assessments with the development of a Progressive Agriculture Index (PAI).

Current Efforts and Challenges

We explore the challenges of creating metric systems that are both inclusive and integrated, beginning with two national-level indicators. We then examine private-sector efforts and highlight the general exclusion of social variables in existing systems. Next, we discuss the importance of using participatory development methods to create indicator systems that are responsive to the priorities and visions of community members, before exploring the difficulties these methods can create as developers attempt to balance stakeholder engagement and specificity with scale and adaptability. We review some of the various classification schemes for existing indicators, followed by an examination of the extreme diversity of purposes, methods, and perspectives behind existing systems. Finally, we reiterate the suggestion of many authors that continuing the development and assessment of indicators are essential, expressing optimism that the many resulting systems will complement one another and serve their intended purposes in a variety of contexts.

Integration and the National Level

At the national level, the USDA’s Census of Agriculture includes several measures that pertain to the development of progressive agriculture under our definition (USDA National Agricultural Statistics Service [NASS], 2007). This includes measures of environmental impacts, such as conservation tillage practices, as well as those intended to capture socio-economic conditions, such as the development of community supported agriculture operations (CSAs) (USDA NASS, 2012). However, these metrics are not integrated into a cohesive whole, limiting their utility as an indicator system.

A similar government-affiliated system is the Agri-Environmental Indicator Project pioneered by Agriculture and Agri-Food Canada (AAFC), which uses a driving force–outcome–response model and considers farm management, soil, water, air, biodiversity, and production intensity (McRae et al., 2000). While this indicator system is more integrative than the isolated variables in the USDA’s Census of Agriculture, it is limited by gaps in data availability and quality as well as geographic limitations, all of which imply the need for caution in interpreting the resulting measurements and in making comparisons in time and space (McRae et al., 2000). Most importantly, social factors remain largely absent from this metrics framework.

The Private Sector and Social Variables

The need for assessment models more suited to multidimensional yet integrated analyses of the state of agriculture has led actors outside the public sphere to create their own indicator systems. Recent efforts to track agricultural progress have been focused on the concept of sustainability; they have been largely private sector or multistakeholder initiatives (MSIs) that often work with industry to develop sustainability reports and scorecards (Konefal, Hatanaka, & Constance, 2014; Vorley, 2001). One example is the assessment created by Field to Market, which includes several environmental and socio-economic variables (Field to Market: The Alliance for Sustainable Agriculture, 2016). Yet with the exception of a worker-safety variable, the system does not track progress toward “worthwhile social goals” (Gliessman, 2015, pp. 292–293) such as racial and gender equality or

equity in the distribution of returns. Furthermore, the indicator is limited to the national scale and thus provides no analyses of local-level sustainability.

The AAFC and Field to Market projects support Konefal, Hatanaka, and Constance's (2014) argument that the movement from public to private and MSI indicators has been accompanied by a shift toward defining and measuring sustainability in terms of increased resource-use efficiency. Konefal et al. (2014) argue that this approach diminishes the potential for indicators developed by private-sector entities to advance a more beneficial model of agriculture, a worry shared by many others. Vorley (2001) argues that private-sector indicators are part of buyer-driven supply chains, and may become tools for creating specialized new markets and increased profit opportunities rather than true measures of progress. Similarly, Nelson and Tallontire (2014) call attention to the lack of consultation with smallholders, laborers, and their communities. The authors describe MSIs as narrowly focused, possibly limiting the ability of agricultural communities to even participate in the definition and advancement of agriculture that benefits communities in the social, economic, and environmental spheres (Nelson & Tallontire, 2014).

The Importance of Participatory Development

Concerns such as this have led some to question the merits of allowing one system or its creators to define and measure progress toward a more beneficial agriculture. As de Olde et al. (2016) assert, asking whether a particular definition really helps to unify and guide transformation is important, as is asking whether it leads to the exclusion of certain voices or perspectives. Addressing this dilemma requires active participation by representatives of the many sectors of society that will be affected by the design and use of a particular indicator, from farmers to academics to policy-makers. Several authors argue that metric systems must be designed and tested by the scientific community in collaboration with other actors in society to support a participatory definition of progress and address existing inequities (Bell & Morse, 2008; de Olde et al., 2016; McRae et al., 2000). Open dialogue can

facilitate acceptance of a "new guiding vision" of progressive agriculture that addresses the complexities of ecological, social, and economic problems as they are truly experienced by people on the ground (Binder et al., 2010; Christen & O'Halloranetholtz, 2002).

Indeed, many authors hold that participatory and transdisciplinary research efforts are crucial to creating legitimate and effective indicator systems (Bell & Morse, 2008; de Olde et al., 2016; Gasparatos, El-Haram, & Horner, 2008; Korhonen, 2004; Ravetz, 1999; Thompson Klein, Grossenbacher-Mansuy, Haberli, Bill, Scholz, & Welti, 2000). After analyzing seven recently developed indicators, Binder, Feola, and Steinberger (2010) concluded that bottom-up, integrated methods of constructing agricultural assessments are more suited to creating indicator systems capable of illuminating socio-economic factors, as compared to top-down initiatives that lack stakeholder involvement and may neglect social issues. Other authors suggest that indicators constructed to measure linked environmental, social, and economic factors need to incorporate expert opinion in addition to scientific analyses, especially when the required data are limited, expensive, or time-consuming to collect.

Incorporating expert opinion into the assessment of agricultural progress requires the use of multicriteria analysis (MCA) or multicriteria decision aids (MCDA), as well as further validation of the strength of these models and of stakeholder trust in their results (Kamali, Borges, Meuwissen, Boer, & Lansink, 2017; Sadok et al., 2009). These tools should embody a broader range of contexts and stakeholder perspectives, ensure transparency, and increase the incorporation of informal knowledge into the development of indicators that can facilitate the multidimensional assessment of progressivity (Sadok et al., 2009).

Participatory Methods: Balancing Scale, Specificity, and Adaptability

Suitable participatory models require involvement from communities and experts, each of which will contribute unique perspectives to the design of indicators (Binder & Feola, 2012; Binder, Feola & Steinberger, 2010; Gasparatos, El-Haram, &

Horner, 2009; Pischke & Cashmore, 2006). At smaller spatial scales this can result in greater specificity, making the resulting indicators suited to the assessment of progress in unique local contexts (Binder, Feola, & Steinberger, 2010; de Olde et al., 2016; Gasso, Oudshoorn, de Olde, & Sørensen, 2015). Yet it can be difficult to translate this degree of engagement into the creation of national-level metrics that provide useful large-scale benchmarking and comparability across regions (Binder, Feola & Steinberger, 2010). Balancing local and national, top-down and bottom-up assessments will continue to challenge those developing indicators to provide an integrated analysis of social, economic, and environmental progress—one that accounts for stakeholder views while maintaining applicability at broader spatial and administrative levels.

Some recent initiatives were devised to overcome these obstacles and combine national-level indicators with participatory development models. An example of one of these initiatives is the LEO-4000 “American National Sustainable Agriculture Standard.” Produced by the Leonardo Academy—a 501(c)(3) standards developer accredited by the American National Institute of Standards (ANSI)—these non-proprietary indicators resulted from seven years of stakeholder input and public engagement. They encompass measures of economic prosperity, social responsibility, and environmental stewardship (Hatanaka & Konefal, 2017). The difficulty of achieving effective stakeholder participation at this scale is illustrated by the fact that the LEO-4000’s development was disrupted when representatives from several agri-food industries and corporations walked out on the discussions and issued a public statement claiming bias (Hatanaka & Konefal, 2017). Despite these setbacks and the challenges of implementation, the LEO-4000 achieved ANSI certification and may contribute to the quantification and characterization of agricultural progressivity.

Classifying Indicator Systems

Even as initiatives like ANSI-LEO-4000 approach the goal of an integrated conception of indicators described in the literature, many problems remain to be addressed in the development of metric systems. While the process of developing and

refining indicator systems has advanced as the number and variety of indicators has grown, few such systems have been seen as truly successful, practical, and comprehensive (Marchand et al., 2014). Furthermore, the many approaches to measuring progress in agricultural systems diverge in their spatial and temporal scales as well as in the number of variables they include; this variation is the result of contrasts in the underlying ideas of “progress” and the purpose behind each of the indicators (Bell & Morse, 2008; Christen & O’Halloranetholtz, 2002; de Olde et al., 2016). Finally, the goals of particular developers influence the characteristics of their indicator systems; thus, the outcomes will differ according to such goals (de Ridder, Turnpenny, Nilsson, & von Raggamby, 2007). Therefore, Christen and O’Halloranetholtz (2002) argue that this great variability necessitates careful classification of different metric systems to avoid misinterpreting or inappropriately applying an indicator.

Marchand et al. (2014) agree with this argument and distinguish between two types of indicators: (1) “Rapid Sustainability Assessments” and (2) “Full Sustainability Assessments.” Binder, Feola, and Steinberger (2010) provide a more detailed classification framework. They describe not only a method for classifying indicators, but also a model for assessing the diverse development and implementation processes employed in various indicator systems. They categorize indicators based on what the authors term the “normative” aspect of indicator systems, which is complemented by procedural and systemic elements as well.

Diversity in Purpose and Structure of Indicator Systems

Although differences among indicator systems may make classification difficult, such variation provides elements to adapt indicators for particular contexts and purposes. No single approach is applicable to all regions, purposes, or situations; thus, the diverse variety indicators in development may need to be combined in ways that complement one another’s strengths and limits (de Ridder et al., 2007). The task of choosing specific indicators to incorporate into an assessment system carries with it as many difficulties as does the

agreement on a vision of progressive agriculture (Bell & Morse, 2008; de Olde et al., 2016; Gasparatos, El-Haram, & Horner, 2009; Korhonen, 2004; Ravetz, 1999). However, these same authors also point to the benefits of including diverse perspectives in the development of indicators. De Olde et al. (2010) suggest that the process of creating assessment systems may actually be more important to the success of such systems than the final shape they take. As several authors assert, the integration of a plurality of methods and perspectives will permit the creation of indicators that are both practical and adaptable to local contexts (Gasparatos, El-Haram, & Horner, 2008; Gasso et al., 2015).

Along the same lines, the specific variables included in an indicator system must be relevant to the scale and intent of that system. Christen and O'Halloranetholtz (2002) highlight the importance of balancing an adequate number of variables with the practicality of implementation and measurement. The use of fewer individual metrics or simpler measurement methods may make quantifying and communicating data easier; therefore, it could potentially improve farmer understanding of and engagement in action for reshaping agri-food systems (Marchand et al., 2014). However, it is also true that the more simplified an indicator becomes the less informative it may be (Gasparatos, El-Haram, & Horner, 2008).

To ensure that a metric system provides decision-makers with useful information, evaluators need to consider how the indicator system was developed and its prospects for success in the context of its application. Rossing et al. (2007) contend that many indicators focus simply on filling gaps in knowledge or technology but fail to provide any follow-up or assessment of change time. This is an important limitation to address because the evolution of agri-food systems require the development of effective processes to manage, monitor, and update indicator systems (Rigby & Caceres, 1997).

The Need for Continued Development

Given this need for evolution, it remains crucial to continue developing and improving metric systems. According to Christen and O'Halloranetholtz

(2002), it is especially urgent that “different systems be actually implemented and their advantages and disadvantages with regard to the various purposes be analyzed in comparative studies” (p. 8). Multiple coexisting efforts to create indicator systems will foster the exchange of ideas, the comparison and assessment of different approaches to measuring complex socio-economic variables, and the development of more efficient data collection and sharing techniques (Binder, Feola, & Steinberger, 2010).

The Progressive Agriculture Index

To contribute to this adaptation and growth, we have created a Progressive Agriculture Index (PAI). We believe this index addresses some of the shortcomings identified in various indicators currently available. The PAI is intended to measure the degree to which local agricultural systems display properties consistent with conceptions of “progressivity” (see our definition, below) to support communities in making decisions to move toward more progressive mode of agriculture. The system incorporates the most detailed and practically available data present at this time by drawing on the USDA Census of Agriculture, the U.S. Census, and other databases. We combine data from these sources to create a multi-variable analysis of progressivity. The PAI brings social, economic, and environmental goals back into balance, based on objectives identified through a process of grass-roots engagement in three New York State counties in various states of urbanization and development.

We think that the PAI will be valuable in permitting comparisons of the state of agriculture both in time and in space. This is something that has not yet been done at the county level for the entire continental United States. Furthermore, it offers a more well-rounded picture of progress that includes environmental, social, and economic factors as well. Some recently developed indicators have taken such a multidimensional approach, for example Green, Worstell, and Canarios's (2017) Sustainability/Resilience Index (SRI). Their system includes a thoughtful array of individual indicators designed to measure the 8 elements of resilience identified by the authors in previous case studies.

Although some of the variables in the SRI are present in our PAI, we believe our proposed index adds to the efforts of the SRI by facilitating comparison between geographically disparate counties with similar demographic and environmental contexts. Finally, the PAI facilitates a comparison between geographically disparate counties with similar demographic and environmental contexts. We believe this will provide communities with information that will aid them in discerning trends in local agri-food systems and in making decisions to advance progressive agriculture.

Methodology

We operationalize “Progressive Agriculture” through specific indicators as a first attempt in an ongoing effort to define and advance a more progressive agricultural system. The importance of developing a more holistic definition of progressivity is evident in the majority of extant indicators, which often focus on environmental factors alone. This narrow perspective has led to persistent and ongoing criticisms of existing measurements of agricultural progressivity, which concentrate almost explicitly on ecological impacts and neglect social outcomes. As Guthman (2004), Allen (2004), Gray (2013), Minkoff-Zern (2017), and many others point out, the sustainable agriculture movement—and emergent food movements more broadly—are focused primarily on the environmental consequences of agricultural production. Additional areas of concern include human health implications of the American diet, animal welfare, food miles, and even questions of taste, craft, and authenticity. Traditionally neglected are broader social concerns such as farm worker protections and wages; racial, ethnic, and gender diversity within agriculture; and economic and political inequity within the food value chain. The need to address these overlooked concerns has been an important consideration in developing the PAI.

The selection of our nine variables was based on a participatory process involving diverse grassroots people organized in focus groups. Participants were given the opportunity to define situations and offer their perspectives and input on topics relevant to agriculture. This input was gathered over two years from informants in three

counties within New York State. The three counties were defined as urban-influenced, stable rural, or urbanizing. They were selected to represent conditions present in various New York regions. In each county, the authors worked with community members to develop a shared vision of the future of progressive agriculture. This process was carried out using a modified version of the proprietary process established by Yellow Wood Associates, Inc., of St. Albans, Vermont.

Participating focus group members were selected with the help of local Extension staff. These staff also participated in the conception and implementation of the indicator system. The groups were guided through three separate visioning, goal-setting, and “key leverage indicator” identification sessions, which were open-ended and intended to identify shared goals of grassroots actors in the three counties. The goals highlighted during these sessions focused on achieving the following conditions:

1. Farmers are using land and other natural resources in ways that maintain agricultural productivity and environmental quality.
2. Agriculture maintains a return on investment that makes farming a viable business.
3. The community (government officials and the public) understands and appreciates agricultural businesses, and these values are reflected in government policies and decision-making that supports agricultural viability.
4. Farmers have ready access to and are able to take advantage of good markets for their products.
5. Agriculture has a legal, reliable, well-trained, and highly dedicated workforce, including farmers, agribusiness, and farm labor.

Interestingly, these emerging goals were remarkably similar across the counties, despite geographic and demographic differences. This suggests the existence of a fundamental core of desires and beliefs about the future of agriculture.

Based on the vision articulated by community members during this participatory process, we contend that our concept of Progressive

Agriculture can be viewed as an ideal type as defined by Max Weber (1977). As such, it is a stylized yardstick for assessing social action and institutions, but not a tool for precisely measuring current and future realities. An ideal type can be thought of as a theoretical construct useful in identifying the key elements of a concept, but every instance fitting this concept does not necessarily show all the characteristics associated with the concept. The adjective “ideal” refers to the typology being a mental template, rather than a desired goal or ethical condition. In this light, we define progressive agriculture as a multidimensional, evolving agricultural system that benefits the social, economic, and environmental conditions of communities. Our goal for describing progressive agriculture as an ideal type is to enable others to grasp the concept and to increase practitioners’ awareness of its various facets in their localities. At the same time, we believe that achieving more progressive agricultural systems is a worthwhile objective given the benefits that such systems can have for the domains of community, the environment, and local economies. We thus argue that agricultural systems that are more progressive are associated with better social, economic, and environmental conditions in communities. Therefore, we developed several “local agriculture viability indicators” to facilitate an increase in the progressivity of agriculture in communities through the act of measuring its state over time. We see these indicators as proxy measures of progress in each of the three domains, and believe that these measures are highly relevant to the goals identified by community members in the three counties. These indicators have evolved through continued discussion into the components of agricultural progressivity under our definition, as listed here:

- the continual improvement of the well-being of all farm-level workers involved in agricultural production;
- the provision of economic opportunities for diverse populations by minimizing social exclusion;

- broadening the ownership of productive assets and maximizing the retaining of economic value at the farm-level of the sales to final consumers;
- reducing economic concentration in agricultural production;
- enhancing decision-making and control of production at the local farm-level;
- forging links with consumers to support desirable social outcomes; and,
- protecting or improving the natural resource base on which all agricultural production depends.

We chose several proxy measures to represent these facets of progressivity. We wanted to address the need for simplicity and allow any interested governmental unit or other organization in a community to measure and report on them; we also wanted to keep the index accessible by limiting the cost of gathering data. Additionally, the variables were chosen from those with available national datasets because we considered comparison across counties and geographies to be crucial. We acknowledge the potential for these measures to be limited by data lag, inaccuracy, or their proxy nature; however, we also believe that measuring temporal change in the variables is more important than achieving precision at any one time.

To encompass the facets of progressivity articulated above, we included nine variables in the PAI. Our variables include:

1. Percent of farms with female principal operators: a proxy measure of gender equality, social progressivity, and recognition of the centrality of women within progressive agricultural production systems.
2. Percent of farms with non-white principal operators in proportion to the percent of non-white county residents: another measure of social progressivity, diversity, and economic opportunities for minorities.
3. Percent of farms with sales of organic products² (including both certified and self-

² The authors acknowledge that, due to a change in the definition of organic agriculture employed by the 2007 and 2012 Census of Agriculture, any comparison of organic agriculture over this particular period may not be entirely accurate. However, the

identified organic producers): an indicator of reduced adverse environmental impact (Pimentel, Hepperly, Hanson, Douds, & Seidel, 2005) and potentially of the development of entrepreneurial attitudes.

4. Average wage of farmworkers as a percent of the federal minimum wage: calculated from the "Combined Field and Livestock Worker Wage Rates" published by the USDA's National Agricultural Statistics Service. The data for this measure is only available at the regional level since labor markets are regional and not constrained by county boundaries. Therefore, in the PAI every county within a region contains the same value for this indicator. We contend that farmworker wages are likely similar across a particular region and are important to include because they constitute a crucial element of social justice and the sustainability of local economies.
5. Percent of farms selling value-added products: a practice that allows farmers to access new markets and signals the potential development of entrepreneurial attitudes. Value-added sales may also increase farm incomes and yield greater return on investments, as a greater share of the difference in price between the producer and consumer is captured as profit at the farm level (USDA ERS, 2017).
6. Number of farms making direct sales per 10,000 residents: selling directly to consumers helps farmers build social capital, while narrowing the farm to consumer price spread and facilitating access to new markets. Additionally, farms engaged in direct marketing often employ environmentally sustainable techniques such as rotating crops and growing a more diverse set of crops, promoting increased farm biodiversity and fostering food system transparency (Lyson & Welsh, 1993).
7. Number of farms participating in CSAs per 10,000 residents: CSAs contribute to economic sustainability by providing farmers

with guaranteed markets for their products, again narrowing the farm to consumer price spread while building social capital and trust within communities. In cases where shares are subsidized, CSAs may contribute to the food security of participating local households. Finally, they may improve environmental sustainability, as farms participating in CSAs often employ organic farming techniques and diversified farm production that support biodiversity and agro-ecosystem stability (Hanson, Dismukes, Chambers, Greene, & Kremen, 2004).

8. Percent of farms with operators residing on-farm: a variable which indicates the degree to which farm enterprises are owned and operated by farmers as opposed to being owned by absentee landlords and operated by employees. Our assumption is that local farm owners will be more responsive to the social and economic conditions of the region in which they farm.
9. Sales distribution across farm size classes (classified by sales in dollars): measured as the Coefficient of Variation of the total sales in each size class. This variable indicates the degree to which sales are concentrated in one or more size class, as opposed to being distributed more evenly across classes; we argue that the latter situation would represent a more ideal progressive agricultural system.

Together these variables address the social, economic, and environmental pillars of the progressivity mentioned in our definition above. Variables 1, 2, 8, and 9 address social facets of progressivity; variables 4, 5, 6, and 7 address economic issues; and variables 3, 6, and 7 measure aspects promoting environmental sustainability. The variables may appear to be somewhat imbalanced in their consideration of the three facets of progressivity (environmental, social, and economic). However, we interpret several of these variables as overlapping in certain elements of progressivity. Additionally, our decision to include

establishment of a consistent Census definition in 2008 should render future temporal comparisons significantly more reliable.

Table 1. Progressive Agriculture Index Classification of Variables

#	Indicator	Indicator Type
1	Percent of farms with female principal operators	Social
2	Percent of farms with non-white principal operators in proportion to the percent of non-white county residents	Social
3	Percent of farms with sales of organic products*	Environmental
4	Average wage of farmworkers as a percentage of the federal minimum wage	Economic
5	Percent of farms selling value-added products	Economic
6	Number of farms per 10,000 residents making direct sales	Economic, Environmental
7	Number of farms per 10,000 residents participating in CSAs (community supported agriculture operations)	Economic, Environmental
8	Percent of farms with operators residing on-farm	Social
9	Sales distribution across farm size classes	Social

* The USDA definition of organic agriculture changed in 2008, but for consistency with the rest of the measurements for 2007 we used the data collected under the 2007 definition for this year.

a roughly equal number of economic and social variables reflects our attempt to provide an index with more balance than the preponderance of existing metric systems focused largely on environmental concerns. Our classification of variables is displayed in Table 1.

The inclusion of a broad array of indicators—relating to the environment, race, ethnicity, farm worker welfare, and value chain development—does not confound the measures within an index. The diversity of indicators, while not intended to produce an index suitable to predict or explain changes in social, economic, or environmental variables, makes the index comprehensive and inclusive in its ability to illuminate trends in these variables. Based on this principle, the PAI measures movement toward progressivity for those counties which score highest in all categories: e.g., raising farm worker wages, increasing the number of acres of organic management, increasing the number of CSAs, being more inclusive of racial and ethnic groups in farming, increasing gender diversity within agriculture, and capturing value at the farm level. We do not propose that the included variables represent an exhaustive list of the elements present in a progressive agricultural system. However, based on the feedback we received from communities, we do contend that

they are amongst these elements.

In the PAI, we included only those counties that contained 100 or more farms because we sought to avoid misleading results from outliers in cases with very few farms and little agricultural infrastructure. Additionally, only counties with data for both 2007 and 2012 were included to permit a more consistent analysis. These exclusions reduced our cases by approximately seven percent, from a total of 3,120 counties in the contiguous United States to 2,904 counties. Counties with no reported data for a variable were assigned a value of zero for that variable. This allowed us to calculate their rank without excluding them entirely.

For all the above variables, Location Quotients for each county were calculated by dividing the percentage of a county's farms displaying the given characteristic by the percentage displaying the characteristic in the entire United States. These LQs were then used to rank the counties within each category, from highest to lowest LQ. Finally, counties were given an average ranking (based on their rankings across all categories). This average was then used to calculate the overall ranking of each county in comparison to all others in the index. Using the mean rank across all categories instead of the mean of the component indicators normalizes the index. In addition, a composite

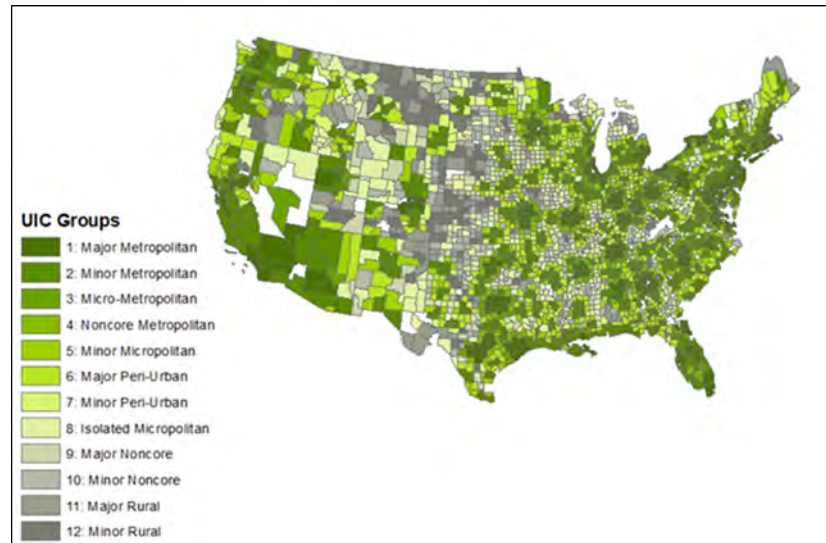
index is less likely to privilege one measure over another and allows for a more meaningful assessment of overall agricultural progressivity.

