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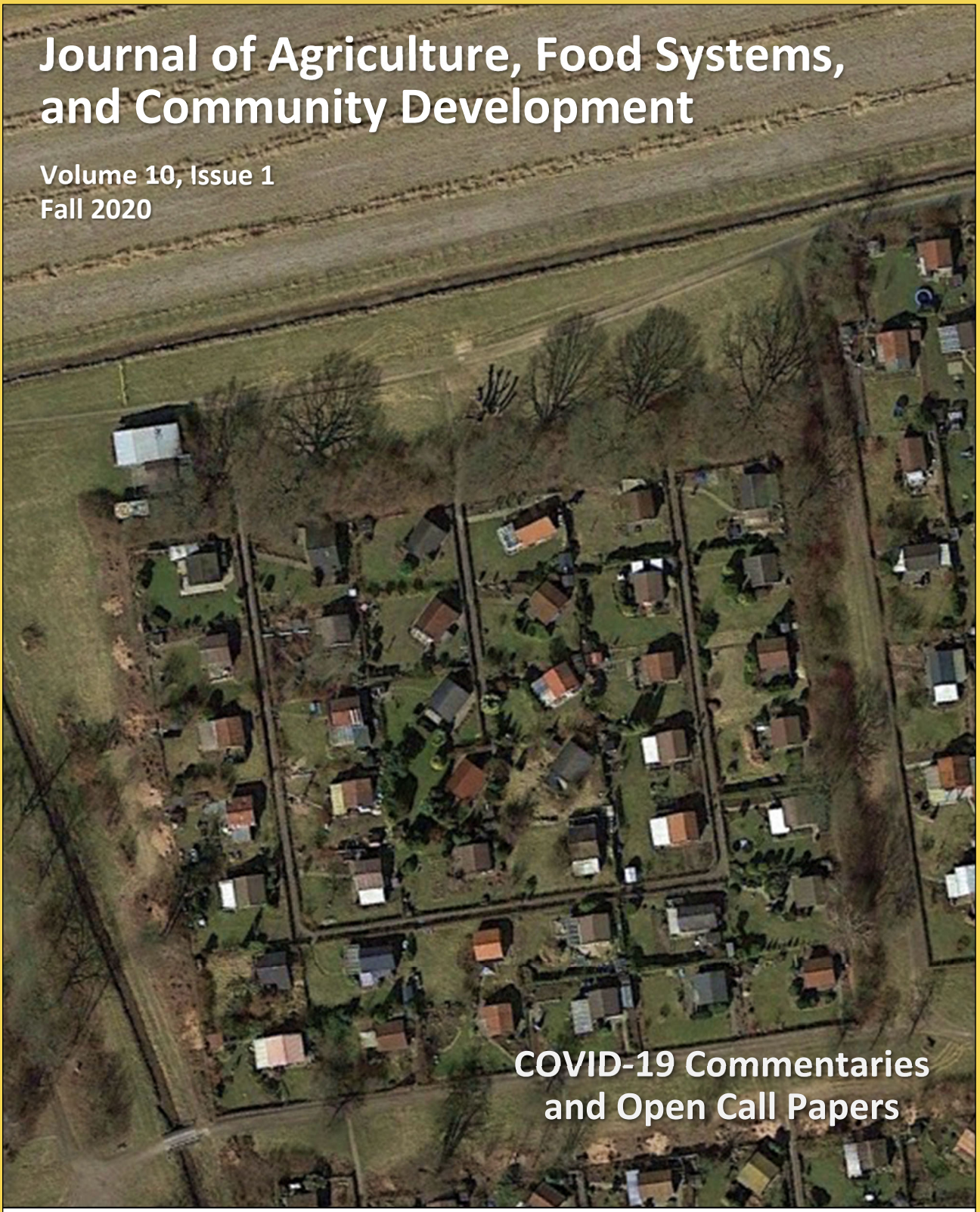

COVID-19 Commentaries and Open Call Papers

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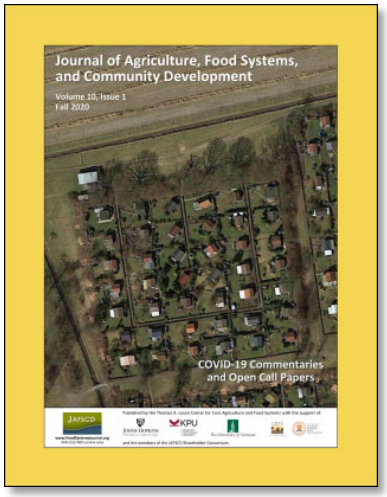

On our cover: A Google Earth view of a Schrebergarten colony near Mannheim, Germany (49° 29' 43.42" N, 8° 30' 39.66" E). Schrebergartens (Germany's version of community or allotment gardens) provide fresh air, produce, flowers, and respite from intensive urban life. (Learn more about these in the editorial "In This Issue.")

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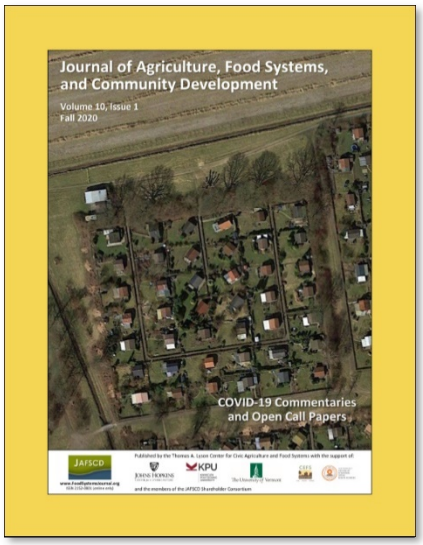
IN THIS ISSUE
DUNCAN HILCHEY

COVID-19 commentaries and open call papers



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The cover of this open call issue of JAFSCD is a Google Earth shot of the Schrebergartens outside Mannheim, Germany. Schrebergartens are named for Dr. Moritz Schreber, a Leipzig University professor who specialized in pediatric health. He is infamous for advocating that children strictly obey adults, but he also suggested that city children should have access to fresh air and green space. Schrebergartens are similar in some respects to the Russian dacha, often including "tiny houses," raised beds, perennials—and lots of garden gnomes. Entire colonies of Schrebergartens have been established since WWII.

While Schrebergartens have been seen as quaint and outdated by some, there are about one million gardens and a five-year waiting list to obtain one. They have traditionally been the haunt of retirees or lower-income residents, but the current uptick in demand seems to be driven by millennials looking for refuge from the hectic pace of modern German life. Could we see this type of urban garden culture leap the Atlantic? After all, we have plenty of millennials looking for a respite from their phones, laptops, and gaming systems. More importantly, we have under-privileged urban residents who might enjoy having their own tiny house and the serenity of a food and flower garden.

John Ikerd starts off our issue with his Economic Pamphleteer column, *A Fair Deal for rural America*. Building on his series of columns analyzing America's food and farm policy agenda, Ikerd argues that the U.S. government's approach to rural development is not only woefully inadequate but, in fact, contributes to persistent poverty.

On our cover: A Google Earth view of a Schrebergarten colony near Mannheim, Germany (49° 29' 43.42" N, 8° 30' 39.66" E). Schrebergartens, Germany's version of community or allotment gardens, provide fresh air, produce, flowers, and respite from intensive urban life.

Following Ikerd's column, appropriately, is a fresh set of perspectives from grassroots food system practitioners and professionals in four Voices from the Grassroots essays:

- *How CARES of Farmington Hills, Michigan, responded to the COVID-19 pandemic,* by **Thomas Schoenfeldt,**
- *Community gardening during times of crisis: Recommendations for community-engaged dialogue, research, and praxis,* by **Angie Mejia**, **Manami Bhattacharya**, **Amanda Nigon-Crowley**, **Kelly Kirkpatrick**, and **Chandi Katoch,**
- *Operation Community Impact responds to food insecurity and challenges faced by dairy producers,* by **Stacey F. Stearns**, **William P. Davenport**, and **Jennifer E. Cushman,** and
- *Observations and suggestions during COVID-19: Harnessing pre-existing elements to increase food security,* by **Neil Cox** and **Zoe Beynon-MacKinnon.**

For our open call, peer-reviewed papers, we start off with *Multi-objective optimization identifies trade-offs between self-sufficiency and environmental impacts of regional agriculture in Baden-Württemberg, Germany,* by **Christian Buschbeck, Larissa Bitterich, Christian Hauenstein,** and **Stefan Pauliuk**, in which the authors present an innovative study examining how social and environmental benefits in regional food systems might be balanced.

Next, **Naudé Malan** presents a reflective essay of his work in a university-based "social lab" focused on agroecology and food systems in *iZindaba Zokudla: A conversation about food systems change in South Africa.* In *Evaluating food hubs: Reporting on a participatory action project,* **Erin Nelson** and **Karen Landman** report on their critical work to develop and encourage the use of participatory food hub evaluation tools.

In *A gap analysis of farm tourism microentrepreneurial mentoring needs in North Carolina, USA,* **Bruno Ferreira**, **Duarte B. Morais**, **Adriana Szabo**, **Becky Bowen,** and **Susan Jakes** use self-efficacy measures of both farmers and cooperative extension to identify training-the-trainer needs in supporting rural microenterprises. In *Oregon farmers' perspectives on motivations and obstacles to transition to certified organic,* **Deanna Lloyd** and **Garry Stephenson** present the results of an exploratory study into the motivations and obstacles of farmer transition to certified organic production.

Jennifer E. Gaddis, **Amy K. Coplen, Molly Clark-Barol**, **Allea Martin**, **Claire K. Barrett**, and **Lauren Lubowicki** then use photovoice to explore how low-income families are affected by diet-related health programs in *Incorporating local foods into low-income families' home-cooking practices: The critical role of sustained economic subsidies.*

In *Is the college farm sustainable? A reflective essay from Davidson College,* **Amanda Green**, **David Martin**, and **Gracie Ghartey-Tagoe** shed light on the challenges of institutionalizing a liberal arts-based college farm. Next, **Cody Gusto** and **John M. Diaz** review the literature and call for a more significant effort to document farmers market managers' perceptions and motivations, and the barriers they face, in administering SNAP-based incentive programs in *Toward a framework for assessing managerial intentions: A review of support for market managers' engagement with nutrition incentive programs.*

In the final peer-reviewed paper, *Making seafood accessible to low-income and nutritionally vulnerable populations on the U.S. West Coast,* **J. Zachary Koehn**, **Emilee Quinn**, **Jennifer Otten**, **Edward Allison**, and **Christopher M. Anderson** used a "positive deviant" approach to explore how to close the gap in supplying healthy seafood to vulnerable populations.

Next, we offer another large batch of commentaries reflecting on COVID-19's effects on food systems around the world, including:

1. *Providing planetary health diet meals to low-income families in Baltimore City during the COVID-19 pandemic,* by **Richard D. Semba, Rebecca Ramsing, Nihaal Rahman**, and **Martin Bloem**

2. *Communication helped UConn Extension address the needs of agricultural producers,* by **Stacey F. Stearns** and **Joseph A. Bonelli**
3. *Leveraging informal community food systems to address food security during COVID-19,* by **Lindsey Haynes-Maslow**, **Annie Hardison-Moody**, and **Carmen Byker Shanks**
4. *COVID-19 amplifies local meat supply chain issues in South Carolina,* by **Steven Richards** and **Michael Vassalos**
5. *Community-led food resilience: Integrating grassroots food access into municipal emergency planning,* by **Sasha Avrutina**, **Hanah Murphy**, and **Eesha Patne**
6. *Vulnerabilities of the craft chocolate industry amidst the COVID-19 pandemic,* by **Jeana Cadby**
7. *COVID-19 responses: Food policy councils are "stepping in, stepping up, and stepping back,"* by **Anne Palmer**, **Abiodun T. Atoloye**, **Karen Bassarab**, **Larissa Calancie**, **Raychel Santo**, and **Kristen Cooksey Stowers**
8. *Interventions and compliance: How the response to COVID-19 reflects decades of retail food protection efforts,* by **Girvin L. Liggans**, **Devin K. Dutilly, Komita J. Carrington-Liggans**, **Mary B. Cartagena**, **Charles E. Idjagboro**, **Laurie B. Williams**, **Glenda R. Lewis**, **Mia B. Russell**, **Veronica S. Moore**, and **Robert Sudler, Jr.**
9. *Iteration, innovation, and collaboration: Supporting farmers markets' response to COVID-19,* by **Diana Broadaway** and **Darlene Wolnik**
10. *ICT solutions to support local food supply chains during the COVID-19 pandemic,* by **Anuj Mittal** and **Jason Grimm**
11. *An initiative to develop 21st century regional food systems (Jump-started, by a US$10 billion federal stimulus COVID package),* by **Larry Yee** and **Jamie Harvie**
12. *Community Capitals Policing merges food economy and public safety, repairing decades of harm,* by **Martin J. Neideffer**
13. *Fostering food equity in an immigrant neighborhood of New York City during COVID-19,* by **Valerie Imbruce**
14. *Providing menu and shopping toolkits to improve food access and security during a pandemic,* by **Kelly Kunkel, Abby Gold**, and **Betsy Johnson**
15. *The impact of the COVID-19 pandemic on food insecurity,* by **Maha Almohamad, Dania Mofleh**, and **Shreela Sharma**
16. *Food systems resilience through dialogue: Localizing a food systems approach in pandemic response,* by **Angela R. Hansen**, **Eilif Ronning**, and **Katie Collier**
17. *"Let us be small": A case study on the necessity for intentionally small producers,* by **Alexandria G. Huber**

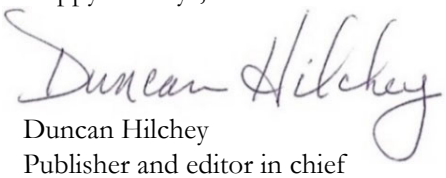
Wrapping up this last issue of 2020 are four book reviews:

- **David Everson** reviews *Indigenous Food Systems: Concepts, Cases, and Conversations,* edited by Priscilla Settee and Shailesh Shukla;
- **Joeva Rock** reviews *Food Security for Rural Africa: Feeding the Farmers First,* by Terry Leahy;
- **Jess Gerrior** reviews *Food Fights: How History Matters to Contemporary Food Debates,* edited by Charles C. Ludington & Matthew Morse Booker; and
- **Paul Lasley** reviews *Green, Fair, and Prosperous: Paths to a Sustainable Iowa,* by Charles E. Connerly.

As 2020 comes to a close, we again send our condolences to those who have lost loved ones, or lost jobs, or been affected in other ways by the pandemic. We have appreciated the opportunity to play a role by publishing these and previous commentaries as rapid responses to the pandemic. Our winter 2020–2021 issue will publish peer-reviewed papers and more commentaries on COVID-19. At this writing, the vaccine to

prevent infection is beginning to be distributed throughout the world. On behalf of the JAFSCD staff, I share our fervent belief that better days are ahead and that our shared movement to create an equitable and resilient food system will emerge stronger.

Happy holidays,



Duncan Hilchey
Publisher and editor in chief

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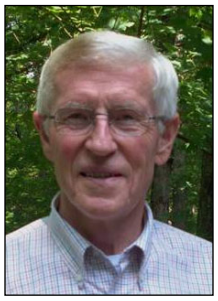

THE ECONOMIC PAMPHLETEER
JOHN IKERD

A Fair Deal for rural America

Published online October 9, 2020

Citation: Ikerd, J. (2020). The Economic Pamphleteer: A Fair Deal for rural America. *Journal of Agriculture, Food Systems, and Community Development, 10*(1), 5–8. http://dx.doi.org/10.5304/jafscd.2020.101.004

A "fair deal" was the phrase used by Harry Truman in his 1949 State of the Union address to Congress. He said that "Every segment of our population and every individual has a right to expect from his government a fair deal" (Truman, n.d.). In a 1947 address to the NAACP, Truman had said, "Every man should have the right to a decent home, the right to an education, the right to adequate medical care, the right to a worthwhile job, the right to an equal share in the making of public decisions. . . . We must ensure that these rights—on equal terms—are enjoyed by every citizen" (Glass, 2018, para. 6).

Truman proposed a bold political agenda that included universal health care, a major increase in the minimum wage, expanded Social Security benefits, and a major increase in federal funding for education. Many of his proposals were rejected by a Republican Congress. However, he had a number of notable successes, including extending telephone service to rural areas, supporting farm commodity price at 90% of parity, expanding soil

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

Why an ***Economic Pamphleteer?*** *In his historic pamphlet* Common Sense, *written in 1775–1776, Thomas Paine wrote of the necessity of people to form governments to moderate their individual self-interest. In our government today, the pursuit of economic self-interest reigns supreme. Rural America has been recolonized, economically, by corporate industrial agriculture. I hope my "pamphlets" will help awaken Americans to a new revolution—to create a sustainable agri-food economy, revitalize rural communities, and reclaim our democracy. The collected Economic Pamphleteer columns (2010–2017) are at* https://bit.ly/ikerd-collection

conservation programs, and fixing loopholes in the Clayton Antitrust Act. Historian Eric Leif Davin writes, "Truman left a record of considerable success—an aspect of the Fair Deal not to be discounted" (Davin, 2011, p. 348).

Truman's Fair Deal of the 1940s set the stage for Lyndon Johnson's Great Society of the 1960s. In September 1966, President Johnson established the President's National Advisory Committee on Rural Poverty. Its charge was "to make a comprehensive study and appraisal of the current economic situations and trends in American rural life, as they relate to the existence of income and community problems of rural areas" (Breathitt, 1967, p. vi). The committee delivered its report to the President a year later: "This report is about a problem which many in the United States do not realize exists. The problem is rural poverty. It affects some 14 million Americans [7% total and 26% of rural populations]. Rural poverty is so widespread, and so acute, as to be a national disgrace, and its consequences have swept into our cities, violently" (Breathitt, 1967, p. ix).

The token "rural development" programs of the U.S. Department of Agriculture have been woefully inadequate to mitigate the negative effects of agricultural industrialization on "the people left behind" in rural America.

The report concluded, "Our programs for rural America are woefully out of date" (Breathitt, 1967, p. ix). The commission placed the primary blame for increasing rural poverty on the displacement of farm families by the industrialization of American agriculture. They wrote, "We have not yet adjusted to the fact that in the brief period of 15 years, from 1950 to 1965, new machines and new methods increased farm output in the United States by 45 percent and reduced farm employment by 45 percent. Nor is there adequate awareness that during the next 15 years the need for farm labor will decline by another 45 percent" (Breathitt, 1967, p. ix).

The commission recommended "that the United States adopt and put into effect immediately a national policy designed to give the residents of rural America equality of opportunity with all other citizens" (Breathitt, p. xi). It reaffirmed President Truman's call for a Fair Deal in stating, "The Commission believes that the United States has the resources and the technical means to assure every person in the United States adequate food, shelter, clothing, medical care, and education and, accordingly, recommends action toward this end. . . . The Commission is convinced that the abolition of rural poverty in the United States, perhaps for the first time in any nation, is completely feasible. The nation has the economic resources and the technical means for doing this. What it has lacked, thus far, has been the will. The Commission rejects the view that poverty, in so rich a nation, is inevitable for any large group of its citizens" (Breathitt, 1967, p. xi).

In January 1969, Richard Nixon replaced Lyndon Johnson as President. In 1971, Earl Butz, an advocate of large-scale, corporate farming, became Secretary of Agriculture (Earl Butz, n.d.). The previous displacement of family farmers had been driven by new post–World War II industrial technologies. The continuing trend toward larger farms and fewer farm families since the 1970s has been driven by 50 years of farm policies initiated during the Nixon/Butz administration. The token "rural development" programs of the U.S. Department of Agriculture (USDA) have been woefully inadequate to mitigate the negative effects of agricultural industrialization on "the people left behind" in rural America.

A 2017 *Wall Street Journal* study documented some of the socioeconomic consequences of continuing industrial agricultural and rural development policies. In an article entitled "Rural America is the new 'inner city,'" the authors concluded, "In terms of poverty, college attainment, teenage births, divorce, death rates from heart disease and cancer, reliance on federal disability insurance and male labor-force participation, rural counties now rank the worst among the four major U.S. popu-

lation groupings" (Adamy & Overberg, 2017, para. 5)—below inner cities.

In 2018, a national conference was convened to evaluate changes in rural American during the 50 years following *The People Left Behind* report. The conference report documented that rural poverty declined during the 1960s but stabilized during the 1970**s**, and has continued to exceed poverty rates in urban areas. The report also noted, "The level of income inequality has surged since 1970, deeply dividing the United States into a prosperous upper quintile (and an even more privileged top 1 percent) that has benefited from the growth in the economy, and the rest of the population that has not shared in this growth to any appreciable extent" (Weber, 2018, pp. 3–4). The report also pointed out that changes in the War on Poverty programs over past 20 years have resulted in a smaller share of the benefits going to those in deepest poverty. The legacy of rural poverty has resulted in these economic inequalities having a disproportionate effect on "the people left behind."

Over time, many rural people have become aware that U.S. farm policies are a root cause of persistent rural poverty, yet they seem unable or unwilling to demand fundamental change. Rural residents have been persistently misled into believing, or at least accepting, the false promises that rural communities can prosper only by extracting wealth from natural resources, including from fertile farmland, by exploiting farm workers and displacing family farmers. This is not a matter of party politics, as it has persisted under both Democratic and Republican administrations. Those who oppose farm policies that subsidize today's so-called modern farming systems are quickly labeled as either uninformed or opposed to agriculture, family farming, and rural communities.

There are good reasons for rural opposition to current government farm policies. These policies subsidize *production,* rather than support *farm families*. Farms classified as "small" by the USDA make up nearly 90% of all farms but account for only about 20% of total agricultural production (USDA Economic Research Service [USDA ERS], n.d.-a). Only about 40% of farmers receive government payments; the vast majority of farm subsidies, including special "emergency funding," go to large farms—the large *producers* (Environmental Working Group, 2020). As a result of this focus on production, only a small percentage of family farmers and rural residents actually benefit from today's farm policies.

The lives and livelihoods of the vast majority of family farmers and as many as 99% of all rural people continue to be diminished or destroyed by government farm programs that subsidize a few larger farmers/producers and wealthy landowners.

Counties classified as rural or non-metro currently make up about 15% of the U.S. population (USDA ERS, n.d.-b). Farmers make up only 1.3% of the total population of the U.S. and thus less than 10% of the rural population (USDA ERS, n.d.-c). This means less than 4% of rural residents (40% of farmers) receive farm subsidies. The percentages vary from year to year, but 10% of those farmers typically receive more than 60% of those subsidies (Environmental Working Group, 2020). The lives and livelihoods of the vast majority of family farmers and as many as 99% of all rural people have been, and continue to be, diminished or destroyed by government farm programs that subsidize a few larger farmers/producers and wealthy landowners.

Current proposals for programs that would ensure a new Fair Deal for rural America are included in a congressional resolution labeled the Green New Deal. However, this proposal has been criticized for its emphasis on its proposals for mitigating climate change, which have been demonized politically in rural America. Setting aside this environmental emphasis, the Green New Deal is simply an affirmation of President Truman's Fair Deal. Its provisions include restoring economic competitiveness to markets and "providing all people of the United States with— high-quality

health care; affordable, safe, and adequate housing; economic security; and clean water, clean air, healthy and affordable food, and access to nature" (Recognizing the duty, 2019, p. 14).

In previous columns, I have outlined a farm policy agenda based on the Green New Deal that could be a key part of a New Fair Deal for rural America (Ikerd, 2020). This agenda includes a fair transition from government programs that subsidize commodity production to programs that share the risk of transitioning to regenerative family farms. Fair Deal farm programs would ensure farm family incomes at parity with nonfarm families. The more comprehensive Fair Deal outlined in the Green New Deal congressional resolution would ensure adequate incomes to meet basic economic needs, in addition to health care and housing, clean water and air, and healthy and affordable food, for all—rural and urban. Those who oppose government policies that subsidize today's so-called modern system of farming are not uninformed or opposed to agriculture, family farming, and rural communities. They simply want a Fair Deal for family farmers and for rural America.

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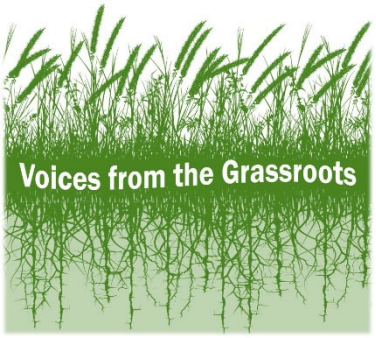
How CARES of Farmington Hills, Michigan, responded to the COVID-19 pandemic



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CARES of Farmington Hills (Michigan) is a front-line food pantry that serves nine cities. CARES is a 501(c)(3) nonprofit. Prior to the COVID-19 pandemic, the CARES office included a large meeting area, clothing room, and the food pantry. Before the pandemic arrived, it was a client-choice, self-serve food pantry set up like a grocery store that is available to those in need in the service area. The pantry was open five days a week, and shopping was available by appointment. Each guest can visit the pantry once each month, and no guest is ever turned away. If a guest is not in our service area, they are offered an emergency bag that consists of enough food for a couple of days and are given a list of food pantries near them. At the beginning of the pandemic, we were serving 400 to 500 families each month.

When the pandemic struck, the client-choice pantry and other areas in the building were cleared out to allow pallets of food to be stored so they could be used in a bag-packing process. The entire distribution process changed to a drive-up system, where carts of food were unloaded into each guest's trunk with no personal contact. We were complying with the recommendations of a variety of health organizations throughout the region and state by doing this.

The structure and requirements for volunteers also completely changed. We now had teams from local churches come in to help pack bags of non-perishable products for distribution. Two different bags of nonperishable products were prepared in separate rooms to maintain spacing and limit exposure. In response to the pandemic, we dismantled the meeting room to make it into two areas for packing bags, with pallets of food and tables spaced out as required for social distancing. The shelves of the client-choice pantry area were emptied to create a third bag-packing area as well as to store dry goods. Volunteer changes were also major. Before the pandemic, there were clothing

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volunteers, check-in volunteers, check-out volunteers, and stockers. The pandemic created the need for bag-packing teams, loaders for the cars, traffic directors, cart fillers, and runners for the frozen meats. Most of the volunteers adapted well to the new situation, realizing it was out of our control. The shifts were expanded for the loaders, as these were younger volunteers, and they worked all of the distribution days, thus limiting exposure of our more vulnerable volunteers to the virus.

During the pandemic, we contacted food companies seeking donated foods to help those in need. We were able to build a relationship with a produce supplier and a chicken farm, so we got a pallet of eggs (900 dozen) and all the produce (peppers, cucumbers, and tomatoes) we need for the distributions each month. We were able to make arrangements to get the USDA boxes of food (produce, dairy, cheese, meat, and nonperishables) for distribution as well. By working with the food suppliers, we were able to keep the growth in food costs to a minimum as all of the food from the food suppliers and the USDA boxes were provided at no cost to the pantry. A local institutional food supplier allowed one of its refrigerator/freezer trailers to be parked at CARES for 7 weeks, and it filled the trailer twice with products to be given away as well as serving as storage for donations from other food suppliers.

During the pandemic we have had only four distribution days each month, as we have to pack bags and clean on other days. On a distribution day, volunteers filled shopping carts with the USDA boxes, several dozen eggs, a case of produce, and two bags of nonperishable food from CARES. As the cars were being loaded from the shopping cart, the car driver let a volunteer know what meat choices they would prefer and that volunteer went to the freezer and collected the meat and placed it in the trunk of the car, after which the guest could drive away. The traffic situations were managed by setting appointments for the pickups. A group of volunteers was also used to help direct traffic. This seemed to work very well; we received no complaints from the neighbors living nearby.

In the month of June 2020, we served 1,394 families, and the weight of the food distributed was more than 70,000 pounds. Obtaining some grants and building relationships with the food suppliers helped significantly in reducing the cost of food that would have had to be purchased from the food banks. The food budget for this pantry was normally US$7,000 to US$8,000 each month from the local food banks. From March 2020 through June 2020, the amount of money that had to be spent on food was about US$3,000 in total. This shows real results of some small grants as well as food company relationships, which will continue after the pandemic.

Another big thing that CARES of Farmington Hills was able to accomplish was getting licensed as a Bridge Card store. This lets us accept Bridge Cards (Michigan's version of SNAP EBT, "food stamps" electronic benefits transfer payments) as payment. The clothing room was converted into the new SNAP store. We are able to buy food from food companies and distributors so we have a well-

CARES of Farmington Hiills is a front-line food pantry that serves nine cities in Michigan.
(Photo by Thomas Schoenfeldt/CARES of Farmington Hills)

stocked store where families with a Bridge Card can shop and get less costly prices so their food dollars go further, and hopefully that means healthier eating. This is the first store of this type in the state of Michigan, and it officially opened on August 3, 2020. It has been exciting to see the response of the shoppers and how grateful they are. Any profits that might be made from the store will be used to help supply food for the free pantry.

We are looking forward to being able to restore the client-choice pantry once we are through the pandemic, and then allowing the shoppers to get their free food and then going into the store and using their other funds to purchase good food. We are trusting that this store will be a real service to the community and those in need.

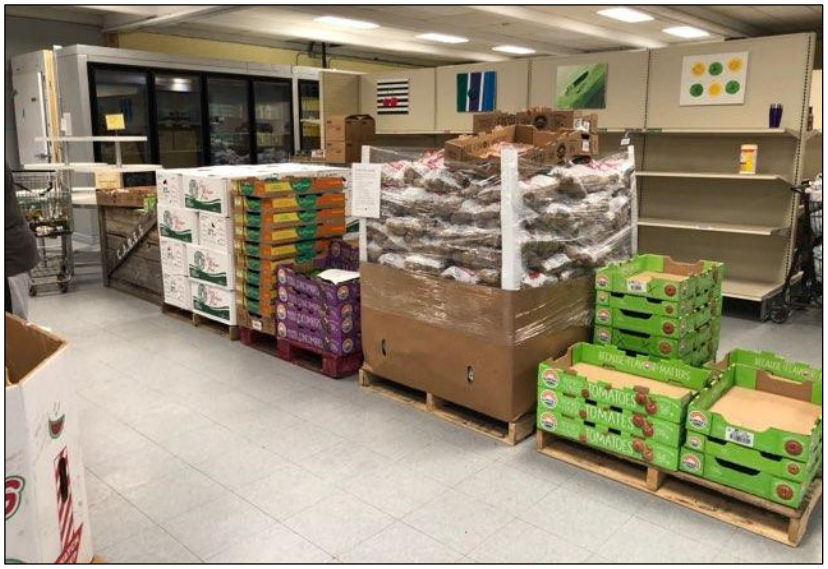
This pandemic has been a real learning experience for everyone, and all the team members were very flexible and very responsive to the needs of CARES. As a result, we were able to handle all the increased requirements.

Also, during the pandemic one of the local food banks had a mobile food pantry set up in our parking lot once or twice a month. The distribution food numbers listed previously do not include any food distributed by the pop-up mobile food bank pantries. CARES provided volunteers at the mobile pantries to help manage the flow of the traffic and moving the food as needed.

A cooperative effort at many levels helped meet the needs of many of our guests during this time of highly increased needs.

CARES's client choice food pantry prior to the pandemic.

(Photo by Thomas Schoenfeldt/CARES of Farmington Hills)



CARES's client choice food pantry after the pandemic.

(Photo by Thomas Schoenfeldt/CARES of Farmington Hills)

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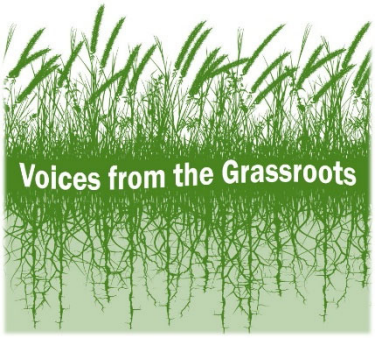
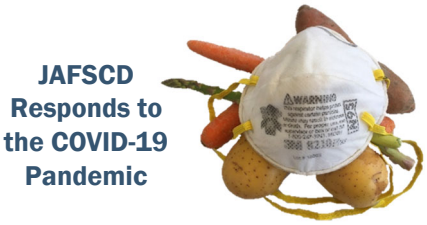
Community gardening during times of crisis: Recommendations for community-engaged dialogue, research, and praxis





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Abstract

Using ongoing reflections from our recent work as members of a community gardening initiative, we outline relevant priorities for researchers, policymakers, and community practitioners to examine the role of community gardens in addressing the effects of COVID-19 on the lives of intersectionally diverse growers. To understand how COVID-

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19 has influenced the practices of community-led urban agricultural spaces, we suggest that future efforts take into consideration three essential areas of focus: uses of community gardening in combating food insecurity during a pandemic, changes in community garden operations in response to crises, and community gardening's role in nurturing emotional well-being.

Introduction

How do community gardens—as spaces to grow fresh and nutritious food—respond to a pandemic socially, politically, and culturally? This essay is informed by the work of a range of stakeholders connected to *The Village Community Garden and Learning Center,*[1] a community garden initiative in Rochester, Minnesota. After introducing our project, we outline three areas of interest to growers, community organizers, students, researchers, and other stakeholders navigating COVID-19's effects on day-to-day operations. We hope that our perspectives encourage conversation among individuals and groups working in projects where food, community gardening, and collective wellness intersect. We also address challenges from the pandemic and our efforts to build new practices that empower our communities.

A Bit About *The Village*

Most of the growers participating in *The Village* live in housing where they do not have access to a garden or larger areas of land,

Left to right: Olivia Allen-Winkler, Kim Sin, Amanda Nigon-Crowley.

(Photo by Chris Allen)

Collard greens and melon trellis.

(Photo by Amanda Nigon-Crowley)

[1] https://www.facebook.com/TheVillageCommunityGarden/

yet they want to grow commodities native to their homeland that they can sell in their communities and at local markets. As an organization serving gardeners from marginalized communities, *The Village* strives to find urban growing spaces with the necessary elements: parking and access to the city bus route, water, and access to a restroom. The gardeners are assigned their own plot to manage for the growing season at no cost (unless they can donate to help with expenses). The organization's steering board seeks local funding and grants to support operations. The gardeners show a willingness to work together on special projects and with the coordinators in managing aspects of the garden. All of the work conducted and produced by *The Village* (such as this essay) centers on the intersectionally rich perspectives of our growers (totaling over 130 heads of households, with over 90% representing non-European, non-Anglo ethnic and racial groups), a steering board (whose membership is around 50% non-European White), as well as the garden's leadership, composed of an academic principal investigator (PI) and community co-PI who represent the two largest communities of growers in the garden—Mexican and Cambodian, respectively.

Summer squash.

(Photo by Amanda Nigon-Crowley)

A Community Garden at a Time of Crisis

Our ongoing conversations as board members, growers, and activist-scholars have highlighted possible issues for further exploration by those looking at the role of community gardens during pandemic times. These spaces can not only provide access to fresh food but also support the collective well-being of racially and/or ethnically minoritized groups and individuals navigating moments of crisis. While these insights are not representative of an agenda that would benefit a more mainstream community gardening audience, we see the importance of our perspectives as highlighting broader social inequities arising from the pandemic, as well as the role of community gardens as possible spaces of social transformation.

The Role of Community Growing Spaces to Grow and Supplement Food During the Pandemic

Community gardens and other spaces can help families weather pandemic-related economic losses by supplementing their diets with nutritious foods (Lal, 2020). In light of the ongoing crisis, what are community gardens' roles in the experience and possible alleviation of individuals' and groups' food insecurity? Using data from a nationally representative sample of U.S. adults, Gonzales and colleagues indicated that families have responded to bouts of pandemic-triggered food insecurity by spending less on groceries, with more than one-third of these having difficulties affording food in addition to other basic needs (2020). Since community gardening has been one of many strategies used by people to access much needed nutritious food, those working in similar initiatives are well positioned to explore how different community garden growers address food insecurity emerging from COVID-19 induced economic issues.

Although the adjustment of supply chain practices has mitigated the bare shelves we saw early in the pandemic, maintain-

ing access to culturally specific food can be difficult for communities of color and immigrants during moments of crisis (Aronson, 2014). Due to employee sickness, store closure, or supply interruptions, small businesses that sell "specialty" food items essential to culturally specific habits are especially at risk. Limited shipping from other countries of specialty crops and additional quarantine requirements have limited supplies and increased the cost of these foods (Gray, 2020). Furthermore, immigrants use community gardening to maintain social and food traditions (Hartwig & Mason, 2016). Our community board members have shared growers' worries about their ability to access culturally specific produce if grocery stores were to close during this or the next wave of this pandemic. Researchers and practitioners alike should examine how community gardening, on a larger scale, may improve access for both gardeners and the greater community to culturally diverse foods during COVID-19 interruptions.

Community Gardens: Pivoting and Responding to COVID-19

The Village has responded to COVID-19 in different ways. During the 2019 growing season, *The Village's* garden plots were assigned at about 75% capacity but were only utilized at about 65%, leaving an acre of land without food production. During the 2020 growing season, which coincided with the pandemic's beginning, the plots were at 100% capacity, with additional growers wait-listed. We also had to develop safe, social-distancing protocols that were linguistically and culturally relevant to our growers. *The Village's* steering board strategized to allocate additional growing space as the number of gardeners increased due to our regional food pantry's diminished capacity and an increase in the number of people seeking space to grow.

Purple heirloom tomatoes.

(Photo by Amanda Nigon-Crowley)

Growers state that the produce from the community garden supplements their food supply and provides places to grow produce from their native countries. Also, several of our growers have asked for increased capacity to grow for their families and to sell in local markets, while others are looking for ways to raise livestock. Many of the long-term growers have stated that the community garden, as a whole, looks better than it has in the past. They have shared that the garden has provided an aesthetically pleasing space (in addition to the other forms of support they have received from our garden coordinator and volunteers since the pandemic began) during a chaotic moment in time. Our steering committee is looking for ways to support our gardeners further as they navigate the pandemic.

Community gardens (and the desire to grow one's food) have blossomed over the last decade. Still, the pandemic advanced this desire so significantly that most seed companies temporarily stopped taking orders in spring 2020 so they could catch up with demand. Locally, this occurred at our Seed Library at the Rochester Public Library, and regionally at seed houses within 100 miles of Rochester. To meet the increased demand for growing food after Minneapolis's calls for justice in the wake of George Floyd's death, in addition to COVID-19, newly created organizations sought donations to supply community gardens with seeds and vegetable transplants in food-insecure and low-income areas. While some growers were starting seeds and planting, the need for community gardens such as ours has expanded.

Our local food bank, which serves the broader southern Minnesota region, could not distribute

fresh food and could not take fresh vegetable donations, significantly limiting access. Other food banks, such as the one serving local university students, had to change operations and work on procedures and guidelines for staff before accepting donations from *The Village*. This created a gap in services for many people who relied on assistance to meet their food needs.

Winter melons.

(Photo by Amanda Nigon-Crowley)

Community Gardens as "Beyond Food" Spaces

Individuals are currently experiencing a loss of connection and increased isolation from COVID-19 stay-at-home orders (Berg-Weger & Morley, 2020; Vannini, 2020). Community gardening increases social capital, social support, and social connectedness (Kingsley & Townsend, 2006). Participants see them as spaces to connect and socialize with others outside their social networks and improve their sense of cohesion. In some communities—especially after trauma, disaster, or tragedy—gardening has been used to promote healing. Examples of this include gardens established by survivors of Hurricane Katrina, refugees after immigration (Bailey, 2017), the community garden established in Christchurch, New Zealand, in response to the earthquakes (Shimpo, Wesener, & McWilliam, 2019), and, most recently, citizens in North Minneapolis after the murder of George Floyd (Townsend, 2020). As we start working to collect qualitative and quantitative data on how our gardeners benefit from *The Village*, we encourage others to map out and share how growing spaces in their localities are helping various communities, both mainstream and minoritized.

Community gardens such as *The Village* continue to provide communities, especially those multiply marginalized, to maintain existing connections. Via the link to other gardeners—even when these interactions occur in a socially distanced fashion—we have noticed that ownership of plots has provided social and emotional support during the pandemic. Our ongoing ethnographic forays and exploratory interviews with gardeners show that *The Village* has provided much-needed space for well-being during great stress. First, *The Village* has become a place that offers gardeners a healthy social activity during COVID-19, while so many people have idle time due to unemployment or being furloughed. Also, the garden has allowed for the strengthening of social relationships between new and existing gardeners. Finally, we have observed that our community gardeners have benefited from the support of the coordinators, volunteers, and members of the steering board.

Growing Together

In this essay, we outlined three areas of interest to researchers, practitioners, and other stakeholders working in small-scale agricultural initiatives as they respond to the pandemic's effects on their communities. In highlighting possible points of exploration that address the ongoing challenges community gardening projects face from COVID-19, we seek to stimulate conversations on these spaces' role for minoritized communities as similar health crises threaten their relationship to food. COVID-19's unpredictable effects do not make it impossible to plan and map how community gardens and similar-positioned initiatives might creatively respond to issues of access, consumption, and the role of food and small-scale growing initiatives in pandemic times. In closing, we propose that food and community are essential nexuses for building new social justice practices and envisioning a new

normal. In light of the barriers and pressures experienced by our community gardens during crises, we are inspired by the possibilities that these sites can nurture transformative visions that go beyond resignation to a "new normal" into developing ways of building stronger community bonds through collective growing spaces.

Left to right: Anna Oldenburg, Kim Sin, Elena Arsentyeva, and Amanda Nigon-Crowley.

(Photo by Cosmas Nyatwori)

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We would like to thank the members of the growers who have shared their wisdom and their knowledge on matters of gardening and beyond. We would also like to thank members of *The Village*'s steering committee—Kim Sin, Teresa Henderson-Vazquez, Anna Oldenburg, Emiko Walker, Saomakara Khin, and Joshua Miraglia—for their support and work on creating a beautiful space for members of our communities.

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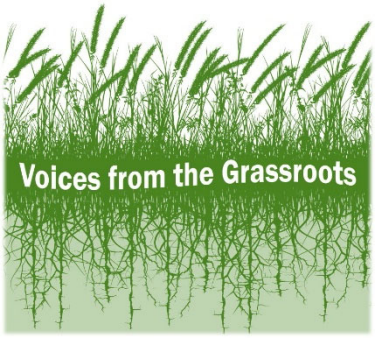
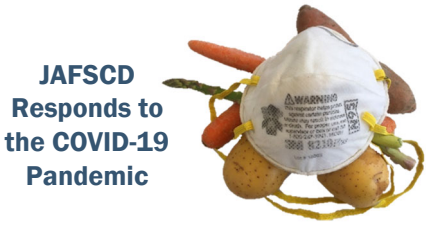
Operation Community Impact responds to food insecurity and challenges faced by dairy producers





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Abstract

For many individuals and families, challenges surrounding food insecurity increased when the pandemic arrived. COVID-19 also created a surplus of fluid milk and led to decreased prices for farmers. Dairy farms nationwide were dumping milk due to decreased demand and lack of storage space at plants. Meanwhile, food pantries were in desperate need of more food to help provide nourishment for the increasing number of individuals facing food insecurity. The Cooperative Extension 4-H and Expanded Food and Nutrition Education Program (EFNEP) programs at the University of Connecticut partnered with dairy processors to secure donations and mobilize Extension volunteers to distribute the donations to food pantries statewide.

Keywords

COVID-19, Pandemic, Coronavirus, Dairy, Milk, Dairy Surplus, Food Donations, Food Banks, Community Impact, Connecticut

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One of every eight residents in Connecticut struggled with food insecurity before COVID-19 (Feeding America, n.d.). For many individuals and families, challenges surrounding food insecurity were only exacerbated when the pandemic arrived.

COVID-19 created a surplus of fluid milk and led to decreased prices for farmers. Dairy farms nationwide were dumping milk due to decreased demand and lack of storage space at plants. Meanwhile, food pantries were in desperate need of more food to help provide nourishment for the increasing number of individuals with food insecurity.

University of Connecticut (UConn) Extension provided the infrastructure, innovative ideas, and staff support to organize Operation Community Impact. The 4-H Fairboard members in Litchfield County had selected this theme at a January 2020 meeting with the goal of reducing food insecurity in their county. The idea expanded statewide in the midst of the COVID-19 pandemic.

A happy customer transports milk from Guida's Dairy. Photo: Berta Andrulis Mette.

Our 4-H and Expanded Food and Nutrition Education Program (EFNEP) programs partnered with dairy processors to secure donations and mobilize our volunteers to distribute the donations to food pantries statewide.

Volunteers have moved the weight equivalent of 10 full-size elephants since distribution began. Dairy Farmers of America, Agri-Mark Cooperative/Cabot Creamery, and H.P. Hood all donated products. Litchfield County has continued delivering milk every two weeks since March. Residents of Litchfield County have raised over US$14,000 in grants and donations to purchase milk for food pantries. To date, Operation Community Impact has:

- Served more than 10,710 families statewide,
- Distributed over 130,000 pounds of dairy products,

Olivia Hall, Maddie Hall, Ellie Hall and their mom, Peg Hall. Peg is a 4-H Club leader, and all three girls are members and officers in the Litchfield County 4-H Fair Association. The family volunteered at every milk delivery. Photo: Jill Davenport, Litchfield Hills Photography, LLC.

- Served 96 food pantries,
- Donated to 57 towns statewide, and
- Had 88 Extension families from the UConn College of Agriculture, Health and Natural Resources donate their time and vehicles for distribution.

A group of volunteers unloads dairy products donated from Cabot. Photo: Donna Liska, University of Connecticut Extension.

UConn 4-H members carry dairy products from the delivery location to vehicles that transport products to food pantries. Photo: Pamela Gray, UConn Extension.

A group of 4-H members and volunteers, Extension educators, and EFNEP program partners deliver the milk from a central drop off location in each county. Other businesses and partners are donating refrigerated trucks and space. Recipients of the dairy products have expressed their gratitude and shared how much the support means to them.

"My residents are elderly and live on fixed incomes," says Cheryl Herzig, manager of a food pantry in Bantam. "For some, they are not able to purchase the dairy items as there is not enough money. Receiving these donations is a dream come true and a luxury for them to enjoy. Most of these people run out of food by the third week of the month and the food donations help support them and allow them to have a meal. We cannot thank you enough for the availability of these donations. It brings tears to some residents' eyes. Thank you so much for allowing this program for our community."

The Freshplace food pantry in Hartford County stated: "Our Freshplace food pantry serves 100 individuals and families in the North end of Hartford—the poorest neighborhoods in Hartford. Most of our participants do not have access to a grocery store and depend on small bodegas that have a limited supply of dairy products and fresh vegetables. This has become a much larger problem due to the current COVID-19 situation. The delivery of the generous

donation of milk will help not only our Freshplace participants but many of our other clients who are having a hard time obtaining food. We have expanded our Freshplace services beyond our Freshplace members to encompass all Chrysalis Center clients in need of food. The milk is an incredible addition to our daily deliveries! Thanks so much—this definitely shows that we are all in this together!"

A Fairfield County food pantry said, "The 115 families that our pantry serves are in significant crisis right now. They are relying on the food pantry for all of their food/meals. Typically, we are very limited in the amounts of dairy products we are able to receive and distribute. The milk, yogurt, and sour cream has made a real impact. Families are now able to add this to their meals, providing a more balanced, nutritional meal and promoting overall health and well-being. THANK YOU!"

Volunteers from many programs participated in the dairy distribution, including 4-H youth members. Several families from Litchfield County have participated in every dairy distribution, often dedicating hours or an entire day away from work for the project. Community service is a key component of the 4-H civic engagement mission. This project provides UConn 4-H members with the opportunity to make a difference in the lives of both consumers and dairy producers.

"Over my seven years in 4-H I have been given many cool community service opportunities, but the dairy outreach community project was by far the most influential," says Madeline Hall, a Litchfield County 4-H member. "It was a huge operation that really helped the community. It was a beautiful sight to see how utterly grateful the pantries and families receiving the milk were. I never knew how many families in Connecticut were in need. I'm so proud to be part of UConn 4-H."

Food insecurity will continue to challenge many residents even after the COVID-19 crisis is over. Our UConn 4-H program is building a sustainable model in which the community members work together to support those in need. The sustained giving from volunteers and donors is supporting our 4-H and EFNEP programs and helping us feed people in communities around the state.

The project results have created new connections in our communities between food pantries and milk processors. The long-term sustainability of the program is helping families in need, increasing milk consumption, and addressing surplus milk issues. It is also making people aware that milk is a local food and that the support of dairy farms has a positive effect in our communities.

Operation Community Impact can be replicated by other dairy cooperatives and organizations. Communities across the country have similar initiatives, and we need to support and expand these efforts. The long-term sustainability and community support will be vital to dairy farmers as they continue adapting to market changes and other situations that arise. Extension can serve as a facilitator for these projects. It has the infrastructure and resources to create connections, as is evidenced by the success of UConn Extension's project.

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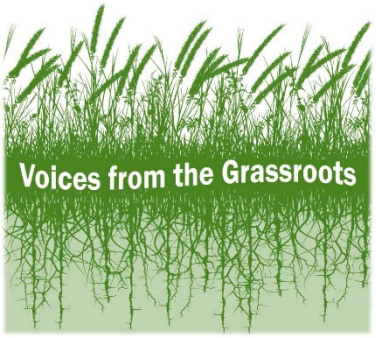
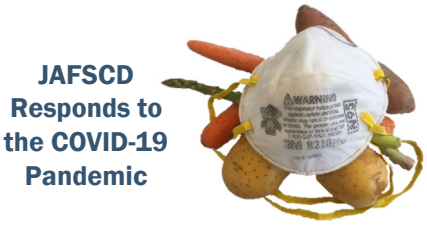
Observations and suggestions during COVID-19: Harnessing pre-existing elements to increase food security





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Abstract

Founded in 2019, Lettuce Harvest Foundation (LHF) is a grassroots urban agriculture nonprofit organization based in Vancouver, Canada. As an organization just launching as COVID-19 took hold, LHF's programming has been designed to enable urban agriculture in light of the pandemic's challenges. This article presents observations and suggestions gained from LHF operations as an organization with limited resources. When COVID-19 put stress on the global food system, it revealed that short-term emergency food relief is insufficient, indicating an urgent need for redesigning our food system. Harnessing pre-existing industry elements for accessible resources is one proposed method that grassroots organizations can adopt to mitigate strains on our food system inflicted by COVID-19 and other future crises.

Keywords

Climate Emergency, COVID-19, Food Security, Global Food Governance, Urban Farming, Grassroots Organizations

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Introduction

Lettuce Harvest Foundation (LHF) is a Vancouver-based urban agriculture nonprofit organization founded in 2019. We transform underutilized yards into volunteer-run urban agriculture sites called Community Farmyards, distributing the harvest throughout our community. We see urban food production as a way to benefit volunteers' diets and build community connections while engaging in climate action and enhancing food security at large. Our role is connecting homeowners with underutilized space to community volunteers and providing expertise to produce a harvest and support a resilient food system.

Lettuce Harvest Foundation is a Vancouver-based urban agriculture nonprofit.