To allow for a more equitable comparison between counties located in very different socio-economic environments and with different production focuses, rankings were also calculated for counties within their Farm Resource Regions (as defined by the USDA ERS, see Map 1), and within their Urban Influence Category (UIC group, see Map 2). Thus, counties with similar populations and locations relative to urban areas can be compared side by side, as opposed to being judged against counties situated in environments with entirely different opportunities for progressive development.

To obtain these rankings, counties were sorted into their UIC groups or regions and then ordered within this group based on their overall rank. Finally, rankings were calculated for farms within the same UIC group in each separate region. This allowed for comparison between farms with the most similar environmental, social, and economic constraints or opportunities.

The collected data are displayed in a comprehensive set of tables that will be made available after publication at the Lyson Center website.³ Additionally, we have extracted information from these tables and the rankings produced by the PAI to create additional tables displaying the top 100 counties overall in 2007 (excerpt in Table 2) and 2012 (excerpt in Table 3). Tables containing the top 50 counties in each region and UIC group were also created for both

Map 1. UIC Groups and Shorthand Names



Map 1. Farm Resource Regions



years. Finally, county-level variables and overall rankings were transformed into a set of maps which allow the visualization and spatial analysis of the trends described here.

This combination of diverse indicators and ranking systems has resulted in a Progressive Agriculture Index that we hope will contribute to accurate and contextually relevant comparisons of agricultural progressivity between counties. We do not suggest that this index represents a universal solution to measuring progress in agricultural systems. Rather, our hope is that the PAI will be

³ <https://www.lysoncenter.org>

Table 2. EXCERPT FROM Progressive Agriculture Index Top 100 Counties Overall, 2007

Overall rank	State	County	Region	UIC Group	UIC Description
1	Washington	San Juan	Fruitful Rim	12	Noncore not adjacent to a metro/micro area and does not contain a town of at least 2,500 residents
2	Oregon	Hood River	Basin and Range	3	Micropolitan adjacent to a large metro area
3	Oregon	Josephine	Fruitful Rim	2	Small—in a metro area with fewer than 1 million residents
4	California	Trinity	Basin and Range	6	Noncore adjacent to a small metro with town of at least 2,500 residents
5	Oregon	Columbia	Fruitful Rim	1	Large—in a metro area with at least 1 million residents or more
5	Virginia	Rappahannock	Southern Seaboard	1	Large—in a metro area with at least 1 million residents or more
7	Washington	Stevens	Basin and Range	2	Small—in a metro area with fewer than 1 million residents
8	Michigan	Leelanau	Northern Crescent	8	Micropolitan not adjacent to a metro area
9	Oregon	Wallowa	Fruitful Rim	10	Noncore adjacent to micro area and does not contain a town of at least 2,500 residents
10	Washington	Wahkiakum	Fruitful Rim	4	Noncore adjacent to a large metro area

Table 3. EXCERPT FROM Progressive Agriculture Index Top 100 Counties Overall, 2012

Overall rank	State	County	Region	UIC Group	UIC Description
1	California	Trinity	Basin and Range	6	Noncore adjacent to a small metro with town of at least 2,500 residents
2	Maine	Waldo	Northern Crescent	6	Noncore adjacent to a small metro with town of at least 2,500 residents
3	Vermont	Orange	Northern Crescent	8	Micropolitan not adjacent to a metro area
4	California	Nevada	Basin and Range	3	Micropolitan adjacent to a large metro area
5	Oregon	Hood River	Basin and Range	3	Micropolitan adjacent to a large metro area
6	Oregon	Josephine	Fruitful Rim	2	Small—in a metro area with fewer than 1 million residents
7	New Hampshire	Carroll	Northern Crescent	4	Noncore adjacent to a large metro area
8	Washington	Jefferson	Fruitful Rim	6	Noncore adjacent to a small metro with town of at least 2,500 residents
9	Vermont	Bennington	Northern Crescent	5	Micropolitan adjacent to a small metro area
10	Maine	Oxford	Northern Crescent	6	Noncore adjacent to a small metro with town of at least 2,500 residents

useful to researchers attempting to identify the factors that may promote positive economic, environmental, and social trends in agricultural development—especially those identified as important by people in the communities that participated in our development process.

Additionally, these rankings may contribute to the efforts of NGOs, government aid programs, and nonprofits. Communities may consider using the PAI as a benchmark to measure and compare their progress with that of others in their region or UIC group, or with the U.S. as a whole.

Results and Discussion

Regional Patterns

Numerous trends are evident from the PAI, with some patterns appearing at the county level and others at regional scales. For example, average rankings are highest for the Northern Crescent, Basin and Range, and Eastern Upland regions in both 2007 and 2012 (Tables 4 and 5, Maps 3 and 4). These regions also tended to rank highly within many of the individual variables; however, there were also several cases in which regions that did

Table 4. Region Ranking, 2007

Rank	Region	Average Rank of Counties in Region
1	Northern Crescent	770
2	Basin and Range	794
3	Eastern Uplands	1,229
4	Fruitful Rim	1,449
5	Northern Great Plains	1,464
6	Prairie Gateway	1,526
7	Heartland	1,587
8	Southern Seaboard	1,989
9	Mississippi Portal	2,258

not contain many highly progressive counties based on overall rankings did perform well in one of the individual variables. Such differences indicate that progress in agri-food systems may occur unevenly in the character and order of the changes that occur. The resulting variation is not entirely unexpected, as the extant literature shows technological change, rural development, and economic growth all follow uneven patterns within and between regions (Ascani, Crescenzi, & Iammarino, 2012). This may be due to differences in proximity to markets for agricultural goods produced in progressive systems, but it is important to consider other drivers of variation as well.

This uneven development is illustrated by the

Map 3. Overall Progressive Agriculture Index Rank, Overall Trends, 2012

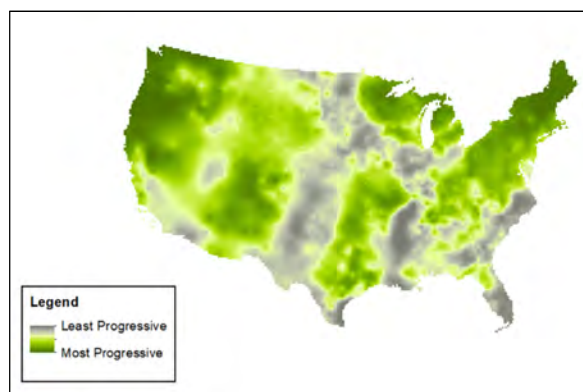


Table 5. Region Ranking, 2012

Rank	Region	Average Rank of Counties in Region
1	Northern Crescent	700
2	Basin and Range	882
3	Eastern Uplands	1,047
4	Fruitful Rim	1,412
5	Prairie Gateway	1,661
6	Northern Great Plains	1,718
7	Southern Seaboard	1,731
8	Heartlands	1,788
9	Mississippi Portal	2,215

divergent performance of the various regions in several of the economic, environmental, and social variables in the PAI. (Unless otherwise noted, the statistics that follow refer to 2012, although many of the same trends are evident in 2007.) Together, counties from the Northern Crescent, Eastern Uplands, and Basin and Range regions constitute 73% of the 100 highest ranking counties within the Value-Added Sales category, 71% of the top 100 counties in the On-Farm Operator category, and 59% of the top 100 counties in the Female Principal Operator categories (Tables 6, 7, and 8; Maps 5, 6, and 7, respectively).

The Northern Crescent region did particularly well in the Organic Sales category. Within this

Map 4. Overall Progressive Agriculture Index Rank, County Rank, 2012

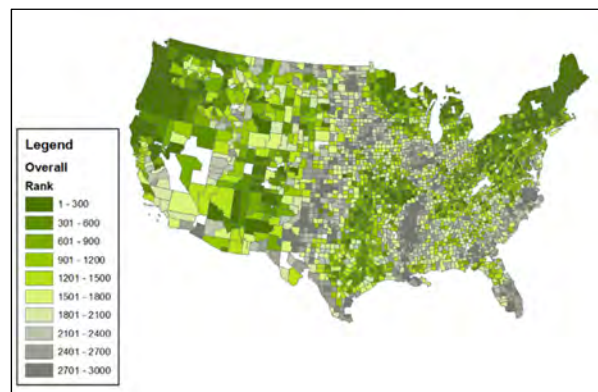


Table 6. Region Ranking: Value Added, 2012

Rank	Region	Average Rank of Counties in Region
1	Eastern Uplands	900
2	Basin and Range	905
3	Northern Crescent	941
4	Fruitful Rim	1,185
5	Southern Seaboard	1,378
6	Mississippi Portal	1,679
7	Prairie Gateway	1,797
8	Northern Great Plains	2,034
9	Heartlands	2,051

Map 5. Value Added Rank, 2012

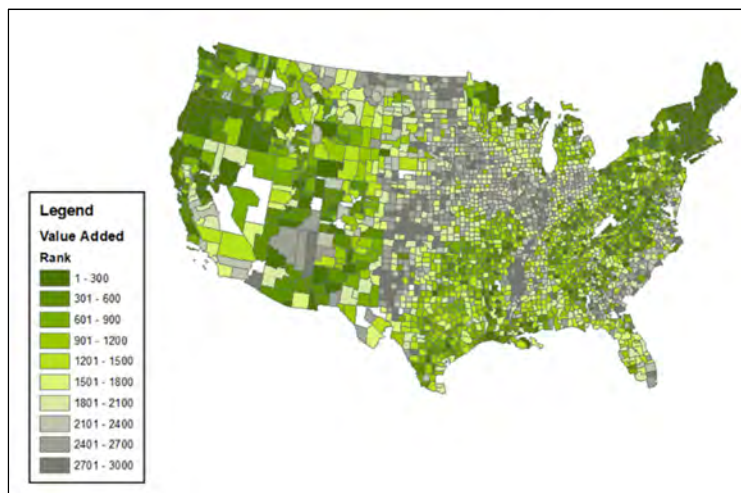
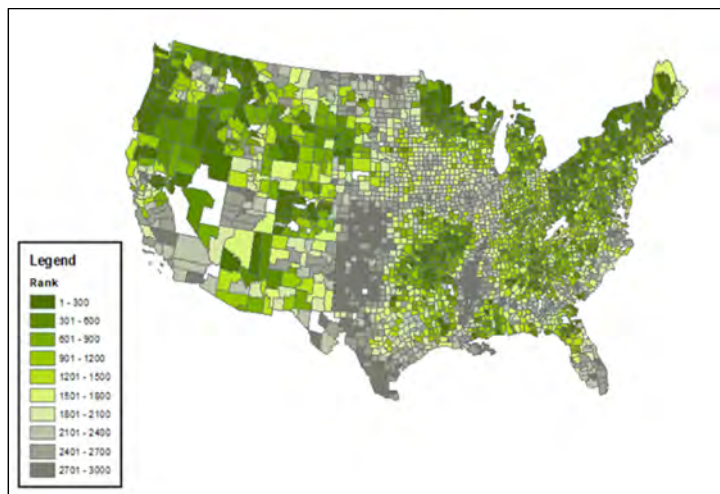


Table 7. Region Ranking, On-Farm Operators, 2012

Rank	Region	Average Rank of Counties in Region
1	Northern Crescent	761
2	Eastern Uplands	852
3	Basin and Range	1,101
4	Southern Seaboard	1,441
5	Fruitful Rim	1,501
6	Heartlands	1,677
7	Northern Great Plains	1,824
8	Mississippi Portal	2,062
9	Prairie Gateway	2,110

Map 6. On-Farm Operators Rank, 2012



variable, the average ranking of counties in the Northern Crescent was 571 (Table 9, Map 8). Just behind the Northern Crescent in the Organic Sales category were the Fruitful Rim and Basin and Range regions, with average rankings of 798 and 993, respectively.

The Basin and Range region also scored well in the Female Principal Operator category, with an average ranking of 1,008. This put it second to the Fruitful Rim's average ranking of 893 and just ahead of the Northern Crescent's average ranking of 1,075. In contrast to the dominance of these three regions in the Female Principal Operator

category, a different set of regions dominated in the Non-White Principal Operator variable. Here the Mississippi Portal exhibited the most favorable ranking. Counties from this region received an average ranking of 851 for this variable (Table 10, Map 9). The region was ranked far above the second-place Southern Seaboard, which had an average ranking of 992 for Non-White Principal Operators.

This trend likely reflects the presence of the "Black Belt" in these regions, illustrating the enduring link between rural African American populations and agricultural production in the southern

Table 8. Region Ranking, Female Principal Operators, 2012

Rank	Region	Average Rank of Counties in Region
1	Fruitful Rim	893
2	Basin and Range	1,008
3	Northern Crescent	1,075
4	Southern Seaboard	1,149
5	Prairie Gateway	1,394
6	Mississippi Portal	1,601
7	Eastern Uplands	1,625
8	Northern Great Plains	1,865
9	Heartlands	2,094

Map 7. Female Principal Operators Rank, 2012

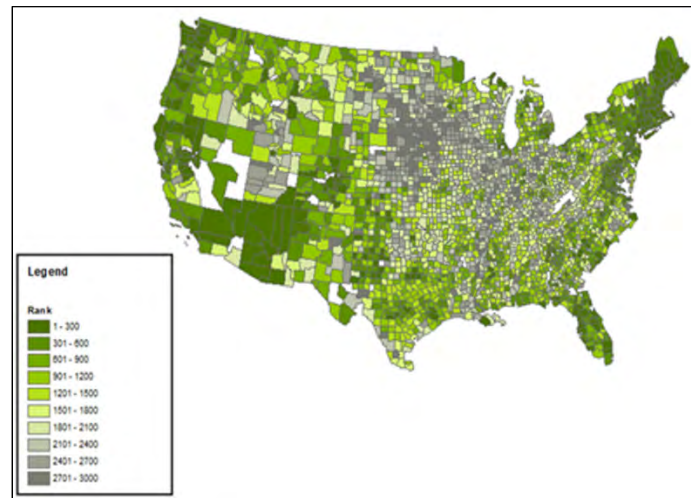
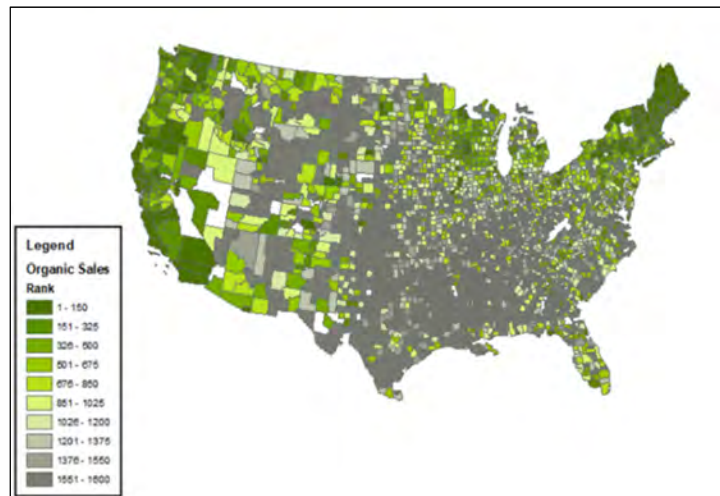


Table 9. Region Ranking, Organic Sales, 2012

Rank	Region	Average Rank of Counties in Region
1	Northern Crescent	571
2	Fruitful Rim	798
3	Basin and Range	993
4	Heartlands	1,193
5	Northern Great Plains	1,193
6	Southern Seaboard	1,314
7	Eastern Uplands	1,370
8	Prairie Gateway	1,428
9	Mississippi Portal	1,510

Map 8. Organic Sales Rank, 2012



U.S. (Rankin & Falk, 2010). The authors acknowledge that the large number of Non-White Principal Operators in the southern regions may not represent a particularly progressive trend, as these operators may be faring poorly compared to White operators in the same vicinity. However, the inclusion of this variable in the PAI alongside many other indicators ensures that our assessment of progressivity does not rely solely on one measure of social justice. Additionally, the viability of operations with Non-White Principal Operators will be measurable as the PAI continues to track this variable through subsequent census years. If Non-

White operators are indeed doing poorly, and their numbers decline as a result, this trend will be visible and may spur further research on the topic.

In contrast, the Heartland, Northern Crescent, and Northern Great Plains regions contain the counties with the lowest percentages of Non-White Principal Operators in proportion to non-white residents. Together, these regions were home to over 60% of the counties that did not contain any farms with non-white principal operators, despite the presence of non-white residents in the county. Compared to the average ranking of 851 for Mississippi Portal counties under this category, the

Table 10. Region Ranking: Non-White Principal Operator, 2012

Rank	Region	Average Rank of Counties in Region
1	Mississippi Portal	851
2	Southern Seaboard	992
3	Fruitful Rim	1,173
4	Eastern Uplands	1,191
5	Basin and Range	1,405
6	Prairie Gateway	1,501
7	Northern Great Plains	1,669
8	Northern Crescent	1,727
9	Heartlands	1,813

Map 9. Non-White Principal Operators Rank, 2012

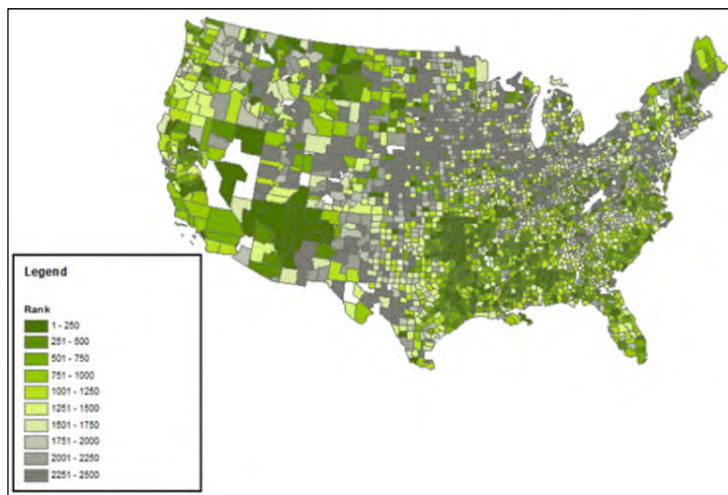
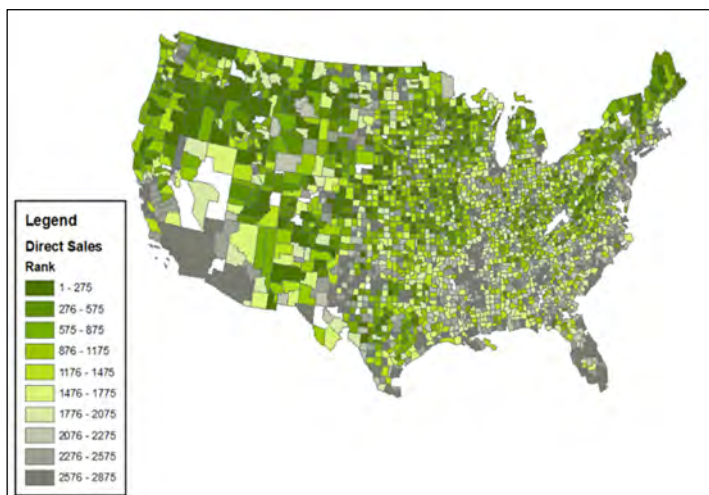


Table 11. Region Ranking: Direct Sales, 2012

Rank	Region	Average Rank of Counties in Region
1	Basin and Range	872
2	Northern Great Plains	1,115
3	Northern Crescent	1,225
4	Eastern Uplands	1,349
5	Heartlands	1,384
6	Prairie Gateway	1,404
7	Fruitful Rim	1,656
8	Southern Seaboard	1,909
9	Mississippi Portal	2,066

Map 10. Direct Sales Rank, 2012



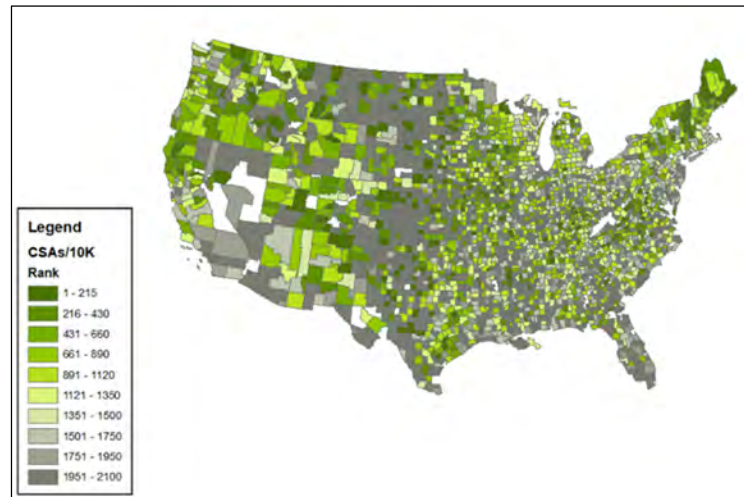
averages for the Heartland, Northern Crescent, and Northern Great Plains were 1,813, 1,727, and 1,769, respectively. We do not imply that non-white residents in those particular regions wish to farm or do not look for better, off-farm opportunities. Rather, we argue that these statistics reflect historical trends in occupational segregation in the operation of farms. This may indicate the persistence of cultural, social, economic and political barriers to entry into farm ownership for non-white farmers, thus diminishing opportunities in this economic sector (Collier, 2017).

The Prairie Gateway and Mississippi Portal

regions showed the lowest percentage of farms with operators residing on-farm; 83 of the lowest 100 counties in the on-farm operator category were located in these two regions. The average ranking of Prairie Gateway counties in the on-farm operator category was 2,110; for Mississippi Portal counties it was 2,062. These rankings put these two regions in last and second-to-last place, respectively, for this category. In contrast, the Northern Crescent region generally had higher proportions of on-farm operators. This region contained 40 of the 100 top counties in the category. The average ranking of Northern Crescent counties was 761,

Table 12. Region Ranking: CSAs per 10,000 Population, 2012

Rank	Region	Average Rank of Counties in Region
1	Basin and Range	1,074
2	Northern Crescent	1,143
3	Eastern Uplands	1,282
4	Heartlands	1,316
5	Fruitful Rim	1,404
6	Prairie Gateway	1,429
7	Southern Seaboard	1,429
8	Northern Great Plains	1,490
9	Mississippi Portal	1,493

Map 11. CSAs per 10,000 Population Rank, 2012

putting it ahead of the Eastern Uplands and Basin and Range regions, which had average on-farm operator rankings of 852 and 1,101, respectively.

The number of operations with direct sales per 10,000 residents was highest in the Basin and Range region, followed by the Northern Great Plains and the Northern Crescent (Table 11, Map 10). The average Direct Sales rankings of these regions were 872, 1,115, and 1,225, respectively.

CSA participation in proportion to population was also high in the Northern Crescent region, with roughly a fifth of the top 100 counties in this category hailing from the Northern Crescent. The region's counties had an average ranking of 1,143 in the category, just behind the Basin and Range at 1,074 (Table 12, Map 11). Unlike many of the other categories, no one region had an average ranking below 1,000 for the CSA variable. Whereas one or more regions tended to stand out from the others in most other categories, the regions all displayed fairly similar rankings for this particular category. This is an interesting trend to note, especially since the USDA has documented a recent growth in CSAs along with rising interest in direct marketing and local food production (Woods, Ernst, & Tropp, 2017).

Contrary to the trend for the CSA category, the Value-Added Sales category had several regions with average ranks below 1,000. The Eastern Uplands had the most favorable ranking of 900,

followed by the Basin and Range and Northern Crescent with average rankings of 905 and 941, respectively. As in the Value-Added category and the Organic Sales category (discussed above), a few regions stood out in the rankings for Wage as a Percent of the Federal Minimum (Table 13, Map 12). The Heartland region performed very well in this category, with an average ranking of 574, followed by the Northern Great Plains at 631 and the Northern Crescent at 821. In contrast, the Southern Seaboard and Mississippi Portal had average rankings of 2,156 and 2,440, respectively. The differences in wages between these regions may be related to the influence of urban areas. That is, income tends to be higher around metro centers (D'Costa & Overman, 2014). For example, with fewer large urban areas, the Southern Seaboard and Mississippi Portal may exhibit less favorable wage rates than the more urbanized Northern Crescent region (Crosset, Culliton, Wiley, & Goodspeed, 2004).