Though founded in 2019, LHF's urban farms have operated solely in 2020. As such, COVID-19 has defined our initiative development. Our programming is designed to allow for physical distancing, limited group size, and altered food and financial security. This article places LHF in the context of COVID-19, shares what we have learned, and explores two observations with suggestions to grassroots organizations operating during COVID-19.

The Lettuce Harvest Foundation team in a weekly updates meeting.
Photo credit: Zoe Beynon-MacKinnon

Observations

We have observed two significant aspects affecting operations. Firstly, COVID-19 has exposed vulnerabilities in our food system, emphasizing the urgent need to focus on a long-term solution rather than react as is typical with short-term responses such as emergency food relief. Vulnerabilities exposed by COVID-19 have regularly manifested in people doubting the safety of grocery store food and increasing their interest in self-provisioning gardens. Secondly, COVID-19 has restricted organizations' resources and complicated the development of safe initiatives. We suggest a mindset change to mitigate this by harnessing pre-existing industry elements as resources, potentially benefiting long-term food security.

Observation One

COVID-19 has shed light on the many holes within our food system that have been long overlooked and underrated. It has placed the necessary strain on the system to exemplify just how vulnerable the global supply chain is to large-scale disruption. While this requires immediate and substantial emergency food relief, to do so without also assessing and reorganizing our food system is ill-guided. Due to the growing presence of the climate breakdown in daily life, we know that 2020 is just the beginning of a series of large-scale disasters and disruptions to the global supply chain. LHF, like many other grassroots nonprofit organizations, is therefore working to change this network, building back a more resilient and responsive food system.

While the need for broad systems change seems self-

explanatory to us, the majority of funding and investment into COVID-19 food relief is focused solely on operations that maintain and support the status quo of food production, distribution, and consumption. We therefore advocate for a paradigm shift around the harnessing of underutilized spaces and resources. In the case of LHF, this takes the form of working with front and back yards donated by homeowners that can be collectively gardened by community members.

Observation Two

Recognizing challenges of implementing long-term solutions to food system strains, we suggest a shift in organizational mindset. We have learned that although COVID-19 inhibits operations and resource acquisition, particularly for grassroots organizations, harnessing pre-existing industry elements as resources is effective. 'Pre-existing elements' refers to unique industry factors that are underutilized and potentially available for use. With COVID-19 threatening survivability, organizations are forced to think creatively about what is valuable. By maintaining this forced mindset after COVID-19 restrictions ease, long-term food system vulnerabilities may be mitigated. On an organizational level, this could increase adaptability and productivity. On a large scale, it could increase resilience during crises, cumulatively enhancing food security using limited resources.

One significant LHF challenge has been obtaining volunteers and yards during COVID-19. LHF utilizes agricultural knowledge and pre-existing land, which are integral, underutilized agricultural inputs. Our summer 2020 plans assumed that growing food was unreasonable, given COVID-19 restrictions. However, with the unexpected support of homeowners, we obtained previously unavailable land and are now growing food in yards that exist whether or not they are used to produce food. In this way, the land is used twice: once as a private yard, and again as a Community Farmyard.

We suggest considering how pre-existing elements extraneous to regular operations, such as community members' yards, could fulfill organizational needs (in our case, these include volunteer knowledge, community garden waitlists, rejected produce, etc.). What is seemingly useless? What is available to your organization and underutilized by others? Can we use COVID-19 factors to enhance food security, such as by utilizing closed parking lots or constructing portable farms? Conventional development requires time and money inaccessible to grassroots organizations during crises. Changing the mindsets of those influencing food security can increase food resilience, enhancing our collective ability to respond and prepare for crises by normalizing quick responses using pre-existing elements. Our hope is that the vital, crisis-driven, creative solutions to food system strains endure, mitigating future challenges and large-scale disruptions.

Conclusion

COVID-19 has exposed vulnerabilities in our global food system that are exacerbated by the looming threat of climate change and disasters requiring short-term relief. LHF, with other grassroots organizations, is working toward systemic change in perceptions of our food system. A change in mindset, though arduous, may eventually create solutions to organizational challenges. Organizations are essential in reorganizing responses to crises from short-term relief to long-term solutions. One potential solution is harnessing pre-existing elements as resources to increase organizational adaptability and collective food security. Addressing food insecurity requires us to be conscious of vulnerabilities and to reimagine the structure of our food system using the resources at hand.

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iZindaba Zokudla: A conversation about food systems change in South Africa

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Abstract
iZindaba Zokudla (IZ) is a multistakeholder engagement project that aims to create opportunities for urban agriculture in a sustainable food system in Johannesburg. IZ implements the *Farmers' Lab,* a social lab used as a transitional mechanism in a larger transition to sustainability. To move the South African urban food system to an ecologically sound, economically productive, and socially equitable system, significant stakeholder integration is needed, and the iZindaba Zokudla *Farmers' Lab* provides that. This reflective essay presents a history of the project (2013 until now) detailing the project's creation of an ecosystem based on social labs that facilitate innovation in the food system. Emergent entrepreneurs and others use the social labs and their activities, as well as stakeholder engagement in their enterprise development, and these *Labs* have created opportunities for applied and other research in the university. This has brought innovation and change to agro-ecological practice in Johannesburg. This reflective essay article situates IZ within the broader evolutionary change in South Africa and considers how conversations about food lead to the creation of sustainable food systems.

Keywords
Multistakeholder Engagement, Social Labs, Urban Agriculture, Social Innovation, Entrepreneurship, Food Systems, Transitions to Sustainability

Introduction: iZindaba Zokudla and South Africa's Food System

In 2013 I held a three-day workshop in Soweto with my colleague Angus Campbell from the University of Johannesburg. We developed a strategic plan for the development of urban agriculture in Soweto, as part of a participatory technology development service-learning project (Campbell & Malan, 2018; Malan, 2020a; Malan & Campbell, 2014). This eventually became known as the iZindaba Zokudla—Conversations about Food

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Farmers' Lab. The name invokes the idea of community deliberation about food through an "iZindaba" (the traditional court of the king) about "Zokudla," (the food that we eat). iZindaba Zokudla (hereafter IZ) organizes the *Farmers' Lab,* which has set in motion a number of changes in the Johannesburg food system. This essay reflects on how this has happened.

Multistakeholder engagement methods developed by the NGO TransForum (Regeer, Mager, & van Oorsouw, 2011; Van Latesteijn & Andeweg, 2011) and REOS Partners (REOS Partners & TransForum, 2011) lie behind the *Lab*. The *Lab* allows emergent producers to draw on resources from the University of Johannesburg, such as the UJ's Process, Energy, Environment, and Technology station (UJ-PEETS)[1] and the UJ Centre for Entrepreneurship[2] (UJCfE) and its forum: Let's Talk Business.[3] The Johannesburg Chamber of Commerce and Industry[4]—an important mainstream stakeholder—has collaborated with IZ to develop a focus on emergent farmers and entrepreneurs. This essay considers how these shifts occurred in the South African food system.

The monthly *Lab* is widely advertised and attracts between 100 and 400 urban farmers and related stakeholders. Due to the apartheid history of South Africa, these farmers and stakeholders are considered emergent, or new, participants in the economy who struggle to establish viable enterprises in the food system. A "social lab" (Hassan, 2014a, 2014b; Kahane, 2010) can bring such actors into the food system by using multistakeholder engagement methodology (Dubbelling, 2010; Regeer et al., 2011; Southern Africa Food Lab [SAFL], 2015; UN Habitat, 2008; Van Latesteijn & Andeweg, 2011) and participatory design methodologies (Manzini, 2014). The monthly *Lab* echoes ideas about food policy councils (see Ledger, 2016) and local traditions of community meetings. The European idea of a living lab (Dutilleul, Birrer, & Mensink, 2010; McGann, Blomkamp, & Lewis, 2018; McGann, Wells, & Blomkamp, 2019) is similar to what IZ has created, albeit located outside the state in civil society. With this *Lab,* I created a unique opportunity to experiment with interactions between the university and society and attempt innovation in the food system. Along with the stakeholders, I have gained important experience on how contemporary actors attempt to change food systems.

The *Lab* is situated in a classical "mercantile-industrial food regime" (McMichael, 2009, p. 143) dominated by a large retail sector (Ledger, 2016) with a sizeable informal sector (Battersby, 2011). Large rural commercial producers dominate agriculture in South Africa (Greenberg, 2010), and they are, as is the case elsewhere, under pressure to transform (Blattner 2020; IPES-Food, 2016; McIntyre, Herren, Wakhungu, & Watson, 2009; NASEM, 2018; Pereira, Karpouzoglou, Doshi, & Frantzeskaki, 2015). South African agriculture is racialized and divided between white commercial agriculture and black emergent and small-scale agriculture. State programs (Broad-Based Black Economic Empowerment Act No. 25899, 2004; Codes of Good Practice on Broad Based Black Economic Empowerment No. 1354, 2017), including land reform, point to racially affirmative targets and outcomes. Unfortunately, "90% of [these] redistributed farms are not productive" (The Economist, 2015, pp. 40–41), and only "around 50 percent have improved … livelihoods" (Cousins, 2018, p. 7). Transformation, in general, has to build a "class" of African food producers in a context where they have been systematically marginalized or "depeasantized" (Bundy, 1988; McMichael, 2005). The *Lab* in this dualistic agricultural structure (Cochet, Anseeuw, & Fréguin-Gresh, 2015) nevertheless aims to create opportunities for urban agriculture in a sustainable food system.

Urbanization (Frayne, Crush, & McLachlan, 2014), capital influx, and modern mall and supermarket development place an emerging South African township entrepreneur in a peculiar position where there is "little chance of … finding a footing

[1] https://www.uj.ac.za/faculties/febe/peets
[2] https://www.uj.ac.za/faculties/cbe/ujcfe
[3] https://www.facebook.com/talkbusinessjohannesburg/
[4] http://www.jcci.co.za/cms/index.php?command=View&item_id=192

in a high-end commercial space to sell his wares" (Mahajan, 2014, p. 2). Townships were and are labor repositories isolated from economic centers and served as key instruments of oppression under apartheid. For urban farmers, these modern mall and supermarket developments can be seen as the urban part of an "adverse incorporation" (Neves & du Toit, 2014, p. 846) into a neoliberal global food system. This may explain why urban agriculture delivers only minor benefits for farmers in South Africa (see Crush & Frayne, 2011; Frayne, McCordic & Shilomboleni, 2014; Ruysenaar, 2013), which is unsurprising (Stewart et al., 2013; Zezza & Tasciotti, 2010), but debatable (Csortan, Ward, & Roetman, 2020; Diekmann, Gray, & Baker, 2018; Dubbelling, 2010; Nkosi, Gumbo, Kroll, & Rudolph, 2014; UN Habitat, 2008). IZ has pioneered methods, events, and processes, albeit peculiar to the immediate context, to enable African and other marginalized producers (like urban farmers and emerging food processors) to gain access to various entry points in the South African food system. This reflective essay addresses a number of key questions for understanding such a transformative approach.

What Does iZindaba Zokudla Do?

IZ hosts, among other events, the *Farmers' Lab* at the Soweto Campus of the University of Johannesburg. This open, facilitated event invites emerging farmers and entrepreneurs, state officials, businesses, and activists to introduce new opportunities, technology, services, products, and systems for emerging entrepreneurs and activists. The Khula! app available on Google Play, and the aparate.co system, were launched in the *Lab*. IZ has influenced submissions to parliament (Rousell, 2017), established seed libraries (Slow Food, 2018), and organized (with the NGO Slow Food) the Soweto Eat-In (since 2016) that showcases the best in heritage, sustainable, and indigenous foods. The *Lab* is an omnibus event that has been able to create "innovative governance arrangements that cross multiple geographic, scalar, and administrative boundaries" (Hammelman et al., 2020, p. 72).

The *Lab* is a transitional mechanism in the broader transition to sustainability in South Africa. Innovation is "a complex, multifaceted and dynamic process involving multiple and changing stakeholders, interacting intimately with its environment, evolving over long periods and unfolding in directions impossible to devise from the start" (Triomphe et al., 2014, p. 54). A social lab recreates the conditions for such innovation to occur as it offers an opportunity for "a sequence of technological and organizational innovations … to take root and [offer] improved opportunities for local communities" (Triomphe et al., 2014, p. 49). IZ and the *Farmers' Lab* have enabled innovation in the Johannesburg food system in the form of publications and opportunities for structured and unstructured interaction. They have also anchored and built relationships between academia, businesses, and stakeholders (Hammelman et al., 2020, p. 80-82). Recalling the history of the project, and the Slow Food Soweto Eat-In, enables a deep understanding of the key themes and concerns in such transitions to a more sustainable food system. I now turn to a discussion of the leading themes underlying a transition to sustainability in order to show how they can be utilized as a means to effect change in the food system.

iZindaba Zokudla and Transitions to Sustainability

Transformation after Apartheid

A sustainable food system in South Africa firstly implies a de-racialized economy with increased participation by previously marginalized (mostly African) entrepreneurs. The next step includes sustainability in their enterprises by adopting sustainable (ecological, social, and economic) production methods, such as appropriate technology and circular economy business models, and the delivery of sustainable products that have low ecological impacts and equitable redistribution. A true achievement of a sustainable food system would result from the networks, synergies, and interactions among actors and stakeholders in the system. The emergence of innovative enterprises that deliver social benefit and transformation goals is certainly due to evolutionary drivers in South African society that emphasize de-racialization, small-farmer development, and township revitalization (Cochet et al., 2015). These innovative enterprises

are also a background driver of an evolutionary transition in South Africa (Friedmann & McMichael, 1989; Geels & Schot 2007). As the facilitator, I had the opportunity to strategically interpret emerging farmer development as a problem of entrepreneurship and deliberately enabled coalitions among stakeholders to focus on it. This implies methodological, associative, and narrative dimensions, and below I show how these are valuable in a transition to sustainability.

Small farmers need to be "entangled" with stakeholders (Latour, 2007, pp. 84, 136) to shape an inclusive transition (Garud & Gehman, 2012; Pereira, Drimie, Maciejewski, Tonissen, & Biggs, 2020). Within this evolutionary context, associations, networks, social capital as a relational driver, and narratives and stories about the past and future as durational drivers (Coenen, Benneworth, & Truffer, 2012), play a role. Transitions show interactions among associations, innovations, and actors, narratives of change, and the political economy (Pereira et al., 2020).

Facilitation and Methods as Means to Food Systems Change

Facilitative methods that allow for diverse cross-society interaction aim to create interpersonal change (Bojer, Roehl, Knuth, & Magner, 2008; Kahane, 2010; Regeer et al., 2011) through meeting "the other." This is necessary for meaningful innovation in a divided society. Participation starts when we shift from thinking, "someone should" to "I will," as this enables "actors to … undertake individual and collective actions … to shift the system" (Kahane, 2010, pp. 118, 125). Facilitation and events enable people's agency to influence deeper processes (Nogueira et al., 2020). Cross-society interaction can subvert differences among people (Anderson & McLachlan, 2015) and build "bridges" between knowledge systems by "layering" different kinds of knowledge and interests alongside each other. As a result, new activities, narratives, and a "transmedia" emerge that make scientific and other meanings accessible. Facilitative methods create social "raw material" that entrepreneurs use to create their enterprises, and these embody a further transition to a sustainable system (Lynde, 2020; Malan, 2020b; Tobias, Mair, & Barbosa-Leiker, 2013). Below I discuss how the facilitation of the *Farmers' Lab* makes such systemic innovation possible.

Creating Stories of Change

Methods build networks, associations, and communities, and enable us, providing a safe space (Bennet et al., 2016; Kahane, 2010; Pereira et al., 2015) to reconstruct and narrate the past, present, and future. Narratives are important for the generational nature of sustainable development, as anything can be recycled as narrative, from geography, to opportunities, to technologies, and synergies among systems and enterprises become possible through our stories. A narrative about sustainability thus has technical benefits because a narrative can show how new technical information can be used and re-used. I show this by reflecting on the Slow Food Soweto Eat-In and how such narratives have shaped the activities of IZ and how entrepreneurs create their enterprises.

Building Networks and Narratives

A "safe space" allows actors to "support diverse, autocatalytic networks of human agents that can propel transformation toward goals such as sustainable energy" or food (Lenton & Latour 2018, p. 1067). The emergence of autocatalytic or self-organizing networks among stakeholders and actors results from evolutionary shifts, narratives, and methods, but primarily from the associative behavior of actors. Social change lies outside the capability of a single actor but is possible in the form of a "cascade" of changes that emerges when actors and actions enable others to act (Latour, 2007).

These cross-society networks can be described in terms of social capital (Herbel & Haddad, 2012; Malan, 2015), networks and power (Castells, 2009) and how actors can use objects and persons in their strategic activities—often through narratives that "animate" an "autocatalytic" network or community. Bonding social capital among similar actors is necessary for both an emergent African class of producers to emerge collectively and for a territorial or local focus to become visible. However, the need for systemic innovation, and to break local parochialism, requires a form of bridging social capital among dissimilar actors, and, here, examples

of cross-sector and society linkages are offered that utilize narratives and other cues to build such networks (that, in turn, can lead to the formation of enterprises).

Narratives allow an actor to sequence social capital, technology, networks, and stakeholders, among other things, as part of enterprise development and an evolutionary shift in society. However, great systemic change will emerge if we can form bonds among highly diverse actors that link local actors with globally significant issues and stakeholders. Linking social capital unifies broader forces in society. To understand this, I offer dense descriptions that show how narratives and actions, events, stakeholders, and other cues can motivate networks, sectors, and entire economies and societies to move in a particular direction. I then reflect on how such grand change can be attempted from a local vantage point.

This approach to social change is consistent with practitioners who advocate for simultaneous change in many places in the system (Burns, 2012, 2014) and the "polycentric" governance (Ruysenaar, 2013; Pereira & Drimie, 2016) of transitions. Such approaches can accommodate inclusion and experimentation (Bennett et al., 2015), continuous learning and scaling (Pereira et al., 2015), and disrupt existing paths of practice (Jørgensen, 2012; Regeer et al., 2011). To make sense of this, I reflect on how background political evolutionary drivers in IZ create opportunities for a transition, how methodological interventions make a difference, and why associations are important in utilizing stories of the past, present, and future to enable shifts to sustainability.

The Soweto Eat-In may be a singular case of change (Yin, 2009) that emphasizes how emerging farmers can build cross-society linkages. The broader history of IZ allows me to show how narratives and general activities can be utilized in building coalitions of actors across social divides.

Sources of Knowledge and the Organization of the Case Study

There has been very little original material published on IZ. The Facebook page[5] and website[6] are true but very partial reflections of the events and activities the project undertakes. This article draws on my experiences as the convener of IZ, my field notes, occasional interviews, and numerous conversations to present a short chronological and thematic history of this project. I have kept detailed records of the project. Publicly visible social media, open discussions during the events the project hosts, semiconfidential information on social media, and my confidential field notes inform the case study. As both an academic and an activist, I can offer a grounded description of the project, albeit with a complex of different kinds of public and confidential information. The article does not offer objective empirical knowledge, but rather an insiders' (and mild) activist perspective on the events and activities of the project. It is aimed at practical enlightenment and theoretical reflection. Because it is impossible to obtain direct consent from all respondents (some gave it in the context of a confidential interview), this article is ethnographic in character. It tries to abstract the knowledge gained and may, at times, conceal identities as it aims firstly to deliberate on abstract issues in the food system. However, given that most of the activities presented here were made in public, I unavoidably refer to some organizations and individuals in an identifiable way.

A History of iZindaba Zokudla

Our initial 2013 workshops created a strategic plan for urban agriculture in Soweto. The workshops aimed to embed the initial service-learning activities in a broader context. I conducted four months of prior fieldwork to enable a contextual understanding of the area and to mobilize stakeholders for the workshops. This strategic plan, created using a variation of open space methodology and a SWOT analysis done by a local, organic intellectual, identified key focus areas for urban agricultural development. This plan presents a crucial picture of what needs to change to support urban agriculture in Soweto. The plan emphasized eight key focus areas for change:

[5] https://www.facebook.com/IzindabaZokudla/
[6] https://izindabazokudla.com

1. Land and Water (Soil);
2. Relevant Stakeholders (Authorities, Extension Officers);
3. Training (Youth, Skills, Information);
4. Tools (Greenhouse, Tractor, Technology, Infrastructure);
5. Marketing (Transport, Business development, Agro-processing);
6. Organizational Development (Cooperatives, Labor);
7. Permaculture (Pests, Seeds, Composting); and
8. Security (Theft, Fencing).

The third focus area (training) was, in fact, on some posters in the workshop presented as a farmers' school—the initial name for the *Farmers' Lab*. The reference to permaculture is an important marker of the desirability of a biologically based agriculture, but also of the economic, political, and other choices farmers want to make as they farm.

These workshops triggered a proliferation of unplanned activities when a few invited academics came on the wrong day. Christa van Zyl (2014) developed participatory design methods for graphic design, and Joyce Sibeko established a relationship between iZindaba Zokudla and the UJ Centre for Entrepreneurship. These shifts in the university fortuitously linked IZ to its current entrepreneurial focus. Ancillary and unplanned activities parallel to mainstream interventions do emerge from social labs as actors use such workshops for their own projects (Nogueira et al., 2020). This pluralizes activities and creates alternative avenues of action for participants that are important in safeguarding the autonomy of actors and stakeholders.

Angus Campbell and I implemented the participatory technology development service-learning courses in 2014 (Campbell & Malan, 2018; Malan, 2020a; Malan & Campbell, 2014), and I held four additional workshops with educators on school gardens. The School Garden Dialogues aimed to persuade schools to combine agriculture and entrepreneurship. Unfortunately, this was abandoned after participation by teachers dwindled, and in the first interview that took place in April 2015, officials mentioned the difficulties of breaking the silos in the then Department of Education. However, many of these educators and farmers are still regulars at the *Farmers' Lab*.

The *Farmers' Lab*, the key event in IZ, emerged after it became clear that the participatory technology development service-learning course could not continue due to the difficulty of coordinating humanities and design students' schedules, although students found the activities very enriching (Campbell & Malan, 2018; Malan, 2020a). Participatory and intermediate technology design nevertheless became part of Angus Campbell's research program, albeit implemented at the master's level (Brand, 2014; Brown, 2017; Harrison, 2017). The program offers clear lessons on how we can design for progressive outcomes (Campbell, 2017; Campbell & Brown, 2018; Campbell & Harrison, 2015).

The *Lab* emerged almost by accident after a nearby institution offered to teach informal agriculture courses at the *Lab* but withdrew at the last minute. A local farmer, certified as a master permaculture trainer, stood in to teach for half a day at each *Lab*. This gave birth to the idea to use local farmers to lecture on important topics in the *Lab*. As a pleasant side effect, this structure also helped us realize how to enhance the density and number of relationships among farmers and entrepreneurs. From these beginnings, the current format of the *Labs* that combines local and outside experts emerged iteratively by trial and error, as well as through theoretical reflection on the needs of systemic change.

The *Lab,* hosted once a month and up to 10 times a year (as opposed to twice a month in 2015/16), attracts numerous stakeholders, as was the case with Slow Food. This NGO endeavors to empower emergent farmers to protect traditional, heritage, and other foods, by helping them overcome cost barriers. Subsequently, the *Lab* significantly lowers the opportunity cost for businesses, activists, and the state to interact with such emergent entrepreneurs. The *Lab* allows stakeholders and actors to develop projects, networks, and relationships among themselves, and this has implications for systemic change. These events organize and re-organize stakeholders, keep them updated, solicit additional participation, and make available ample information and goodwill to implement

interventions. The *Lab* is utilized as a safe space, which lowers the cost of autonomous action, as ideas can be pitched in the *Lab* before costly real-world implementation.

Daily Program

The *Lab* is a rowdy affair with anywhere from 100 to 400 participants arriving for the day. Participants include farmers and food processors, students volunteering time at the *Lab,* entrepreneurs (who are often looking for products or clients), stakeholders to change, and the occasional surprise visitor. Farmers bring produce to sell at the *Lab,* and there have even been attempts to institute some farmers markets at the events. This rowdy plurality of participants provides the raw material needed for innovative practices and forms the basis of further action. Reflection on the daily program enables deeper methodological understanding.

The daily program is controlled by an agenda inclusive of the theme of the day, which is announced on the media. The themes are often determined in an end-of-year evaluation and planning session. As the facilitator, I also deliver a formal editorial, which sets the theme for the day. Anyone can make an announcement in the subsequent announcements hour, and these are captured through photos and video. Details of the opportunity are written down on the blackboard, posted on Facebook and aparate.co pages, and also typed up in a report published on Facebook. This leaves a digital record of the project, which enables any participant to retrieve details of the event and network at any time. This is followed by an expert-to-farmer and farmer-to-farmer lecture, often on the same topic and presented in a vernacular language that enables immediate understanding of complex topics like technology or new services.

Each event is further documented through an attendance register, an SMS notification system, a sign-up sheet for farmers to be allocated a formal slot in next week's proceedings, other documentation that a stakeholder might need, and a declaration of ethics for the event. This enables the development of the next event's agenda and enables record-keeping and advertising. The documents on the activities of each day—the editorial, a report on the day, and ad hoc documentation—leave a trace for further study as everything is posted on Facebook and aparate.co. This creates a plurality of records for each event that anyone can use to organize themselves or others. This proto-digital participatory project management system (Malan & van der Walt, 2019) led to the development of IZ's website[7] by Juanita van der Walt.

Yearly Program

The daily program of the *Lab* runs parallel to a yearly program that is developed at the beginning or end of each year using variations of Open Space and World Café in an evaluation and planning exercise. This is difficult to follow due to inconsistent presenters but gives participants control over the proceedings. Participatory methods that need time and focus stand in some tension with the plurality of the event. Specific issues, however, can be attended to in the *Lab,* as the African Centre for Biodiversity (ACBIO) did when they workshopped seed libraries and their submission to parliament in August 2017. The agenda changes often depending on which stakeholders participate on a particular day, but the events nevertheless enable structured engagement. Independent retailers, for instance, have used the *Lab* to build competitive supply chains that recruit farmers by declaring the percentage of shelf prices that will be paid to them. This makes them accountable in public and, in fact, governs the food system. Those who aim to host similar events could develop a yearly program along production cycles and perennial themes, say, for a producer group. The *Lab,* however, is best for pluralizing such a program as alternative actors will surely emerge, and this can lead to great dynamism among stakeholders, given that a single stakeholder cannot capture a group of farmers. Participants can also control how stakeholders may gain access to them.

The *Lab* serves as a meeting place and opportunity for singular actors to expand their reach by making use of the material in the *Lab* for their own enterprise development. Broader movements have emerged, like an iZindaba Zokudla forum in

[7] https://www.izindabazokudla.com/

another city with a companion page on Facebook.[8] The *Lab* reduces risks and costs of enterprise development and elicits specialist support from a broad coalition of stakeholders as information and opportunities, technologies, and services are offered. It enables both stakeholders and entrepreneurs to renegotiate standard and blueprint ideas on agricultural and enterprise development. This is where innovation lies: in the interactions among peers in a public space.

Such innovation emerges from the program of the *Lab:* The first announcement made in the *Lab* was by a local chicken-feed maker who sought and immediately started trading with local chicken farmers. These announcements are used regularly by UJ-PEETS, UJCfE, and activists to recruit stakeholders. Some entrepreneurs use the hour to market their business, and many use it to gauge client reactions to new products. The *Lab* hosts movie screenings, has organized ancillary activities like a gardens tour in Soweto for farmers, and has facilitated the planning for a greater event, the Slow Food Soweto Eat-In. This has enabled a broad ecosystem wherein actors and stakeholders can operate and has resulted in interesting developments in the food system in Soweto, Johannesburg. However, the building of formations with and beyond social capital connections is what is most interesting of IZ. To understand this, it is necessary to reflect on the Slow Food Soweto Eat-Ins, as these bring together a greater cross-section of stakeholders to food systems change in South Africa.

The Slow Food Soweto Eat-In

The Soweto Eat-In (2016, 2017, and 2018) is a key institutional opportunity that has catalyzed a cascade of additional changes by bringing together a diversity of actors in the food system. An "eat-in" is a European tradition of gathering in the village square for a communal meal. Slow Food Johannesburg and the South African Chef's Association had been hosting eat-ins at various wealthy country clubs and resorts. However, they had a more compelling interest in hosting an event in a South African Township. The series of events that led to the creation of the Soweto Eat-in illustrates how a cascade of changes can emerge in a food system.

The *Lab* hosted a Food Processing Day in April 2016 with lectures from both chefs and local caterers. Caroline McCann, a representative of Slow Food International, suggested that we incorporate local caterers in the planned Eat-In. The *Lab* on the day could further organize farmers for a farmers market at the Eat-In. This allowed me to further innovate, and I suggested creating a Free People's Conference, which brought public dialogue and significant new stakeholders, such as a local chapter of the FAO, to the event. This cascade of features was built upon the current Slow Food and the South African Chefs Association's cooking competition and led to a multifaceted event.

The Free People's Conference at the Soweto Eat-In was an open and free conference that facilitated dialogue about the food system among diverse stakeholders, experts, and laypersons through panel discussions on a range of topics. This conference, nested in the greater event and slogan of "good, clean and fair" food (Slow Food, 2018), creates narratives, product profiles, and enterprise models for emerging entrepreneurs. The South African Chefs Association's cooking competition utilized a free-range, grass-fed Nguni cow (an indigenous breed) that emphasized sustainable eating. This eventually included the Skaftini (lunchbox) challenge that emphasized a healthy lunchbox for the National School Nutrition Program. This layered yet another meaning onto the event. A *Farmers' Lab* team competed in this challenge in 2016, which led to Slow Food sponsoring them on an entrepreneurship course. All of these chefs subsequently established new enterprises.

The Eat-In as an event highlights the effectiveness of a networked and locally based strategy for change. I mentioned in my notes that we could piggyback on the larger organizational capabilities of Slow Food for this event, as Slow Food did with IZ to reach emerging farmers. This opportunity to build two-way, mutually beneficial networks led to a cascade of innovations that radically differentiated the Eat-Ins from their European counterparts.

[8] https://www.facebook.com/IzindabaZokudlaPage/

This enabled all stakeholders, particularly emerging and new ones, to achieve more than they themselves could do on their own. This integration of interests was how the event became possible and brought together not only the author, but also newer stakeholders, like the South African Chefs Association, and the wider university. The Seven Colors Market that commenced immediately after the Eat-In on the same site boosted the network and local character of the event even further. This fortuitously linked food as a theme to a broader entertainment agenda and increased the reach and appeal of the event. Besides the branding value, it illustrates how innovation can flow through a network, which catalyzes action.

IZ and its activities enable us to reflect on the key trajectories a food system needs to go through to reach sustainability. I emphasize below the most interesting and important lessons we may gain from IZ. An approach to enterprise development that draws on stakeholder engagement as opposed to technical learning and mentoring, within an events-based social innovation system, is elucidated. Forms of social capital or networks were animated by broader narratives and facilitative methods and opportunities. This enables me to comment on how activists and practitioners can advance a progressive agenda through a system of social labs.

Reflecting on a Transitional Mechanism: Food Systems Change as a Conversation about Food

South African policies (DAFF, 2008) advocate a participatory and institutional solution to innovation in agriculture and society (Ledger, 2016; Pereira et al., 2015) that can lead to autocatalytic change "composed of many elements already in existence, albeit reconfigured and combined with new participants, ideas, infrastructure, and technologies" (Bennet et al. 2016, p. 442). In the first *Lab* (May 2015), a participant commented on how the same people who were chased around the university by security forces during apartheid were now receiving free instructions at the same place. The background transition from apartheid is significant as a systemic transition, and my conclusions reflect on this systemic change as opposed to the minutiae of enterprise development.

However, what is a safe space for innovation? The *Lab* as an open and free event conditions systemic changes as opposed to changes in farmers' organization. IZ can avoid organizational issues and conflicts as there are no members, and participation is completely open. Participants cannot draw on IZ for resources as it has none, and this avoids activities that only serve one organization. Participation is thus also risk-free. The event has benefits because actors can use the information and opportunities toward their own interests.

The free Wi-Fi and the SMS notifications create a sense of inclusion and belonging among participants but cannot bind participants to a set agenda. The fact that enterprises need to be pursued independently of IZ has deeper systemic effects and creates conditions best suited to building a class of Africa producers rather than organizing them all into a singular association. A singular association will undoubtedly narrow down production systems and possibly reify emergent producers into set production regimes. Innovation needs experimentation, which means that farmers act autonomously in realizing their interests in new ways. The innovations needed are not grand innovations but iterative changes to local food enterprises.

The *Lab* allows stakeholders to make such changes by planning their own engagement with stakeholders and opportunities. Actors should be able to freely mix bonding, bridging, and linking social capital to suit their interests. This is what one would expect of mature enterprises, and this must be encouraged among emerging entrepreneurs as well. They cannot all be bound by a singular technology or new production routine, which is prevalent in technology-driven agencies. The low costs of engagement allow many stakeholders who also want to empower farmers to do so without capturing them, thereby benefitting emerging entrepreneurs as opposed to powerful stakeholders.

The *Lab* enabled farmers to build relationships among themselves, and this bonding social capital is evident in the collaborative announcement hour that allows farmers and others to trade among themselves. This was very difficult in the past due

to the isolated nature of townships and is important for the broader economic development of South Africa.

The way entrepreneurs built relationships among themselves drew significantly from narratives of broader political transition but added stories about permaculture, organic or imvelo (natural) farming, and local township self-reliance. Food production at this scale is indeed lucrative (Nkosi et al. 2014), and the *Lab* has emphasized the ecological base of such viable food gardens and farms. This has created a narrative of how a township-based enterprise can survive and has led to a series of videos on the Facebook page and website on how to build a circular economy. The *Lab* cannot create such enterprises but can give actors the confidence to develop them by making suggestions to enterprises that trade locally and on a small scale.

The *Lab* has also made possible relationships beyond the immediate context by linking with local state officials, activists, and academics. Soon after implementing the *Lab,* I was invited to a similar workshop session by the city of Johannesburg (March 2015) using these methods. Because an open *Lab* is not owned by anyone, anyone can use the lab to recruit farmers and entrepreneurs, and many do. The mere existence of such a lab has effects across society. Because multiple presenters are often invited, no single actor can capture the event. However, supply and value chains, which are forms of association, can be made much more transparent in this way and enable emerging entrepreneurs to trade selectively, so they benefit themselves. This governs the market.

While associations can build the synergies we need for sustainable development, they may not be able to bridge the gap between bonding and bridging and linking social capital. The forms of association needed for a transition to sustainability have to bridge this gap. IZ suggests that networks would be more important than organizations and close associations, as they narrow the scope for innovation by relying almost exclusively on bonding social capital. Bridging and linking social capital is key in innovation, particularly if technology is incorporated in enterprises. My experience suggests that the right narratives need to be employed alongside networks and stakeholders to realize this. Facilitation is needed, but the overall character of the engagement event is also pertinent. Open events allow a broader diversity of networking, and this allows actors to find the right connections, albeit by trial and error.

The Slow Food Eat-In demonstrates how to create such synergies. Slow Food International, a large, respected organization (while Slow Food South Africa is fledgling), brings a superstructure wherein members and representatives of numerous other activist organizations can participate. The layering of organizations at this event, the Free People's conferences that attracted both academics and many ordinary people from both the local area and from *outside* the townships, and the resulting interaction and innovation give meaning to the idea of a safe space. Underneath the broader superstructure of Slow Food's narrative of "good, clean and fair," we mobilized diverse organizations, and this avoided the parochialism of an exclusive, say, "organic" focus (Anderson & McLachlan, 2015, p. 13).

Conclusion

IZ, the *Farmers' Lab,* the Slow Food Soweto Eat-In, and a series of related events enabled emergent farmers to seize opportunities in the South African political transition and move towards sustainability. To realize sustainability, networks may be more important than farmers' organizations, and interaction among stakeholders needs to be facilitated. But above all, it is the stories we tell about change that re-organize society for sustainability.

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Multi-objective optimization identifies trade-offs between self-sufficiency and environmental impacts of regional agriculture in Baden-Württemberg, Germany

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Abstract

Regional food supply, organic farming, and changing food consumption are three major strategies to reduce the environmental impacts of the agricultural sector. In the German Federal State of Baden-Württemberg (population: 11 million), multiple policy and economic incentives drive the uptake of these three strategies, but quantitative assessments of their overall impact abatement potential are lacking. Here, the question of how much food can be produced regionally while keeping environmental impacts within political targets is tackled by comparing a scenario of maximum productivity to an optimal solution obtained with a multi-objective optimization (MO) approach. The investigation covers almost the entirety of productive land in the state, two production practices (organic or conventional), four environmental impact categories, and three demand scenarios (base, vegetarian, and vegan). We present an area-based indicator to quantify the self-sufficiency of regional food supply, as well as the database required for its calculation. Environmental impacts are determined using life cycle assessment. Governmental goals for reducing environmental impacts from agriculture are used by the MO to determine and later rate the different Pareto-efficient solutions, resulting in an optimal solution for regional food supply under environmental constraints. In the scenario of maximal output, self-sufficiency of food supply ranged between 61% and 66% (depending on the diet), and most political targets could not be met. On the other hand, the optimal solution showed a higher share of organic production (ca. 40%–80% com-

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pared to 0%) and lower self-sufficiency values (between 40% and 50%) but performs substantially better in meeting political targets for environmental impact reduction. At the county level, self-sufficiency varies between 2% for densely populated urban districts and 80% for rural counties. These results help policy-makers benchmark and refine their goalsetting regarding regional self-sufficiency and environmental impact reduction, thus ensuring effective policymaking for sustainable community development.

Keywords
Environmental Impact, Evolutionary Algorithm, Foodshed, Life Cycle Assessment, Multi-Objective Optimization, Organic Farming, Regional Agriculture, Self-Sufficiency, Scenario Analysis, Germany

Introduction and Literature Review

Problem Setting

Agriculture and animal husbandry contribute significantly to the two most pressing environmental problems globally: climate change and nitrogen pollution (Smith et al., 2014; UNEP, 2013). At the same time, they form the largest employment sector in developing economies and still employ 27 million people in the Organization for Economic Co-operation and Development (OECD) countries (OECD, 2019). Agriculture and animal husbandry are directly linked to and affected by the Sustainable Development Goals and related targets (United Nations General Assembly, 2015), including the goals 'Zero Hunger,' 'Responsible Consumption and Production,' and 'Life on Land.' Transforming food production systems is, therefore, a major leverage point for sustainable development, both from the environmental and the health and social perspectives (Foley et al., 2011; Schmidt-Traub, Obersteiner, & Mosnier, 2019; Tilman & Clark, 2014).

Regional and Organic Agriculture

In developed economies, regional and organic agriculture are two widely discussed and promoted supply-side solutions for sustainable food provision. Further, consumers are often willing to pay higher prices for these products compared to conventional and non-regional products (Brunori et al., 2016; Theurl, 2016).

Organic agriculture, defined as an integrated farming system that strives for sustainability, the enhancement of soil fertility, and biological diversity, is an ongoing sustainability transformation in the sector that can cause less environmental damage and greenhouse gas (GHG) emissions per hectare than conventional agriculture (Badgley et al., 2007; Erb et al., 2009; Muller et al., 2017; Reganold & Wachter, 2016). Meta-studies on the topic outline that organic farming leads to significantly higher soil organic matter content and soil nitrogen, an increase in biodiversity, and a decrease in energy turnover (Mondelaers, Aertsens, & van Huylenbroek, 2009; Tuomisto, Hodge, Riordan, & Macdonald, 2012). Yet these benefits generally come with lower yields (Seufert, Ramankutty, & Foley, 2012), which leads to higher land use compared to conventional food production. Due to the often lower yields in organic production, organic agriculture's per product impacts can be higher than those from conventional agriculture (Seufert & Ramankutty, 2017), and its potential to create and ensure food security worldwide is limited (Connor, 2008; Seufert et al., 2012).

The spatial extent of food supply chains is another debated issue in sustainable food production (Born & Purcell, 2006; Brunori et al., 2016; Edwards-Jones, 2010; Edwards-Jones et al., 2008). Recently, there has been an increasing demand for regionally produced food in Germany (Feldmann & Hamm, 2015) because many consumers expect social and environmental benefits from its consumption (Zepeda & Deal, 2009). However, the actual environmental impacts of regional agriculture are highly debated. For example, Schlich and Fleissner (2005) showed that, regarding energy turnover, traveling distance is of minor concern compared to production practices, at least for some products. They argue that due to efficiency of scale, large businesses produce more efficiently than smaller ones. Contrarily, Andersson and Ohlsson (1999) came to the conclusion that besides a lower energy turnover, smaller bread production systems have less impact on eutrophication, acidification, and ozone-depleting substance

formation compared to a larger, industrial one. Similarly ambiguous are the results of several studies that compared the footprint of apples consumed in Europe, originating from Europe and New Zealand respectively (Jones, 2002; Milà i Canals, Cowell, Sim, & Basson, 2007; Saunders, Barber, & Taylor, 2006; Stadig, 2001). Edwards-Jones et al. (2008) highlighted the importance of system boundary definitions and advocated for the inclusion of social and economic factors when evaluating whether local food is the better option or not. Currently, the share of organic products consumed in Germany is rising (Statista, 2013), and regional products are politically supported (e.g., in the German federal state of Baden-Wuerttemberg; MLR, 2017).

Trade-offs in Agriculture and Multi-objective Considerations

Maximizing the output of an agricultural production system is optimal in terms of demand fulfillment but not in terms of environmental pressures. Trade-offs between different sustainable development goals also exist for regional food production. A widely used technique to analyze such trade-offs in agriculture is multi-objective optimization (MO) (Holzkämper, Klein, Seppelt, & Fuhrer, 2015). For example, Lautenbach, Volk, Strauch, Whittaker, and Seppelt (2013) used MO to assess the trade-off between biofuel and food production in terms of their respective yields, water discharge, and nitrate leaching. They concluded that the methodology can be a helpful tool in the management of ecosystem services. A study conducted by Galán-Martín, Vaskan, Antón, Esteller, and Guillén-Gosálbez (2017) used results of life cycle assessments to optimally allocate agricultural land to either rain-fed or irrigated wheat production in Spain.

Trade-offs also apply to regional production of organic food: It may be possible to decrease environmental impacts by scaling up organic agriculture, but this is likely to decrease the amount of food that can be produced within a region due to lower yields (Zasada et al., 2019). While trade-off relationships between environmental impacts and productivity of organic farming are addressed frequently in the literature (Azadi, Schoonbeek, Mahmoudi, Derudder, De Maeyer, & Witlox, 2011; Seufert et al., 2012; Tuomisto et al., 2012), their connection to regional self-sufficiency of agricultural products (lower productivity means lower self-sufficiency rates) has not been studied in detail.

Research Gap, Goal, and Scope

In particular, the question of how regional food supply potential changes if different environmental impacts are included in the optimization process is understudied. A prerequisite for such an analysis would be an indicator for a region's potential self-sufficiency (e.g., what is possible with given socio-geographic conditions?). Although many indicators exist that represent the status-quo regarding a region's self-sufficiency (Blay-Palmer, Santini, Dubbeling, Renting, Taguchi, & Giordano, 2018; Pradhan, Lüdeke, Reusser, & Kropp, 2014; Strolling of the heifers, 2019), none of them is suitable to calculate potential self-sufficiency rates under different scenarios. This is because they use actual production, or monetary data instead of estimating production based on the agricultural land and its use. A research tool that determines how self-sufficiency changes under different demand scenarios and environmental impact reduction targets could not be found in the literature either.

The German Federal State of Baden-Wurttemberg (BW) has strong lobby group and political support for organic regional agriculture, e.g., in the form of so-called "bio-pioneer regions," which are promoted using the slogan, "Bio + Regional = Optimal" (Ministerium für Ländlichen Raum & Verbraucherschutz Baden-Württemberg, 2019). But to what degree self-sufficiency of regional food supply is even possible in BW is not known. Also unanswered is the question of whether BW's agricultural production system could meet political emission targets under maximal output. We want to fill the aforementioned research gap for BW by addressing the following research questions:

1. How large is the maximal possible self-sufficiency of food supply for BW?
2. How compatible is a scenario of maximum self-sufficiency with political environment protection goals?
3. What would be an optimal solution that

ensures relatively high self-sufficiency with relatively low environmental impacts?
4. How do the answers to questions 1 - 3 change under different demand patterns and production practices?

Condensed into one goal that answers all of these questions, it means that we want to:

> Analyze the trade-off relationship between self-sufficiency and environmental impacts by comparing a state of maximum self-sufficiency with the optimum of these opposing objectives for different demand and production patterns

To tackle this goal, we compiled a comprehensive database of agricultural plots and pastures within the state, sorted by possible crop sequences, as well as life cycle inventories of crop production. We defined a set of food demand scenarios, derived a suitable definition of the 'regional self-sufficiency rate' for food demand across all categories, and applied a multi-objective optimization. In the supplementary material, we also provided results to the question, "How big is the self-sufficiency regarding regional food supply of different subregions of Baden-Württemberg across all demand categories?"

The study focuses on the state of BW because there is strong political support for regional agriculture and community development on the governmental, county, and city levels (Ministerium für Ländlichen Raum & Verbraucherschutz Baden-Württemberg, 2019). In order to inform the political and community development process at the state level, the geographical scope is limited to the state boundaries. Optimizing a food system with regional scope will of course lead to a very different outcome compared to a scope including national or global markets. It is not our research goal to provide optimal outcomes with supra-regional scope, as that would require significantly more data and explicit modeling of global markets for agricultural commodities. Instead, our intention is to quantify the environmentally optimal outcome for a set of scenarios conceived under the premise that a high share of regional supply is a paramount objective. In such a situation and given that imports to BW are very small compared to the overall market volume for different commodities, we can assume that sufficient import quantities will be available irrespective of the optimization outcome for BW. Hence, the production and impacts of imported commodities do not need to enter the BW-focused optimization.

Applied Research Methods

We applied a multi-objective optimization to obtain a first estimation of the possible regional self-reliance of food production (Peters, Wilkins, Rosas, Pepe, Picardy, & Fick, 2016).

Multi-objective Optimization with Evolutionary Algorithms

Multi-objective optimization algorithms are applied to problems with several opposing objectives. They try to minimize (or maximize) all objectives at the same time. With the number of objectives, the dimension of the decision space increases (Deb, 2014). Thus, for optimizations with more than one objective, the result is not one specific point but rather a set of points that are all equally (Pareto-) optimal (Konak, Coit, & Smith, 2006). A point within the solution space is called Pareto-optimal if it is not possible to better one objective without worsening another (Ehrgott, 2012). The set of Pareto-optimal points, which is determined by multi-objective optimization, is called Pareto front or Pareto set. It can be examined with a variety of visualization methods to gain insight into trade-off relationships and possible best solutions (Tusar & Filipic, 2015). Yet, finding one best solution is non-trivial because, at some point, the different objectives need to be compared and weighed against one another. The procedure developed by Blasco, Herrero, Sanchis, and Martínez (2008), which is also used in this study, solves this issue by defining desirability classes for each objective and applying a scoring system that follows the 'one vs. others criteria' (cf. supplementary material) introduced by Messac (1996). Where possible, desirability classes for the different environmental objectives were defined according to actual emissions and existing governmental goals.

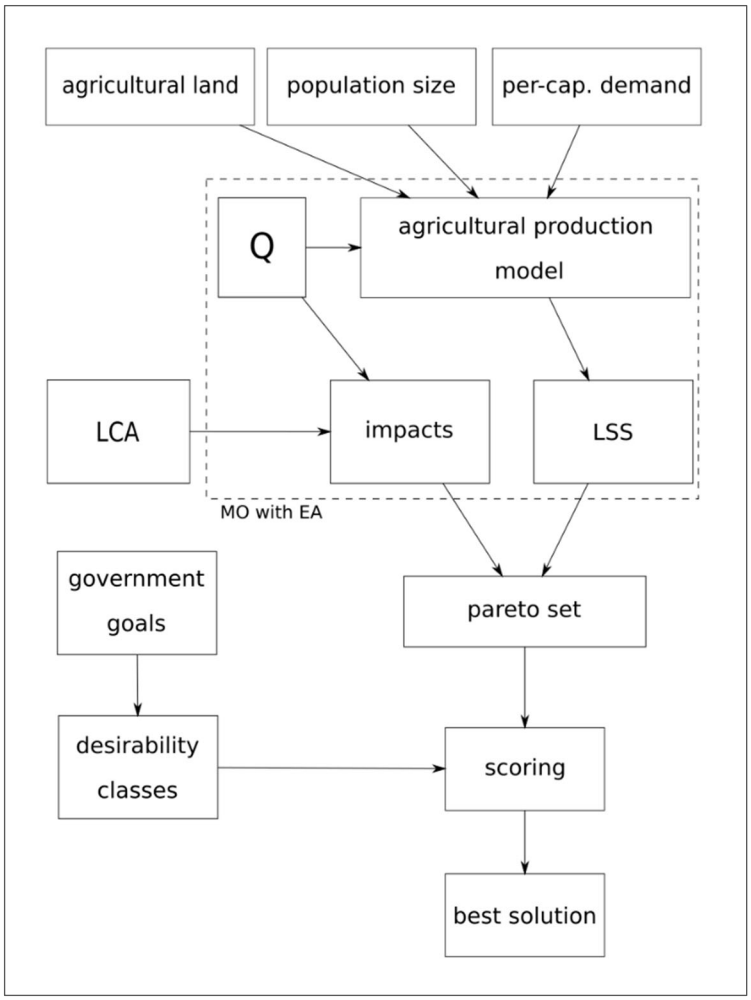
In the field of multi-objective optimization, the

family of evolutionary algorithms (EA) is widely used to determine the Pareto set (Deb, 2014). EAs are stochastic search algorithms that try to optimize a target function by mimicking evolutionary processes like mutation, crossover, and selection (Baeck & Schwefel, 1993). The target function is chosen in accordance with the research goal. Here, we determine an optimal outcome by maximizing self-sufficiency and minimizing environmental impacts by altering how the available land is cultivated in terms of which field crop is produced on which land class, and which production practice is used. The objective function is a vector Q, whose elements denote the mass of the different agricultural products supplied by the land within the region's boundaries. To incorporate production practice, each product is represented by two elements—one for organic and one for conventional production. According to the research goal, the objectives that should be optimized by altering Q are:

a. A quantitative measure of self-sufficiency
b. Environmental impacts induced by regional agriculture.

Figure 1. Workflow of the Multi-objective Optimization

Q is the vector of the produced amount of food for every product. "Per-cap. demand" is the per-capita demand; LCA: life cycle assessment; LSS: level of regional self-sufficiency of food supply; MO: multi-objective optimization; EA: evolutionary algorithms.



As a measure of self-sufficiency, we introduce an area-based indicator called 'level of self-sufficiency' (LSS). For its calculation we developed an agricultural production model and compiled the required database of land plots and production life cycle inventories (LCI). Environmental impacts are calculated by scaling up the life cycle inventories (LCI) of the individual products and production practices following the life cycle assessment (LCA) methodology (Figure 1). Research question 4 is investigated by repeating the procedure with alternative food demand scenarios, and the question on county-level results is answered by reducing the geographical scope from the state to the county level.