The Southern Seaboard and Mississippi portal also exhibited poor rankings in the Sales Concentration variable, along with the Fruitful Rim. With averages of 1,793, 1,849, and 1,807, respectively, the three regions demonstrate the trend toward uneven distribution of sales between farms of different size classes in the southern regions of the country, a phenomenon that is concerning given the need for more equitable distribution of income

Table 13. Region Ranking: Wage as Percent of Federal Minimum, 2012

Rank	Region	Average Rank of Counties in Region
1	Heartlands	574
2	Northern Great Plains	631
3	Northern Crescent	821
4	Prairie Gateway	987
5	Fruitful Rim	1,656
6	Eastern Uplands	1,721
7	Basin and Range	1,757
8	Southern Seaboard	2,156
9	Mississippi Portal	2,440

Map 12. Wage as Percent of Federal Minimum Rank, 2012

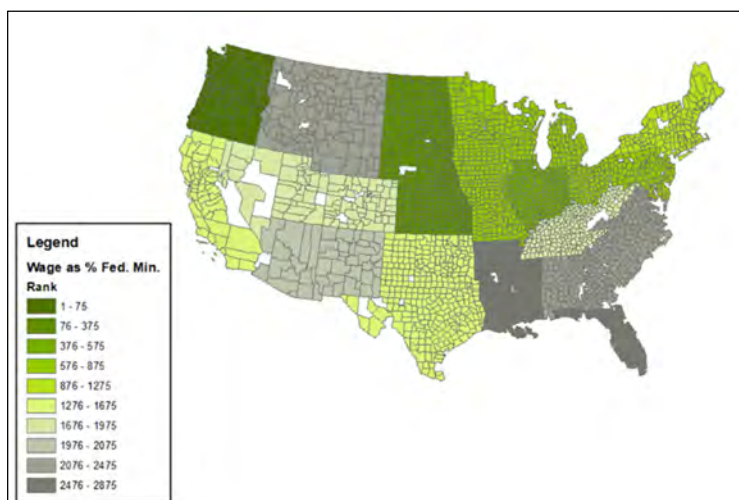
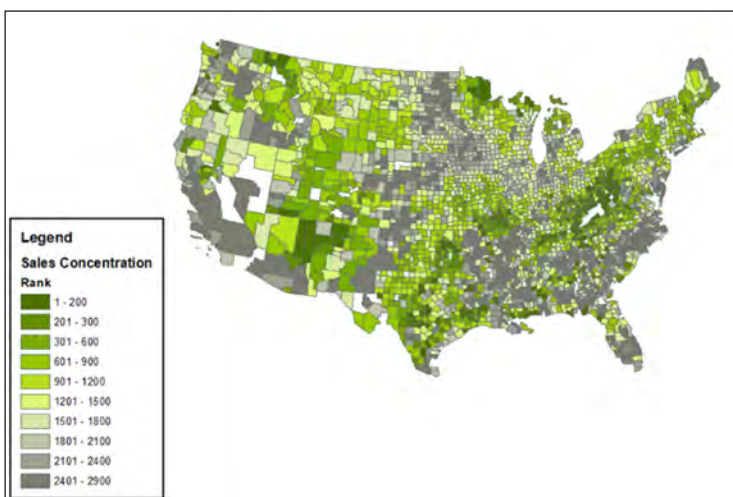


Table 14. Region Ranking: Sales Concentration, 2012

Rank	Region	Average Rank of Counties in Region
1	Eastern Uplands	884
2	Basin and Range	1,076
3	Northern Crescent	1,271
4	Prairie Gateway	1,315
5	Heartlands	1,608
6	Northern Great Plains	1,664
7	Southern Seaboard	1,793
8	Fruitful Rim	1,807
9	Mississippi Portal	1,840

Map 13. Sales Concentration Rank, 2012



for farmers with operations of all sizes (Table 14, Map 13).

Urban Influence Categories

In addition to the regional trends, UIC groups also displayed some correlation with specific variables and overall progressivity, but these relationships were generally weaker and often differed between 2007 and 2012. For example, the top-ranking UIC groups in 2007 were 4 (Noncore Metropolitan), 7 (Minor Peri-Urban), and 12 (Minor Rural), with group 1 (Major Metropolitan) ranking 6th overall. In 2012, group 1 had moved to first place, ahead of

both group 3 (Micro-Metropolitan) and group 4 (Noncore Metropolitan) (Tables 15 and 16, Map 14).

Furthermore, while it may appear that higher ranked counties cluster around urban areas, a quantitative analysis shows this is not the case. We created a binary variable for each county in the data set where 1=UIC code of 1, 2, 3, or 4 (dominantly urban) and 0=UIC code 5, 6, 7, 8, 9, 10, 11, or 12. We then calculated a Pearson correlation between the overall PAI ranking and the new binary variable. The correlation coefficient was -0.14 , indicating that a correlation is not present.

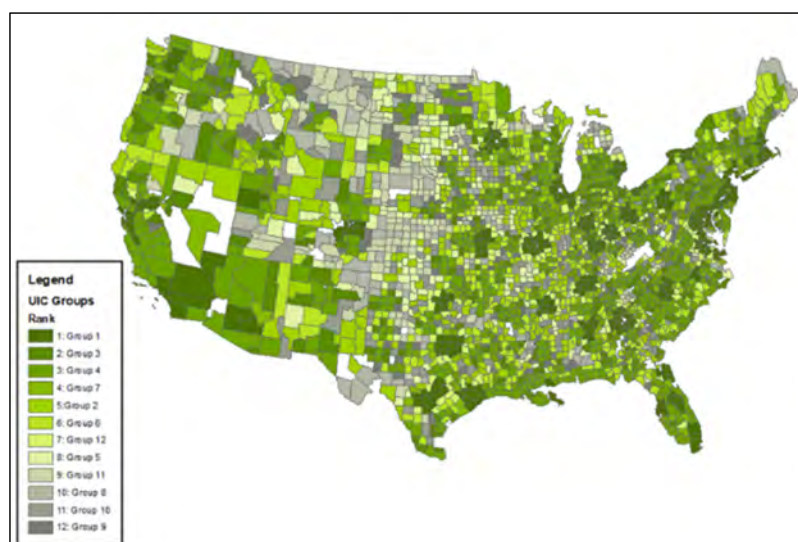
Table 15. UIC Group Ranking, 2007

Rank	UIC Group	UIC Description	Average Rank of Counties in UIC Group
1	4	Noncore adjacent to a large metro area	1,176
2	7	Noncore adjacent to a small metro and does not contain a town of at least 2,500 residents	1,236
3	12	Noncore not adjacent to a metro/micro area and does not contain a town of at least 2,500 residents	1,316
4	3	Micropolitan adjacent to a large metro area	1,321
5	11	Noncore not adjacent to a metro/micro area and contains a town of 2,500 or more residents	1,346
6	1	Large-in a metro area with at least 1 million residents or more	1,388
7	10	Noncore adjacent to micro area and does not contain a town of at least 2,500 residents	1,434
8	9	Noncore adjacent to micro area and contains a town of 2,500-19,999 residents	1,440
9	6	Noncore adjacent to a small metro with town of at least 2,500 residents	1,448
10	5	Micropolitan adjacent to a small metro area	1,561
11	2	Small-in a metro area with fewer than 1 million residents	1,573
12	8	Micropolitan not adjacent to a metro area	1,610

Table 16. UIC Group Ranking, 2012

Rank	UIC Group	UIC Description	Average Rank of Counties in UIC Group
1	1	Large-in a metro area with at least 1 million residents or more	1,164
2	3	Micropolitan adjacent to a large metro area	1,199
3	4	Noncore adjacent to a large metro area	1,246
4	7	Noncore adjacent to a small metro and does not contain a town of at least 2,500 residents	1,398
5	2	Small-in a metro area with fewer than 1 million residents	1,447
6	6	Noncore adjacent to a small metro with town of at least 2,500 residents	1,510
7	12	Noncore not adjacent to a metro/micro area and does not contain a town of at least 2,500 residents	1,516
8	5	Micropolitan adjacent to a small metro area	1,524
9	11	Noncore not adjacent to a metro/micro area and contains a town of 2,500 or more residents	1,582
10	8	Micropolitan not adjacent to a metro area	1,634
11	10	Noncore adjacent to micro area and does not contain a town of at least 2,500 residents	1,636
12	9	Noncore adjacent to micro area and contains a town of 2,500-19,999 residents	1,696

Map 14. UIC Group Rank, 2012



This inconsistency may stem from the fact that, while UIC groups share demographic trends related to population and urbanization, counties in the same group may perform very differently in environmental, social, and economic variables that depend largely on regional trends in agricultural systems. For example, the Corn Belt region stretching across much of the Heartland and Northern Great Plains regions tends to be dominated by large industrial-scale farms. Such farms are not conducive to the practices of organic agriculture or engagement in services like CSAs, which rely upon more diversified crop production. Attitudes toward progressive practices such as organic agriculture

may also correlate more strongly with a certain region due to the different cultural and political trends associated with the country's coastal and central regions.

However, while some variables did not show much correlation between UIC group and average rankings, in a few cases one or more UIC groups had higher average rankings within a variable than did other groups. For example, UIC group 1 (Major Metropolitan) out-ranked other UIC groups in the Female Principal Operator category, with an average of 805. This average was far better the average rankings of the remaining groups (Table 17). The

next-best group in the category was UIC group 2 (Minor Metropolitan), with an average ranking of 1331. The rankings of the remaining groups continued into the 1,700s. This large gap between UIC group 1 and the rest of the groups may present an interesting topic for further research concerning the impacts of urban areas on economic opportunities for a large county located in a metro area with greater than 1 million residents.

UIC group 1 (Major Metropolitan) also performed well in the Organic Sales category, with an average ranking of 1,032 (Table 18). This was just behind UIC group 3 (Micro-Metropolitan),

Table 17. UIC Group Ranking: Female Principal Operator, 2012

Rank	UIC Group	UIC Description	Average Rank of Counties in UIC Group
1	1	Large—in a metro area with at least 1 million residents or more	805
2	2	Small—in a metro area with fewer than 1 million residents	1,331
3	3	Micropolitan adjacent to a large metro area	1,449
4	4	Noncore adjacent to a large metro area	1,527
5	5	Micropolitan adjacent to a small metro area	1,573
6	11	Noncore not adjacent to a metro/micro area and contains a town of 2,500 or more residents	1,594
7	6	Noncore adjacent to a small metro with town of at least 2,500 residents	1,639
8	8	Micropolitan not adjacent to a metro area	1,639
9	12	Noncore not adjacent to a metro/micro area and does not contain a town of at least 2,500 residents	1,653
10	10	Noncore adjacent to micro area and does not contain a town of at least 2,500 residents	1,669
11	7	Noncore adjacent to a small metro and does not contain a town of at least 2,500 residents	1,720
12	9	Noncore adjacent to micro area and contains a town of 2,500–19,999 residents	1,775

Table 18. UIC Group Ranking: Organic Sales, 2012

Rank	UIC Group	UIC Description	Average Rank of Counties in UIC Group
1	3	Micropolitan adjacent to a large metro area	1,017
2	1	Large—in a metro area with at least 1 million residents or more	1,032
3	2	Small—in a metro area with fewer than 1 million residents	1,077
4	5	Micropolitan adjacent to a small metro area	1,150
5	7	Noncore adjacent to a small metro and does not contain a town of at least 2,500 residents	1,199
6	6	Noncore adjacent to a small metro with town of at least 2,500 residents	1,208
7	11	Noncore not adjacent to a metro/micro area and contains a town of 2,500 or more residents	1,208
8	4	Noncore adjacent to a large metro area	1,213
9	8	Micropolitan not adjacent to a metro area	1,223
10	12	Noncore not adjacent to a metro/micro area and does not contain a town of at least 2,500 residents	1,249
11	9	Noncore adjacent to micro area and contains a town of 2,500–19,999 residents	1,296
12	10	Noncore adjacent to micro area and does not contain a town of at least 2,500 residents	1,365

with an average ranking of 1,017; group 2 (Minor Metropolitan) was close in ranking to group 1, with an average of 1,077. The prevalence of organic sales in these three UIC groups may once again be related to the proximity of counties in these groups to large metropolitan areas, which (as mentioned above) may affect economic conditions and

opportunities due to higher population densities and wages.

In particular, the higher incomes associated with urban areas may result in larger populations of consumers willing to pay the price premium associated with organic products (Bonti-Ankomah & Yiridoe, 2006; D'costa & Overman, 2014). Additionally, some studies have shown the populations of large cities to be younger on average than rural areas (Thomas, Serwicka, & Swinney, 2015), and many authors suggest that younger consumers are increasingly interested in purchasing organic products due to their concern for environmental and health issues (Buzby & Skees, 1994; Hay, 1989). In combination with higher average education levels, the demographics of large cities may also play a significant role in the prevalence of organic farming near urban areas (Hay, 1989; Thomas, Serwicka, & Swinney, 2015). These relationships deserve further investigation and may provide an interesting topic for future research on the drivers of consumer responses to progressive agricultural practices.

In contrast to the organic sales variable, the highest-ranking groups in Direct Sales per 10,000 Residents tended to be from non-urban UIC groups. Within this variable, UIC groups 12 (Minor Rural), 7 (Minor Peri-Urban), and 10 (Minor Non-core) exhibited the most favorable average rankings of 821, 920, and 937, respectively (Table 19).

Interestingly, the percentage of farms reporting direct sales was higher in the more urban UIC groups 1 through 5, with group 1 (Major Metropolitan) averaging just over 10% of farms reporting direct sales.

This counters the trend seen in UIC groups 6–12, which all averaged less than 6% of farms reporting direct sales. The contrast between high rates of direct sales per 10,000 residents and actual percents of farms with direct sales reflects once again the influences of urban areas on the variables included in the PAI. The higher per-capita rates of direct

sales in the less urbanized counties of UIC groups 7 (Minor Peri-Urban), 10 (Minor Noncore), and 12 (Minor Rural) illustrate how lower population densities in rural areas can result in greater rates of direct-to-consumer sales; conversely, high population densities in urban areas result in lower per-capita direct sales despite a greater percentage of farms selling products directly to consumers. These trends offer interesting insights into the possibility for population structure and urbanization to affect characteristics associated with progressive agriculture and should be investigated in future studies.

Temporal Patterns

Another useful element of the PAI is its inclusion of data from both the 2007 and 2012 Census of Agriculture. This allows for direct comparisons between the two years, facilitating the quantification of changes in the variables included within the PAI. Based on changes in the overall rankings, it is apparent that many of the counties displaying the most significant progress in their agricultural systems are located in the southern and coastal areas of the country. Based on the average percent change in the overall rankings of their counties, the Southern Seaboard, Mississippi Portal, and Eastern Uplands regions displayed the greatest improvements in overall ranking between 2007 and 2012.

Also useful in measuring change is the percent of a region's counties that displayed an improvement in overall rankings; this does not consider the magnitude of change in rankings but rather the general trend of improvement or decline in ranking. The Southern Seaboard and Mississippi Portal again performed well under this measure of improvement, with 68% and 62% of the counties from these regions, respectively, showing improvement from 2007 to 2012. Interestingly, a similar percentage (62%) of Northern Crescent counties showed an improvement in overall rank, despite the apparent lower magnitude of these improvements according to percent change in rankings. Future studies should continue monitoring the development of progressive agriculture in both the

Table 19. UIC Group Ranking: Direct Sales, 2012

Rank	UIC Group	UIC Description	Average Rank of Counties in UIC Group
1	12	Noncore not adjacent to a metro/micro area and does not contain a town of at least 2,500 residents	821
2	7	Noncore adjacent to a small metro and does not contain a town of at least 2,500 residents	920
3	10	Noncore adjacent to micro area and does not contain a town of at least 2,500 residents	937
4	4	Noncore adjacent to a large metro area	1,124
5	11	Noncore not adjacent to a metro/micro area and contains a town of 2,500 or more residents	1,147
6	6	Noncore adjacent to a small metro with town of at least 2,500 residents	1,234
7	9	Noncore adjacent to micro area and contains a town of 2,500–19,999 residents	1,308
8	3	Micropolitan adjacent to a large metro area	1,451
9	5	Micropolitan adjacent to a small metro area	1,488
10	8	Micropolitan not adjacent to a metro area	1,554
11	2	Small—in a metro area with fewer than 1 million residents	1,760
12	1	Large—in a metro area with at least 1 million residents or more	1,960

regions where it is already well established and the areas in which it is still less prevalent. A comparison of these changes could help determine what level of programming or funding is most successful at spurring progress in agricultural operations.

A problematic trend is evident in the category of average farmworker wages as a percentage of the federal minimum wage, which decreased for all regions in the U.S. This trend may be due to the gradual increase in federal minimum wage that has taken place since the Fair Minimum Wage Act of 2007 (U.S. Department of Labor, Wage and Hour Division, 2017). As the minimum wage has risen, the average wage of farmworkers has not risen at a comparable pace, thus reducing the average wage as a percentage of the minimum wage. The topic of farmworker wages is one that should continue to be watched closely as wage rates are a key element of healthy local economies and more just food systems.

In contrast, the percent of farms with sales direct to consumers has shown growth on both the East and the West coast, with the Basin and Range, Fruitful Rim, and Northern Crescent regions leading in terms of the number of counties exhibiting an increase in direct sales per 10,000 residents. Seventy percent of counties in the Basin and Range region showed increases in this variable. Sixty

percent and 56% of counties in the Fruitful Rim and Northern Crescent regions, respectively, reported increases in direct sales. This could be viewed as a very positive trend and one that is crucial to the development of local social capital. As direct links grow between farmers and consumers, local food systems will be strengthened, which may lead to both economic growth and positive environmental impacts. Furthermore, Dimitri and Lohr (2007) demonstrated that direct sales constitute a large proportion of the organic market. This suggests that growth in the former may contribute to the development of organic agriculture and thus further support the transition to more progressive food systems.

Interestingly, over 70% of the total counties included in the PAI exhibited a decline in the number of farms from 2007 to 2012; however, only about half of those included in the overall top ranking 100 counties displayed a decrease in total farms (Map 15).

A decline in the number of farms could indicate either consolidation, with a few larger farms replacing many smaller ones; or, it could simply indicate a decline in farms with no consolidation and thus simply point to declining participation in agriculture. In either case, the fact that high-ranking counties do not show as much of a decline in total farms would suggest that involvement in

agriculture has a positive impact on overall agricultural progressivity. The areas with the largest decreases in total farms per county were the Mississippi Portal, Eastern Upland, and Southern Seaboard regions. Eighty-eight percent of counties in the Mississippi Portal, 84% of those in the Eastern Upland, and 77% of those in the Southern Seaboard reported a decrease in number of farms from 2007 to 2012.

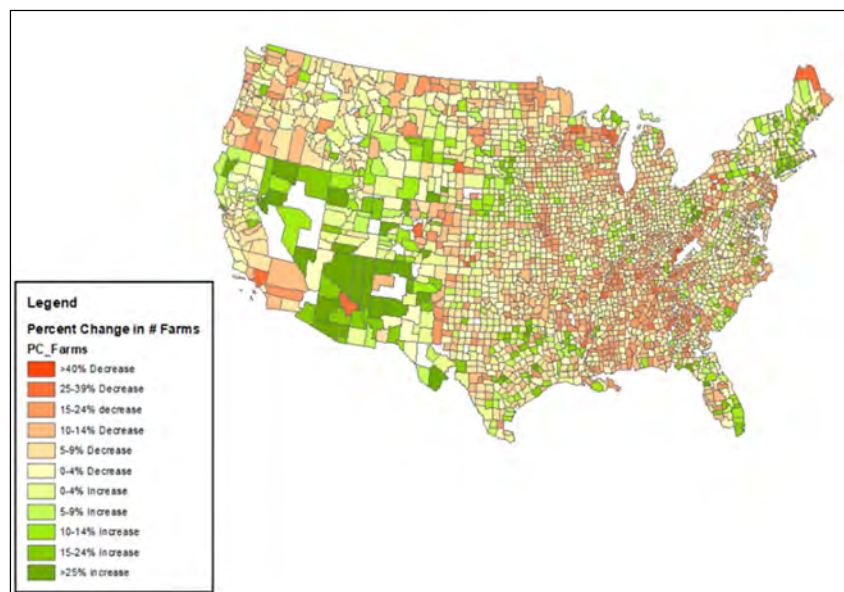
Another surprising finding is the overall decline in operations reporting organic sales within the U.S. as a whole; in 2007, over 18,000 farms reported organic sales; in 2012, this number fell to just over 14,000. Some counties did show increases in Organic Sales, but such cases appear somewhat rare as only about a quarter (26.6%) of counties included in this index reported growth in the variable. Some regions exhibited even lower percentages of counties with increases in organic sales. On the opposite end of the spectrum, over 65% of counties in the Basin and Range region showed a decrease in farms reporting organic sales. These trends merit further investigation, as they appear to contradict the observed increase in consumer interest in organic products and the actual increase in organic farms between 2007 and 2012 (Forsell & Lankoski, 2017). Interestingly, a large portion of the counties that exhibited growth in organic sales also exhibited growth in the direct sales category.

As discussed above, this may reflect the importance of direct marketing practices in generating sales of organic products. It is also possible that there is a correlation between the willingness of consumers to buy from local sources and their increasing interest in organic products—both of which are actions that may appeal to consumers interested in environmental sustainability (Dimitri & Lohr, 2007; USDA NASS, 2015).

Conclusions

This paper examines only a few of the many trends and patterns that can be identified

Map 15: Percent Change in Total Farms per County, 2007–2012



from the PAI. As new data is collected, the perspective provided by the PAI will continue to change and be updated. The system is by no means perfect and we encourage discussion concerning opportunities for its improvement. We recognize the limitations of metrics in which all variables are weighted equally. This may not accurately reflect the importance of the many aspects of progressivity perceived by farmers, workers, and communities on the ground. However, the challenge of agreeing upon a weighting system may be even more complex than the development of the indicators themselves. Just as the definition of progressivity will vary in the eyes of the many stakeholders engaged in the pursuit of a better agri-food system, opinions will also diverge concerning the relative weight that should be given to each environmental, social, and economic element of progressive agriculture (Bell & Morse, 2008; De Olde et al., 2016; Gasparatos, El-Haram, & Horner, 2009; Korhonen, 2004; Ravetz, 1999).

The difficulty of engaging with diverse views and values should not prevent efforts to do so, as a weighted metric system could help move indicators toward a more inclusive, flexible, and holistic paradigm for measuring the progress of the nation's agriculture (Cloquell-Ballester,

Cloquell-Ballester, Monterde-Diaz, & Santamarina-Siurana, 2006; de Olde et al., 2016; Elsaesser et al., 2015). The same applies in the case of other shortcomings, including a lack of data availability, an over-emphasis on economic goals, and variables that are contradictory or difficult-to-measure. Better cooperation and integration between private and public-sector initiatives, as well as greater engagement with communities and workers, will also be necessary if indicators are to fulfill their potential as tools for informing the transition to progressive agriculture. We hope these issues and others that will surely arise may be dealt with through collaborative and inclusive efforts that consider economic, social, and environmental challenges. Our PAI is intended to act as a step toward this important goal. Its ability to distill and combine indicators of progressivity across geographies and time suggests it may have value in improving the understanding of trends associated with social, economic, and environmental progress. Ultimately the balanced perspective we believe our index begins to approach will allow the creation of indicator systems that will support decision-making to advance progressive agriculture.