Level of Self-Sufficiency

Self-sufficiency is a key indicator in characterizing regional agriculture. It describes to what extent the final food demand within a foodshed can be met with products that are produced within it. Here, instead of referring to Hedden (1929), who first introduced the term foodshed, we rely on a more recent definition from Peters, Bills, Lembo, Wilkins, and Fick (2009), who describe it as "the land that could provide some portion of a population center's food needs within the bounds of a relatively circumscribed geographic area" (p. 73). Since self-sufficiency is an area-related problem, its indicator needs to be area-

based as well. In contrast, weight- or calorie-based LSS values are misleading because they are not good proxies for food quality or environmental impacts, especially in cases where products vary significantly in their agricultural land occupation values (ALO) (examples are provided in the supplementary material). Thus, we propose the following area-based level of self-sufficiency indicator:

> The LSS of any given foodshed is the area used for producing regionally consumed food, divided by a hypothetical area necessary to produce the amount of food that meets the inhabitants' total demand. The latter is calculated by assuming production practices and area yields are the same as for the regionally produced food ('mirrored agriculture' assumption). In other words, the available agricultural land and its use are extrapolated so that they meet the total demand.

To calculate LSS, information is needed about the amount of food consumed by the inhabitants, the amount of food produced in the foodshed, and how much agricultural land is occupied. In this study, demand data are compiled from official statistics, and the amount of produced food and the occupied area are estimated with an agricultural production model, which uses detailed information of the available agricultural land in BW.

Demand

Food consumption data representing typical German consumption is provided by the Ministry for Nutrition and Agriculture (Ministerium für Ernährung & Landwirtschaft). It was converted to per capita values and aggregated into a representative *market basket* (Clancy et al., 2017) with 17 products in 14 main food product categories (Table 1).

During the aggregation process, food items that cannot be grown in BW (rice, cacao, fish, citrus fruits) or are of minor relevance in terms of cal-

Table 1. Per Capita Annual Demand for Agricultural Products and Product Categories*

Agricultural product	Category	Base [kg/yr]	Vegetarian [kg/yr]	Vegan [kg/yr]
carrots	carrots	64.9	68.8	68.8
lettuce	lettuce	35	37.1	37.1
sunflower	vegetable oil	80.5	147.1	184.8
rapeseed				
potatoes	potatoes	178.2	238.7	238.7
rye	rye	13	13.8	13.8
soybeans	soybeans	1.3	45.3	73.4
sugarbeet	sugarbeet	258.3	118.3	118.3
tomatoes	tomatoes	38.7	41	41
wheat	wheat	104.9	111.4	111.4
beef	beef	9.4	0	0
eggs	eggs	14.4	12.8	0
milk pasture fed	milk	401.9	414	0
milk arable fed				
pork	pork	39.1	0	0
broiler	poultry	15.7	0	0
turkey				

*The list excludes fruits, wine, cacao, tea, coffee, and the like. The multitude of available food products was converted and aggregated to categories of agricultural products (e.g., bread to wheat, second column). For some categories, different agricultural production inventories exist (first column).

orie intake and food security in Germany; honey, nuts, game, rabbit, sheep, and horse were excluded. Fruit trees and vineyard cultivation were not included either because areas dedicated to their production are difficult to transform, and we reduced the dedicated agricultural land accordingly. For the different food categories, we designated certain products as representative for the entire category (e.g., soy as proxy for legumes). The aggregated market basket represents the base demand scenario for the study. It covers the demand reported by the Ministry for Nutrition and Agriculture to an extent of 80% for vegetable products, 90% for meat products and 100% for milk products (weight percentages). The base demand was altered according to Meier and Christen (2013) to estimate vegetarian and vegan demand scenarios respectively, which serve as reference cases for the optimization. The total demand is calculated by multiplying the per capita demand by the population of BW (Statistische Ämter des Bundes & der Länder, 2018). For details see the supplementary information.

Agricultural Land

In order to obtain detailed and realistic information of the production potential within BW, high resolution geo-referenced terrain, climate, and soil data were combined with the requirements of the different agricultural food crops. We used this information to identify the unique combination of crops that can potentially be grown on all arable land plots. The result is a novel georeferenced vector database with 319516 individual agricultural plots at a resolution of ca. 60x60m for the German state of Baden-Württemberg, each tagged with data on soil quality (soil depth, stone content, and groundwater table, which determine plot-specific crop restrictions and crop sequence), and inclination (plots with an inclination of >25% were excluded). This information is the central database of this work, and its compilation is described in detail in the supplementary material. For the land allocation procedure, the plots were aggregated into 137 different classes of arable land, by grouping plots with similar or identical crop sequence potentials. The total area of the different classes within BW ranges from 0.04 to ca. 330000 ha, with the five biggest land classes making up 78% of the total arable land (808615 ha) (Bundesamt für Kartographie und Geodäsie [BKG], n.d.; Kaule et al., 2011; VELA, 2014) . Each of these land classes has specific yields and possible crop sequences for the 16 crops that serve as food or fodder crop (Table 2). Next to arable land, pasture is included as well, and the amount of pasture was retrieved from georeferenced land use data for BW (Bundesamt für Kartographie und Geodäsie, 2018). The details of compilation of the land class database are described in the supplementary material.

Agricultural Production Model and LSS Calculation

An agricultural production model was developed to calculate the levels of self-sufficiency for a given vector Q that lists the quantities for each product produced within the foodshed. In the model, all entries of Q are converted into the area needed to produce the respective food or fodder crops (e.g., 1 kg milk is expressed in terms of the area needed to produce the fodder required for its production). The area needed for a single crop is calculated by multiplying its quantity with its ALO-value. Crop rotation constraints are taken into account with crop rotation factors, which indicate the proportion of the area within a land class that is maximally available for a single crop. For example, if one crop

Table 2: Which Crops (Food and Fodder) Can Be Grown in the Five Biggest Land Classes

Class	Area (ha)	Carrots	Salad	Potato	Rape-seed	Rye	Pea	Sugar-beet	Sun-flower	Toma-toes	Wheat	Barley	Maize (corn)	Maize (silage)	Soy	Triticale
1	334,557	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	✓
2	177,726	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	59,562	✓	✓	✓	✓	✓	✓	✓	X	✓	✓	✓	✓	✓	X	✓
4	37,799	X	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	✓
5	20,980	X	✓	X	X	✓	✓	X	X	✓	✓	X	✓	✓	X	✓

can only be farmed every third year, the model would allocate a maximum of 33% of that land class to that crop. The crop rotation factors were taken from KTBL (2009) and Rippel (2014). For a given crop, ALO-values and crop rotation factors may be different for organic and conventional production. The model consecutively allocates the area needs of the different crops to the land classes where they can be grown, and diminishes the remaining available area within those land classes accordingly.

In the allocation process, both land classes and crops are used in a certain order, which is based on how flexibly they can be used to farm different crops: By using up "picky" land classes and restricted crops first, it is assured that the area is used efficiently. After all crops are allocated to corresponding land classes, the area needed for each product category c (n_c [ha]) is calculated. With Q (population size times per-capita demand) the model also calculates product category specific demand fulfillment rates (r_c [%]). These values indicate to what extent the demand of a given category is met, and they are used to estimate the area that would be needed if the total demand would be met. In the calculation of demand fulfillment rates, coupled products are treated in a system expansion approach: The production of one kiloton of a main product (eggs, milk), automatically produces a certain amount of poultry and beef respectively (as co-products). With given n_c and r_c the area-based LSS-values can be calculated:

$$LSS(Q) = \frac{\sum_{c=1}^{14} n_c(Q)}{\sum_{c=1}^{14} n_c(Q) + \sum_{c=1}^{14} (n_c(Q) * \frac{100 - r_c(Q)}{r_c(Q)})} \quad (1)$$

The numerator represents the area that is needed for producing Q. The denominator represents the area that is needed if the local demand would be met. It is the sum of what is needed to produce Q and what is needed to produce the 'missing part' of the demand. For example, assume a category's demand fulfillment rate is 75% and it needs 30 ha arable land. Then (100-75)/75 multiplied with 30 ha yields 10 ha as the area needed to cultivate the missing 25%.

This hypothetical area of 10 ha automatically possesses the same composition of products and production practices as the actually produced food because it was calculated from its demand fulfillment rate (mirrored agriculture). Note, here, that the hypothetical area is only used as an extrapolation of the available agricultural land (and its use) in order to quantify LSS and does not relate to any actual production.

In case the available agricultural land is exceeded, or overproduction occurs for any category ($r_c > 100$), LSS is set to zero as penalty for the optimization (overproduction of one category will leave less area for the others). For poultry and beef, the demand fulfillment rates are adjusted to include cases where they are co-products of egg and milk production.

Environmental Impact Calculation with LCA

Total potential environmental impacts induced by agriculture were calculated by scaling up product specific LCIs calculated for one kiloton of raw product at the farmgate as reference flow. The assessment contained all upstream products including, e.g., energy and fertilizer use. The LCAs were performed in openL CA v. 1.6 with the AGRIBALYSE v. 1.3 database. This was chosen after extensive review of the existing LCI databases because it allows for detailed comparison of conventionally and organically grown products (cf. supplement). The farming processes selected from AGRIBALYSE v1.3, which reflect French agricultural practice in a climate similar to that of BW, were adapted to reflect regional production in BW by changing the electricity mix. With these modified process inventories, midpoint indicators according to the ReCiPe 2008 life cycle impact assessment method (Goedkoop et al., 2009) were calculated for four salient agricultural impact categories (Stoate, Boatman, Borralho, Carvalho, Snoo, & Eden, 2001): climate change (CC), marine eutrophication (ME), terrestrial acidification (TAC), and terrestrial ecotoxicity (TET). It is important to note that in the ReCiPe 2008 method, marine eutrophication refers to nitrogen eutrophication to the water body in contrast to freshwater eutrophication, which refers to phosphorus eutrophication.

For some products, the database only contains conventional production. In the case of beef and

turkey production, LCIs of the organic counterpart were estimated by taking the conventional processes and changing the fodder input to an organic diet with the same energy content. In the case of organic milk production, only a single management system is available in the LCI database and is used in our model. It represents a feeding system relying on grazed grass as well as concentrate feed such as silage corn. For vegetable products where LCIs are not available (two conventional and six organic products), data from either the conventional counterpart or a similar crop was used as proxy. Because the impacts are later related to governmental goals concerning German emissions, only those emissions taking place within the country of production are included in the impact assessment step of the LCA. In the objective function of the MO, the amount of every product (i.e., each element of Q) is multiplied with the corresponding characterized life cycle inventory result of that product. By summing up the emissions of all products per impact category, the total emissions of Q are obtained (in other words the line vector Q is multiplied with the column vector of the respective LCI).

Conducting the MO

The MO was conducted with the widely used NSGAII algorithm (Deb, K., Pratap, A., Agarwal, S., & Meyarivan, T. 2002), which is designed to minimize all objectives. Because LSS needs to be maximized, for the optimization it was transformed into negative LSS by multiplying it with minus one. The other objectives (environmental impacts) are calculated as described above, resulting in the following target function:

$$fitness(\vec{Q}) = \vec{F} = \begin{pmatrix} \vec{Q} * \overrightarrow{LCI_{CC}} \\ \vec{Q} * \overrightarrow{LCI_{MA}} \\ \vec{Q} * \overrightarrow{LCI_{TAC}} \\ \vec{Q} * \overrightarrow{LCI_{TET}} \\ -LSS(\vec{Q}) \end{pmatrix} \quad (2)$$

It is a function of $\vec{Q}$ and the outcome is another vector ($\vec{F}$) with five elements that are all subject to minimization (Note that $\vec{Q}$ is a column vector and the respective $\overrightarrow{LCI}$ vectors are row vectors).

In order to properly approximate the Pareto front, the algorithm needs boundaries and reasonable start values for Q (first-generation). These were obtained by a mechanistic approach that gradually increases the amount of each product simultaneously until the demand is met or the area is exceeded. A random element was chosen from the solution set generated by that approach to ensure that the first generation has a big enough variety. The parameter population size (not to be confused with the population of BW) defines the number of individuals within one generation of the algorithm and by that, the number of points in the resulting Pareto set. To ensure that the Pareto set is large enough to broadly reflect the Pareto front, it was set to 1500, reflecting typical choices in the literature. The MO was run with a probability for mutation of 0.2 and a probability for crossover of 0.7 over 5000 generations. Mutation randomly alters a number of elements within Q whereas crossover creates "offspring" by combining two Qs ("parents") according to a specified operator. In this study an operator that, element-wise, calculates the mean of the two "parents" was used.

Desirability Classes

The methodology from Blasco et al. (2008) for retrieving an MO solution needs pre-defined desirability classes for every objective. In this study the classes include the following: highly undesirable (HU), undesirable (U), tolerable (T), desirable (D), and highly desirable (HD). For climate change, eutrophication, and terrestrial acidification, desirability thresholds were defined according to actual emissions (undesirable) and governmental goals (highly desirable) developed by the institutions BMU (n.d.), MUKE BW (n.d.), and Umwelt Bundesamt (UBA) (2018) (for details, cf. Supplement). Because state level emission data and goal definitions for climate change and terrestrial acidification were not available for BW, corresponding data for Germany were scaled down using the share of BW in German agricultural output. For terrestrial ecotoxicity, no emission data was available, so its range within the Pareto set was divided into five equally sized intervals. We defined the thresholds for LSS according to what is maximally possible in BW if environmental constraints

Table 3. Desirability Thresholds and Scores for the Desirability Classes*

Objective**	Unit	HD	D	T	U	HU
CC	kt CO2-eq	< 4737.1	< 5021.9	< 5306.6	< 5591.4	≥ 5591.4
ME	kt N-eq	< 10.4	< 17.3	< 24.26	< 31.2	≥ 31.2
TA	kt-SO2-eq	< 84.8	< 90.6	< 96.3	< 102	≥ 102
TET	kt 1,4 DCB-eq	< 90	< 175.7	< 261.4	< 347.1	≥ 340.1
LSS	%	> 60	> 50	> 40	> 30	≤ 30
	Score	0	1	6	31	156

* For the five objectives described above, the desirability classes are highly desirable (HD), desirable (D), tolerable (T), undesirable (UD), and highly undesirable (HU).
** The acronyms are climate change (CC), marine eutrophication (ME), terrestrial acidification (TAC), terrestrial ecotoxicity (TET), and level of self-sufficiency (LSS).

are not accounted for. Table 3 shows the desirability thresholds for the different objectives. A score was assigned to every desirability class (Table 3, bottom) according to the scheme described by Blasco et al. (2008), which fulfills the 'one vs others' criteria (i.e., bettering one objective in a given class is preferred over bettering all other objectives in the next best class) (Messac, 1996). By summing up the scores of every class, the total score of a point within the Pareto set is derived. The lower it is, the better the point performs regarding the desirability of the different objectives. The best point is then determined by choosing the point with the lowest score out of all possible points.

Results

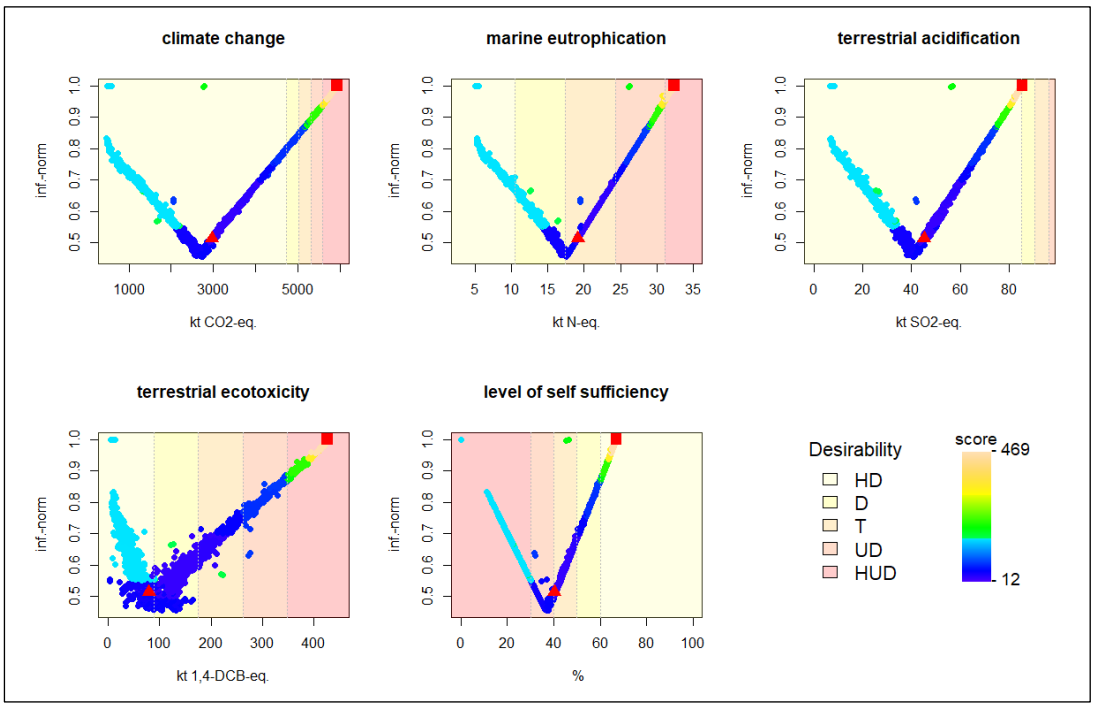
The regional self-sufficiency of food supply was maximized while minimizing environmental impacts in order to analyze the trade-off relationship between the opposing objectives. Figures 2–4 show so-called level plots (Blasco et al., 2008) of the multi-objective optimization for base-, vegetarian-, and vegan-demand scenarios. Level plots show the whole Pareto set for one specific objective. The x-axis represents the different objective values in physical units whereas the y-axis represents a norm that describes the distance to an ideal point. For this hypothetical point, the value of every objective is the minimal, and the point with the lowest norm value is closest to the ideal point. Here, the infinity norm was applied because it is best suited for visualizing trade-offs between conflicting objectives. Because the same norm is shown for each of the different objectives, one can compare the performance of a certain point regarding different objectives. Desirability classes and their thresholds are shown as colored background and dashed grey lines to show how desirable different points are for each objective. Additionally, a scoring system which is described in detail in the supplement, was applied to the points in the Pareto set. In the plot the score is shown as the points' coloring. The lower the score, the better a point performs concerning the defined desirability classes. The best solution (i.e., the point with the lowest norm value among those, with lowest score) is shown as a red triangle. The red rectangle represents the point of maximum LSS.

In the level plots, the trade-off between LSS and environmental impacts is visible: Outcomes with increasing impact values are less desirable (darker background) while increasing LSS values leads higher desirability (brighter background).

For every objective, moving towards either very small or very high values will eventually increase the distance to the ideal point (expressed as infinity norm) because performance regarding one of the opposing objectives is worsened too severely. The case of maximum LSS is one of those extremes. Here, LSS values range between 61 and 66% (research question no. 1), depending on the demand scenario (Table 4). For all diets, soy is a limiting factor in LSS maximization because its overall production potential in BW is low. In the base demand scenario, soy is primarily needed as animal fodder, in the vegan diet as vegetable food

Figure 2. Pareto Set with 1,500 Elements of a Multi-objective Optimization for Four Environmental Impacts and the Level of Self-sufficiency in the Form of Level Plots. The MO was conducted for a *base food demand* scenario.

The set contains 1,500 points that represent the Pareto front. The Pareto-efficient solutions are plotted using the infinity norm as y-axis coordinate, and they are evaluated according to the desirability classes defined in table 3 and a score based on these classes. The red triangle represents the optimum obtained by this approach; the red square represents the state of maximum LSS.



and in the vegetarian for both. Compared to the vegan demand scenario, the base and vegetarian demand scenarios have higher maximum LSS values, because, for the latter, pasture is available for food production (regulations and also partly political climate considerations prohibit the conversion of pastures to arable land).

The level plots show that the state of maximum LSS comes with strong environmental impacts: In the base and vegetarian demand scenario, the state of maximum LSS is in the highly undesirable section for climate change, marine eutrophication, and terrestrial ecotoxicity. In these impact categories political goals cannot be achieved in a state of maximum productivity (research question 2). For the vegan demand scenario only terrestrial ecotoxicity is in the undesired section for maximum LSS.

In contrast to maximized productivity, the MO optimum's values lay in moderate desirability classes for all objectives (research question 3): For the base and vegetarian demand scenario, the optimum's worst section is 'tolerable,' for the vegan demand scenario its worst is the 'desirable' section. Among the different diets' optimums, the vegan demand scenario has the highest LSS value (50%).

When the state of maximum LSS and the MO's optimum are compared (research goal), an overproportional decline in environmental impacts is visible (Figure 5). For example, in the base demand scenario, going from a point of maximum LSS to the optimum decreases self-sufficiency by 40% (27 percentage points), but also decreases climate change impacts and terrestrial acidification by half and terrestrial ecotoxicity by 80%. Marine eutrophication decreases by about 40% as well. For the vegan demand scenario similar declines can be observed, but in the vegetarian demand scenario it is less distinct. For all demand scenarios, the production technology mix of the optimum comprises

Figure 3. Pareto Set with 1,500 Elements of a Multi-objective Optimization (MO) for Four Environmental Impacts and the Level of Self-sufficiency in the Form of Level Plots. The MO was conducted for a *vegetarian demand* scenario.

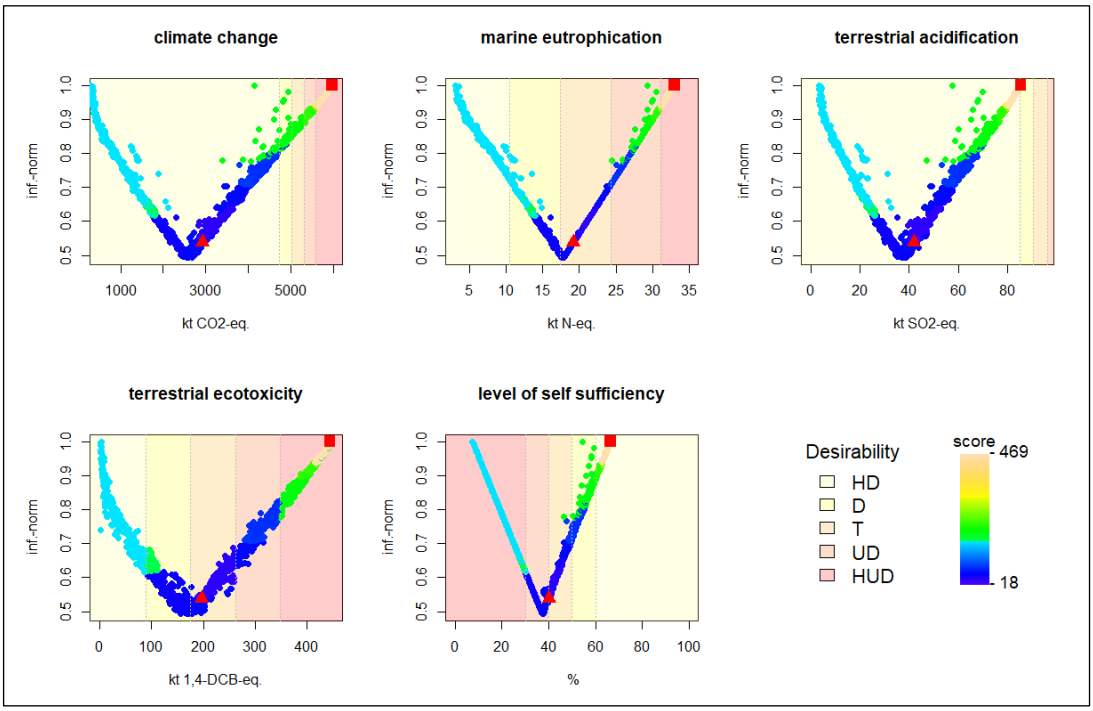
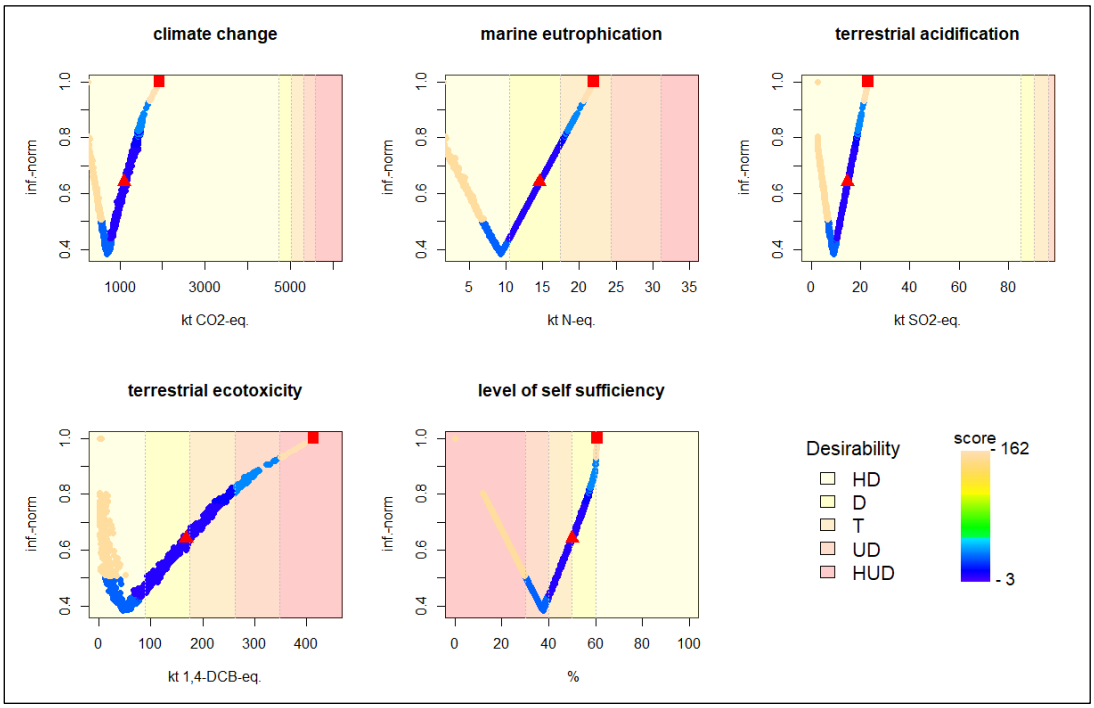


Figure 4. Pareto Set with 1,500 Elements of a Multi-objective Optimization (MO) for Four Environmental Impacts and the Level of Self-sufficiency in the Form of Level Plots. The MO was conducted for a *vegan demand* scenario.



at least 40% organic agriculture (Table 4), which contributes to the nonlinear decline of environmental impacts (especially terrestrial ecotoxicity).