References

- Allen, P. (2004). *Together at the table: Sustainability and sustenance in the American agrifood system*. University Park: The Pennsylvania State University Press.
- Allen, P., Van Dusen, D., Lundy, J., & Gliessman, S. (1991). Integrating social, environmental, and economic issues in sustainable agriculture. *American Journal of Alternative Agriculture*, 6(1), 34–39.
<https://doi.org/10.1017/S0889189300003787>
- Ascani, A., Crescenzi, M., & Iammarino, S. (2012). *Regional economic development: A review* (Working paper WP1/03). Sharing Knowledge Assets: Interregionally Cohesive Neighborhoods.
- Bell, S., & Morse, S. (2008). *Sustainability indicators: Measuring the immeasurable?* London: Earthscan.
- Binder, C. R., & Feola, G. (2012). Normative, systemic and procedural aspects: A review of Indicator-Based sustainability assessments in agriculture. In A. A. Marta-Costa & E. L. D. G. da Silva (Eds.), *Methods and Procedures for Building Sustainable Farming Systems* (pp. 33–46). Dordrecht: Springer Netherlands.
- Binder, C. R., Feola, G., & Steinberger, J. K. (2010). Considering the normative, systemic and procedural dimensions in indicator-based sustainability assessments in agriculture. *Environmental Impact Assessment Review*, 30(2), 71–81.
<https://doi.org/10.1016/j.eiar.2009.06.002>
- Blowers, A., Boersema, J., & Martin, A. (2012). Is sustainable development sustainable? *Journal of Integrative Environmental Sciences*, 9(1), 1–8. <https://doi.org/10.1080/1943815X.2012.666045>
- Bockstaller, C., Feschet, P., & Angevin, F. (2015). Issues in evaluating sustainability of farming systems with indicators. *OCL Oilseeds and Fats, Crops and Lipids*, 22(1). <https://doi.org/10.1051/ocl/2014052>

- Bockstaller, C., Guichard, L., Keichinger, O., Girardin, P., Galan, M. B., & Gaillard, G. (2009). Comparison of methods to assess the sustainability of agricultural systems: A review. *Agronomy for Sustainable Development*, 29(1), 223–235. <https://doi.org/10.1051/agro:2008058>
- Bonti-Ankomah, S., & Yiridoe, E. (2006). *Organic and conventional food: A literature review of the economics of consumer perceptions and preferences*. Truro, Nova Scotia: Organic Agriculture Centre of Canada.
- Buzby, J., & Skees, J. (1994). Consumers want reduced exposure to pesticides on food. *Food Review*, 17(2), 19–22. Retrieved from <https://ageconsearch.umn.edu/record/266146/files/FoodReview-147.pdf>
- Carter, V. G., & Dale, T. (1974). *Topsoil and civilization*. Norman: University of Oklahoma Press.
- Christen, O., & O'Halloranetholtz, Z. (2002). *Indicators for a sustainable development in agriculture*. Bonn, Germany: Institute for Agriculture and Environment and the European Initiative for Sustainable Development in Agriculture. Retrieved from <http://sustainable-agriculture.org/wp-content/uploads/2012/08/ilu-eisa.pdf>
- Cloquell-Ballester, V.-A., Cloquell-Ballester, V.-A., Monterde-Diaz, R., & Santamarina-Siurana, M.-C. (2006). Indicators validation for the improvement of environmental and social impact quantitative assessment. *Environmental Impact Assessment Review*, 26(1), 79–105. <https://doi.org/10.1016/j.eiar.2005.06.002>
- Crosset, K., Culliton, T., Wiley, P., & Goodspeed, T. (2004). *Population trends along the coastal United States: 1980-2008*. National Oceanic Atmosphere Association's National Ocean Service. Retrieved from https://aamboceanservice.blob.core.windows.net/oceanservice-prod/programs/mb/pdfs/coastal_pop_trends_complete.pdf
- D'costa, S., & Overman, H. G. (2014). The urban wage growth premium: Sorting or learning? *Regional Science and Urban Economics*, 48, 168–179. <https://doi.org/10.1016/j.regsciurbeco.2014.06.006>
- de Ridder, W., J. Turnpenny, M. Nilsson, & A. von Raggamby. (2007). A framework for tool selection and use in integrated assessment for sustainable development. *Journal of Environmental Assessment Policy and Management*, 9(4), 423–441. <https://doi.org/10.1142/S1464333207002883>
- de Olde, E. M., Moller, H., Marchand, F., McDowell, R. W., Macleod, C. J., Sautier, ... Manhire, J. (2016). When experts disagree: The need to rethink indicator selection for assessing sustainability of agriculture. *Environment, Development and Sustainability*, 19(4), 1327–1342. <https://doi.org/10.1007/s10668-016-9803-x>
- Dimitri, C., & Lohr, L. (2007). The US consumer perspective on organic foods. In M. Canavari & K. D. Olson (Eds.), *Organic Food* (pp. 157–167). New York: Springer. https://doi.org/10.1007/978-0-387-39582-1_11
- Elsaesser, M., Jilg, T., Herrmann, K., Boonen, J., Debruyne, L., Laidlaw, A. S., & Aarts, F. (2015). Quantifying sustainability of dairy farms with the DAIRYMAN sustainability index. *Grassland Science Europe*, 20, 367–376.
- Field to Market: The Alliance for Sustainable Agriculture. (2016). *Environmental and socioeconomic indicators for measuring outcomes of on-farm agricultural production in the United States* (3rd ed.). Washington, D.C.: Author. Retrieved from https://www.wheatworld.org/wp-content/uploads/2017/11/Field-to-Market_2016-National-Indicators-Report-Pages-002.pdf
- Forssell, S., & Lankoski, L. (2016). Navigating the tensions and agreements in alternative food and sustainability: A convention theoretical perspective on alternative food retail. *Agriculture and Human Values*, 34(3), 513–527. <https://doi.org/10.1007/s10460-016-9741-0>
- Gasparatos, A., El-Haram, M., & Horner, M. (2008). A critical review of reductionist approaches for assessing the progress towards sustainability. *Environmental Impact Assessment Review*, 28(4–5), 286–311. <https://doi.org/10.1016/j.eiar.2007.09.002>
- Gasparatos, A., El-Haram, M., & Horner, M. (2009). The argument against a reductionist approach for measuring sustainable development performance and the need for methodological pluralism. *Accounting Forum*, 33(3), 245–256. <https://doi.org/10.1016/j.accfor.2008.07.006>
- Gasso, V., Oudshoorn, F. W., de Olde, E., & Sørensen, C. A. G. (2015). Generic sustainability assessment themes and the role of context: The case of Danish maize for German biogas. *Ecological Indicators*, 49, 143–153. <https://doi.org/10.1016/j.ecolind.2014.10.008>
- Gliessman, S. R. (2015). *Agroecology: The ecology of sustainable food systems* (3rd ed.). Boca Raton, Florida: CRC Press.

- Gray, M. (2013). *Labor and the locavore: The making of a comprehensive food ethic*. Berkeley, CA: University of California Press.
- Green, J. J., Worstell, J., & Canarios, C. (2017). The Local Agrifood System Sustainability/Resilience Index (SRI): Constructing a data tool applied to counties in the southern United States. *Community Development*, 48(5), 697–710. <https://doi.org/10.1080/15575330.2017.1370001>
- Guthman, J. (2004). *Agrarian dreams: The paradox of organic farming in California*. Berkeley: University of California Press.
- Hansen, J. (1996). Is agricultural sustainability a useful concept? *Agricultural Systems*, 50(2), 117–143. [https://doi.org/10.1016/0308-521X\(95\)00011-S](https://doi.org/10.1016/0308-521X(95)00011-S)
- Hanson, J., Dismukes, R., Chambers, W., Greene, C., & Kremen, A. (2004). Risk and risk management in organic agriculture: Views of organic farmers. *Renewable Agriculture and Food Systems*, 19(4), 218–227. <https://doi.org/10.1079/raf200482>
- Hatanaka, M., & Konefal, J. (2017). Legitimation and de-legitimation in non-state governance: LEO-4000 and Sustainable Agriculture in the United States (V. Higgins, Ed.). In M. Viele, H. Bjørkhaug, & M. Truninger (Eds.), *Research in Rural Sociology and Development: Transforming the Rural* (Vol. 24, pp. 135–153). Bingley: Emerald Publishing Limited.
- Hay, J. (1989). The consumers perspective on organic foods. *Canadian Institute of Food Science and Technology Journal*, 22(2), 95–99. [https://doi.org/10.1016/s0315-5463\(89\)70322-9](https://doi.org/10.1016/s0315-5463(89)70322-9)
- Kamali, F. P., Borges, J. A., Meuwissen, M. P., Boer, I. J., & Lansink, A. G. (2017). Sustainability assessment of agricultural systems: The validity of expert opinion and robustness of a multi-criteria analysis. *Agricultural Systems*, 157, 118–128. <https://doi.org/10.1016/j.agsy.2017.07.013>
- Kiley-Worthington, M. (1980). Problems of modern agriculture. *Food Policy*, 5(3), 208–215. [https://doi.org/10.1016/0306-9192\(80\)90129-3](https://doi.org/10.1016/0306-9192(80)90129-3)
- Konefal, J., Hatanaka, M., & Constance, D. H. (2014). Patchworks of sustainable agriculture standards and metrics in the United States. In D. H. Constance, M.-C. Renard, & M. G. Rivera-Ferre (Eds.), *Alternative Agrifood Movements: Patterns of Convergence and Divergence* (Vol. 21, pp. 257–280). Bingley, UK: Emerald Group Publishing Limited. <https://doi.org/10.1108/s1057-192220140000021011>
- Korhonen, J. (2004). Industrial ecology in the strategic sustainable development model: Strategic applications of industrial ecology. *Journal of Cleaner Production*, 12(8–10), 809–823. [https://doi.org/10.1016/s0959-6526\(04\)00098-8](https://doi.org/10.1016/s0959-6526(04)00098-8)
- Lyson, T. A., & Welsh, R. (1993). The production function, crop diversity, and the debate between conventional and sustainable agriculture. *Rural Sociology*, 58(3), 424–439. <https://doi.org/10.1111/j.1549-0831.1993.tb00503.x>
- Marchand, F., Debruyne, L., Triste, L., Gerrard, C., Padel, S., & Lauwers, L. (2014). Key characteristics for tool choice in indicator-based sustainability assessment at farm level. *Ecology and Society*, 19(3), 46. <https://doi.org/10.5751/ES-06876-190346>
- McRae, T., Smith, C., & Gregorich, L. (2000). *Environmental sustainability of Canadian agriculture: Report of the Agri-Environmental Indicator Project: A summary*. Ottawa: Agriculture and Agri-Food Canada. Retrieved from <http://www5.agr.gc.ca/resources/prod/doc/policy/environment/pdfs/aei/summary.pdf>
- Minkoff-Zern, L. (2017). The case for taking account of labor in sustainable food systems in the United States. *Renewable Agriculture and Food Systems*, 32(6), 576–578. <https://doi.org/10.1017/s1742170517000060>
- National Research Council [NRC]. (1999). *Our common journey: A transition toward sustainability*. Washington, D.C.: National Academy Press. <https://doi.org/10.17226/9690>
- Nelson, V., & Tallontire, A. (2014). Battlefields of ideas: Changing narratives and power dynamics in private standards in global agricultural value chains. *Agriculture and Human Values*, 31(3), 481–497. <https://doi.org/10.1007/s10460-014-9512-8>
- Pimentel, D., Hepperly, P., Hanson, J., Douds, D., & Seidel, R. (2005). Environmental, energetic, and economic comparisons of organic and conventional farming systems. *BioScience*, 55(7), 573–582. [https://doi.org/10.1641/0006-3568\(2005\)055\[0573:eeaeeco\]2.0.co;2](https://doi.org/10.1641/0006-3568(2005)055[0573:eeaeeco]2.0.co;2)
- Pischke, F., & Cashmore, M. (2006). Decision-oriented environmental assessment: An empirical study of its theory and methods. *Environmental Impact Assessment Review*, 26(7), 643–662. <https://doi.org/10.1016/j.eiar.2006.06.004>

- Pretty, J. (2008). Agricultural sustainability: Concepts, principals and evidence. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 363(1491), 447–465. <https://doi.org/10.1098/rstb.2007.2163>
- Rankin, B. H., & Falk, W. W. (2010). Race, region, and earnings: Blacks and Whites in the South. *Rural Sociology*, 56(2), 224–237. <https://doi.org/10.1111/j.1549-0831.1991.tb00433.x>
- Ravetz, J. (1999). Citizen participation for integrated assessment: New pathways in complex systems. *International Journal of Environment and Pollution*, 11(3), 331–350. <https://doi.org/10.1504/IJEP.1999.002265>
- Rigby, D., & Caceres, D. (1997). *The sustainability of agricultural systems*. Manchester, UK: Institute for Development Policy and Management, University of Manchester. Retrieved from <http://ageconsearch.umn.edu/record/30574/files/rr970010.pdf>
- Rossing, W., Zander, P., Josien, E., Groot, J., Meyer, B., & Knierim, A. (2007). Integrative modelling approaches for analysis of impact of multifunctional agriculture: A review for France, Germany and The Netherlands. *Agriculture, Ecosystems & Environment*, 120(1), 41–57. <https://doi.org/10.1016/j.agee.2006.05.031>
- Sadok, W., Angevin, F., Bergez, J.-E., Bockstaller, C., Colomb, B...Doré, T. (2009). MASC, a qualitative multi-attribute decision model for ex ante assessment of the sustainability of cropping systems. *Agronomy for Sustainable Development*, 29(3), 447–461. <https://doi.org/10.1051/agro/2009006>
- Thompson Klein, J., Grossenbacher-Mansuy, W., Haberli, R., Bill, A., Scholz, R. W., & Welti, M. (Eds.). (2000). *Transdisciplinarity: joint problem solving among science, technology and society*. Zurich: Haffmans.
- Tilman, D. (1999). Global environmental impacts of agricultural expansion: The need for sustainable and efficient practices. *Proceedings of the National Academy of Sciences*, 96(11), 5995–6000. <https://doi.org/10.1073/pnas.96.11.5995>
- United Nations Conference on Environment and Development [UNCED]. (1992). *Agenda 21, Rio Declaration on Environment and Development, Statement of Forest Principles: The final text of agreements negotiated by Governments at the United Nations Conference on Environment and Development*. New York: Author. Retrieved from <https://catalog.hathitrust.org/Record/007191249>
- U.S. Department of Labor, Wage and Hour Division. (2017). *History of changes to the minimum wage law*. Retrieved from <https://www.dol.gov/whd/minwage/coverage.htm>
- USDA Economic Research Service [ERS]. (2017, July 3). *Price spreads from farm to consumer*. Retrieved August 1, 2017, from <https://www.ers.usda.gov/data-products/price-spreads-from-farm-to-consumer>
- USDA National Agricultural Statistics Service [NASS]. (2007). 2007 *Census of Agriculture: Full report*. Retrieved July 27, 2017, from https://www.agcensus.usda.gov/Publications/2007/#full_report
- USDA National Agricultural Statistics Service [NASS]. (2012). 2012 *Census of Agriculture: Full report*. Retrieved July 27, 2017, from https://www.agcensus.usda.gov/Publications/2012/#full_report
- USDA National Agriculture Statistics Service [NASS]. (2015, September 17). *New data shows organic farmers continue to expand markets and increase sales*. Retrieved from <http://sustainableagriculture.net/blog/2014-org-production-survey/>
- Vorley, B. (2001). *The chains of agriculture: Sustainability and the restructuring of agri-food markets*. London: International Institute for Environment and Development. <http://pubs.iied.org/pdfs/11009IIED.pdf>
- Walker, R. (2004). *Conquest of bread: 150 years of agribusiness in California*. New York: The New Press.
- Weber, M. (1977). *From Max Weber: Essays in sociology* (H. H. Gerth & C. W. Mills, Trans.). London: Routledge & Kegan Paul
- Woods, T., Ernst, D., & Tropp, E. (2017). *Community supported agriculture—New models for changing markets*. U.S. Department of Agriculture, Agricultural Marketing Service. Retrieved from <https://www.ams.usda.gov/publications/content/community-supported-agriculture-new-models-changing-markets>
- 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>
- Worster, D. (1979). *The Dust Bowl: The Southern Plains in the 1930s*. New York: Oxford University Press.

Cultivating successful student farms through site selection and design

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Abstract

The number of college and university student farms is growing rapidly in the United States. New, and even established, student farms have the opportunity and challenge to define both their strategy and physical design, which are critical to the farm's success. In this exploratory study of student farms across the U.S., I examine the spatial and physical design relationships that tend to be hallmarks of thriving university student farms. I employ grounded theory and content analysis to analyze 27 semistructured interviews with student farm personnel and direct field observations from 19 student farm sites at 12 public universities. The findings of this study suggest important considerations for site selection based on accessibility, appearance, and visibility. Onsite design recommendations for layout, spaces, and features are presented for six domains of the farm site. These findings illuminate how resilient student farm sites

rely not only on appropriate biophysical conditions and production efficiencies, but also on physical spaces that stimulate social interaction and align with the broader campus context. These insights are most applicable to new or expanding student farms undergoing the master planning process.

Keywords

Campus Planning, Community Building, Student Farms, Education, Farm Vision, Landscape Design, Resiliency, Site Design, Site Selection

Introduction and Literature Review

Student farms have rapidly grown at colleges and universities across the United States, and for good reason: they are meaningful and significant places where students, staff, faculty, and community members gather to engage in and learn about sustainable food systems (Leis, Whittington, Bennett, & Kleinhenz, 2011; Parr & Trexler, 2011; Sayre &

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Clark, 2011). More specifically, student farms benefit universities and local communities by supporting food systems education and research (Biernbaum, Ngouajio, & Thorp, 2006; LaCharite, 2016; Markhart, 2006; Parr & Horn, 2006), experiential learning opportunities (Carlson, 2008; Parr & Trexler, 2011), broader community health and outreach, and valuable green infrastructure on campus (Biernbaum et al., 2006; Carlson, 2008; Hyslop, 2015; Leis et al., 2011; Markhart, 2006; Parr & Horn, 2006; Parr & Trexler, 2011).

Planning for and building a successful university student farm is a challenging and laborious undertaking involving multiple stakeholders and long-term planning. Growing a student farm involves strategizing about mission and goals, property development, curriculum integration, staffing and student involvement, production systems, marketing, and outreach programs. It also requires significant commitments to funding and staffing (Ratasky et al., 2015), support from administrators and academic departments (Leis et al., 2011), and ongoing coordination with campus planners and facilities management. These unique dimensions of student farms situated in campus environments create similarly unique conditions for site selection and physical design that should be considered in the farm's development.

There is a small but growing domain of scholarship on university student farm planning. This research has primarily focused on farm administration, production systems, educational programming, and student experiences (Biernbaum, 2006; LaCharite, 2016; Parr & Horn, 2006; Parr & Trexler, 2011). These studies highlight the importance of student farms for providing experiential learning spaces beyond the classroom, particularly as agriculture educators strive to engage students from a variety of disciplines who are less likely to possess practical farming skills. Several case studies have examined the historical development and operations of well-regarded student farm programs in the United States (Ashling, Tchida, Markhart, & Porter, 2007; Biernbaum et al., 2006; Clark, 2014; Parr & Horn, 2006; Sayre & Clark, 2011), emphasizing the value of administrative and curricular systems accompanying farm site development.

Scholars have recently begun to directly

investigate success factors for university student farms. Leis and colleagues (2011) discovered that the two most difficult challenges of operating student farms were working with limited budgets and gaining support from administration. Ratasky and colleagues (2015) expanded this area of inquiry, undertaking a detailed examination of student farm success factors that also included some spatial or physical factors. For example, a key insight from this study was that student farm success depends on the stability of a permanent farm site, or "land tenure." This is because, without secure land holdings, farms are unlikely to invest in building and soil improvements if the location is competing with long-range building plans and other development pressures (Ratasky et al., 2015). This study also found that a clear farm vision and long-term plan is important for managing a successful farm (Ratasky et al., 2015). Long-term plans, or master plans, help develop a farm's mission and goals, which should also inform site selection and design (Milburn & Vail, 2010). Also recently, Hyslop (2015) valuably compiled student farm maps and imagery as part of a guidebook of 10 student farms in the U.S., with the aim of providing comparative overviews of farm histories, site information, and associated university courses; but, this study did not examine the value of spatial characteristics in particular. While this growing area of study has generated vital insights into successful student farms and related educational programs, there remains limited scholarship on the physical planning and onsite design features of student farms.

Beyond the literature specifically focused on university student farms, some landscape architecture scholarship on the history, planning, and design of food spaces is informative for the present study. For example, studies of community gardens (e.g., Lawson, 2005; Milburn & Vail, 2010) and farmers markets (e.g., Francis & Griffith, 2011) find that social spaces foster human engagement that builds interaction and community. Furthermore, Milburn and Vail (2010) outline pragmatic strategies for community garden planning, site selection, site layout, and site elements. Their study provides insights on the importance of access to biophysical elements (e.g., sun exposure, water, soil), equipment circulation, and storage. Philips'

(2013) studies of urban agriculture and edible landscapes highlight planning for city-scale food systems as well as developing a site-scale project using an integrated systems approach; but, her studies only include one university farm case. Finally, the City of Vancouver's Urban Agriculture Garden Guide (Gocova, n.d.) provides substantial site layout and design details and drawings, but does not incorporate the student experience or university campus planning setting. Still, limited research attention has been given to the physical design of edible landscapes within the college or university context.

To address these gaps in the literature, the present study examines how the physical and spatial design aspects of university student farms contribute to farm success. The goal of this inquiry is to explore how the organization, qualities, and relationships among the farm's physical features—location, visibility, size, layout, structures, and furnishings—affect the site's functionality and user

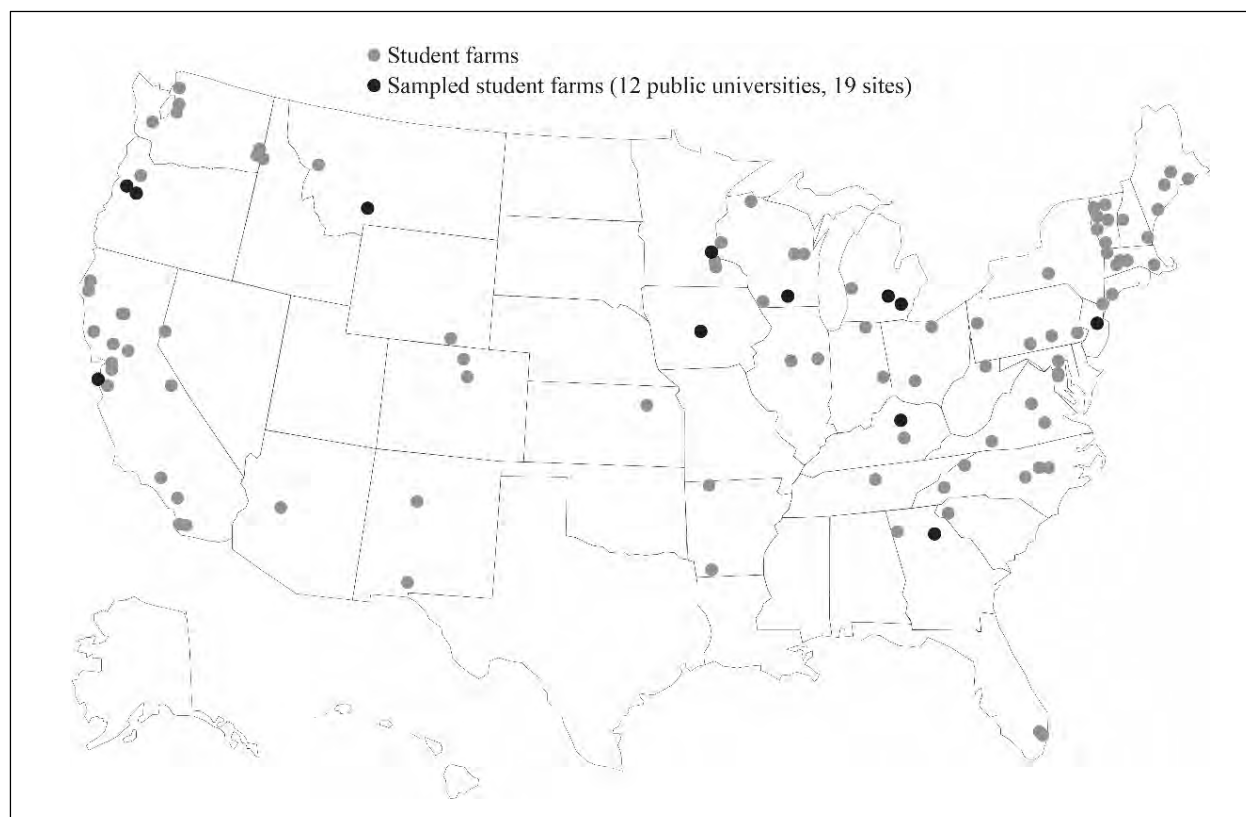
experience. This study contributes to the literature on student farms in three ways. First, it articulates practical physical design strategies for creating a university student farm, based on an analysis of exemplary student farms around the United States. This is valuable because it broadens the type of information for building a successful student farm. Second, the study articulates how campus location and the use of surrounding land impact the physical design and management of student farms. Third, it highlights how the design of student farm spaces benefits user engagement and community-building. These contributions are beneficial to new or expanding student farms that are developing a farm vision and site plan.