Interestingly, none of the Pareto-optimal points produced results where all the agricultural land is used. This indicates that in order to reach the proposed goals in environmental protection (which enter the routine via the desirability classes),

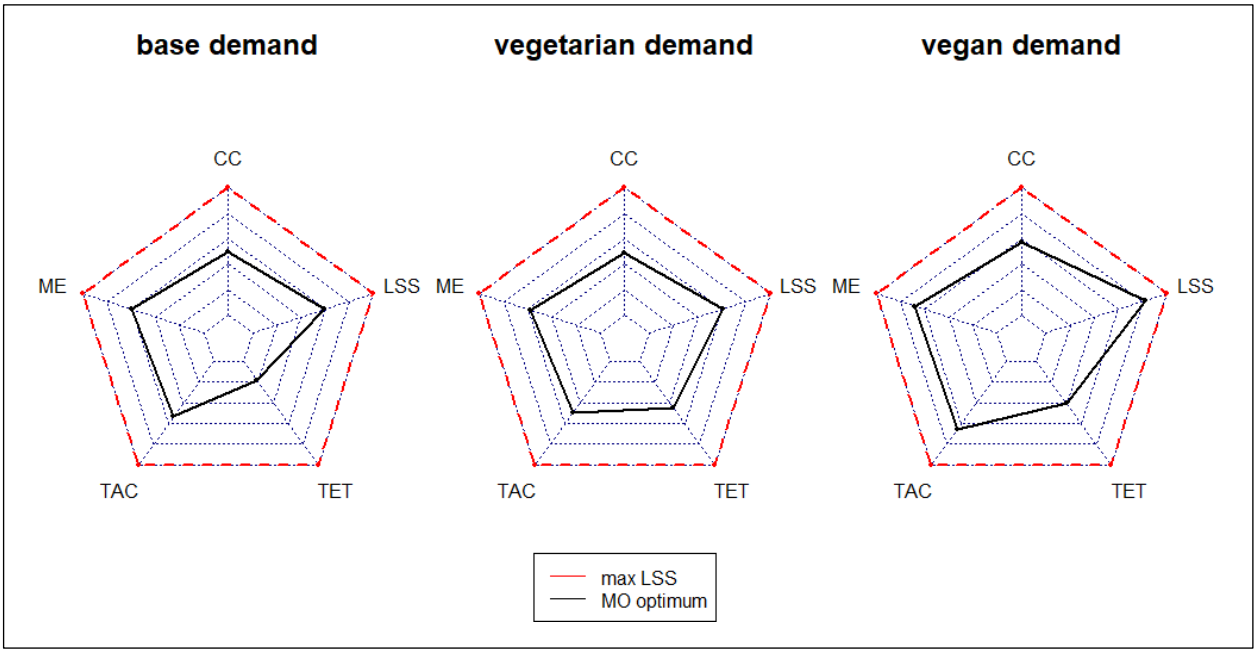
Table 4. Comparison of the Agricultural Land Allocation for a State Where Level of Self-sufficiency (LSS) is Maximized (Left) vs. the Best Solution of the Multi-Objective Optimization (MO, right)

		Maximize LSS			Optimum of MO		
Indicator	Unit	Base	Vegetarian	Vegan	Base	Vegetarian	Vegan
Score*	1	469	469	162	12	18	3
CC	kt	5,929	5,981	1,926	2,966	2,923	1,095
ME	kt	32	33	22	19	19	15
TAC	kt	85	85	24	45	42	15
TET	kt	426	444	413	79	197	168
LSS	%	65	66	61	40	40	50
Arable land used	%	93	95	80	74	77	76
Pasture used	%	99	1	0	65	43	0
Share org.	%	0	0	0	77	44	54

* The score is the one obtained by the multi-objective optimization. CC stands for climate change, ME for marine eutrophication, TAC for terrestrial acidification, and TET for terrestrial ecotoxicity.

Figure 5. Radarcharts of Performances Regarding Level of Sself-sufficiency (LSS) and Environmental Impacts in a State of Maximum LSS and the Multi-Objective's (MO's) Optimum

Each chart is designated for a demand scenario and scaled according to the respective state of maximum LSS. Each objective's range is divided into five equal sections. Based on these sections, the overproportional decline of environmental impacts by going from a state of maximum LSS to the optimum is evident: for example, in the vegan demand scenario, the optimum's LSS value lies in the outmost section whereas all the impact values lie further within.



a shift toward more environmentally friendly production practices is not enough. There is also a need to produce less than what would be possible in the region by converting some land to fallow, which could lead to additional environmental benefits. The county specific LSS values, the resulting food quantities per product for all cases, and the demand fulfillment rates for each product category are listed in the supplementary material.

Discussion

The results show that a state of maximum self-sufficiency can reach LSS-values ranging from 61% to 66% but fail to satisfy three out of four environment protection goals for base and vegetarian demand scenarios, and one out of four for the vegan demand scenario (research questions 1 and 2). The optimum retrieved by the MO is a compromise between opposing objectives and fulfills environmental requirements to at least a 'tolerable' degree, but only reaches LSS-values ranging from 40% to 50% (research question 3). With a vegetarian diet, it is possible to reach the highest level of self-sufficiency, because pasture, which cannot be converted to other land use types due to legal and partly climatic reasons, is utilized for dairy products. If environmental impacts are included in the optimization process, the vegan diet outperforms the other two not only in most impacts, but also in LSS (research question 4).

The decline in LSS-values under environmental constraints compared to a state of maximum LSS comes with an even greater decline in environmental impacts (research goal). For base and vegetarian demand, this overproportionality can partly be explained by a lower share of meat and/or milk products in the MO's optimum. Here, only 18%–21% (compared to 28%–29% in the LSS maximization) of the products are animal-based, whose production tends to put more pressure on the environment. Another central factor in impact reduction is the shift towards organic production (from 0% to around 40%–80%) as the vegan demand scenario exemplifies.

Policy Implications

Optimization results such as the ones presented here show the extent to which conflicting objectives can still be achieved under best possible circumstances. This maximum potential impact of a sustainable development strategy provides a guardrail against which the different policy targets and the eventual real-world impacts can be benchmarked. It also shows the potential of a given strategy in relation to what other strategies can achieve. It can be communicated to policy makers to show the potential of regional agriculture under different environmental and sustainability objectives. The policy targets themselves often do not directly build on optimization outcomes and are the result of a consensus-building process that takes into account the perspectives and power of different stakeholders. The main application of the MO results is thus not to be used directly as policy targets, but to make sure that policy targets are feasible in principle. This situation is similar to how energy system models are used to depict optimal future outcomes of the energy transition (Pfenninger, Hawkes, & Keirstead, 2014). The process of informing policy target setting is best applied at the state and county level due to the coarse level of resolution of the land-use conditions and, in particular, the average process inventories for farming the different crops. Local, farm-level conditions may deviate substantially from the average and require other, locally optimal decisions. The results are by no means to be interpreted such that all organizational units, including farms, should adhere to the solutions found. Instead they can be used to set regional targets based upon the different incentives that regions devise for reaching them.

Community Development for Sustainable Agriculture

The study presents an analysis of both the current and extreme diet alternatives, such as a completely vegan diet. The extreme cases were studied to map the solution space and show what changes in environmental impacts and self-sufficiency are possible in principle to then inform policy and public debates. From the analysis itself, we can conclude neither that such extreme developments are desirable nor that they are feasible. Instead, and this is where the true value of the study lies in our view, we show that sustainable development in the food system requires both: major shifts in farming prac-

tices and major shifts in consumption patterns. The sustainability transformation on both production- and consumption-side has to be co-designed using a variety of planning and community development tools including transdisciplinary research. Urban-resident-driven initiatives such as the 'save the bees' campaign (proBiene—Freies Institut für ökologische Bienenhaltung, 2019) focus on one part only (here: the supply side) and under-appreciate the importance of community development required for adopting more sustainable farming practices. They tend to also ignore the system-wide consequences of their vision, such as a shifting of impacts to other regions as a result of increasing regional organic farming output without changes on the demand side (Muller et al., 2017; Smith, Kirk, Jones, & Williams, 2019).

Limitations of the Study

Due to their stochastic nature, EAs can only approximate the Pareto set. We found that the NSGAII algorithm requires a very large computational effort to maintain a pressure towards the Pareto front when there are more than three objectives to optimize (Coello Coello, Aguirre, & Zitzler, 2005). For the five objectives considered here, we therefore chose a very large population size (1,500) and many generations (5,000). A leaner solution would be to incorporate an adjustment in the algorithm according to Köppen and Yoshida (2007), but that was not possible within the scope of this study.

The food basket used in this study only contains a certain selection of food products to reflect German consumption. Therefore, the results only apply to a part of the total demand. Due to the fact that vegetable products are underrepresented compared to meat and milk products, the vegan demand scenario is biased in the sense that LSS is overestimated. On the other side, the choice of soy as the sole legume is a bias that might underestimate LSS for the vegan and vegetarian demand scenario because the land in BW that is suitable to grow soy is limited.

The approach presented here needs detailed geo-referenced land-use and census data. It was possible to conduct such a study for Germany, where such data is relatively easily accessible, but this may not be possible in regions with poorer data availability.

In general, LCA results come with high epistemic uncertainty due to the proxy choice made (use of aggregated AGRIBALYSE datasets) and the assumptions and uncertainties contained therein. In addition, there is an aleatory uncertainty of the LCI data of the different agricultural processes due to changing local and seasonal conditions. Especially the poor representation of distinctive impacts for different management systems in organic milk production is a major shortcoming and may overestimate the environmental impacts for base and vegetarian demand. Still, using those LCI datasets was the only feasible way to obtain reasonable impact estimates for regional agriculture in BW, and more region- and site-specific agricultural process inventories are needed to provide more accurate scenarios in the future, including potential yield changes as a consequence of climate change (Griffin et al., 2018). Considerations of the economic and political feasibility of the self-sufficiency rates and underlying scenarios, as well as the question of how and where the missing food should be produced and imported from without intense environmental damages, are of paramount importance but were beyond the scope of this study.

Further Research

Next to overcoming the limitations stated above, more site-specific process inventories are needed to increase the relevance of the MO-based approach at the local scale (farm cooperative or farm-level). Moreover, not only production but also scenarios and business models for storage, logistics and transport, and marketing need to be included in the system boundary to fully describe regional potential and sustainable relations between food production and consumption. More high-resolution information is needed regarding the usage of plant protection agents, as the currently available information is very scarce. The region-based scenarios should be contrasted with those including a depiction of global market for agricultural commodities to study the displacement and indirect land-use effects of substantial changes towards organic agriculture in BW, as demon-

strated for other regions by Muller et al. (2017) and Smith et al. (2019).

Conclusions

The study showed that regional agriculture in Baden-Württemberg cannot be fully self-sufficient regardless of the diet (level of self-sufficiency (LSS) ranges between 61% and 66%), because of the high population density (310 inhabitants/km²). Moreover, an agricultural production system targeted at maximum output, cannot meet all political environmental protection goals. Using multi-objective optimization, it was possible to identify optimal trade-offs between regional self-sufficiency and environmental impacts. The optimum is not only a compromise between the conflicting objectives (all objectives are at least 'tolerable' for base and vegetarian and at least 'desirable' for vegan demand scenario), but also eco-efficient in a sense that when compared to a state of maximum LSS, environmental impacts are reduced overproportionally compared to the LSS reduction. This overproportional decline in impacts is partly due to a shift towards organic production. The efficient state has a share of organic production of around 40%–80% (depending on the diet) and balances self-sufficiency and environmental impacts (according to governmental goals), with LSS-values around 40%–50%. A shift towards a vegan diet (also if incomplete) has strong co-benefits regarding environmental impacts and self-sufficiency. Thus, another conclusion is that food production problems need to be tackled not only from the production but also from the consumption side.

The results presented may help policy-makers as well as community-driven initiatives to benchmark their transformation target suggestions, as they present a quantitative basis to substantiate an ongoing debate.

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Supplementary Material

A supplementary file is provided that contains additional method descriptions and results. The land class dataset is available on Zenodo (https://doi.org/10.5281/zenodo.3706470), and for the model code, a GitHub repository was created (https://github.com/christianbuschbeck/RegionalFood-MO).

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Evaluating food hubs: Reporting on a participatory action project

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Abstract

Food hubs create a range of economic, social, and environmental impacts through a wide variety of activities and programs. Evaluation of these impacts is important; however, many hubs lack the capacity (including time, resources, knowledge, and expertise) to do effective, ongoing evaluation work. This lack of capacity is exacerbated by the difficulties inherent in capturing the kinds of complex, multidimensional, context-specific impacts and outcomes that many of these businesses and organizations strive to achieve. This paper reports on a participatory research project designed to develop a resource to support food hub evaluation efforts. It presents highlights from the guide that was created and discusses associated insights regarding the tensions and opportunities of food hub evaluation. We argue that food hubs need to be engaging in evaluation efforts, even in the face of significant resource constraints, as a means of strengthening individual entities and the sector as a whole. These efforts must be carefully aligned with

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a hub's stage of development and context-specific, multifunctional goals. They should also account for food hubs' emergent, dynamic, and adaptive nature. To that end, participatory evaluation methodologies that take a flexible, collaborative, action-oriented approach are especially relevant.

Keywords
Food Hubs, Evaluation, Participatory Research, Local Food, Community Development, Sustainable Food Systems

Introduction

Much has been written in recent years about the problematic nature of the conventional global food system. From an ecological standpoint, food production and transportation are two of the most significant sources of greenhouse gas emissions (Vermeulen, Campbell, & Ingram, 2012). Furthermore, overuse of agrochemicals contributes to the contamination of soil and water resources (Food and Agriculture Organization of the United Nations [FAO], 2011), and extensive monocrop production threatens the biodiversity of ecosystems around the world (FAO, 2019). At the same time, small- and medium-scale farmers increasingly struggle to maintain the viability of their livelihoods (Berti & Mulligan, 2016), while food security remains a serious problem even in the world's wealthiest nations (FAO, IFAD, UNICEF, WFP, & WHO, 2017). To make matters worse, a lack of food skills and knowledge contributes to high levels of food waste as well as diet-related disease (Allen, FitzSimmons, Goodman, & Warner, 2003). One of many responses to challenges such as these has been the emergence of food hubs, which serve as a model for developing a kind of "infrastructure of the middle" (Stahlbrand, 2017) that can increase the viability of more localized food systems and, in the case of some hubs, also work toward broader goals related to social justice and ecological sustainability (see Blay-Palmer, Landman, Knezevic, & Hayhurst, 2013; Clark et al., 2019).

The growing body of literature on food hubs highlights the diversity that exists within the sector, as a wide variety of actors employ different approaches, with considerable variation in the extent to which they challenge (or not) the conventional food system paradigm (see Berti & Mulligan, 2016, Blay-Palmer et al., 2013; Cleveland, Müller, Tranovich, Mazaroli, & Hinson, 2014; Levkoe et al., 2018; Perrett & Jackson, 2015). This diversity produces some tensions, particularly as many food hubs grapple with how or if to engage in programs that may not be directly or immediately profitable, such as those that focus on social justice objectives (see Clark et al., 2019; Hoey, Fink Shapiro, & Bielaczyc, 2018; Levkoe et al., 2018) and/or pursue environmental goals (see Cleveland et al., 2014; Franklin, Newton, & McEntee, 2011). In spite of debates regarding the precise role that food hubs can or should play in a transition toward more sustainable food systems, it is clear that they are playing *some* role, as they create a range of economic, social, and environmental impacts through a wide variety of activities and programs (see Colasanti, Hardy, Farbman, Pirog, Fisk, & Hamm, 2018; Jablonski, Schmit, & Kay, 2015; O'Hara, 2017; Schmidt, Kolodinsky, DeSisto & Conte, 2011). As we will elaborate upon in this paper, measuring such impacts is important; however, doing so effectively requires substantial resources (including time, money, knowledge, and expertise) that hubs often do not possess. This lack of capacity is exacerbated by the difficulties inherent in capturing the kinds of complex, multidimensional, context-specific impacts and outcomes that many food hubs strive to achieve.

The disconnect between the importance of evaluating food hub efforts and the challenges inherent in doing that work created the impetus for the project presented in this paper. With funding from Ontario's Ministry of Agriculture, Food and Rural Affairs (OMAFRA), we conducted participatory research with food hubs in Canada and the United States with the goal of creating a resource that would support their ability to conduct evaluations of their businesses or organizations. This paper presents the results of that project, including highlights from the guide that we developed as well as insights we gained regarding the tensions and opportunities associated with food hub evaluation. We begin with a brief overview of the food hub sector, some explanation regarding why evaluation is so important for its future development and success, and an outline of relevant ideas drawn from

the evaluation literature. Following that introduction, we describe our project methodology. We then present our research results organized into three main themes: (1) capacity considerations that food hubs should take into account when thinking about evaluation; (2) evaluation as a necessity for food hub success; and (3) the importance of going beyond basic financial metrics to capture more holistic stories about the multifunctional work that food hubs are doing and how that work is tied to the creation of more sustainable food systems. Finally, we discuss a number of tensions as well as opportunities associated with food hub evaluation. We argue that food hubs need to be engaging in evaluation efforts, even in the face of significant resource constraints, in order to improve their own operations and also garner continued public support for their work. These efforts must be carefully aligned with a hub's stage of development and context-specific, multifunctional goals and should also account for food hubs' emergent, dynamic, and adaptive nature. As such, one-size-fits-all templates and more traditional evaluation frameworks have somewhat limited applicability. Instead, participatory evaluation methodologies that take a flexible, collaborative, action-oriented approach offer especially significant potential for food hub evaluation.

Background: What are Food Hubs and Why do They Need to be Evaluated?

A recent literature review by Berti & Mulligan (2016) discusses two broad approaches to food hub work: values-based agri-food supply chain management and sustainable food community development. The values-based supply chain end of the spectrum is primarily categorized by for-profit businesses and tends toward a supply-side approach. It is well-articulated by the much-used Barham, Tropp, Enterline, Farbman, Fisk & Kiraly (2012, p. 4) definition of a food hub as "a business or organization that actively manages the aggregation, distribution, and marketing of source-identified food products primarily from local and regional producers to strengthen their ability to satisfy wholesale, retail, and institutional demand." By contrast, Berti & Mulligan's (2016) sustainable community development model type is generally the domain of nonprofit organizations, and is more consistent with a definition of food hubs as "networks and intersections of grassroots, community-based organisations and individuals that work together to build increasingly socially just, economically robust and ecologically sound food systems that connect farmers with consumers as directly as possible" (Blay-Palmer et al., 2013, p. 524). Irrespective of where on this typology a food hub might fit, Rose (2017) stresses the multidimensional character of the sector as a whole, arguing that food hubs generally "embrace a systemic understanding of food and farming that values its multidimensional and multi-beneficial character" (p. 233).

While establishing a precise, uniform definition of a food hub is challenging, one thing that is clear is that food hubs are on the rise. In the United States, the number of documented food hubs increased 300% between 2007 and 2014 (NGFN, 2015 cited in Rose, 2017), and by 2017 almost 400 hubs were identified and targeted for the third iteration of a national food hub survey (Colasanti et al., 2018). The results of that survey found that 119 respondent hubs had gross annual revenues totaling US$235 million and employed almost 2000 people, with 67% indicating that their operations were breaking even or making a profit (Colasanti et al. 2018). That same year, a food hub survey conducted in Ontario was completed by 125 respondents (Blay-Palmer, Nelson, Mount & Nagy, 2018), again demonstrating the vibrancy of the sector in the North American context, and Rose (2017) suggests that, while in Australia food hubs are currently less prevalent, there is growing interest in adapting and adopting the model as part of growing that country's local food movement.

In the United States, the vast majority of food hubs include a combined focus on promoting human health, market access for small- and medium-scale farmers, fair prices for farmers, and sustainable agriculture within their mission statements, while more than half also work towards a variety of other goals, including racial equity and fair wages (Colasanti et al., 2018). Similarly, food hubs in Ontario reported top operational values to be locality, sustainable agriculture, profit, social justice, and community and civic engagement, and

the benefits of their work ranged from increasing market access and employment opportunities for youth, to providing food education and food donations (Blay-Palmer et al., 2018). There are tensions inherent in working towards these varied goals within a system that remains largely governed by market principles, and this can push food hubs to prioritize economic concerns above social or ecological ones (see Clark et al., 2019; Hoey et al., 2018). However, while food hubs do need to maintain financial viability to survive, and not all hubs seek to challenge the conventional food system to the same extent, it is still clear that a significant degree of multifunctionality is a key characteristic of the food hub model (see LeBlanc, Conner, McRae, & Darby, 2014).

The highly multifunctional nature of most food hubs does not lend itself well to simple assessment of impacts. Indeed, in spite of the sector's rapid growth in recent years, there has been relatively little work done to track the multidimensional impacts that food hubs are having on the communities and food systems within which they are embedded. Part of the challenge is that it can be difficult to determine what indicators should be tracked. As Matson & Thayer (2013) explain: "Because of their adaptability in function, a variety of metrics might be applied to determine whether a particular food hub is a 'success'. No single measurement can be applied to all food hubs, as each must be measured by its success or failure in achieving its own underlying goals" (p. 47). This issue is echoed in a Brislen, Barham, & Feldstein (2017) report examining case studies of food hubs that have failed, as they highlight the logistical complexity inherent in trying to evaluate several different types of activities that may exist within one hub. However, although the multidimensional nature of the food hub sector presents a particular challenge, evaluating even one aspect of a hub's operation can also be difficult. For example, although food hub finances may be one of the most conventional indicators of viability or success, there have been few economic impact assessments of the sector (Jablonski et al., 2015) and there is no agreed-upon method for conducting such work (O'Hara & Pirog, 2013). In addition to methodological challenges, food hubs also face capacity challenges that can constrain their ability to engage in effective (or any) evaluation work. Discussing food movement organizations more generally, Freedgood, Pierce-Quiñonez, & Meter (2011) note that "food system professionals may not use assessment tools or may shun food systems planning as an unnecessary step in creating on-the-ground projects" (p. 98). Because many food hubs suffer from resource scarcity (see Stroink & Nelson, 2013), they can find it difficult to dedicate resources to evaluation, preferring instead to invest in their "on-the-ground" efforts.

In spite of these challenges, a number of important efforts have been undertaken to evaluate the impacts of specific food hubs, and of the sector as a whole. Most notable has been a series of three surveys conducted in the United States that has tracked the progress of the food hub sector there (Colasanti et al., 2018; Fischer, Hamm, Pirog, Fisk, Farbman & Kiraly, 2013; Hardy, Hamm, Pirog, Fisk, Farbman & Fischer, 2016). The most recent iteration of that survey found that food hubs are: (1) contributing to the economy, for example by creating jobs; (2) supporting small- and medium-scale farmers in accessing markets and securing fair prices; and (3) supporting the triple bottom line, for example through programs that aim to improve human health and increase food access for marginalized populations (Colasanti et al., 2018). A survey conducted in Ontario yielded similar results, finding that food hubs allowed producers to diversify their production, access new markets, and hire more people, while also creating opportunities for youth employment, food donations, and food education programming (Blay-Palmer et al., 2018). In addition to these examples of larger-scale projects that assessed multiple food hubs across a wide jurisdiction, many individual food hubs also conduct at least some internal evaluation work, enabling them to participate in surveys such as those just mentioned. A number of resources have been made available in recent years to support these efforts, notably a Business Assessment Toolkit published by Wholesome Wave (Moraghan & Vanderburgh-Wertz, 2014) and a series of publications from the U.S. Department of Agriculture (Matson, Thayer and Shaw 2015a; 2015b; Matson, Thayer and Shaw, 2016; McFadden et al., 2017).

However, while useful, these resources have a heavy focus on business planning and financial assessment, leaving a gap with respect to measures of social and/or ecological impacts.

A salient example of an individual food hub evaluation that looked beyond financial indicators is presented by Schmidt et al. (2011) in their discussion of research conducted with Vermont's Intervale Food Hub. Of particular interest in this case study is the participatory methodology employed by the researchers, who explicitly sought to facilitate learning and action to contribute to the organization's development through their work (Schmidt et al., 2011). Such an approach is consistent with arguments regarding the complex, adaptive and emergent nature of food hubs (Stroink & Nelson, 2013) and food systems more generally (Meter, 2010), and the related limitations of trying to assess their impacts in more traditional, linear, outcome-oriented ways. As Meter (2010) puts it: "What if we examined [food systems'] underlying dynamics, rather than limiting ourselves to measuring only performance or impact? What if we embraced the complexity of the moment, and moved beyond linear models?" (p. 23).