Methods

Study Sites

To build an understanding of successful site selection and design of university student farms, I

Figure 1. College and University Student Farm Sample Geographic Distribution



Sources: Sayre & Clark, 2011; Sustainable Agriculture Education Association, 2016.

visited 19 exemplary student farms sites at 12 public universities around the U.S. (see Figure 1). I chose student farms to sample based on varied geographic distribution and land use context, recommendations from student farm leaders, highlighted cases in Sayre and Clark (2011), and student farm lists from the Sustainable Agricultural Education Association (2016). I utilized a purposive sampling method that sufficiently led to theoretical saturation related to my research question (Deming & Swaffield, 2011).

College and university student farms are highly diverse in their missions, strategies, and design characteristics. They are differentiated from other agricultural projects by both “student initiative or possibilities for student leadership at the farm” and “a degree of attention and concern paid to questions of environmental stewardship and sustainability” (Sayre & Clark, 2011, p. 6). Table 1 categorizes the student farms I studied according to predominant features related to land planning and site design. The farms ranged in size

Table 1. Student Farm Sample Characteristics

University	Student Farm Project	Farm Size ^a (ac)	Land Use Context ^a	Campus Location	Distance to Campus Center (mi) ^a	Farm Stage ^b
Iowa State University	Student Organic Farm	2	Agricultural	Off-campus	9.5	Sustained
	Campus Garden run by Student Organic Farm	<0.5	Campus	On campus	<0.25	Developing
Michigan State University	Student Organic Farm	15	Agricultural	Off campus	5	Sustained
	Liberty Hyde Bailey Urban Farm	<0.5	Campus	On campus	0.25	Established
Montana State University	Towne’s Harvest Garden	3	Agricultural	Off-campus	1.5	Sustained
Oregon State University	Organic Growers Club Farm	1.5	Agricultural	Off-campus	3	Sustained
	Oak Creek Center for Urban Horticulture farm site	6.5	Mixed use	Campus edge	1	Sustained
Rutgers University	Student Farm, Rutgers Gardens	<0.5	Park	Off campus	3.5	Developing
University of California, Santa Cruz	Student Farm, Center for Agroecology & Sustainable Food Systems	27	Agricultural	Off-campus	1.25	Sustained
	Alan Chadwick Garden	2	Campus	On campus	0.25	Sustained
University of Georgia	UGarden	6.5	Agricultural	Off-campus	4	Established
University of Kentucky	Student Organic Farm	18	Agricultural	Off-campus	5.25	Sustained
University of Michigan	Student Farm, Matthaei Botanical Gardens	1	Park	Off-campus	6	Established
	Project Grow Garden	<0.5	Mixed use	Campus edge	0.5	Sustained
University of Minnesota	Cornercopia, Student Organic Farm	5.5	Agriculture	Campus edge	0.5	Sustained
University of Oregon	The Urban Farm	1.5	Mixed Use, Park	Campus edge	0.5	Sustained
	Neighborhood Garden Site	0.5	Mixed Use	Off-campus	0.5	Developing
University of Wisconsin, Madison	F.H. King Student Farm	1.75	Park	Off-campus	2.5	Sustained
	Pyle Center Rooftop Garden	<0.5	Campus	On campus	0	Developing

^a Measured using Google Earth Pro and AutoCAD software; rounded to nearest quarter acre (0.1 ha) or quarter mile (0.4 km).

^b Farm stage was defined as: developing, 0–4 years old; established, 5–9 years; sustained, 10+ years.

from 1,400 ft² (130 m²) to over 25 acres (10.1 ha). I made field observations to categorize primary land uses surrounding the farm site as either campus, agriculture, park or public green spaces, and mixed-use, which may include a combination of residential, commercial, campus, and other uses. The campus setting of the farms ranged from being adjacent to central campus buildings or residence halls, which I defined as “on” campus, to being located within larger agricultural research properties or park-like settings (such as arboreturns or botanical gardens), which I defined as “off” campus. There were also four projects located within transitions between campus buildings and mixed-use or neighborhood land uses, which I defined as a “campus edge” setting. The farms in the study also varied from being located less than 0.25 miles (0.40 km) to nearly 10 miles (16 km) from the center of campus or a student union building. Finally, I characterized the farm stage, or age, to better understand interviewee data and farm site histories, but data collection and analysis did not significantly differentiate among farm stages.

Data Collection

I collected two primary types of data for analysis: semistructured interviews and direct observations. Because my research questions were exploratory and there is little existing design research within the university student farm context, inductive field research was an ideal fit (Creswell, 2014). The qualitative interview format coupled with onsite observations allowed for more dynamic and spatially-genuine sources of data for elaborating findings (Deming & Swaffield, 2011). I recorded 27 semistructured interviews with farm leaders and participants at the student farms in question. The role of the interviewees were farm managers (41%), faculty (22%), or other students or volunteers closely involved with the farm (37%). I interviewed a farm manager at all but one university. Forty-one percent of the interviews represented production-focused student farms, 26% represented demonstration-focused student farms, and 33% represented both production- and demonstration-focused farm sites. I conducted the interviews either at the student farm while walking or sitting

in the shade, or in faculty offices, and I recorded them for transcription. On average, interviews were 37 minutes each, for a total of 993 minutes of recorded content. I began by asking initial questions about the interviewees’ roles and responsibilities and the farm type. I then asked specific questions that explored farm functionality and important spatial features for operations, favorite and most memorable places, least favorite places and unsuccessful features or projects, ideas for improving the farm space or site elements they had changed to increase farm functionality, and farm interests. When needed, I asked interviewees follow-up questions to expand on content related to the research questions.

I also collected data through direct observation at each student farm while farm personnel went about their work. My observations and field notes were conducted as a nonparticipant observer, since I was an outsider and non-expert at the student farms. Onsite activities at each university lasted at least one day, totaling approximately 71 hours of formal observation. Activities included a formal farm tour, informal conversations with farm workers, photographic documentation, and sketches. These observations contributed to a more comprehensive understanding of the farm processes and spatial experience. Further mapping and geospatial data were also collected using Google Earth Pro and AutoCAD software.

Analysis

I used a grounded theory approach to data analysis in which I iteratively moved between the collected data and emerging insights on design characteristics of successful farms (Glaser & Strauss, 1967). The analysis process occurred over a period of four months. I first free-coded, line by line, each interview transcript using NVivo 11 software for themes that seemed recurrent, central, or meaningful and were directly related to my research question (Boyatzis, 1998). Further re-coding was conducted by exploring patterns in the coded data across interviews to create higher-order categories of emergent themes. From the direct observation data, I analyzed site diagrams of the existing farm spaces for site organization of circulation and spaces. I also explored onsite

photographs in tandem to evolving patterns in the interview data to understand materials, aesthetic quality of, or uses of space. I went through multiple iterations of this analytic process until I reached theoretical saturation with the data (Glaser & Strauss, 1967).

Findings and Discussion

Data analysis revealed two domains of physical design—site selection and onsite features—that emerged as crucial for the successful design of university student farms. First, I found three key considerations to be related to successful site selection: accessibility, appearance, and visibility. Second, I found six key elements, characterized as farm domains, to be related to the successful design of onsite spaces and features: the hub, gathering areas, experimental areas, compost areas, attractions, and reflective areas. Together, these patterns provide a conceptual framework for how the physical design and management of student farms can facilitate food production as well as educational and social functions to ensure longevity within the campus landscape. In the following sections, I describe and elaborate on each of these patterns.

Site Selection Considerations

The following three patterns illustrate physical considerations for the successful selection of sites for university student farms. Note that this study did not focus on the biophysical needs—sun exposure, water, soil quality, topography, land area, etc.—that are also essential to comprehensive site analysis.

Accessibility

The first site selection pattern that emerged in the data was how the site's campus location impacted accessibility to needed resources. Accessibility considerations for site selection tended to manifest in two realms, each with their own trade-offs: people-related or facilities-related. Accessibility for people to travel to the farm from campus was the most prominent theme among these. Human accessibility matters for farms because most student farms

rely on students and volunteers to operate the farm, even when a full-time manager is on staff. The farm's physical relationship to campus is therefore extremely valuable. Having safe and efficient transportation was especially challenging for farms further from central campus and for those relying on students who are less likely to own automobiles (e.g., freshmen and sophomores). One farm director described this challenge, stating, "By the time you put a student in a van or a car and you drive 'em out there, the focus gets lost. Some students don't show up. It's really hard for them to go back and maintain [the farm]" (F8).¹ One student leader went so far as to say, "I also wish that this was on campus so people would actually walk past it. I think the engagement level would be higher because I mean physical access to this place is really hard for individuals because there's not a bus route here" (F5).

Conversely, on-campus farms benefited greatly from easy and efficient access. Easy access helped to foster engagement and more effectively demonstrated connections between food and social systems on campus, which are important aspects of many student farm missions. A director of an urban student farm adjacent to a residence hall discussed this accessibility benefit, saying that, "They go out and hang out and there's just this great therapy in being able to go right outside your dorm and engage with it" (F4).

Accessibility to facilities and materials is also important for student farms. While off-campus student farms tend to have greater acreage, and therefore more resources, on-campus student farm sites tended to lack access to the same breadth of resources, such as greenhouses, storage, soil, compost, or loading areas preferred for daily farm work. This creates obstacles for tasks like truck access for compost delivery or food packaging and distribution. One student manager noted that, "having to rely on other structures or other areas for what we need is a time sink and a little frustrating when we don't have what we need or don't have the space to get what we need" (F4). Another farm director noted that, "We're going to get our own greenhouse

¹ Participant quotes are cited by their corresponding student farm (F) in chronological order of site visits (#).

that we can have space and do stuff in and not have to shuffle around and negotiate and share” (F8).

Appearance

The second site selection pattern that emerged in the data was that the farm site’s appearance should align with its campus landscape context. Traditional campus landscapes are characterized by turf areas, deciduous trees, and ornamental planting beds. Similarly, conventional agricultural landscapes strive to be tidy and organized. Set within either of these contexts, production practices at student farms were often perceived as messy, weedy, and unkempt. Like Nassauer’s (1995) seminal landscape architecture research on using “cues to care” to frame messy native landscapes in the context of manicured settings, student farms applied maintenance cues, elements of beauty, and organization to frame the farm sites in order to build acceptance.

The appearance pattern and resultant aesthetic expectations manifested simultaneously as a nuisance and necessity. Meeting appearance expectations was a nuisance when they curtailed work on food production or when extra maintenance was not anticipated. For example, one farm director noted, “the problem with the ones that have to look a certain way is you gotta have serious student commitment to make it happen. It can’t be just like piecemealed together” (F9). In some cases where these nuisances were a threat to farm operations, farm sites selected locations with more aesthetic flexibility. The advantage of doing so was the ability to experiment with farm spaces and production methods without the pressures of matching with surrounding appearance norms. One faculty director expressed,

I think there’s an attitude by some of the campus planners who think that the campus farms are a little messy and they’re a little unwilling to give up some of the decision-making to students, whereas we’ve [university botanical gardens] been very open to allowing students to shape the spaces themselves and trying to accommodate their needs. (F5)

Similarly, one student farm moved from a location along a major arterial street because “if we have a field that gets really, really weedy it’s not like everyone driving by is going to see it [the weeds]” (farm manager, F1).

At the same time, participants consistently recognized the importance of the farm’s appearance and saw aesthetics as a necessity to show commitment and appeal for visitors and decision-makers (Sayre & Clark, 2011, p. 328). For example, one faculty director shared, “Aesthetics is, in my mind, a competency when you think about sustainability. I think if you don’t understand what a beautiful world looks like, how can you sustain it?” (F4). Appearance was important for gaining buy-in from campus grounds and facilities management as well. One farm manager noted, “If we’re making it pretty, they [campus planners] don’t care” (F10). Appearance was also important for attracting visitors, especially in settings where farms were not a typical land use. A student manager said, “Just trying to get someone in there, you know, who has never done it before; You have to appeal to people’s aesthetic, wants, and needs to be able to do that” (F4). Another student manager at a project located in central campus shared,

Anything to do with aesthetics you really have to think about because it’s so apparent to many people that usually don’t see these types of things, gardens and such in the city. So, you really have to have these appearances. It can’t just be overrun or unkempt. You have to really focus on that. (F3)

Interestingly, in the case of a new satellite site associated with the University of Oregon Urban Farm, the student farm itself became the “cue to care” in the context of repurposing a university-owned vacant lot. The conversion of the lot to a student farm took an underutilized, “unframed” space and created a neighborhood asset. The student farm acted as a landscape buffer where, as the farm manager noted, “the university planning department is really concerned about encroaching on the neighborhoods surrounding the university” (F10).

Visibility

The third site selection pattern that emerged in the data was that the farm site's location impacted its visibility (i.e., how well it can be seen, or its prominence in the landscape). Visibility is important for navigating to and within the site, attracting people to explore the site, and facilitating the farm's demonstration goals. For some farm sites, high visibility was a benefit. For example, visibility of on-campus farms helped garner the interest of student workers and enticed people passing by to engage with the site. One student leader noted,

They're [the residence hall and student farm site] here together purposefully, and that plays together to create this community of students and other students that get drawn to it. I just love seeing that dynamic relationship happen, because people are drawn to the area and then they're drawn to these other places because of that. So, I think that's my favorite part and that's the part I think is the most important, the holistic picture of it. (F4)

Farms located within campus tended to value visibility for giving the site an open feeling. One farm manager said, "Over at the Columbia site, you'll notice that it's a lot more spread out, and there's grassy spaces that seem to be serving no purpose, but the purpose is that it's more inviting to people" (F10). Also, farms intentionally chose sites with high visibility as an opportunity for specialized research in food systems for highly-developed settings. One faculty director shared how visibility was a benefit, saying,

Urban food production's not at all like rural food production. It's very, very different and it comes with all the challenges of being in a densely populated area. So for us, the challenges are very real-world challenges that we're trying to get answered for our stakeholders across the country, literally. And the one that we're facing right now is the bees.

Oh my God, we had no idea how many people are fearful of bees. This is a farm, but it's not a farm. It's a campus. It's a res hall. It's the same challenges that people who live in high-density housing in urban settings are gonna face. (F4)

On the other hand, visibility also created difficulties that tended to manifest in one of two ways. First, locations with greater visibility require heightened security measures that restrict the farm's outreach and demonstration programming. For example, student farms with rooftop growing spaces were required to keep them locked unless a student leader was present, precluding access for students and visitors to informally walk through the site, read signage, and explore what was going on during other rooftop events. This defeated the purpose of choosing a highly visible site for the project. Second, visibility led to unexpected visitors, which some farms narrated as a deterrent. One farm staff member expressed, "I do want people to go in it, but I guess I want them there when we can engage them in an organized way, rather than a random way" (F5). Another faculty advisor shared a concern about research projects, saying, "I like the idea of signage as long as it doesn't attract people to walk through it. I mean, they shouldn't be clomping through" (F1).

Design Considerations for Six Site Domains

The following six site domains²—the hub, gathering areas, attractions, student projects, compost, and reflective places—emerged as key areas and features of successful university student farms. The following description of each domain provides onsite design considerations for circulation, spaces, structures, and detailed features, as well as their benefit for farm functionality.

Domain 1: The Hub

Fundamental to a successful student farm design is a command center or central hub (see Figure 2). Whether composed of a simple outdoor area, its own building, or several buildings, hubs function as

² There were also patterns in the data related to animal systems, but because only two of the farms I visited had animals, the data was not sufficient to analyze.

Figure 2. Farm Hubs: Large (Left), Medium (Center), Small (Right)



the primary node where the work day starts and ends. The farm hub acts as a site landmark and orienting feature that one manager described as “key because it’s a central location where you can tell people to meet you” (F8). Especially given varied staff schedules and high numbers of volunteers, the farm hub was consistently identified as a key feature for farm efficiency and productivity because it centralized farm management spaces. The physical design of well-established farm hubs serves four key functions: site organization, circulation, administration, and storage. While the hub serves as a point of informal gathering and socializing due to its primary functions, formal gathering areas are distinct features of successful student farms that may or may not be incorporated within the hub area (see Domain 2).

Site Organization

First, farm hubs help organize the layout of other farm spaces. This impact on site organization tended to manifest in two ways: spatial hierarchy and legibility. Here, *spatial hierarchy* means that spaces requiring more attention were placed closest to the farm hub—e.g., demonstration projects, production areas that use hand-scale methods, or areas vital to farm operations like season extension structures or multi-purpose buildings. Conversely, spaces that required less attention or used larger equipment, including areas for mechanized production, or were everchanging, like student projects, were placed further from the farm hub. This site organization was important because it saved time moving materials and tools between the farm hub and work areas. To design a site that accommodates this spatial hierarchy, the farm hub does not

necessarily have to be in the geographic center of the farm site, but rather should be located with easy access to and from key areas. However, for a site that is long and linear, the spatial hierarchy will be more efficient if the farm hub is placed near the center of the site.

Legibility means that farms clearly delineated spaces, paths, and boundaries in a manner such that “as people come there, they can understand how things are laid out” (F5). Successful legibility was structured to be visible from the farm hub. This aspect of site organization helped facilitate work for students and volunteers, many of whom had no farming or gardening experience. For example, one respondent described having uniform and repeated spaces as “universally understandable for students” and “more accessible to volunteers” (student, F8). Another farm manager noted that, “pathways are really big, because I think people get nervous about where to step and where not to step if they don’t know anything about it” (F9). Clearly delineated growing spaces, or zones, also helped to disperse large groups—in one case over 100 students during class time—in a more systematic manner. This also helped “people know what they can do in their free time” (F10) by having a designated work zone for which they can take ownership during the semester. Finally, clearly delineating site boundaries with permanent fencing was a successful strategy to not only protect farm resources in areas with deer but also to stake claim to farm spaces and provide farm legitimacy.

Farm Flow

Second, farm hubs aid physical circulation, or “farm flow” as I refer to it, for sequencing food

production processes. This was achieved by ensuring easy connectivity that links growing spaces to washing stations or processing facilities, which connects to storing or packing, and finally connects to loading and distribution. A farm staff member described this farm flow design, saying,

We have an awesome packing shed next to the field that has clean water and a place for that water to go, even though it's just into the ground. Thinking about that system of when you harvest [is important]: Where do you bring the food? What do you do with it? How do you clean it? Then having a road that goes right there so we can drive the truck up and load all the boxes. (F12)

Designed farm flow was especially important for production-oriented farms that had organic certification or where food safety protocols were carefully followed. For example, a student manager said, "Our packing shed is close to the roadway where we can pull up the wagon and enter through the back of the shed. The flow of moving from the field where it's dirty to the cooler on the other side, of having it flow from dirty to clean, that's really good" (F9).

Administration

Third, farm hubs facilitate administrative activities related to the student farm. The farm hub acts as the primary location for all communication. This is important for managing the spatiotemporal challenges of having work tasks, staff, and volunteers dispersed throughout the site and work week. In addition, the integration of spaces for both farm operations and administration at the hub allows farm staff to keep working while waiting for visitors, groups, or community supported

agriculture (CSA) members to arrive at the farm. The administrative-related physical features that tended to be incorporated at successful student farms were vehicle parking, bike racks, offices or meeting rooms, scheduling and task boards, staff lockers, kitchens, bathrooms, and farm bells. Successful farms that did not incorporate each of these features at the farm hub tended to at least have access to these resources within adjacent facilities or grounds.

Storage

Forth, farm hubs provide storage space for equipment, tools, materials, and produce. At successful farms, storage spaces tend to be permanent, a combination of covered and uncovered areas, and integrated with administrative or social spaces. More covered storage, in general, was the type of structure that developing and established student farms needed most (see Figure 3).

Locating primary storage areas at the central hub is important for three key reasons: consolidation, organization, and socialization. First, having all equipment and tools in a designated, centralized area increased work efficiency by guaranteeing availability and access. For example, one student worker noted, "It's nice that the tools are around here. Everything is pretty accessible. I like that it's

Figure 3. Season Extension Structure Converted to Needed Covered Storage (Left); Systematic Organization of Tools at Farm Hub (Right)



all up here. If you ever need something . . . you know it's going to be here. There are no random toolsheds around" (F8). A faculty advisor elaborated on the challenge of dispersed storage spaces, saying, "If we don't have the space to store, then you put a little of it here and a little of it there, and students have to chase around finding it" (F1). Similarly, a student manager described the challenge with offsite equipment or tools, stating,

The more we can build up our own arsenal of tools here rather than borrowing from the botanical gardens, the better. It takes time to go down to the botanical gardens, get a wheelbarrow, come back up, realize you've forgotten to get a pitchfork and then go back down and up. (F5)

The second most important benefit of storage at the farm hub was instating processes for keeping equipment and tools well-organized and cared for (Figure 3). This was paramount to operating efficiently and maintaining high-quality equipment and tools. One director noted, "When you've got this many different users, it has to be super clear, so the motto here is like the ship captain's motto, 'a place for everything, and everything in its place'" (F9). Finally, storage facilities that were placed at farm hubs also created social value. In general, site designs will often place storage facilities on the edge of the property, proximate to roadways, or somewhere hidden because it may look messy. But, at successful student farms, storage was located right in the middle of the farm activity (i.e., at the farm

hub) and therefore valuable to structuring and promoting meaningful socialization.

Domain 2: Gathering Areas

The second domain of successful student farm design is gathering areas (Figure 4). Gathering areas can be defined as designated spaces for specific social functions, which may or may not be incorporated as part of the hub area. All but four of the student farms I visited had at least a casual gathering area under a shade tree or at scattered picnic tables. However, the most beneficial gathering areas provided hybrid spaces that could accommodate small or large groups for various social functions at the farm, such as staff meetings, classes, taking breaks, cooking and eating together, galas, and festivals. Respondents emphasized the critical importance of these intentional gathering areas for community building at the farm, as with successful community gardens (Milburn & Vail, 2010). For example, one faculty advisor said,

I almost think that sense of place and space is more important than the fields in some way, because so many students come to it for the social community. You need to create that space to foster that community. (F1)

Thriving multifunctional gathering areas tend to include the following features: cover from sun and rain, seating, flat spaces for tables or chairs, and easy access from within the farm. The gathering spaces were entirely either open-air, inside a structure, or more often, a combination of both. Larger farms tended to have two to

Figure 4. Indoor Primary Gathering Area at Farm Hub (Left); Outdoor Event-Sized Gathering Area (Middle); Outdoor Primary Gathering Area (Right)



three separate gathering areas that accommodated different sized groups, with the primary gathering area that served daily social functions being combined with the farm hub. This was important to streamline and centralize operational aspects of farm work with community, academic, and administrative facets. Interestingly, the primary gathering areas were not only found to be valuable for farm staff and students but were also found to enhance the volunteer experience. One student manager said,

You want their experience to be positive so they come back, so I think it's important to have easily identifiable gathering spaces or places where you know you can get into the shade. (F5)

Domain 3: Attractions

The third domain of successful student farm design is attractions. Attractions can be defined as unique, artistic, or beautiful features or demonstration spaces that draw people to the site. Attractions tend to be intentionally designed and constructed to serve this purpose. Drawing people to the site using attractions is important to build farm awareness and community outreach. For example, at on-campus student farms, attracting people to the site is important for gathering

student interest in sustainable food systems projects, as well as for showing farming strategies to laypeople. However, at off-campus student farms, attracting CSA members to the site is important for grower-to-consumer dialogue and engaging members in the farm experience.

Effective attractions tended to be one of three types: entryways and edges, ornamental and demonstration plantings, and farm craft (see Figure 5). Entryways that were designed as a point of emphasis differentiated the student farm from the surrounding landscape and attracted visitors. Strategies tended to include gates, archways, ornamental plantings, fencing, and signs. Similarly, site edges along visible corridors, such as arterial roads or trails that were well-maintained or intentionally planted, appealed to both passersby and the university administration. For example, campus grounds management lauded student farms that had edge spaces under production or planted with ornamentals because they looked “prettier and better” than previously being overgrown with other vegetation (F10).

Ornamental and demonstration plantings were used to attract and interest people at the farm. These plantings tended to take the form of rain gardens, entryway plantings, U-pick flowers, or pollinator gardens or pods. One farm manager said,

Figure 5. Types of Attractions: Entryways and Edges (left), Ornamental Demonstration Planting (Middle), Farm Craft (Right)



I think, in general, flowers really do add to the space. We have flowers in our U-pick field out there. Just those pops of color, I think that's a draw—to go out into the U-pick field and see the flowers. We have the flower gardens here [at the farm hub] and it's a communal space, so people are drawn to it. ... People are drawn to it for the picturesque beauty of it. (F9)

Finally, the inclusion of craft and artistry at the farm was evident in items like sculpture, repurposed planters, handmade bee boxes, and painted signs to provide interesting, unexpected artistic elements to view for staff and visitors. This farm craft was beneficial to create a unique farm character. One student manager said that, “I think a good organic farm needs a little quirk here and there just to keep it lighthearted” (F4). High-quality building methods and materials ensured longevity, especially outdoors.

Collectively, these attractions contribute to making a memorable place and forging a strong farm identity. However, when attractions were not supported by farm priorities, these spaces and features were not maintained to the same level of care and aesthetic as other farm spaces, and as a result often became overgrown or dilapidated. Similarly, signage was an element highly valued by farms for building awareness and site wayfinding (see Figure 6). However, handcrafted signs were frequently sloppy or

completely faded (Figure 6). High-quality craft and routine maintenance are essential for attractions and signage to sustain their purpose and value.

Domain 4: Student Projects

The fourth domain of successful student farm design is student projects (see Figure 7). Student projects can be defined as student research plots, experimentation spaces, and independent projects or studies. Student projects tended to either be permanent projects or spaces that evolved yearly and included projects such as food forests (or other forms of polyculture or edible perennial areas), staff personal plots, herb spirals, aquaponic systems, and architecture-related projects. Respondents emphasized that student projects are fundamental to being a student farm and promoting innovation, hands-on learning, and individual ownership. For example, one staff member said, “I really think that once they get up there and have worked a little, the students start an emotional attachment to the space, and what the process is” (F5).

Meanwhile, respondents also identified challenges with the coordination, quality, and maintenance of student projects (Figure 7). For example, a student's accountability to complete a project can be tenuous and lead to piecemeal work. In addition, student-driven work may not be required to follow professional standards, especially when exploring innovative techniques or materials. This

Figure 6. Professional Signage (Left and Center Left); Dilapidated Handmade Signage (Right and Center Right)



Figure 7. Compost Experiment Plots (Left) and Farm Hub Building Design Project (Center Left); Unmaintained Herb Spiral (Center Right) and Overgrown Polyculture Project (Right)



can lead to farm features or spaces that are underutilized or defective. One farm director noted that,

They say they'll come back and finish 'em, and then they never do. That would be one thing that I would caution people, when you start doing these projects, is that this isn't just a hypothetical kind of student project. This is actually a functioning farm. (F9)

Student turnover also complicates long-term care of or interest in student projects, which can create neglected spaces over time. For example, a new technology or farming method explored by a student may result in physical changes to the farm that become obsolete or may have been championed only by a cohort of students during a particular period. One faculty advisor described such a challenge with a food forest area, saying, "I never show it to anybody because it looks like hell because it's an example of a really interesting idea that needs a lot of attention in the early stages" (F1).

Certainly, having a clear administrative protocol to approve and advise student projects is necessary to manage effective short- and long-term changes to the farm site. Beyond administrative strategies, successful farms benefit from applying two physical strategies to balance the benefits and challenges of student projects. First, they allocate specific areas to place student projects that have

fewer appearance expectations. For example, one farm embedded staff personal plots within a food forest area, where aesthetics were already more flexible. Second, student projects may be placed in areas with lower visibility, like back edges or transitions away from key pathways and entrances. For example, one farm placed student compost research plots in a transitional space between two production zones that was lined with a hedgerow that provided a visual buffer (F12). Finally, simply keeping student projects well-maintained by using cues-to-care and signage to "frame" the project's purpose can optimize the impact of the project.

Domain 5: Compost Areas

The fifth domain of successful student farm design is compost stations or areas. Every farm site studied discussed design considerations for compost because "pretty much what you do every day uses compost. Either you're putting into it or taking out of it" (Student, F10). Student farms tend to generate more biomass than their compost areas can process. Therefore, the successful design of compost areas includes three recommendations: truck access, convenient placement, and aesthetics. First, placing compost areas to accommodate the circulation of large trucks is essential for easily removing or delivering material. Second, compost areas that are convenient to cultivation areas where biomass is produced are a benefit because "the shorter the distance that you have to take, the easier it is" (Student, F10). Finally, the aesthetics of

the compost structures and bins is important for public and campus acceptance.

Besides animals, compost spaces elicited some of the most impassioned design conflicts at the farms studied. Composting areas at farms located on-campus or the campus edge were scrutinized and considered to be an “ongoing issue” (Student, F8). Strategies employed in these cases included using clearly delineated piles, high-quality construction materials and craft, and routine care of the area to “keep it tidy” (see Figure 8). For example, several farms cautioned against using shipping pallets, a common reused material for compost bins. One faculty director noted, “As soon as we removed like 75 percent of the pallets we had no more issues” (F4). Finally, in highly-visible locations farms had to convince campus planning and administration that it wouldn’t smell, attract rodents or other pests, and that its on-farm location was essential for farm functionality.

Domain 6: Reflective Places

The sixth domain of successful student farm design is reflective places. Reflective places are intimate

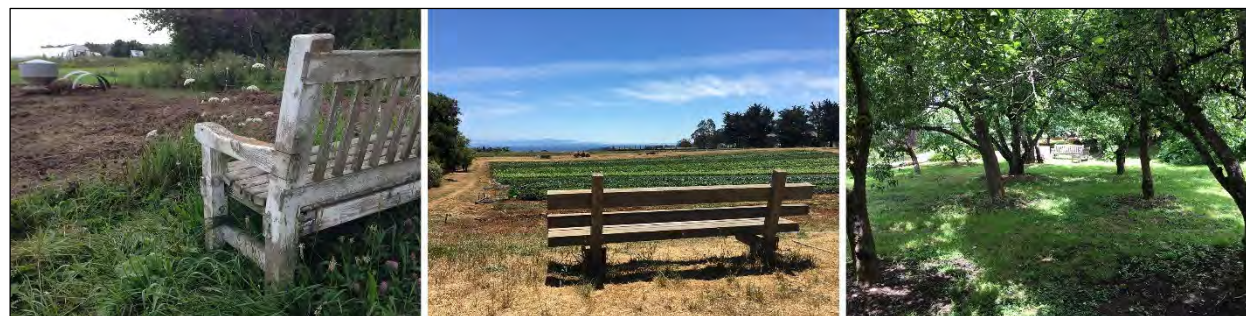
spaces or features for individuals or very small groups to have conversations, make observations, or seek solitude. These places are separate from the gathering areas that are best associated with the farm hub to accommodate larger group functions. Respondents emphasized the value of these smaller sites for respite to the physical labor involved at the farms. However, interestingly, these places were discussed most often as beneficial for stress reduction, mental restoration, and interpersonal connections. For example, one student stated, “Being out here is so nice, and it really takes you away from the stress of campus, because it does feel like you’re going somewhere else” (F8). Likewise, one farm staff member described why students are drawn to the farm, saying,

I don’t even think the free food is the main driver. . . . I think honestly a lot of them just like to come out, hang out, not stare at their cell phones for two hours, but actually talk and engage with one another and get their hands dirty. I think that’s the biggest thing. (F5)

Figure 8. Compost Areas in Different Settings: Central Campus (Left), Campus Edge (Center), and Off-Campus (Right)



Figure 9. Reflective Seating at Pig Project (Left), Farm Vista (Center), and Memorial Grove (Right)



These reflective places tended to consist of seating in the farm site designed to observe production spaces or picturesque views, or to take refuge in the shade (see Figure 9). A farm manager described one of these favorite places, sharing that, “There’s this overlook that goes down into the woods. . . . It’s a very peaceful, quiet spot, nobody goes back there. But you can look off into the woods and just reflect for a second” (F8). Another farm staff member said that, “Then [there’s] the ocean view fields [that are important.] There is a particular spot on the farm that you can see Monterey Bay and it’s just glorious and shining. I call it the money shot. I mean, it’s really impactful” (F12).

Being immersed in a dense production field was also described as a reflective experience. For example, one student said, “in the middle of the field if you’re down on your hands and knees weeding, and you can’t see anything around you and it just feels like you’re enclosed by the farm, it’s nice” (F5). Another farm staff member described the importance of these small design movements, saying,

But then also [important are] those little secret spaces that are where you feel in close, cradled by the environment, and it makes you look at the details more closely. Like inside the bamboo—there is one little place when you go inside of it, it’s like you get into another world. (F12)

The reflective places tended to be a combination of intentionally placed features as part of the site design along with an organic evolution of meaning and use for farm users. Although the character and experience of these features should be expected to change through time, the places should be formally included in farm master plans to prioritize the benefits of nearby nature and reflection that the farm provides for student health and well-being.

Conclusions

This study contributes new perspectives for developing successful college and university student farms by broadening considerations to the physical

and spatial aspects of a farm in the university setting. The considerations presented will not equate to success in and of themselves. Successful student farm site selection and design also depend on the integrated systems at play both on and off the farm, for example, staffing, funding, marketing, curricula, water, and other resource access, in addition to design considerations for the intended production systems. This study’s findings add another layer of understanding to apply upfront as student farm projects develop master plans. Although the site selection and design considerations could be comprehensively constructed all at the start of a new project, the reality is that a site’s design and its character unfold over time. Student farm scholars (Ratasky et al., 2015; Sayre & Clark, 2011) recommend that starting small and evolving over time allows for purposeful growth and sustained programming.

When undergoing site selection as part of farm planning, the findings highlight the need to expand site assessment to include spatial factors in addition to the site’s biophysical conditions, including sun exposure, soil quality and toxicity, and water. The findings outline how accessibility, appearance expectations, and visibility conditions vary across farms in different campus locations, which, in turn, affect farm productivity and user engagement. As student farm projects assess potential sites based on these three considerations, they will be challenged by tradeoffs. For example, an on-campus site may tend to favor better people-related accessibility, while an off-campus site may favor better facilities-related accessibility. Or, while maintenance for aesthetics is necessary at any site location, on-campus sites are expected to have an appearance that blends with the more ornamental, constructed surroundings. This study provides patterns of these tradeoffs that should be discussed and used to build a rationale for acquiring a site that best enables farm goals, rather than choosing a site for which it was easier to receive campus planning approval. The student farms studied that initially acquired sites that were not the best size, configuration, or location experienced enough challenges that the projects failed or moved. Advocating for the most appropriate site upfront allows the farm to sustainably invest money, time, and

Table 2. Summary of Physical Considerations for Six Domains of Student Farm Site Design

<p>1. Farm hub</p> <p><i>“Center” of site organization:</i> Create hierarchy of spaces, with those needing most attention near farm hub; create site legibility with clearly delineated areas.</p> <p><i>Starting point for farm flow:</i> Connect spaces starting from farm hub; sequence circulation from dirty to clean.</p> <p><i>Administration activities:</i> Create communication center with task board, office, meeting area, and visitor entry point.</p> <p><i>Storage:</i> incorporate Permanent, centralized structure for equipment, materials, and staff lockers.</p>	<p>2. Gathering Areas</p> <p><i>Multifunctional:</i> Design space(s) for small to large groups to serve a variety of educational and social functions, such as class, seminars, meetings, galas, lunch breakroom.</p> <p><i>Location:</i> Integrate at or nearby farm hub for community building and farm engagement.</p> <p><i>Features:</i> Include shade or cover, seating, flat space for tables and events, kitchen.</p>	<p>3. Attractions</p> <p><i>Placemaking:</i> Incorporate attractions to create strong farm identity; need to keep well maintained to remain impactful.</p> <p><i>Entryways and edges:</i> Design points of emphasis or corridors to add appeal. Strategies such as, gates, arbors, ornamental plantings, fences, signs.</p> <p><i>Ornamental or demonstration plantings:</i> Include plantings to interest visitors in farm sites and practices. Strategies such as rain gardens, green roof gardens, themed raised beds, U-pick areas, pollinator gardens.</p> <p><i>Farm craft:</i> Create artistry with farm materials, signs, sculptures, etc., to build farm character.</p>
<p>4. Student Projects</p> <p><i>Ownership:</i> Promote student learning and site ownership by strategically designing areas for student projects. Strategies include experimentation projects, research plots, food forests, aquaculture.</p> <p><i>Location:</i> Allocate less visible areas where appearance is more flexible.</p> <p><i>Aesthetics:</i> Keep well maintained with signage about project’s intent.</p>	<p>5. Compost</p> <p><i>Location:</i> Place to accommodate truck circulation and for convenient access to large production spaces</p> <p><i>Aesthetics:</i> Keep it tidy; align materials and appearance to surrounding landscape; caution on re-use of shipping pallets.</p>	<p>6. Reflective Places</p> <p><i>Small social spaces:</i> Design intimate spaces for individuals to small groups for conversation, observation, or solitude.</p> <p><i>Location:</i> Disperse throughout farm site.</p> <p><i>Features:</i> Include seating, views, sense of enclosure, shade.</p>

student resources, as well as set the stage for successful onsite design.

Table 2 summarizes the findings for the six identified domains of site design. The findings provide an overarching framework for developing site plan layouts, organization of spaces, and detailed design features to foster success. An overarching theme that emerged is the imperative that spaces not only be designed for production and teaching needs, but also for the social functions and farm identity that influence educational experiences, student learning, and community engagement. This mirrors site design recommendations for urban agriculture projects in community or other contexts (Gocova, n.d.; Milburn & Vail, 2010; Philips, 2013), but has not been thoroughly articulated in the university student farm scholarship. The well-developed farm hub, especially with gathering areas, tends to be one of the key domains

for successful farm functionality. Most importantly, centralized storage, administration, and social areas allow for the integration of the activities associated with operations, teaching, and community building. Attractions and experimentation areas are important for gaining student interest and ownership on the farm, as well as designing spaces for demonstration and outreach. Finally, reflective places benefit student discussion, health, and well-being and foster a deeper connection to the farm.

Future Directions

Because this study is an initial exploration of physical design, more research is needed to illustrate exemplary college and university student farm cases that apply these site selection and design principles. A future study could develop a student farm typology to show how the six site domains are designed at student farms in different campus

locations. Or, in contrast, further investigation of the physical characteristics on farms that have failed may uncover strategies that should be avoided. In addition, further research could explore connections between site design features and student learning outcomes and experiential impacts. For example, this study's data revealed a deep connection between student farm spaces and user experience being in nature. To this end, a future study could investigate the human health and well-being benefits of student farms for campus environments.

In closing, this study made evident the breadth of benefits that student farm physical spaces have on students beyond building disciplinary knowledge and skills. One farm manager described what happens at a student farm,

It's just like life comes out. And even if you're not trying to, it happens. And there's

a lot of conversations, a lot of in-the-field mentoring, a lot of life. Just life stuff. When I look for higher up staff, I look for people who could be a good mentor, because that's what ends up happening in the field. (F8)

The physical site design, in part, allows these experiences to emerge. This investigation summarizes considerations for how to successfully select and design college and university student farm sites to be valuable, lasting places in the campus environment.

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References

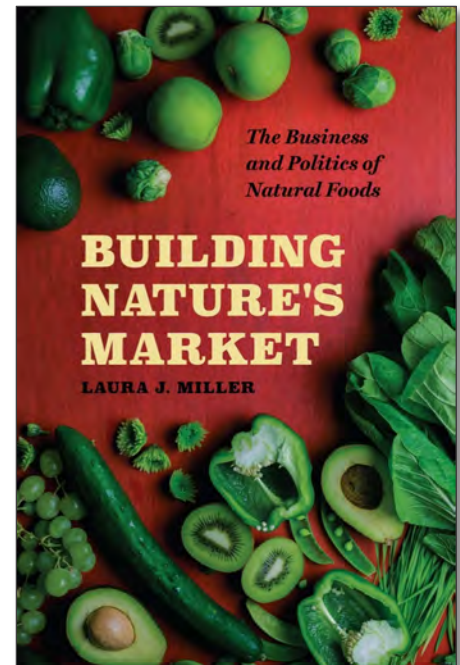
- Ashling, J., Tchida, C., Markhart, A., & Porter, P. (2007). Origin of cornercopia, the University of Minnesota student organic farm. *Journal of Hunger & Environmental Nutrition*, 1(2), 27–42. https://doi.org/10.1300/J477v01n02_03
- Biernbaum, J. A. (2006). Student and new farmer education to support the growth of organic farming. *Crop Management*, 5(1). <https://dl.sciencesocieties.org/publications/cm/index>
- Biernbaum, J. A., Ngouajio, M., & Thorp, L. (2006). Development of a year-round student organic farm and organic farming curriculum at Michigan State University. *HortTechnology*, 16(3), 432–436. Retrieved from <http://horttech.ashspublications.org/content/16/3/432.abstract?sid=b47db44d-8baf-4703-b68a-a5072e89eee8>
- Boyatzis, R. E. (1998). *Transforming Qualitative Information: Thematic analysis and code development*. Thousand Oaks, CA: Sage.
- Carlson, S. (2008, March 28). The Farmer in the Quad. *The Chronicle of Higher Education*. Retrieved from <http://www.chronicle.com/article/The-Farmer-in-the-Quad/20394>
- Clark, S. (2014). Resource-use and partial-budget analysis of a transition to reduced-input and organic practices and direct marketing: A student-farm case study. *Journal of Agriculture, Food Systems, and Community Development*, 4(2), 113–130. <https://doi.org/10.5304/jafscd.2014.042.005>
- Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches* (4th edition). Thousand Oaks: SAGE Publications, Inc.
- Deming, M. E., & Swaffield, S. (2011). *Landscape Architectural Research: Inquiry, Strategy, Design* (1 edition). Hoboken, NJ: Wiley.
- Francis, M., & Griffith, L. (2011). The meaning and design of farmers' markets as public space an issue-based case study. *Landscape Journal*, 30(2), 261–279. <https://doi.org/10.3368/lj.30.2.261>
- Glaser, B. G., & Strauss, A. L. (1967). *The Discovery of Grounded Theory: Strategies for qualitative research*. New York, NY: Aldine de Gruyter.
- Gocova, A. (n.d.). *Urban Agriculture Garden Guide: Manual for starting and designing urban agriculture projects*. Vancouver Board of Parks and Recreation and City of Vancouver. Retrieved from <https://vancouver.ca/files/cov/urban-agriculture-garden-guide.pdf>
- Hyslop, T. (2015). *Exploring Student Farms: A look at student farms at ten universities across the united states*. Rutgers University. Retrieved from <http://agriurban.rutgers.edu/Documents/Student%20Farm%20Research.pdf>

- LaCharite, K. (2016). Re-visioning agriculture in higher education: The role of campus agriculture initiatives in sustainability education. *Agriculture and Human Values*, 33(3), 521–535. <https://doi.org/10.1007/s10460-015-9619-6>
- Lawson, L. J. (2005). *City Bountiful: A Century of Community Gardening in America*. Berkeley: University of California Press.
- Leis, A., Whittington, M. S., Bennett, M., & Kleinhenz, M. (2011). Student farms at United States colleges and universities: Insights gained from a survey of the farm managers. *NACTA Journal*, 55(1), 9–15. Retrieved from <https://www.nactateachers.org/index.php/vol-55-num-1-mar-2011-sp-1003999532/502-student-farms-at-united-states-colleges-and-universities-insights-gained-from-a-survey-of-the-farm-managers>
- Markhart, A. H. (2006). Organic educational opportunities at the University of Minnesota: The role of a student-run organic farm. *HortTechnology*, 16(3), 443–445. Retrieved from <http://horttech.ashspublications.org/content/16/3/443.abstract?sid=fa89392b-19d5-472d-ad08-b3e9b7586659>
- Milburn, L.-A. S., & Vail, B. A. (2010). Sowing the seeds of success cultivating a future for community gardens. *Landscape Journal*, 29(1), 71–89. <https://doi.org/10.3368/lj.29.1.71>
- Nassauer, J. I. (1995). Messy ecosystems, orderly frames. *Landscape Journal*, 14(2), 161–170. <https://doi.org/10.3368/lj.14.2.161>
- Parr, D. M., & Horn, M. V. (2006). Development of organic and sustainable agricultural education at the University of California, Davis: A closer look at practice and theory. *HortTechnology*, 16(3), 426–431. Retrieved from <http://horttech.ashspublications.org/content/16/3/426.abstract?sid=77a36c42-28fc-4419-86b7-b58102a43ce3>
- Parr, D. M., & Trexler, C. J. (2011). Students' experiential learning and use of student farms in sustainable agriculture education. *Journal of Natural Resources and Life Sciences Education*, 40(1), 172–180. <https://doi.org/10.4195/jnrlse.2009.0047u>
- Philips, A. (2013). *Designing Urban Agriculture: A Complete Guide to the Planning, Design, Construction, Maintenance and Management of Edible Landscapes* (1st edition). Hoboken, New Jersey: Wiley.
- Ratasky, S., Schroeder-Moreno, M., Jayaratne, J., Bradley, L. K., Grossman, J., & Orr, D. (2015). Identifying Key Characteristics for Student Farm Successes through a National Delphi Study. *NACTA Journal*, 59(2), 96–103. Retrieved from <https://www.nactateachers.org/index.php/volume-59-number-2-june-2015/2293-identifying-key-characteristics-for-student-farm-successes-through-a-national-delphi-study>
- Sayre, L., & Clark, S. (Eds.). (2011). *Fields of Learning: The Student Farm Movement in North America*. Lexington: University Press of Kentucky.
- Sustainable Agriculture Education Association. (2016, October 11). Student Farms & Gardens. Retrieved August 11, 2017, from <http://www.sustainableaged.org/projects/student-farms/>

Mobilizing food: A review of *Building Nature's Market*

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Review of *Building Nature's Market: The Business and Politics of Natural Foods*, by Laura J. Miller. (2017). Published by the University of Chicago Press. Available as clothbound, paperback, and ebook; 288 pages. Publisher's website: <https://www.press.uchicago.edu/ucp/books/book/chicago/B/bo27035081.html>



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Miller's (2017) *Building Nature's Market* introduces the American natural foods movement to social movement studies, highlighting its challenge to the prevailing social order related to food, consumption, health, state authority, and individualism. This movement is concerned with more than just food; it tackles no less than society's values about progress as it is generally tied to industrialization and technical innovation. The

book's primary thesis is the argument that the natural foods movement has been propelled not only by activist altruism and perseverance, but also through the innovativeness of savvy capitalist entrepreneurs and corporations.

This argument is distinctive in social movement studies, as many scholars identify corporate cooperation as "selling out" (Chasin, 2000) or capitalist co-optation (Wrenn, 2016; Zeisler, 2016). Despite the clear contradiction created by aligning with a corporate system that was simultaneously problematized, Miller identifies businesses as movement participants. For most of its history, she writes, "... the natural foods movement has to a large degree been constituted by a natural foods industry at the same time as it has retained a cri-

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tique of the corrupting influence of commercialism on the social organization of diet and health” (p. 2). It is “not always the case,” she furthers, “that private enterprise stands in opposition to movements for social change” (p. 4).

Miller begins her analysis with a review of the aesthetic roots of the health food industry nurtured by romantics and pseudoscientists such as Sylvester Graham, the Alcotts, and John H. Kellogg. By the end of the 19th century, the movement was secularizing, notably prompting natural foods leader Kellogg to split with the Seventh Day Adventists who had nurtured his career so that he could develop what had become a business enterprise. While the Adventists reacted sourly to his eager patent-seeking, advertising, and expansion, Kellogg’s emancipation invariably led to the growth of vegetarian products and availability. Even in its early years, it was evident that cooperation with capitalism was correlated with movement success, if success is understood as changing consumption behaviors. For many movement puritans, such as the Adventists, this compromise indicated failure, not victory.

Indeed, social movement scholars understand movement success to be ambiguous and contested (Martin, 2008), particularly given their tendency to factionalize and innovate goals as the collective action progresses (Frey, Dietz, & Kalof, 1992). Although the religious roots of the natural foods movement were important for sustaining adherents in a society that was hostile and mocking of its health-centrism, most activist-producers across the field eventually dropped their religious framework to appeal to a wider consumer base. This strategy, Miller indicates, annoyed the movement’s spiritual purists and demonstrates one of its first instances of factionalism over radicalism and capitalist co-optation. A further point of schism developed from the emergent corporate strategy of framing health food as something that had to be packaged and processed, thus cutting off the public from accessing health food on its own. Natural foods thus ironically transformed into processed foods in order to increase sales and protect its market. This certainly demonstrates a negative consequence of collaborating with capitalism. Movement purity was further threatened by the desire to add salt,

sugar, and other flavorings to improve consumer appeal.

Despite the compromises, Miller suggests that this industrialization increased the accessibility of the products. Compromises may have been considerable, but the movement did seize cultural footholds in a particularly hostile environment. Because it questioned the hegemony of the medical, scientific, and state institutions, it predictably garnered considerable resistance. The bulk of countermobilization derived from the efforts of the medical establishment, which felt the most threatened by the movement’s desire to reclaim and reframe the meaning of “health.” To avoid the medical establishment’s state-supported retribution, many purveyors conceded with vague language like “dietary food.” Natural food’s foothold was further threatened by the American Medical Association’s grand effort in the production of literature, films, and outreach programs in tandem with pressure on mainstream media sources, all designed to counter the movement’s health-food claims. Because the health-food movement challenged the status quo of farming and food production, the state invested considerable effort into clamping down on said claims, specifically in regard to labeling, but also as it surfaced in books, lectures, and store displays. Miller reports that health-food leaders and purveyors were regularly fined and harassed by state agents who would confiscate literature and products deemed illegitimate. The state even coordinated spies who could obtain insider information to later use to control natural foods efforts.