Notwithstanding the efforts outlined above to capture some sectoral as well as individual food hub impacts through a range of more conventional as well as participatory methods, the recent literature examining the food hub sector clearly communicates a need for increased attention to research and evaluation (see LeBlanc et al., 2014; Levkoe et al., 2018; Matson & Thayer, 2013). For example, in discussing the results of a roundtable discussion with food hub researchers and practitioners from the U.S., Canada, and Australia, Levkoe et al. (2018) conclude that one of three key lessons learned is that there is a need for future research to help make the case for food hubs. Similarly, Matson and Thayer (2013) call for more systematic data collection on food hub impacts, and LeBlanc et al. (2014) argue that work is needed to "document, test, and share keys to [food hub] success in order to begin to develop a roadmap for development from nascence to maturity" (p. 134). This is consistent with findings by Stroink and Nelson (2013) that some food hubs are more able than others to adapt to changing circumstances and survive over the longer term, but further investigation is needed to understand why this is the case.

While research and evaluation are important for the food hub sector as a whole, tracking impacts and outcomes is also critical for the long-term viability of individual food hub operations. Without a strategic understanding of core competencies and capacity, it is easy for food hubs, particularly in their earlier stages, to stretch themselves too thin (Feldstein & Barham, 2017; Stroink & Nelson, 2013). As a result, it is imperative that food hub staff have the knowledge and capacity to track financial as well as other metrics (Feldstein & Barham, 2017) and that they use these metrics to guide planning and decision-making regarding their own development (Brislen et al., 2017). The implications of a lack of clarity regarding a food hub's core activities and how to evaluate success (or lack thereof) have directly contributed to the failure of some operations (Brislen et al., 2017). Even if it does not directly contribute to a food hub's failure, a lack of evaluation makes it difficult to optimize efforts. Hoey et al. (2018) cite a food hub manager grappling with how challenging it is to ensure an organization does its best work: "Are there ways to morph so that I can actually do the work of the hub even better? That's a huge struggle…" (p. 53). As will be discussed below, effective implementation of robust evaluation strategies can help alleviate at least some of that struggle.

Using evaluation as a means to improve operational efficiency and efficacy is particularly necessary because, although it is sometimes assumed that food hubs will be financially self-sustaining within the first several years of operation, the reality is that many continue to rely on at least some degree of grant funding for longer periods of time (Colasanti et al., 2018; Rysin & Dunning, 2016). Given the wide range of economic, social, and environmental benefits that food hubs create, there is a strong argument for public and/or foundation funding to be made available for their continued functioning (Hoey et al., 2018; Rysin & Dunning, 2016). As Hoey et al. (2018) explain, grants and other debt-free capital "allow food hubs to experiment, take chances, and … with flexibility … time and space to make mistakes, to figure things out slowly" (p. 54). While this may be central to their

long-term success, maintaining external funding without clear demonstration of impacts and outcomes is difficult if not impossible. Rather, it is essential "to ensure that governments recognize that public support for food systems interventions, such as food hubs, is likely to yield economic, public-health, environmental, and social returns on investment" (Hoey et al., 2018, p. 57, citing Roberts, 2014). Similarly, it is important for food hubs to be able to realistically assess their specific funding needs and timelines (Rysin & Dunning, 2016).

In thinking about the ways in which food hub research and evaluation could or should be carried out in practice, some useful insights can be drawn from literature in the field of program evaluation, which can be defined as "the systematic collection of information about the activities, characteristics, and outcomes of programs to make judgments about the program, improve program effectiveness and/or inform decisions about future programming" (Patton, 2000, p. 426). While such assessments are often required by funding agencies, "beyond meeting such accountability requirements, evaluation provides a rich and strategic opportunity to learn more about what works and how; inform improvements to a program or an approach; optimize the use of community assets and resources; and enable the discovery and sharing of successes" (Newberry & Taylor, 2014, p. 5). Although the two categories are not mutually exclusive, evaluation is sometimes thought of as being either formative or summative, focused more heavily on process or on outcomes, with the former associated most directly with ongoing program improvement and learning and the latter with identifying and understanding reasons for success or failure (see Briedenham & Butts, 2005; Newberry & Taylor, 2014).

Because of the high degree of dynamism, complexity and multifunctionality characteristic of many food hubs (see Blay-Palmer et al., 2018; Stroink & Nelson, 2013), evaluation approaches that are participatory, collaborative, flexible, and process-oriented are especially relevant as they are explicitly designed to take into account such factors (see Crishna, 2007a; Fetterman, 1994; Ramírez & Brodhead, 2013). One specific example of this general approach is developmental evaluation, wherein the goal is "tight integration between evaluators and program staff and use of data for continuous program improvements" (Fagen et al., 2011, p. 645) rather than summative assessment of so-called success or failure. The developmental evaluation framework emerged as a way to support adaptive learning in complex, innovative, and evolving initiatives (Gamble, 2008) and is intended to enable "a long-term, on-going process of continuous improvement, adaptation, and intentional change" (Patton, 1994, p. 317). Another model that is well-aligned with documented characteristics and needs of many food hubs is Utilization-Focused Evaluation which is a highly flexible, user-driven, multimethod process that aims to build an organization's capacity for data-informed decision-making (Ramírez & Brodhead, 2013). This methodology can contribute to both formative and summative evaluation needs and can involve collection of multiple data types (e.g., quantitative and qualitative) for multiple purposes (e.g., attention to process, outcomes, cost-benefit analysis), all depending on the needs and priorities of the intended evaluation users (Patton, 2000). Notably, approaches such as these do not offer a uniform set of methods; rather, they stress the importance of developing and adapting methods to suit the context of a particular initiative, taking into account the perspectives and priorities of key stakeholders (Crishna, 2007b; Fetterman, 1994; Ramírez & Brodhead, 2013). Specific evaluation tools can range from more traditional logic models and quantitative measures, to in-depth mixed methods case studies as exemplified by Schmidt et al. (2011) in their work with the Intervale Food Hub.

Overview of Research Project and Methods

The idea for the project presented here grew out of an understanding of food hubs that was developed through previous research on local food systems and food hubs in Ontario (see Blay-Palmer et al., 2013; Blay-Palmer et al., 2018; Nourishing Communities, 2015), and ongoing communication with actors who had participated in that work. Those projects used the relatively expansive Blay-Palmer et al. (2013) definition and, as such, we employed that same definition, choosing to explicitly refer to

community food hubs as a means of highlighting our interest in hubs that included goals beyond just profit. The project was initially conceptualized in consultation with the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) as well as representatives from a number of Canadian food hubs, and was designed to include these stakeholders as active collaborators throughout the process.

We collected data from 2013 to 2015; this involved four main components. Firstly, the project team conducted a literature review examining the relationship between food hubs and evaluation. This literature included scholarly papers along with policy documents, evaluation design materials and reports, and NGO as well as funder (e.g., foundations) resources and documentation. Much of the literature in the latter category was provided by collaborating organizations. Secondly, the primary author conducted in-depth, semistructured key informant interviews with representatives from five food hubs, three evaluation experts with experience working in the local and regional food sector, and five members of OMAFRA's local food working group. The food hubs were selected to include a range of organizational type (i.e., distribution-focused hubs and hubs focused on a broader range of social and ecological issues, hubs of different scales, nonprofit as well as for-profit hubs, and hubs that had been operating for different lengths of time). Topics covered in the key informant interviews included motivations for doing evaluation work; specific models and metrics used; how these models and metrics were developed and/or adapted; resources used for evaluation; strategies for securing resources; evaluation results and products; benefits and challenges of evaluation; and, finally, strategies for addressing challenges.

In addition to the key informant interviews, we conducted in-depth case studies of two hubs, both of which represented more mature organizations characterized by both a high level of complexity in their programming and demonstrated leadership in evaluation work. Each case study included multiple site visits, observation of operations, interviews, focus group discussions, and review of internal documents. The final method used was a collaborative review of the initial evaluation guide that was drafted by the authors based on a synthesis of results of the literature review, interviews, and case studies. The authors shared that draft with all research participants via email and requested feedback. Participants from each of the five participating food hubs provided feedback (via email and, in some cases, telephone call), as did a number of the other key informants. The lead author collated this feedback and incorporated it into an updated draft of the guide and, again, shared that with research participants. The authors waited until all participants expressed satisfaction with the guide before finalizing it.

Results

Capacity Considerations for Food Hub Evaluation

As already noted, the motivation to conduct this project came from an understanding—based on previous research and conversations with relevant stakeholders—that evaluation presented a challenge for existing food hubs, and this perception was borne out by the research process. All of the participating hubs, even those that were most mature and had relatively robust evaluation systems in place, found themselves grappling with capacity issues when it came to evaluating their work. Specifically, research participants talked about how limited time and funds, as well as a lack of knowledge and expertise, constrained their ability to do effective evaluation work. One hub representative suggested he "wouldn't even know where to begin, or have the time and resources to dedicate to [evaluation]." Another noted that "you just kind of put your head down and go about your business, but I think there's lots of stories that can be told about the work we do…and those stories aren't necessarily being told..." Yet another spoke about wanting to track how consumer attitudes about food might be shifting as a result of participating in the hub but felt that "I have no idea about how to do that."

Although the more mature hubs that participated in our project faced challenges with respect to their evaluation capacity, it was clear that the extent to which a food hub will be able to engage in evaluation work, and the kinds of evaluation it can and should do, are closely linked to the number of years it has been operating. Our research

results suggest that it can take seven to ten years for a food hub to begin to demonstrate the kind of outcomes that may be associated with its vision. "When you're in that early stage of things … you're just thinking about things like attendance [at events or activities] and return attendees. … It takes a while to have the luxury to look at other impacts. In the beginning, our surveys were about how we can make an event that people will like and will come to. Now we've figured out that formula, so it's become about how is this changing your life, or what role does this play in your life." These insights from a food hub staff member underscore how important process-oriented (as opposed to outcome-oriented) evaluation is for supporting food hub development in the first several years. Such an approach takes into account the reality that "tracking program success is easier than tracking program impact. Changing people's habits … is much harder and slower than getting them to go out and gather some information or learn more about something" (food hub staff).

In addition to the impact that a food hub's stage of development will have on its evaluation capacity, the structure of a food hub will, to some extent, dictate the type of evaluation that is possible and desirable. The manager of one of the for-profit food hubs that participated in this project summarized his perception of the difference between a for-profit and nonprofit food hub with respect to evaluation: "We wouldn't have been ready to have done any evaluation until [the seven-year mark]. It takes a certain scale to start thinking about big picture things, and we're finally at that kind of scale. Before this point, it's just been a grind. I was driving myself for the first three years, whereas now I have staff that oversee that. Until you have that luxury, for a for-profit business, it would be very difficult [to do any evaluation work beyond basic finances]. For a nonprofit, maybe you could get a grant to do some evaluation, but for us this is the earliest point at which we would consider it." As this statement indicates, evaluation tended to be more important for nonprofit hubs, at least in the early years, given their needs to report to funders as well as seek continued funding sources. That said, even the most economically focused hubs tend to include at least some social or ecological considerations as part of their mandate. The most important consideration then for developing an evaluation strategy is not what specific areas to focus on tracking, but rather to ensure that the information tracked is in alignment with the hub's specific goals and vision.

While research participants did draw some distinctions regarding when and how food hubs would want to engage in evaluation depending on organizational maturity, structure, and goals, there was consensus that it is important to make evaluation as simple and resource-efficient as possible, and to make some effort to do it in some way, even if imperfectly. As one food expert explained, "it doesn't matter if you weren't doing evaluation from the beginning. … It's never too late to start." In some cases, food hubs were doing evaluation without directly recognizing it as such. For example, one food hub manager explained: "We haven't really formalized an evaluation process. A lot of it is just through sort of informal meetings with member farmers. We brainstorm ideas over a case of beer, for example, and we gather a ton of really valuable information. Some of that gets recorded, though a lot of it is just in my head and gets implemented right away." Regardless of how formal or informal the approach, participants agreed that building evaluation into a food hub's daily operations was the easiest and most efficient way to ensure it gets done. One staff member suggested: "If you're hiring people, they need to know that 15% of their job is going to be evaluation and tracking. That needs to just be built into all positions. That expectation has to be set, and it becomes part of all the positions, instead of having to hire someone specifically to do it." Another important consideration was taking care in selecting the information to be tracked. "You've got to pick three to five things" argued one food hub staff member, "because if you have hundreds of things, you're never going to get the data you want. And you have to stick by your decisions, so if someone asks you 'how many x?', and you're not measuring 'x,' you can be open in that conversation and say why you did the evaluation the way you did and why you don't have that data. You can offer to get it if it might be useful, but you need to know why you'd get it."

Evaluation as Essential for Optimizing Operations and Communicating Impacts

All project participants clearly indicated that they considered evaluation an important component of their food hub's work and felt that it would contribute to the long-term success of their business or organization. As one food hub representative put it, evaluation "is not a want anymore; it's a need." The motivations for engaging in evaluation fell into two broad categories: optimizing operations and telling the story of a food hub's work.

There was a keen awareness of how developing and implementing a strong evaluation plan could help optimize a food hub's work by increasing clarity of vision and purpose, as well as creating opportunities for course corrections. From this perspective, evaluation was sometimes likened to using a map for navigation, with one food hub staff person noting: "It's really important to … draw a line from where you are to where you want to be, and try to stay on that path as much as possible." In some cases, a strategic planning process was viewed as an essential foundation for evaluation efforts. During field visits to one food hub, staff members repeatedly gestured to a large poster on the boardroom wall that illustrated the organization's core mission and goals in a very simplified way. The manager of that hub explained how this version of the strategic plan was used to maintain a clarity of purpose: "I printed out the one page because we had so many meetings [in that room] and I wanted us to be able to keep our eyes on the high level points."

Research participants also stressed how evaluation results can create opportunities to improve the functioning of the food hub by demonstrating what is working well and what is not and enabling strategic decision-making. In the words of one food hub staff person: "Evaluating is really about: How do I improve the process, and how do I get enough information so that I can make decisions grounded in a good assessment of what's really going on." All of the hub representatives we spoke to indicated that they had, at one time or another, made some changes to their operations as a result of feedback received via formal or informal evaluation. In some cases, these changes were relatively minor, for example the timing of an activity or the format for a workshop; however, in other cases, evaluation results helped clarify the need for more significant course corrections such as the discontinuing of a particular program that was consuming limited hub resources without achieving the desired impact.

The second rationale that research participants expressed for engaging in evaluation work was that it helps them tell the story of what their food hub does and why their work matters, enabling them to track metrics and articulate impacts to a range of stakeholders. One food hub staff person described how having solid evaluation results helps her feel confident about securing future funding: "I like feeling confident. I like going into a meeting with a funder, or writing a grant, and knowing that I'm accurately representing the work we're doing. I like being confident that the impact we can demonstrate is real, and measurable, and repeatable." While current and potential funders are perhaps the most immediately obvious audience for the story of food hub impacts, they are certainly not the only one. Research participants also spoke about sharing evaluation results with customers, business partners, policy-makers, program participants, community members, and the general public. "One big benefit [of doing evaluation] is sharing your success" explained one food hub staff person, who went on to note: "I share our work with a lot of other organizations, so having some synthesis of what we do is super helpful in being able to outline what our impacts are."

In terms of the food hub sector's capacity to contribute to more systemic food system change, research participants identified policy-makers as an essential target audience for messaging about impacts. One research participant made the link between effective evaluation and the potential to influence policy very explicit: "The policy window is going to open in a discussion around food and we're hoping that we've got what we need to prove what works and push some stuff through. We're starting to get into the political fray and it's a whole new learning curve." With respect to this potential to influence public policy, some food hub staff also noted the importance of communicating their impacts to the general public in the hopes that they would then put pressure on elected officials to

enact changes, for example to support local food processing infrastructure or public procurement programs.

Looking at the Numbers but also Beyond Them

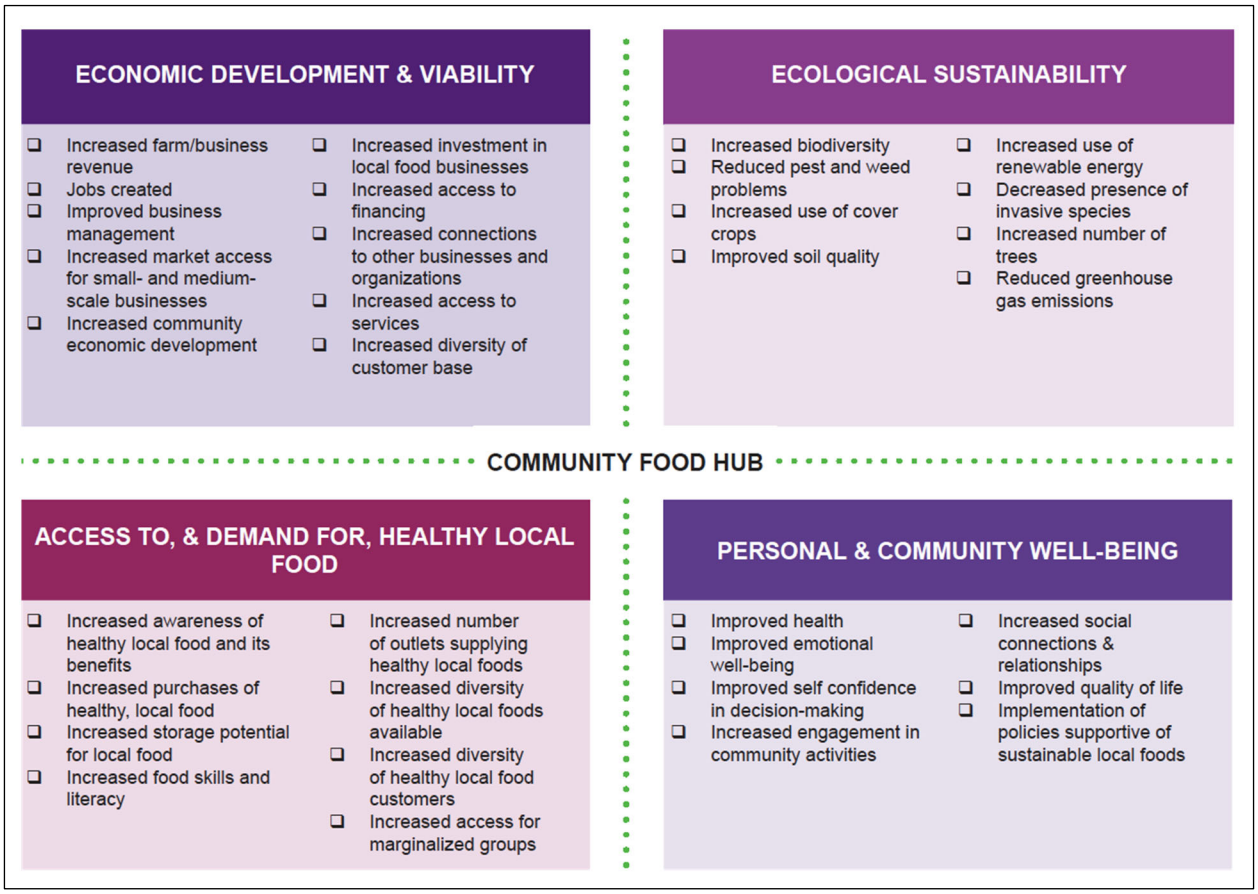
Implicit in this discussion regarding the importance of evaluating food hubs is the notion that impact measurement needs to be about more than just numbers and, specifically, about more than just a hub's profitability and direct economic impact. That said, research participants from both for-profit and nonprofit food hubs noted that tracking basic finances can be a useful starting point for thinking about evaluation. For example, they explained that tracking the dollar value of local food that is bought and sold through a hub is relatively easy. Indeed, across the hubs, there was a sense that "dollars are so easy to measure" (food hub manager) and that understanding financial viability was essential to the long-term success of a hub, regardless of structure.

While there was strong recognition regarding the importance of evaluating financial viability and tracking basic numbers such as local food bought and sold, all research participants agreed that capturing the multifunctional benefits of their food hubs was necessary in order to understand and communicate the full picture of their work. In the words of one food hub staff person: "if [a food hub] is judged by its ability to be financially sustainable over time and grow over time like a business—a straight up for-profit business—then it may not be catching all those other benefits that aren't captured in the bottom line but that are invaluable to changing the culture, or getting food to hungry people, or whatever the goal happens to be." Similarly, one hub staff person—who was trained as an accountant—suggested that food hubs would do best to measure investment-to-output ratios as opposed to the more traditional profits versus losses as a means of elucidating the value achieved through public investment even in the face of possible financial "losses." In spite of this recognition, most of the hubs felt that they were falling short in these efforts to track their impacts more holistically. The manager of one of the most mature hubs, that had quite robust evaluation systems in place, explained the challenge: "If we're successful with the food hub it's not just that the food hub makes half a million dollars in food sales and returns that to the farms, but we're hoping that people are making different purchasing decisions outside of what we do. And we haven't really gotten all the way to [measuring] that, though we're starting to …"

The specific multifunctional impacts that the food hubs in our study were aiming to achieve, and ideally measure, can be clustered into four general categories: achieving economic viability and development; increasing access to and demand for healthy local food; improving personal and community wellbeing; and enhancing ecological sustainability (Figure 1). As outlined in Figure 1, within each category we identified a number of specific goals, such as: creating jobs and increasing market access for small- and medium-scale businesses; increasing purchases of healthy local food and increasing food skills and literacy; improving self-confidence in decision-making and increasing social connections and relationships.; and increasing biodiversity and increasing use of renewable energy. Each hub was not working towards all of the goals presented; rather, these goals reflect the range of desired outcomes that we encountered across participants.

These sample food hub outcomes appear in the evaluation guide as a menu of options designed to help hubs identify the ones that apply to their operations. They are accompanied by similar tables of common food hub activities and sample metrics to track the success of those activities (for more formative evaluation work), as well as a set of sample metrics to support the design of data collection tools that can be used as part of more summative evaluation efforts (Figure 2). Our initial hope had been to develop a more concise, and perhaps even uniform set of metrics and measures that could significantly reduce the time and effort required for food hubs to design and implement evaluation work; however, research results quickly and clearly demonstrated that the highly context-specific nature of each hub did not lend itself well to such a prescriptive approach, but rather to something more flexible and process-oriented. One drawback of this approach is that the evaluation guide does not provide the kind of template that

Figure 1. Common Outcomes that Community Food Hubs Want to Achieve (from Nelson & Landman, 2015)

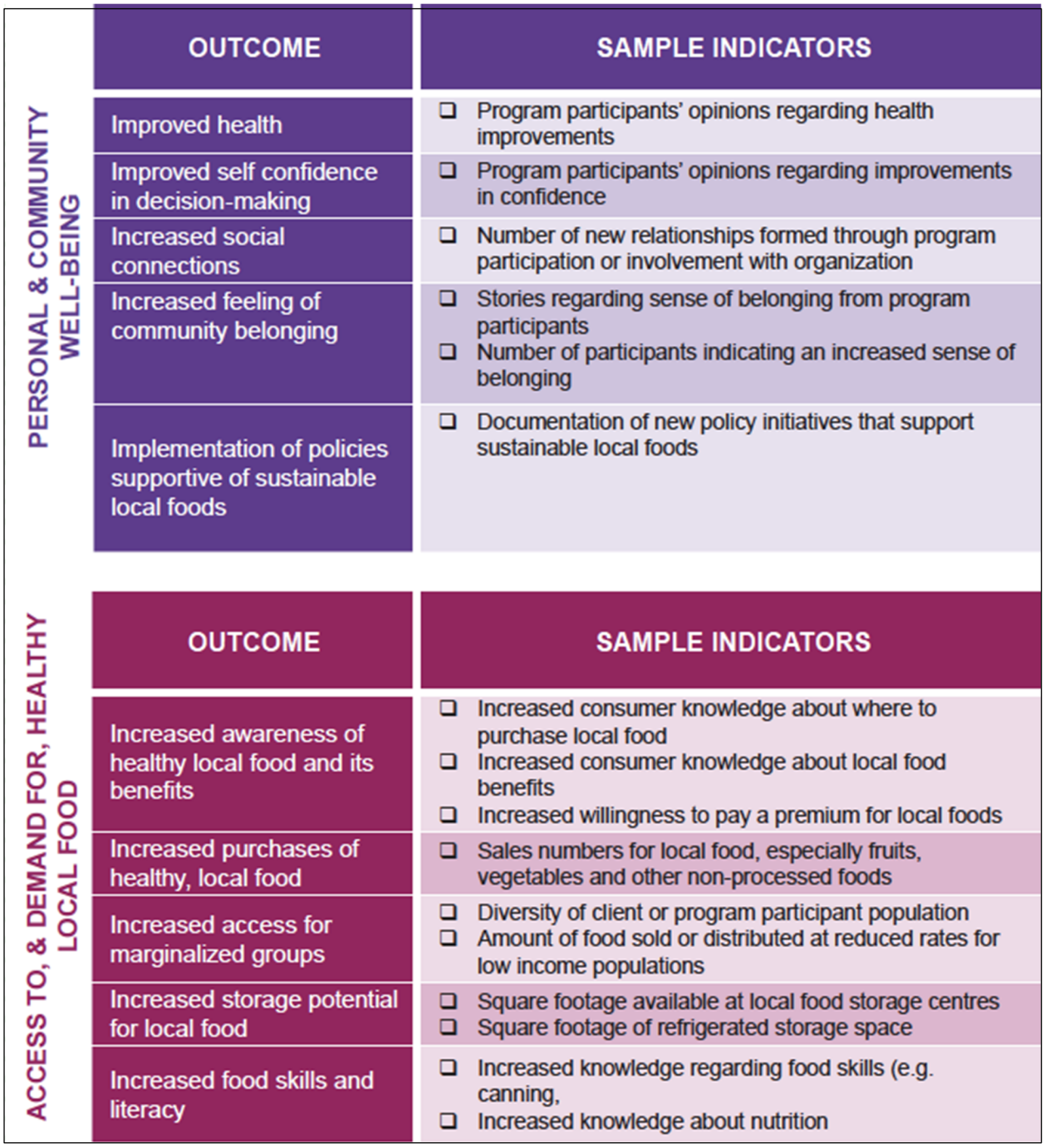


some food hub stakeholders may be interested in. Such a product would not have been applicable to the full spectrum of food hubs that we encountered through our research, including hubs with different organizational structures, operating at different scales, characterized by varying stages of development and levels of complexity, and focusing on a wide variety of goals and priorities. To accommodate this diversity, a collective decision was made that a process-oriented resource guide was most appropriate.