Along with the First Amendment, libel laws did allow the natural foods movement to persist, but it clearly faced an uphill battle in protecting and advancing its claims-making. As a consequence, Miller argues that the movement took a tactical turn toward individualism by framing its aim as a matter of consumer freedom and self-determination in health. Doing so allowed it to broaden its political base. The movement was also bolstered in the late 1960s and 1970s by the counterculture and environmental movements, notably advantaged by Rachel Carson’s *Silent Spring* (1962), which constituted a mobilizing moment. More young people subsequently adopted natural foods as a political measure. These rapid changes resulted in an ele-

ment of culture clash as the supplement salespersons who characterized the movement in the decades prior struggled to efficiently cooperate with the looser organizational style of new participants of a countercultural persuasion.

With the affluence of the 1980s, the movement would transform again, moving away from the simplistic back-to-nature ethic of its earlier portrayal toward a higher-class bracket, aligning natural foods with being educated and wealthy. Stores became cleaner, glossier, and more aesthetically pleasing, while natural foods were rebranded as products of the wealthy through price markups, artisanal recipes, and nice packaging. Evoking the Bordieuan concept of distinction (Bourdieu, 1984) and its power to manifest cultural value and reproduce class inequality, Miller credits this stylistic change with finally pushing natural foods into the mainstream.

It was at this time that larger grocers such as Whole Foods began to dominate natural foods retail sales, while the number of distributors dwindled to a just a few, raising some concern regarding the suffocation of smaller, community-based businesses. Power in the field consolidated further with the institutionalization of certification programs and trade organizations, which increased clout in the field and to the public, but dramatically changed the face of the movement, professionalizing it and removing its activist edge. This new wave in the movement lost the small-time feel of its earlier incarnations, which had prioritized personal networks. Smaller producers that could not afford to participate were gradually squeezed out.

The movement's move to standardize brings attention to a common movement tension regarding identity and ideology. McGarry and Jasper (2015) point to an "identity dilemma" as movements must decide boundaries of inclusion and exclusion. Greater inclusion allows a movement to grow, but generally requires a significant compromise to movement ideologies and goals. It became increasingly difficult for the natural foods movement to maintain any semblance of ideological purity as it began producing on a large scale in a capitalist system that is otherwise designed to facilitate exploitative or unhealthful practices. One consequence of this growing pain was the fissure that

erupted between the supplement industry and natural foods. Many understood supplements not only to be non-foods but, more specifically, non-foods that risked defaming the movement given regular scandals about their purity and safety. Yet supplements had long been the bread and butter of the movement, allowing it to infiltrate mainstream society (given their scientific aura) and remain financially afloat.

Miller maintains a very forgiving position on capitalist growth in the movement, emphasizing that industry was always, from the very beginning, part and parcel of natural foods activism. The author briefly mentions the erosion of vegetarianism in favor of flexitarianism as an example of how movements must water down their message and abandon purity in order to grow. However, vegetarianism is not just a lifestyle movement, as the author most frequently describes it. It is also part of the social justice-oriented animal rights movement (Maurer, 2002), and thus entails different interests and goals. This is important because the author claims that all movements, and especially lifestyle movements as they are focused on consumption, will inevitably need to work heavily with capitalist enterprise. Some vegan and vegetarian scholars disagree that plant-based eaters, who challenge mainstream consumption patterns, must collaborate with capitalism to succeed (Nibert, 2017; Wrenn, 2016). Capitalism, from this perspective, is the source of speciesism, not the solution.

Furthermore, Miller's identification of business as a contributor to social change provides only a superficial engagement with the problems inherent to this approach (such as the systemic violence against people of color, women, and animals). Sociological theory on the consequences of capitalism is barely mentioned, aside from a nod to Marx's observation that capitalist elites can be toppled by technological changes in the means of production, which allows for entrepreneurs who will replace them. Such a strategy still works in congruence with a system of exploitation and high inequality, however. Miller only seems to explore natural foods as it pertains to people growing and selling food, and only briefly hints at how this turns into organized protest by referring to the rise of trade groups and certification programs. A large body of

research exists on the relationship between capitalism and food movements (Carolan, 2018; Dauvergne & Lister, 2013; Raynolds, Murray, & Wilkinson, 2007; Smith, 2017; Torres, 2006; Winders & Nibert, 2004), but very little of this discourse is mentioned in the book. Instead, the author is primarily committed to engaging general social movement theory and its failure to embrace industry as an agent of change and an oft-ignored movement participant.

Miller also highlights the role of industry in reducing governmental and medical resistance by normalizing the movement as a viable economic sector. This was made possible, she explains, by turning to capitalism over countercultural politics such that the former resistance to state and scientific authority erodes. Alternatively, this weakened resistance could indicate that the movement was successful in challenging these hegemonies in determining personal health and its anti-science frames may have resonated. It may be effective protest, in other words, not capitalist co-optation as she suggests, that propelled the movement. Miller does not engage at all with the literature of the animal rights movement, which discusses how this anti-science element emerges largely due to the systemic violence against animals that has been promulgated in the name of scientific inquiry (Jamison & Lunch, 1992; Kean, 1995). In fact, her position (that capitalism, more than contentious protest, manifests social change) also counters her

previous observations that the natural foods movement actively sought out scientific research to verify its efficacy.

Lastly, the author celebrates big industry as an abeyance mechanism given its ability to hold a movement together and sustain it through rough times. Institutionalization, it is offered, is helpful for longevity. This point is a strong one. As I can attest from my research in the animal rights movement, radical groups that resist institutionalization sprout up and die off with a very short lifespan. Larger organizations are able to weather the tide and maintain cultural authority and movement resources. Their propensity for heavy compromise and dilution of goals, however, calls into question how effective this structure is for attaining just food.

In conclusion, Miller makes a compelling argument for the need to acknowledge industry as a viable actor in the mobilization and success of social movements, especially consumption movements, but it remains to be seen how capitalism—a system that requires inequality and encourages overproduction and consumption—will ultimately prove compatible with goals of social health, equality, and justice. It is clear that capitalist pressure is a major influence on social movements, but it is not clear from Miller's analysis how capitalism is expressly a catalyst for movement progress, and not regress.

References

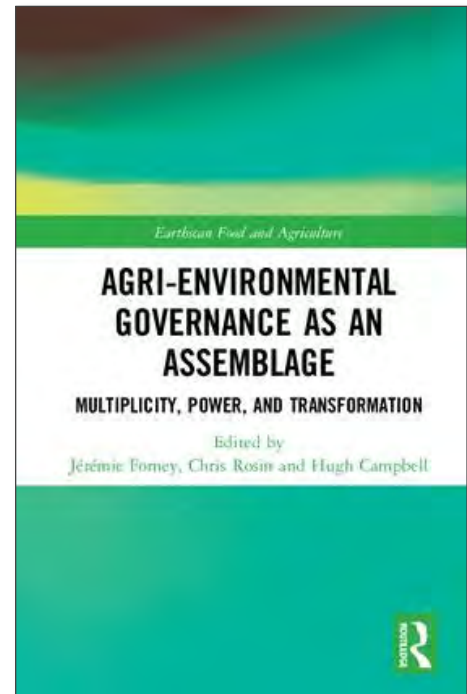
- Bourdieu, P., & Nice, R. (Trans.). (1984). *Distinction: A social critique of the judgment of taste*. New York: Routledge.
- Carolan, M. S. (2018). *The food sharing revolution: How start-ups, pop-ups, and co-ops are changing the way we eat*. Washington, D.C.: Island Press.
- Carson, R. (1962). *Silent spring*. New York: Houghton Mifflin.
- Chasin, A. (2000). *Selling out: The gay and lesbian movement goes to market*. New York: Palgrave.
- Dauvergne, P., & Lister, J. (2013). *Eco-business: A big-brand takeover of sustainability*. Cambridge, MA: MIT Press.
- Frey, R. S., Dietz, T., & Kalof, L. (1992). Characteristics of successful American protest groups: Another look at Gamson's strategy of social protest. *American Journal of Sociology*, 98(2), 368–387. <https://doi.org/10.1086/230012>
- Jamison, W. V., & Lunch, W. M. (1992). Rights of animals, perceptions of science, and political activism: Profile of American animal rights activists. *Science, Technology, & Human Values*, 17(4), 438–458. <https://doi.org/10.1177/016224399201700402>
- Kean, H. (1995). The 'smooth cool men of science': The feminist and socialist response to vivisection. *History Workshop Journal*, 40(1), 16–38. <https://doi.org/10.1093/hwj/40.1.16>
- Martin, A. W. (2008). Resources for success: Social movements, strategic resource allocation, and union organizing outcomes. *Social Problems*, 55(4), 501–524. <https://doi.org/10.1525/sp.2008.55.4.501>

- Maurer, D. (2002). *Vegetarianism: Movement or moment?* Philadelphia, PA: Temple University Press.
- McGarry, A., & Jasper, J. M. (Eds.). (2015). *The identity dilemma: Social movements and collective identity*. Philadelphia, PA: Temple University Press.
- Nibert, D. (Ed.). (2017). *Animal oppression and capitalism*. Santa Barbara, CA: Praeger.
- Raynolds, L. T., Murray, D., & Wilkinson, J. (Eds.). (2007). *Fair trade: The challenges of transforming globalization*. London: Routledge. <https://doi.org/10.4324/9780203933534>
- Smith, J. P. (2017). Markets in mothers' milk: Virtue or vice, promise or problem? In M. Cohen & Y. Otomo (Eds.), *Making milk: The past, present, and future of our primary food* (pp. 117–138). New York: Bloomsbury. <https://doi.org/10.5040/9781350029996.ch-007>
- Torres, B. (2006). *Making a killing: The political economy of animal rights*. Oakland, CA: AK Press.
- Winders, B., & Nibert, D. (2004). Consuming the surplus: Expanding “meat” consumption and animal oppression. *International Journal of Sociology and Social Policy*, 24(9), 76–96. <https://doi.org/10.1108/01443330410790786>
- Wrenn, C. (2016). *A rational approach to animal rights: Extensions in abolitionist theory*. New York: Palgrave.
- Zeisler, A. (2016). *We were feminists once: From riot grrrl to CoverGirl®, the buying and selling of a political movement*. New York: PublicAffairs.

Rethinking control: Complexity in agri-environmental governance research

Review by Matt Comi *
University of Kansas

Review of *Agri-environmental governance as an assemblage: Multiplicity, power, and transformation*, edited by Jérémie Forney, Chris Rosin, and Hugh Campbell. (2018). Published by Routledge. Available as hardcover and ebook; 236 pages. Publisher's website: <https://www.routledge.com/Agri-environmental-Governance-as-an-Assemblage-Multiplicity-Power-and/Forney-Rosin-Campbell/p/book/9781138070738>



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Discourse on governance always faces the challenge of describing, and usually simplifying, the many voices who formally and informally participate in controlling, and therefore governing, shared outcomes for community members both

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locally and globally (Callon, Lascoumes, & Barthe, 2009). Environmental and agricultural governance faces this problem redoubled, as outcomes and governing bodies cross boundaries between species, affecting humans and nonhumans, animals and otherwise (Latour, 2017; Tsing, 2015). Addressing incoherence, difference, and complexity (Law, 2004) is a general research concern among social scientists who wish to avoid subjugating otherwise marginalized participants. By looking to measurements and research methods that arise from studies outside politics and economics, actors that would be hidden or silenced by political

economic critiques and metrics may become visible. For engaged governance research, the benefits of this are clear: a more inclusive social science of governing stakeholders. This edited collection brings together diverse international scholarship in agri-food social science research to rethink the framework of agri-environmental governance. The editors frame the selection of essays as efforts to look to the mess of stakeholders, legislators, growers, eaters, food councils, lands, crops, assessments, and so forth as a governing assemblage. By doing this, researchers are able to explore meanings and social experiences that diverge (although do not entirely separate) from neoliberal (e.g., large, corporate) frameworks in ways that complicate the governing underpinnings that are continually at work (*re*)territorializing the world of agriculture, food, and environment policy and praxis.

The collection organizes contributions into three intellectual arcs representative of concerns and techniques brought to light by this approach to agri-environmental governance. The first arc, *Assembling ontologies: Multiplicities and agencies*, includes research on the constructive relations between actors and the discourse (e.g., marketing, food labelling, court arguments, crop consulting, etc.) by which foodways, environmental policy, or governance are more broadly co-produced in the social relations and expressions of humans and materials involved in the *assemblage* of governance. The second arc, *The politics of territorialisation*, looks particularly to the social spaces filled up and enrolled by these assemblings; to put it another way, this arc looks to the flexibility, breadth, and depth of control expressed by these complex governing assemblages and how these assemblage enter into conventionally political and economic spaces. The third and final arc, *Assemblage for building new AEG practices*, takes a more speculative approach, imagining some ways in which assemblage, as an ontological research approach, opens new avenues for future governing formations and collaborations and how dominant methods of governance may be met with resistance when needed.

Forney, Rosin, and Campbell's collection as a whole operates as a sort of continuation and riff on an earlier collection, *Biological Economies* (Le Heron, Campbell, Lewis, & Carolan, 2016), with many of the same authors and editors. In some ways, this book is a more active and pragmatic extension of this earlier collection. In this sense, it shares part of its goals with Roelvink, Martin, and Gibson-Graham's *Making Other Worlds Possible* (2015), which draws from a wide range of disciplines to rethink many approaches to managing and imagining environmental problems and solutions. What this collection offers, which the prior collections do not, is more sustained attention to non-economic ways of governing food production, and environmental care. Take Burch et al.'s examination of the governing responses to the 2011 TEPCO power plant meltdown in Fukushima prefecture.¹ It explores the nuances of food-safety labeling and measurement techniques for safe levels of radioactivity beyond a simplistic economic explanation: the government's monied interest was on limiting the economic loss of agricultural food production damaged by the radioactivity of food near the power plant. This economic motivation becomes the background for a more nuanced exploration of how the language of measurement and the in/visibility of radioactivity in food, alongside the trust of buyers and eaters, all act as interconnected forms of cooperation and resistance in a governing assemblage (2018, pp. 129, 131).


Similarly, O'Connel and Osmand's assemblage approach to understanding farmers' decision-making reveals that the economic bottom line is not always the motivating factor. Instead, "by viewing farmer decision-making as complex assemblages, we propose that incongruities are to be expected, and gains in water quality will come from diversifying outreach and implementation programs from the beginning to increase the number of early adopters and hasten the overall pace of adoption and diffusion of conservation practices over farmers' social networks" (2018, p. 39). In one instance, they find that Carolina

¹ In 2011, the coinciding occurrence of an earthquake and tsunami in Fukushima prefecture set off a chain reaction resulting in multiple nuclear meltdowns and the release of radioactive contaminants into the surrounding region, affecting its inhabitants and the food supply.

farmer's motivations to use water-conserving exclusion fencing techniques diverged widely from one another (2018, p. 49) and was not particularly influenced by economic concerns. The decisions of these farmers most often related to one's sense of aesthetic, neighborliness, and belief in environmental goods (2018, p. 49). Encouraging uptake using diverse methods more effectively addressed the diverse relations, positions, and intentions of the many stakeholders in this (and any) formation of agri-environmental governance.

At times, the many and varied approaches presented in *Agri-Environmental Governance as an Assemblage* can present as disconnected, broad retheorizations of local, national, and international foodways. However, taken together, the collection offers a critical and timely rethinking of the varieties, challenges, and disconnects in a world of agri-environmental governances. And, perhaps most importantly, it offers a peek into what these rethinkings can offer for intentional engagement

with distributed assemblages of governing power in contemporary agri-food regimes. The collection's intellectual gesture is a meaningful contribution to both academic theoreticians and practitioners of agri-food and environmental research. While its message to stakeholders and policy-makers is less direct, it offers a conceptual reordering that meaningfully engages with the socio-relational pragmatics of changes in governance, often revealing that looking to farm-aesthetics, moral orders, or neighborliness may be as (or more) productive than more conventional efforts to apply economic boons or political sticks to promote agri-environmental conservation techniques. In the same sense, organizers, policy-makers, and agri-food stakeholders, particularly at the grassroots, may find the conceptual reordering of governance as assemblage, instead of top-down hierarchy, a productive space in which to imagine new ways forward for more sustainable and ecologically just governance.



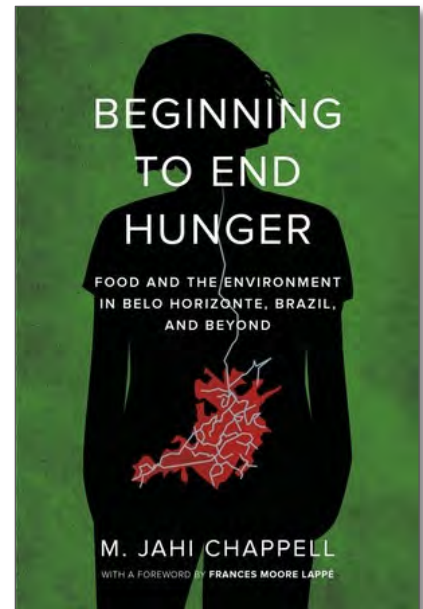
References

- Callon, M., Lascoumes, P., Barthe, Y., & Burchell, G. (Trans.). (2009). *Acting in an uncertain world: An essay on technical democracy*. Cambridge, MA: MIT Press.
- Latour, B., & Porter, C. (Trans.). (2017). *Facing Gaia: Eight lectures on the new climatic regime*. Cambridge, UK: Polity Press.
- Law, J. (2004). *After method: Mess in social science research*. London: Routledge.
- Le Heron, R., Campbell, H., Lewis, N., and Carolan, M. (Eds.). (2016). *Biological economies: Experimentation and the politics of agri-food frontiers*. New York: Routledge.
- Roelvink, G., Martin, K. S., & Gibson-Graham, J. K. (2015). *Making other worlds possible: Performing diverse economies*. Minneapolis: University of Minnesota Press.
- Tsing, A. L. (2015). *The mushroom at the end of the world: On the possibility of life in capitalist ruins*. Princeton, NJ: Princeton University Press.

Ending hunger is possible — institutional change matters

Review by Marianna Siegmund-Schultze *
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Review of *Beginning to End Hunger: Food and the Environment in Belo Horizonte, Brazil, and Beyond*, by M. Jahi Chappell. (2018). Published by the University of California Press. Available as hardcover, paperback, and ebook; 272 pages. Publisher's website: <https://www.ucpress.edu/book/9780520293090/beginning-to-end-hunger>



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Jahi Chappell continuously begs the question: “Who benefits?” He shares his thoughts about hunger and our food systems in his book *Beginning to End Hunger: Food and the Environment in Belo Horizonte, Brazil, and Beyond*. In six chapters, he outlines his analytical background and tells the story about an extraordinary effort to end hunger in the city of

Belo Horizonte and its surrounding villages.

The book is preceded by a foreword by Frances Moore Lappé, who encourages us to rethink common assumptions as part of the solution. In the introduction (chapter 1), Chappell introduces institutions and epistemology, and coins the terms *Minority World* (for instance, wealthier areas such as the U.S. and the E.U.—where relatively few people live) and *Majority World* (where the majority of the world’s population lives, in economies such as Brazil’s). He reminds us to be careful when adopting food security indicators: do not take information out of context, but account for the multifaceted and intertwined nature of the subject. Then he shares a list of eight basic propositions about global food systems (although he unfortunately does not reveal how he arrived at

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these). The major message is: there is enough food in most places at most times, and perceived scarcity and unhealthy patterns are often a question of profitability and the institutions (the rules, norms and values) that govern societal behavior.

In chapter 2, Chappell revisits relevant theories and concepts of the field: (1) productivism, decline in food availability, and neo-productivism; (2) hunger, entitlements, and food security; and (3) food justice and food sovereignty. Chappell laments that food security discourses are “often depoliticized, ahistorical, and at best agnostic regarding power inequalities” (p. 62). He advocates for us to analyze lines of rhetoric in order to understand the worldviews of their defenders. Most importantly, he directs, always ask “Why?” In this chapter, Chappell also introduces one of the frameworks he will use in the following chapters: the Five A’s of Food Security (according to Cecilia Rocha). These are availability, accessibility, adequacy, acceptability, and agency.

In chapter 3, Chappell describes the rise, most productive times, and challenges of Belo Horizonte’s Municipal Under-Secretariat of Food and Nutritional Security (with the Portuguese abbreviation of SMASAN). In a short time, it issued a large number of policies related to food security. Just to name a few: Popular restaurants (very cheap meals), ABC stores (20 to 25 consistently cheap basic items), School Meals, Consumer Education, Promotion of Community and School Orchards, and sales spaces for produce sold through “Straight from the Countryside” and Organic Fairs programs. Assessed along the Five A’s, the implemented programs contributed to secure food availability from small farmers’ local production. Accessibility was achieved, though with varying degrees of success. Acceptability and appropriateness of foods were widely met, while metrics for agency and a right-to-food agenda indicated the SMASAN approach still had some flaws. In particular, people hardly knew who was behind which program, and some people were free-riding and improved only their own circumstances.

An analysis of the food programs’ metrics follows in chapter 4. The multiple streams approach (MSA) of problems-policies-politics (following John Kingdon) was Chappell’s method

of choice. SMASAN’s establishment profited from a policy window under a determined mayor (Patrus Ananias), who, together with a renowned scientist in food policy (Maria Regina Nabuco, SMASAN’s first secretary), set up the new Under-Secretariat. Nabuco was apparently genius at leadership; she knew very well what was going on, how all the initiatives worked together, and what each member’s role was. The process slowed down when the policy window closed and less-engaged leaders followed. Nevertheless, it inspired a continuation of the programs’ spirit when Ananias later served as Federal Minister for Social Development and Fight against Hunger with the famous Zero Hunger flagship program.

Chapter 5 is partly a remake of a published paper on the two-way interrelationship of food security and biodiversity. In it, Chappell reports some (known) challenges of data collection. He again highlights that “basic human rights—including agency and substantive democracy—are keys to a world without hunger” (p. 164). Deep institutional changes and embeddedness, i.e., the interpersonal ties among societal and governmental actors, are fundamental for the fair and effective implementation of policies.

Finally, Chappell applies the MSA to the U.S. food system, which I initially found to be a surprising approach to the conclusion. However, it turned out to be a useful presentation of how to use the theory as a practitioner. Policy windows are difficult to open intentionally. That is why it is extremely relevant to contribute to the convergence of potential solutions by repeating the subject in order to increase public awareness and the odds that the issue will become a matter of broader action. People who enable such synergies are desperately needed.

Chappell writes with passion and is keen on getting his message through. The book is easy to read, although some sections are a bit lengthy and at times repetitive. It is useful that he frequently provides evidence from interviews he conducted. Sometimes it made me a bit impatient, especially when it comes to names and kinship. This could be due to his presumed embeddedness—he conducted fieldwork repeatedly over several years, calls several cited persons his friends, and acknowledges

a large number of people. Though it makes the reading laborious at times, this approach also displays his strong commitment to the topic and people he is writing about.

The book is valuable reading for all people interested in food security in the comprehensive sense that Chappell outlines in his book. I hope that the book will be translated into Portuguese so it can be easily read locally by those Chappell writes about. Reading about international

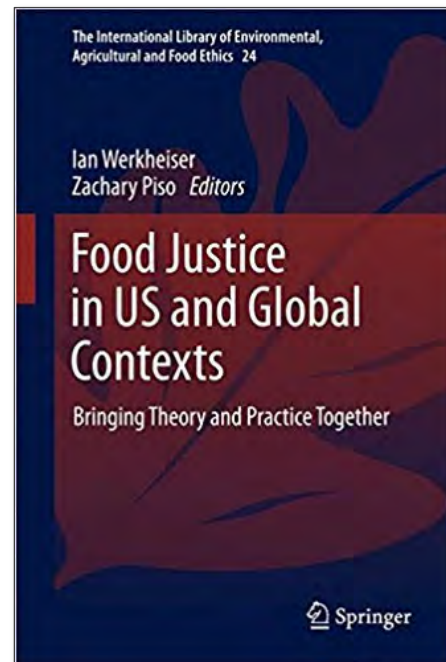
attention to domestic policies can trigger pride and identification on the one hand. On the other hand, the analyses and lessons learned may spur further activities. Personally, I most enjoyed chapter 4, where Chappell provides insights into specific success factors for the productive years of SMASAN's pioneering approach to ending hunger. Eventually, he ends his book on the encouraging note that ending hunger *is* possible.



Gritty philosophical thinking about food justice doing

Review by Christine M. Porter *
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Review of *Food justice in US and global contexts: Bringing theory and practice together*, edited by Ian Werkheiser and Zachary Piso. (2017). Published by Springer. Available as hardcover, paperback, and ebook; 312 pages.
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What do academics who work in the humanities and social sciences have to offer to food justice, if anything? An academic colleague and friend in civic studies once posed this question to me. The 33 editors and contributing authors who produced this book aim to offer concrete examples of potential answers to this question.

However, none of these authors, my civic

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studies colleague, nor I are in a good position to lead Sustainable Agricultural Systems proposals for USDA's Agricultural and Food Research Initiative (USDA AFRI). This new program area, announced in April 2018, will fund US\$10-million, five-year projects that aim, for example, to increase use efficiency of three crop inputs (water, nitrogen and phosphorus) by 50%, reduce crop losses by 20%, or reduce food-borne illnesses to 8.5 cases per 100,000 Americans each year.¹

These technical goals have clear and practical food production applications. The first two also attend to the right of future generations to have enough to eat. However, today they do little or

¹ <https://nifa.usda.gov/sites/default/files/rfa/FY-2018-AFRI-SAS.pdf>; <https://nifa.usda.gov/resource/afri-sas-faq#ChallengeAreas>

nothing to promote food justice. Sufficient food supply is not a problem yet. However, inequitable distribution of the means of food production, exchange, and consumption are current problems; and within the U.S., this maldistribution closely, and unjustly, follows lines of class, gender, and race.

These food justice issues of distribution are moral and political problems, not scientific ones. In this volume, the editors proffer “signs of hope for the success of public philosophy” (p. xiii), providing guidance for U.S. society for navigating the wickedly problematic ethical and political terrains of food injustice and food system unsustainability.

The book grapples with food justice in four domains: global context, built environment, governance, and animal lives. Each of the associated sections opens with a brief vignette about a specific food justice practice or organization on the ground. These are authored or co-authored by people actually doing that work. Perhaps because the work of activists is generally *doing* the work rather than *analyzing* it in writing, these brief pieces tend toward descriptions rather than discussion. Also, though one goal of this volume is to offer “examples of what such engaged scholarship and theoretically informed practice can look like” (p. xiii), only the vignette in the Animal Lives section actively attaches itself to the chapters that follow. The scholarship in this book grapples deeply with real-life food and food justice practices, but, per my colleague’s question above, how much practitioners value this array of scholarship as contributions to their work, in this volume and more generally, is less clear.

Each vignette is followed by an introductory “roadmap” to the section’s three to four original scholarship chapters. Of these, Paul Thompson’s introduction to governance is well worth reading and assigning as reading on its own. Heldke’s summary of the Animal Lives section also provides a succinct “CliffsNotes” for the four chapters that follow.

Nearly every one of the research chapters offers substantially new and applied contributions to the food justice literature, and none has appeared in similar forms before in print. These authors are not taking advantage of a book format

to sidestep rigor, but taking advantage, in the best sense of that word, to embrace new and innovative ways of applying philosophy and social sciences to food justice issues.

Discussing the merits of any individual chapters raises questions about whom they are engaging in conversation. In my case, I volunteered to review this book for two reasons. One, I’m deeply interested the role of academia in promoting food justice. Two, it meant I could get a copy of the book without paying US\$109 for an e-copy or US\$129 for a paper one (which is my tree-killing preference for substantive and sometimes dense reading like this book offers). The price point alone makes this book accessible mainly to academics—and generally, even then, as part of a library collection. (Because of the quality and diversity of this collection, I will say that every university library should have a copy.)

A few chapters might be of interest directly to food justice activists, if they can access them. Most animal rights activists and all animal ethics scholars would find the four Animal Lives chapters, along with the preceding vignette and introduction, to be provocative. This collection makes a range of ethical arguments in favor of eating animal flesh. Within that section, hunters who ponder the lives of those they hunt would enjoy McConnell’s auto-ethnographic, phenomenological, and accessible examination of being predator and/or prey. In addition, the Governance section’s chapter on food gleaning offers a cogent, rigorous, and insightful review of the history of gleaning in the U.S., as well as current practice and policy that would be useful for any organization doing, or thinking of doing, work in that arena (by Leasure-Earnhardt, Scrufari, and Valentine).

Overall, for the growing array of academics striving for transdisciplinary—or even postdisciplinary—work in food justice and food systems, the Governance section in particular may make this book worth buying or borrowing. In addition to Thompson’s introduction and the gleaning review, it contains an incisive geopolitical analysis of the notion of “security” and power in relation to food (by Brisman and South). It also contains a brilliant essay using the case of Anishinaabe–University of Minnesota relations in wild rice research to

question whether academic commodification of knowledge blocks academic work from being systematically useful to (by being in solidarity with) food justice practice (by Bowman). Of all the chapters, this one most directly addresses questions of how academic work could, but mainly does not, promote food justice.

The editors, seeking lessons for the U.S. food justice movement, included two ethnographic case studies in the Global Context section: one of the Cuban permaculture movement (by Williams) and one of Brazil's landless workers movement, or MST, within one settlement in the state of Mato Grosso (by Chávez). The rigor of their methods, lucid reporting of findings, and insightfulness of the discussions would make both excellent upper undergraduate or graduate readings in food system and food justice courses.

The two chapters set in education settings serve, in my view, as extended vignettes. One shares stories by each of four schoolteachers tangling with food injustice and insecurity in their schools, each in their own way (by Stapleton, Cole, Washburn, Jason, and Alvarado). The other shares "community engaged, student-centered" (Johnson, p. 201) learning and teaching experiences in undergraduate and graduate food education.


A chapter by Noll examines ways in which physical and geopolitical histories of U.S. cities may be barriers to present-day urban agriculture and food sovereignty projects in a wide-ranging yet highly specific tracing of some policy roots. The most theoretical chapter might be a discussion of the meaning of individual and collective memories, heirloom seeds and foods, and culinary communities by Leichter, in which my favorite line is: "the loss of biodiversity is one form of forgetting" (p. 17). An examination of cultural loss suffered by traditional whaling communities as a result of hunting moratoriums is, by contrast, a narrow and highly applied ethical analysis (by Mattes); this appears in the Global Context section, but would fit well in *Animal Lives*, with its pro-flesh-consumption perspective and punchline of "how global anti-whaling discourse may save whales, but harm human-whale relations in Japan" (Mattes, p. 67).

A critical discourse analysis of U.S. mobile produce market websites (by Mari) stood out for

me for two reasons. One, again, was the rigor of the methods. The other was the finding that "most mobile market organizations do not operate from a food justice perspective, but instead, operate from a food availability perspective" (p. 148). As an American, I confess I have food movement envy of the MST and Via Campesina, and the seats they have secured for food sovereignty leadership at UN FAO tables in Rome (McMichael & Porter, 2018). I do also worry about the nonradical discourses common in community food work in the U.S. (see, e.g., "the type of political action recommended by US organizations is certainly tame compared to that undertaken by some of their international counterpart—I could not find a single call to commit civil disobedience" [Fairbairn, 2012, p. 224]). However, in my own action and research partnerships in the U.S., my experience is that the neoliberal context in the U.S. forces people to choose between openly flying radical flags for justice and their organizations' survival. In other words, though some operations are genuinely neoliberal, I would say many are simply camouflaged for survival as they do their organizing work. Finally, if academics would like their work to support food justice practices, I'm not sure further analysis from ivory towers focusing solely on whether people sweating the work on the ground are reproducing or resisting neoliberalism is the most useful or ethical place to direct our efforts. We could perhaps more productively and (for those of us merely watching from the sidelines) ethically ask, for example, how neoliberalism constrains their work and document promising strategies for resisting it.

As in nearly all edited books, this is not a methodical survey of the most prominent issues in the field (academically and more literally), or even of the question of how to make theory serve food justice practice. It is a compilation of what people who produced it happen to care about, at least in association with the workshops convened at Michigan State University starting in 2013 on "Food Justice and Peace: Bringing theory and practice," where this work originated. It offers, overall, a collection of highly applied, deeply considered philosophical and anthropological analyses of work and practices for food justice. It

succeeds as public philosophy by engaging food practices in theory. If the next volume offered a meta-analysis, guided by the thinking in Bowman's

chapter about the relations between academic and activist work, then we might succeed in making theory better serve food justice practice. 

References

Fairbairn, M. (2012). Framing transformation: The counter-hegemonic potential of food sovereignty in the US context.

Agriculture and Human Values, 29(2), 217–230. <https://doi.org/10.1007/s10460-011-9334-x>

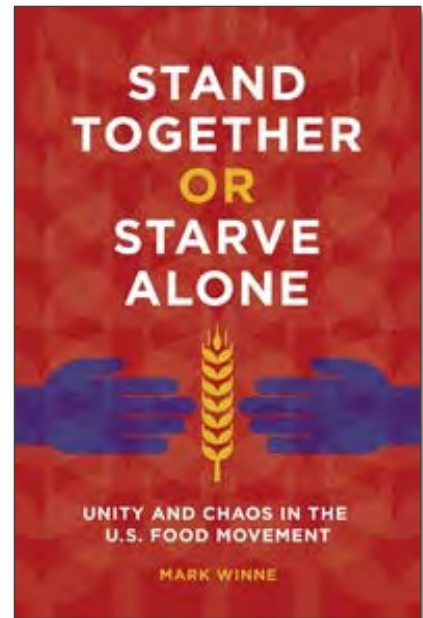
McMichael, P., & Porter, C. M. (2018). Going public with notes on close cousins, food sovereignty, and dignity. *Journal of Agriculture, Food Systems, and Community Development*, 8(Suppl. 1), 207–212.

<https://doi.org/10.5304/jafscd.2018.08A.015>

Transformative change eludes the well-meaning but fractured food movement

Review by Renee Brooks Catacalos*
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Review of *Stand Together or Starve Alone: Unity and Chaos in the U.S. Food Movement*, by Mark Winne. (2017). Published by Praeger. Available as hardcover and ebook; 178 pages. Publisher's website: <https://www.abc-clio.com/ABC-CLIOCorporate/product.aspx?pc=A5085C>



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Mark Winne may not have invented food policy councils, but he has probably done more than anyone in the U.S. to popularize them over his more than four decades of experience working in the food movement. In the last 15 years, Winne has traveled the country and the world, working with hundreds of organizations as a consultant and trainer. From this vantage point, in

Stand Together or Starve Alone, he laments the failure of the food movement to achieve deep and lasting change, despite the growing momentum surrounding the food movement. Citing dismal numbers that show food insecurity only getting worse in the richest country in the world—while obesity has eclipsed tobacco use as the United States' most pressing public health issue—Winne asks why so little progress has been made in 50 years of the food revolution. His answer: both the food movement's inability to collaborate across sectors, and each sector's inability to look critically at its own assumptions about its role in the food system. He cites as an example the rise of the food bank as one of the most important nonprofit institutions in many communities, calling this a "dubious measure of success." Charity feeding programs have not

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turned the ship around with regard to hunger or obesity in the U.S., partly, Winne argues, because they are working, like other sectors, without a “shared understanding of the causes of our food problems.”

Winne looks at the challenges that come with growth as organizations, information, and communications have proliferated in each of the system’s “submovements” (e.g. anti-hunger, local food, food education, food justice, farm-to-school). For instance, in 2005, he finds that there were 268 books published on food issues; ten years later the number of books on the subject ballooned to 1,672. And within this category of food issues, books on the topic of hunger also increased, from 148 in 2005 to 979 in 2015. Winne includes these statistics to illustrate not only information overload but also the increasing specialization within the food movement. At the same time, however, it has become much more difficult for a single book to have the kind of widespread impact that books like *Diet for a Small Planet* or *The Omnivore’s Dilemma* did when they were published.

Competition over scarce funding for food systems work causes much of the unwillingness to collaborate across sectors. Tension and disunity over the ethics of taking money from sources like Walmart add to these divisions because these sources are seen as contributors to the problems that food systems reformers are working to fix, such as a lack of living wages. Winne writes vividly and candidly about his regrets over accepting a grant from cigarette maker Philip Morris while running the Hartford Food System, reflecting that “as a person who spoke often and loudly about the need to promote healthy eating and lifestyles for everyone, especially the poor, it was more than a bit ironic that I was now guzzling the Devil’s booze and taking his bucks” (p. 58).

To this issue, he places blame at the feet of philanthropic funders, who often exacerbate the competition by all rushing to fund the latest issue (school gardens! food waste! underestimating the true cost of doing the work they want to fund, or requiring short-term deliverables that distract organizations from working on longer-term solutions. Federal funding can be a powerful force for food systems change, he says, but the effort

required to pass and appropriate food systems funding has also resulted in siloed programs and “program protectionism” that discourages, rather than promotes, connecting different sectors of the food system.

The concept of “community food security” offers a strong framework for moving past obstacles to coordination, cooperation, and collaboration that Winne has described. He delves into the theory and strategies of community food security, which emerged in the 1990s and combines approaches to ending hunger and food insecurity with a call for building local and regional food systems, and connects those to public health outcomes, healthy food supply chains, and other operational aspects of the food system. Community food security also prioritizes sustainability, social justice, and democratic decision-making.

While he looks at several current examples of community food security in action, the most compelling part of this chapter—and, to me, the whole book—is his insider account of the demise of the Community Food Security Coalition (CFSC), which was the leading forum for organizations working in this ostensibly collaborative space from 1996 to 2012, and where Winne was a part-time staffer in 2012. As a participant in a couple of CFSC events and a subscriber to its very active listservs, I was among those in the food systems world shocked by the news in August 2012 that the CFSC was disbanding immediately and without explanation. Until I read *Stand Together*, I still had never seen an answer to the question Winne poses, “Why had an organization that had garnered so much support, attracted so many followers, and envisioned a profoundly new way of thinking about the nation’s food and farm problems suddenly closed up shop?” (p. 101).


In Winne’s telling, “the elephant in CFSC’s room was always race,” in addition to personality and ego clashes, and the perennial resource conflicts. There may be more to this saga than Winne has committed to the page, but what he does tell us is instructive for the mounting number of organizations around the country attempting to work collaboratively, share leadership and democratic decision-making, and create a more equitable distribution of power within the food systems

movement. He also provides an interesting contrast later in the book when he presents the National Sustainable Agriculture Coalition as an example of an effective organization, capable of bringing together diverse interests under a big tent in ways that the CFSC could not. I found the tips and techniques Winne offers near the end of the book particularly valuable, in which he proposes ways to improve group dynamics and facilitate the successful performance of coalitions. These tips, like this book overall, provide a useful resource to anyone working on food policy councils, community food planning and security, or any coalition working across sectors and looking to have an impact greater than the individual members could have on their own.

However, by the conclusion of the book, it feels like race is *still* the elephant in the room of food systems collaboration. Winne quotes long-time activist Hank Herrera on the failure of leading organizations to include people of color in leadership or to grapple with structural racism, despite the rise of food systems organizations being led by African Americans such as Malik Yakini. Yet Winne then misses the opportunity to highlight the

work of Yakini's Detroit Black Community Food Security Network or others like it. He cites unsuccessful attempts to bring organizations led by people of color into existing coalitions, as well as the seeds of the CFSC's demise sown by the exit of several organizations led by people of color. Efforts led by and serving farmers of color, immigrant farmworkers and consumers, food service workers, and other marginalized communities have become a submovement of their own, one that arguably represents the real opportunity to create systemic change. But this sector is increasingly going its own way, rejecting what they see as too-little and too-late offers for "seats at the tables" where they have traditionally been excluded and not valued.

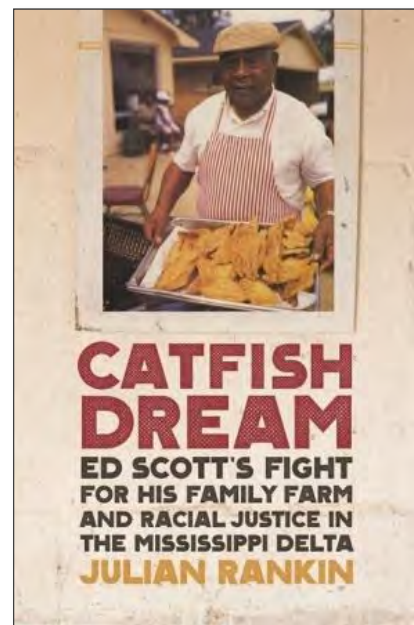
For the most part, the food systems activists Winne exhorts to stand together are not the ones who are going to starve if they don't, except to the extent that they may lose the funding that pays for their particular role in the system. Until the movement is being steered by people whose real-world food issues might actually be solved by unified collective action, the promise of systemic change may continue to elude us.



Injustices made right: Ed Scott Jr.'s victory in saving the family farm

Review by Aaryn Wilson *
St. Paul, Minnesota

Review of *Catfish Dream: Ed Scott's Fight for his Family Farm and Racial Justice in the Mississippi Delta*, by Julian Rankin. (2018). University of Georgia Press, Athens, GA. Available as hardcover, paperback, and ebook; 160 pages. Publisher's website:
http://www.ugapress.org/index.php/books/catfish_dream/



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Catfish Dream is told in 129 pages with every line crafted to tell the best parts of a man who rose above barriers to become a war hero, community hero, family hero, and business hero. In this book, Rankin articulates the proud history of the Scott family in farming, community, and business. The book traces Ed Scott Jr.'s struggles to keep his land, despite the discrimination and disenfranchisement he and other African American farmers faced during the 20th century, and on the

slow road to seeing injustices made right.

Instead of being a book that just makes readers angry and sad about the plight of African American farmers in the recent past, Rankin describes Ed Scott Jr. as a figure not unlike Henry Ford. A strength of this book is that it is approachable to all, and everyone who reads it will be glad they did. This book could appeal to both academics and practitioners.

The book is divided up into three sections. Part one, "Seed," describes Ed Scott Jr.'s father as a man who feared no white man and acquired land from white landowners at a time when many blacks were sharecroppers. "Edward Sr. taught his son that a bounty of work was the real blessing, and a moral businessman was one who shared the fruits of his enterprise" (p. 36). Therefore the seed not

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just for farming, but for economic self-reliance, was inherited from his father. Like a seed that can last indefinitely if cared for properly, that land Ed Scott Jr. inherited was given to him with the understanding that he would pass it along to his children.

In part two, “Stalk,” Rankin weaves Ed Scott Jr.’s life with the changing times he and other black farmers faced in the period from about 1960 to 1970. Additionally, Rankin highlights how Scott worked alongside people like Fannie Lou Hammer and Dr. T. R. M Howard, all of whom worked to grow black power in the Delta through business, politics, spirituality, and education. Scott is portrayed as a stubborn farmer who saved his family farm by following in the footsteps of white farmers who turned to catfish farming when row cropping ceased to be profitable. He marched on, creating a catfish enterprise out of thin air when the government and catfish farming cooperatives did all they could to crush him.

Like his father, Scott made his children and grandchildren work on the farm. In part three, “Reap,” Rankin describes Scott as a powerful man who motivated all of his employees and family to work as hard as they could. Daniel, Ed Scott Jr.’s grandson, said, “I was seeing things that the average person would be way up in life before they

got the chance to experience” (p. 88). For many of Ed Scott Jr.’s employees, the jobs were a means out of the misery of unemployment.

Reap traces the process of how Ed Scott Jr. lost his catfish business and land in the 1990s until 2011, when the courts settled in his favor, awarding him over a million dollars in the *Pigford v. Glickman* class-action lawsuit. Instead of going out and spending the money willy-nilly, with the help of his daughter he was able to buy back his land from the very governmental entity responsible for taking it in the first place.

Catfish Dream is a wonderfully written story about a rare African American farmer who persevered through adversity and was able to create a legacy that will forever be remembered through this book and several other archives. Perhaps one weakness of the book is that Rankin left out information about the minority land ownership discrimination that is continuing to occur. For example, a Kansas farmer by the name of Carlos Valencia has been facing discrimination for the past several years as he attempts to create an organic poultry enterprise (Webster, 2018). Ed Scott Jr. will now sit alongside the “Peanut Man”—George Washington Carver—when I think of African American farming heroes. 

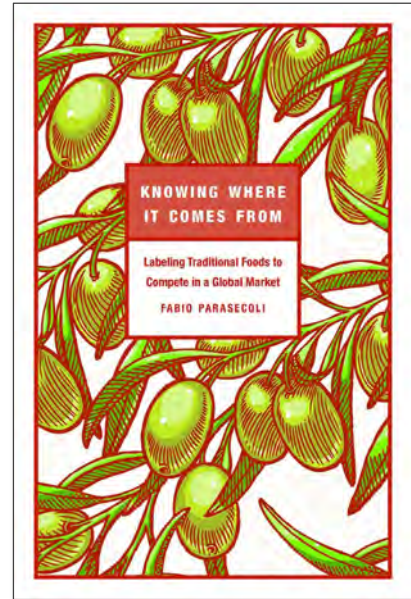
Reference

Webster, B. (2018). Farmer’s problems in rural Kansas smack of racial discrimination. *Organic Broadcaster*, 26(4), pp. 9, 14. Retrieved from <https://mosesorganic.org/farmer-racial-discrimination/>

Following food to its source

Review by Carrie A. Scrufari*
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Review of *Knowing Where it Comes From: Labeling Traditional Foods to Compete in a Global Market*, by Fabio Parasecoli.
(2018). University of Iowa Press, Iowa City. Available as paperback; 254 pages. Publisher's website:
<https://www.uiopress.uiowa.edu/books/2017-fall/known-where-it-comes.htm>



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Knowing Where it Comes From seeks to provide a history for the various labeling systems for foods now present in the global supply chain. Accordingly, author Fabio Parasecoli explains what a geographic indication is while comparing how these labels are used in various administrative systems, namely the *sui generis* system and the mark-based system. Parasecoli refers to these indications and labeling schemes as “place-based labels” (p. 7). His stated goal is to “explore and assess the

political, legal, and administrative apparatus that has been activated to identify and safeguard the connection between foods and their places of origin and to illustrate its different effects on all the stakeholders” (pp. 6–7).

While Parasecoli may ultimately achieve this goal, such success is contingent upon the reader's dedicated toil. Parasecoli does not follow the sage writing advice to never use two words where just one will do, leaving the reader to navigate a Faulkner style of writing with long, complicated

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sentences often containing excessive verbiage. For example, at one point Parasecoli writes, “The increasing commercial and cultural relevance of local products and practices—especially those expressing long-lasting traditions—has led to attempts to describe, systematize, and regulate them through different kinds of classifications, juridical frameworks, and international conventions” (p. 6). Although Parasecoli takes pains to explain our globalized labeling scheme, his writing style often adds further complexity to an already complicated subject matter.

Nevertheless, Parasecoli is comprehensive in his treatment of the subject. His lists of abbreviations and acronyms at the beginning of his book are helpful, as is his chronology of laws, treaties, and administrative measures that are discussed in depth later. The first four chapters focus on intellectual property rights and their attendant rules and regulations. Within these chapters, he discusses everything from the industrialization and globalization of European food and wine products beginning in the 19th century, to trade disputes before the World Trade Organization to enforce the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIP) (i.e., whether “Parmesan” could be used to label cheese produced in Germany), to tensions between traditionally produced foods and safety standards, to modern-day concerns over genetic engineering, crop contamination, and biopiracy. Parasecoli then shifts out of this discussion of legal frameworks and dedicates the remainder of his book to the history and effectiveness of the civil society association Slow Food and the role of various international bodies in protecting the integrity of locally produced foods.

A key strength of the book is Parasecoli’s explanation of how legal frameworks have

developed to support the labeling of locally or specially produced foods and how such a framework has provided alternative revenue schemes for rural communities struggling in depressed economic climates. His discussion comparing and contrasting the European-based geographic indicator (based on local traditions) with the United States’ federal mark system is particularly informative. He correctly observes that in the U.S., such a system is premised upon “the right of the public to be correctly informed about the origin of the food it buys, not because of any particular characteristics attributed to the geography and environment of the area of origin, but rather because such misrepresentations were a form of fraud that could cause confusion among consumers” (p. 85).

Despite its strengths, Parasecoli’s work reads largely like a dense treatise or textbook and would have benefited from incorporating some design principles to enhance its readability. For example, employing more subject matter headings and subheadings within chapters or including charts comparing the state of affairs in various regions such as India, Pakistan, Canada, the U.S., and China would have been helpful in allowing the reader to digest different pieces of information. Another common textbook design that could have aided the reader’s comprehension is the use of sidebars to define and compare various key terms such as collective trademarks, certification trademarks, and certification marks. It also would have been useful for each chapter to contain a list of cited laws or international treaties to allow for quick referencing within the text. In sum, the book can be useful for gaining valuable knowledge about the historical development of various labeling schemes . . . if the reader works hard enough to get it.