One final insight with respect to the importance of looking beyond basic finances in evaluating food hub activity is the way in which multiple research participants referred to an element of "magic" inherent in using evaluation results to paint an effective picture of a food hub's multifaceted impacts on society. One staff person explained: "You have to not worry about the societal change and proving it. From my perspective, the connection between the stuff happening in your boxes [i.e., your food hub's activities] and the bigger societal change is magic and you explain it in a paragraph where you say 'we did this specific thing and these are our program numbers' but you don't claim you made the big societal impact. But then you can say 'there is this big problem and it's getting better and this is how our work contributes.' You have to paint that story and demonstrate that magic." This notion of magic was also used to describe the actual activities of a food hub organization, and the challenges associated with measuring the impacts of those experiences. In the words of one manager referring to a particularly successful community event organized by the hub: "We have done some things that are just a bit of magic" and "a key question is how you capture those things [in an evaluation]."

This concept of magic was closely related to the importance of storytelling as part of a food

Figure 2. Sample Outcomes and Associated Indicators for Community Food Hubs (from Nelson & Landman, 2015)



hub's evaluation strategy and essential for, again, capturing the complex, multifunctional nature of the work. One food hub manager explained how a compelling narrative could be created drawing upon relatively small numbers and combining them with other data to create an effective story about a food hub's impact: "We can say 'we planted 35 000 trees last year' and people nod, and then we say 'we had this community project where we planted, like, 200' and it's like that's not a big deal. But we can

say that people came from the local church group or a company or the schools and they put their hands in the ground and really dug in, and in 2 hours we planted these 200 trees, and then people are like 'whoa, 200 trees!' and you're like, 'but no, it's 35 000 trees! 200 trees is nothing!' So we're working on how to get the stories aligning with the data, and then when you add it all up you get what we call magic." The point here is that sometimes a story can be told more impactfully using smaller numbers as a starting point to enable an audience to envision what an impact looks like. A number of participants shared this perspective and clarified that the bigger data with which the stories align does not necessarily need to be collected by the food hub, but instead could be drawn from other research or existing literature.

Discussion: Tensions and Opportunities in Food Hub Evaluation

Our research both confirmed and clarified a number of tensions with respect to evaluating food hubs. Firstly, there is a distinct gap between food hub stakeholders' and advocates' recognition of how important, or even necessary, it is to evaluate food hub activities on one hand and the hubs' actual capacity to conduct robust, ongoing monitoring and evaluation on the other. While our work initially set out to develop a template that food hubs could use to ease their evaluation efforts, results demonstrated that the significant variability within the sector rendered this approach inappropriate. This was particularly true as we utilized the Blay-Palmer et al. (2013) definition of a food hub, which is especially expansive in nature, allowing for inclusion of hubs across Berti & Mulligan's (2016) spectrum, from more supply-chain oriented models to those focusing more explicitly on sustainability and community development. The challenges we encountered in trying to develop a template of common food hub metrics is consistent with findings by Matson & Thayer (2013) that highlight the need for context-specific—as opposed to singular—measures of food hub success, and also reflect O'Hara & Pirog's (2013) more general discussion of the methodological difficulties inherent in local food system evaluation efforts.

The tension between evaluation needs and capacity was evident in all of the food hubs in our study, regardless of structure and underlying goals; however, the sense of urgency to evaluate was especially acute for nonprofit hubs. Indeed, although representatives of for-profit hubs indicated a keen interest in resources that might support their ability to engage in some form of impact assessment, they were not prioritizing evaluation in the same way as their nonprofit counterparts. Rather, they viewed it as something that would be "poignant and relevant" and that they would "love to be able to do more formally" if external resources were available, but it was not something they would prioritize in terms of their own investment of money or labor. By contrast, the nonprofit hubs expressed a clear awareness of their continued dependence on external funding and, in accordance with Newberry and Taylor's (2012) discussion of the relationship between program evaluation and community food actions, viewed effective evaluation as a kind of prerequisite for maintaining such funding. In spite of these findings, there is evidence that even many for-profit food hubs rely at least in part on grant funding even after many years in operation (Colasanti et al., 2018; Rysin & Dunning, 2016), suggesting that collecting compelling evidence of impacts to support funding applications is in fact important for both for- and nonprofit entities. In addition, the kinds of sectoral research and evaluation efforts conducted in the United States (Colasanti et al., 2018; Fischer et al., 2013; Hardy et al., 2016) and Ontario (Blay-Palmer et al., 2018), as well as individual food hub evaluation stories (see Schmidt et al., 2011) help paint a picture of food hub benefits that can be used to advocate for policy changes (e.g., public procurement of local food) as well as to push for shifts in consumer purchasing behaviors, both of which benefit food hubs across the definitional spectrum. Being able to point to studies such as these highlights the value of externally conducted research on food hubs, as the resources and expertise of research-oriented institutions can be leveraged to fill gaps in food hub monitoring and evaluation capacity. This reinforces existing calls to increase research on the food hub sector to help support its long-term viability (LeBlanc et al., 2014; Levkoe et al., 2018; Matson & Thayer, 2013).

A second tension elucidated by our research relates, not to the need to evaluate food hubs per se, but rather to the kinds of data that are collected or not through evaluation processes. Specifically, there was a consensus amongst research participants that outcomes tied to the social and/or ecological aspects of their work were considerably more difficult to evaluate than financial or economic indicators. "In terms of dollars of local food bought and sold—that's easy to do" explained one participant, going on to note that "the rest of it" (i.e., broader social and environmental outcomes, including increasing access to healthy food, reducing food miles, and supporting ecological farming practices) remained a bit of a mystery. The challenges inherent in *measuring* the social and ecological, along with economic, impacts of food hub work mirror the struggle that many hubs face in actually *doing* activities that prioritize social or ecological outcomes over economic ones and, particularly, maintaining those activities over the long term. While not every food hub includes social or environmental goals as part of its mandate, there is evidence that social considerations such as food security, racial equity, access to healthy food, and fair prices for farmers are important for many hubs, as are environmental issues, particularly support for sustainable agricultural practices (see Blay-Palmer et al., 2018; Colasanti et al., 2018). However, the literature also highlights how food hubs' social and/or environmental goals are often subsumed by financial considerations (see Clark et al., 2019; Cleveland et al., 2014; Franklin et al., 2011; Hoey et al., 2018), as evidenced in the headline of a report on food hub closures: *"Kentucky food hub suffered when it emphasized social mission over financial viability"* (Brislen et al., 2017). As Hoey et al. (2018) explain, 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" (p. 56). At the heart of this difficulty is the fact that, like other local food efforts, food hubs continue to be embedded within a conventional capitalist system that emphasizes economic performance above social or ecological concerns (Cleveland et al., 2014; Hoey et al., 2018; Stroink & Nelson, 2013).

In the face of such deeply entrenched structural issues, conducting robust evaluation of food hubs' multidimensional impacts is certainly no silver bullet; however, building capacity for food hubs to effectively identify and articulate their impacts across economic, social, and ecological spheres does represent an opportunity to reduce the vulnerability of individual hubs and strengthen the sector as a whole. For individual food hubs, engaging in some combination of formative (process-oriented, assessing program success) and summative (outcome-oriented, assessing program impacts) evaluation work (see Briedenham & Butts, 2005) creates important opportunities to clarify vision, ensure strategic alignment between goals and activities, and identify successes as well as areas for improvement. When describing evaluations with a strong process focus, one research participant explained that the results can be used as a kind of "road map," helping ensure that food hubs avoid making detours that leave them stretched beyond capacity and at risk of the kind of failure described by Brislen et al. (2017) and Stroink and Nelson (2013). Beyond these internal uses, food hubs can use more outcome-focused evaluation results to communicate a compelling story about the complex, multidimensional impacts of their work to a variety of audiences. This is particularly important given many hubs' continued reliance, at least in part, on external funding as well as volunteer labor and other donated resources (Hoey et al., 2018; LeBlanc et al., 2014; Stroink & Nelson, 2013).

While the use of evaluation results to support organizational improvements and secure external funding is of significant practical importance to existing food hub operations, there is a broader argument to be made for identifying and tracking the impacts that food hubs have on the food systems in which they are embedded and that, to varying extents, they seek to transform. Specifically, evaluation has the potential to provide convincing evidence regarding the kinds of public goods that food hubs provide (see Hoey et al., 2018), and that evidence can be used to advocate

for changes to food system policy. Indeed, a number of our research participants were keenly aware that their evaluation efforts play an instrumental role in increasing their readiness to "get into the political fray" by providing them with solid data regarding the value of their work. In the Canadian context, recent consultations on the development of a national food policy have created opportunities to put this kind of evidence to good use, thus highlighting the importance of such readiness. While policy frameworks still overwhelmingly support the mainstream food system, rendering food hubs and other alternatives at a structural disadvantage, the vulnerabilities of that mainstream food system are becoming ever more apparent (Stroink & Nelson, 2013), thereby creating some hope that more opportunities to push for policy change may emerge. If food hubs are to be ready for these opportunities, however, it is essential that they have access to resources that facilitate their ability to gather evidence about their impacts.

An additional opportunity that became apparent through our research is for food hubs to look to participatory evaluation models as a means of engaging in action-oriented, collaborative evaluations that can support their own capacity-building, strategic decision-making and growth. As already noted, early research results indicated that developing a process-oriented guide was more realistic, and also more desirable, than establishing a set of common metrics and methods to serve as a one-size-fits-all template for food hub evaluations. To that end, the guide directs users to a variety of resources related to different evaluation steps and styles, including participatory methodologies such as developmental evaluation (see Patton, 1994) and Utilization-Focused Evaluation (see Ramírez & Brodhead, 2013), that can be adopted and adapted depending on a hub's particular priorities and capacities. These approaches allow for the flexible application of a wide range of data collection methods that can be employed to gather both formative and summative information about an organization's programs and outcomes. They also enable a wide range of stakeholders to participate actively in all phases of an evaluation process and facilitate ongoing practical application of evaluation findings (Crishna, 2007a; Patton, 1994; Ramírez & Brodhead, 2013). Conceptualizing evaluation in this way contrasts with more conventional methods, often focused on the logic model. While these methods certainly prove useful in some contexts, and are often incorporated into funding agency requirements, they are also subject to critique for being overly linear, noncollaborative, and more useful to funders than to the organizations or initiatives being funded (see Butterfoss, Francisco, & Capwell, 2001; Crishna, 2007b). The idea that participatory evaluation approaches are particularly relevant in the context of food hubs builds upon Schmidt et al.'s (2011) case study of the Intervale Food Hub, which underscored the importance of a participatory orientation to food hub research and evoked elements of a developmental evaluation—e.g., supporting the development of an innovative program in an adaptive context, nurturing learning for the organization being evaluated, situating the evaluator as part of a collaborative team that includes program staff (Patton, 1994)—without explicitly defining itself as such. It is also aligned with Meter's (2010) call for assessments that take into account the complex, adaptive nature of food systems (see also Stroink & Nelson, 2013) and "look for patterns of emergence, rather than relying solely on comprehensive counts of inputs and outputs" (p. 25).

Although we consider the use of participatory evaluation methodologies an opportunity for food hubs, it is also important to recognize that a hub's capacity to employ such methodologies is subject to many of the same resource constraints that hamper any evaluation effort. Indeed, Crishna (2007a) stresses that participatory evaluation strategies require significant time as well as skill-building on the part of participants, and also depend upon availability of a highly trained, creative facilitator. Beyond that, they tend to generate high volumes of data that can be challenging to manage (Butterfoss et al., 2001; Gamble, 2008; Zukoski & Luluquisen, 2002). Given that many food hubs have been found to overextend themselves to the point of threatening their viability, particularly in the early years (Feldstein & Barham, 2017; Stroink & Nelson, 2013), embarking upon a full-fledged participatory evaluation project may not be realistic. However, drawing upon participatory evalua-

tion methodologies can help hubs in their strategic planning processes, which can in turn help them avoid such overextension. For example, looking to the tools and practices associated with Utilization-Focused Evaluation can provide a road map for how a food hub can actively involve staff, clients, program users and other stakeholders in decisions regarding what information should be tracked based upon the outcomes and metrics most aligned with its vision and goals. Involving multiple stakeholders in this way is, again, consistent with Meter's (2010) discussion of effective food system assessment, and creates opportunities for multiple actors to buy into evaluation processes, thus helping ensure such processes will be implemented over the long term and that results will be applied in a meaningful way (Newberry & Taylor, 2014; Ramírez & Brodhead, 2013).

Conclusions

Our research results demonstrated that food hubs very much need to engage in evaluation work, yet often lack the resources to do so. With limited supplies of time and funds and, in many cases, little or no expertise in evaluation methods, food hub actors often find it challenging to know how to most effectively assess the impacts of their work. In spite of these barriers, however, organizations and businesses across the food hub spectrum see clear value in building simple processes into their operations that allow them to evaluate the multifaceted goods they create for people, communities, and food systems. Evaluation results can be used internally as a means of optimizing a hub's operations, and also externally to garner support from funders, clients, partners and, ideally, policy-makers as well as the general public. Tracking basic financial and economic indicators (e.g., profits, dollar value of local food sold) tends to be the easiest place for many food hubs to start with respect to measuring their success; however, finding ways to capture some of the social and ecological impacts that many hubs include within their mandate is an essential element of a truly effective food hub evaluation strategy.

Although the resource constraints that hinder many food hubs' ability to engage in comprehensive—or indeed any—evaluation work might suggest that development of templated metrics and methods to facilitate consistent data collection across the sector would be useful, our research results indicated that this approach, while not without potential value, was subject to significant limitations. Instead, because of the highly complex, dynamic nature of food hub work, participatory evaluation methodologies that are collaborative, flexible, and process-oriented are especially relevant. Such approaches do not offer a uniform set of metrics or methods, but instead are designed to foster engagement of a wide range of actors in developing and adapting methods to suit the ever-evolving context of a particular initiative or program. Although working from this kind of participatory, collaborative perspective when conducting evaluation is not without its own challenges, it helps to ensure that evaluation results will be put to practical use in strengthening individual food hubs and the sector more broadly.

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A gap analysis of farm tourism microentrepreneurial mentoring needs in North Carolina, USA

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Abstract

Tourism is frequently proposed as a strategy to revitalize rural economies. The current mushrooming of web platforms for the tourism sharing economy affords rural microentrepreneurs opportunities to capitalize on the growing demand for authentic experiences. However, these platforms may actually be widening the socio-economic gap between individuals across the digital and urban/rural divides. In addition, the well-established urban culture of entrepreneurial mentorship is not taking hold in the rural areas, which direly need to attract and support nascent entrepreneurs. Farms are increasingly adopting tourism to diversify their business models, and Extension agents are trusted mentors par excellence of agribusiness entrepre-

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neurs; therefore, this study explores the extent to which Extension agents feel able to address the mentoring needs of farm tourism microentrepreneurs. We measured both tourism e-microentrepreneurial self-efficacy (TeMSE) among farmers and tourism e-microentrepreneurial mentoring self-efficacy (TeMMSE) of Extension agents. Results show that farmers have relatively low self-efficacy in the dimensions of e-marketing and marshalling resources, and that agents may be efficacious mentors in these dimensions. Farmers also show low self-efficacy in adapting to externalities; however, agents do not perceive themselves as efficacious mentors in this dimension. We conclude with a discussion of practical implications for train-the-trainer strategies to enable farm tourism microentrepreneurship success.

Keywords
Agritourism, Farm Tourism, Entrepreneurial Self-Efficacy, Microentrepreneurship, Food Systems

Introduction

Tourism has been employed globally to revitalize rural economies by leveraging natural resources, cultural heritage, or the appeal of local champions who strive to share their passions with visitors. This is matched by a growing demand for authentic, unscripted experiences by hyperconnected urbanites and fueled by the current mushrooming of the tourism sharing economy (Organization for Economic Cooperation and Development [OECD], 2016) and web platforms like Airbnb, HipCamp, and HarvestHost. Tourism microentrepreneurs who provide experiences, food, lodging, or transportation now have the ability to bypass retail monopolies and mitigate information imbalances by making their services and products directly available to potential visitors (Ditta-Apichai, Kattiyapornpong, & Gretzel, 2020). However, there are concerns that the advent of web-based sharing economy platforms may be widening the socio-economic gap between individuals across the digital divide by excluding microentrepreneurs with unreliable access to the internet and limited computer skills (Morais et al, 2012; Payton, Morais & Heath, 2015). In addition, they may show low efficacy in other domains of entrepreneurial activity that may preclude them from investing themselves in entrepreneurial opportunities (Ferreira, Morais, Pollack, & Bunds, 2018).

Whereas the culture of mentorship is well-established in the urban incubator-accelerator tech-entrepreneurship context, there is limited evidence that such a culture is taking hold in rural areas that so direly need to attract and support nascent entrepreneurs (Halim, 2016, Hustedde, 2018; OECD, 2003). Frequently, Extension agents are trusted mentors of agribusiness entrepreneurs, and farming businesses are increasingly adopting tourism as a component of their business model; therefore, this study explores the extent to which rural development Extension agents in North Carolina feel able to mentor farmers wishing to start or add value to an existing farm tourism microbusiness. We first measured tourism microentrepreneurial self-efficacy (Ferreira et al., 2018) among 29 farmers in North Carolina. Secondly, we adapted this scale to assess Extension agents' tourism e-microentrepreneurial mentoring self-efficacy (TeMMSE). Third, we did a paper-based pilot test with 24 agents participating in a statewide Extension conference. Fourth, after incorporating feedback from the pilot, we surveyed 54 agents in North Carolina self-identified as being involved in advising farm tourism microentrepreneurs. Finally, we plotted the data from both the farmer and agent samples on a bidimensional matrix and compared the relative location of each pair of datapoints: the farmers' TeMSE versus the agents TeMMSE. Results show that agents may be efficacious mentors in the dimensions of e-marketing and marshalling resources, but not in adapting to externalities, which may require a train-the-trainer approach to close the gap between the agents' capabilities and the farmers' needs.

Literature Review

Rural Tourism and Agritourism

Tourism has been a major force in the rejuvenation of depressed rural areas, which have been plagued by distinct although related problems such as population decline, disinvestment, industrialization, and urbanization (Carneiro, Lima, & Silva, 2018; Cunha, Kastenholz, & Carneiro, 2011; Lane, 1994;

Sharpley & Sharpley, 1997). According to Lane (1994), defining rural tourism simply as "tourism which takes place in the countryside" (p. 9) detracts from its multifaceted character and inherently and erroneously assumes rural areas are static and immune to urban influence. Accordingly, rural tourism has taken many forms and has served many purposes around the world, in the social, environmental, and economic spheres. For example, in Japan, "green tourism" in the Kunisaki Peninsula has contributed to raising public awareness and gaining political support for the preservation of a communal system of reservoirs that had been the backbone of local agriculture for centuries until urban exodus and industrialization sent the system into disarray (Vafadari, 2013). In South Africa, rural tourism was traditionally a "white man thing" that accounted for almost the totality of demand and supply and was for the most part a synonym of wildlife tourism; eventually it branched out into adventure tourism, cultural tourism, and 'township tourism,' which has created economic opportunities for previously disenfranchised rural communities (Briedenhann & Wickens, 2004). Teixeira and Ribeiro (2013) reported that a renewed interest in the food practices associated with the lamprey in rural Portugal led to a "retrenchment and revitalization of traditional means of capture, preparation, and consumption among the local and visiting populations" (p. 193).

Moreover, there has been an increased demand for recreational activities on farms over the last decades (Barbieri, Xu, Gil-Arroyo, & Rich, 2016). The continued price drop of commodity crops also contributed to farm diversification, with about two-thirds of portfolio farmers (i.e., farmers with a diversified portfolio of income-generating farm-related businesses) in Texas reporting having diversified through agritourism (Barbieri & Mahoney, 2009). However, the real importance of agritourism as a component of farm income is debatable (Chase, Stewart, Schilling, Smith, & Walk, 2018; Schilling, Sullivan, & Komar, 2012). For example, farmers may choose to charge visitors directly for leisure and educational activities, or use them as a loss leader to increase direct sales of produce or added-value products. According to Barbieri (2017), the wide range of activities falling under the umbrella of agritourism and the different strategies adopted by farmers to monetize them seem to hinder objective assessments of the real economic impact of agritourism.

Importantly, while farmers generally acknowledge important socioeconomic benefits from agritourism, they nonetheless identify primarily as farmers and take pride in welcoming visitors to a working farm (Tew & Barbieri, 2012). For example, initiatives like Fork2Farmer encourage foodies to visit "authentic" local farms that supply the meat and produce consumed at high-end farm-to-table restaurants, while at the same time offering needed agritourism training to interested farmers (Morais, Jakes, Bowen, & Lelekacs, 2017). However, more often than not, farmers do not have strong bridging ties with formal tourism business partners or small business development agencies to support them as they branch out into tourism-related services (Ferreira, 2018).

Tourism Sharing Economy

Small and microenterprises have struggled to make their goods and services visible to potential customers (Ferreira, Morais, & Lorscheider, 2015). However, solutions that mediate information exchanges between suppliers and potential customers may disrupt the control exerted by formal distribution channels (Payton et al., 2015). Often, these solutions take the form of web marketplaces where microentrepreneurs can offer their services to potential customers. Marketplaces such as Airbnb, HipCamp, and Harvest Host allow suppliers to showcase their goods or services and help potential customers navigate offerings (Ditta-Apichai et al., 2020; Ferreira et al., 2015).

However, Morais et al. (2012) contend that the economic power of the emerging sharing economy is largely being tapped by hyperconnected urbanites. Similarly, Baum (2006) suggests that the "digital divide"—the gap observed between individuals with ready access to information and communication technologies and those without such access—exacerbates social and economic discrepancies within societies. Therefore, web marketplaces are largely failing to engage under-resourced rural tourism microentrepreneurs who could benefit the most from alternative income sources to support

their vulnerable livelihoods (Morais, Ferreira, Nazariadli, & Gharamani, 2017).

Tourism Microentrepreneurship

Tourism microenterprises employ five or fewer employees and tend to operate in underregulated business environments that allow low entry barriers, but typically do not afford stable livelihoods or health benefits (Ferreira et al., 2015). Nevertheless, their small size and informal nature render microenterprises nimble and easily adaptable to the changing opportunities and challenges of business landscapes (Mladenovic, 2013). It should be noted that, in the scope of this paper, informality relates more to the range of informal arrangements (e.g., labor, channels, structure, nonmonetary exchange) than with the legal status of the firms (Boanada-Fuchs & Boanada Fuchs, 2018).

Tourism microentrepreneurship is the process of launching a new enterprise or adding value to an existing one, relying partially on web marketplaces to attract visitors and operating in any of the tourism sectors, employing no more than five people, with the aim to meet a market need and permitting the owner a desired livelihood and lifestyle (Ferreira et al., 2018). This definition helps differentiate de facto tourism microentrepreneurship (Gardiner & Dolnicar, 2018; Morais, Ferreira, & Wallace, 2017), from other microentrepreneurial activities performed in the context of tourism, such as management, maintenance, or cleaning services supporting the burgeoning web-based short-term accommodation rental market (Sigala & Dolnicar, 2018). Thus, in this paper we refer to the former, that is, individuals who have a passion or hobby which they are willing to share with visitors in exchange for remuneration. These include micro-hoteliers (e.g., Airbnb.com, VRBO.com), providers of cultural experiences (e.g., PeopleFirstTourism.com, Vayable.com), or farmers offering farm-based recreational and educational experiences (e.g., Fork2Farmer.com).

In North Carolina, agritourism appears to be the most prominent expression of tourism microentrepreneurship, perhaps by capitalizing on the state's rich and diverse agriscape and its romantic appeal to urbanites seeking to celebrate local roots (Halim, Barbieri, Morais, Jakes, & Seekamp, 2020; Nazariadli, Morais, Bunds, Baran, & Supak, 2019). Accordingly, the Visit NC Farms app currently lists nearly 800 agritourism assets (e.g., farm experiences, farm stays and lodging, tours and trails) and claims to reach close to 10,000 active users (Visit NC Farms, n.d.). Moreover, in a survey of 207 farms across North Carolina, Ferreira (2019) reported that the sales of farm experiences, tours, and stays to visitors were deemed at least very important by 45.4% of farmers, accounting for an estimated 14.4% of total farm income. Finally, agritourism offerings in the state may include a diverse set of educational, farm-based recreation, recreational self-harvest, hands-on, and other nonagricultural recreation (e.g., bounce castles, swings) activities (Brune, Knollenberg, Stevenson, Barbieri, & Schroeder-Moreno (2020).

Importance of Tourism Microentrepreneurship

According to McGehee and Kline (2008), microentrepreneurship is well suited to the context of rural tourism development, because it "harmonizes with the philosophy that problems are best solved by solutions generated from inside the community, and that external consultants are not needed to propose successful strategies for economic redemption" (p. 123). Likewise, many more authors have called for an increase in the stimulation and support of tourism microentrepreneurship by small business development authorities (Ferreira, 2016; K.C., 2015; LaPan, 2014; Mao, 2014; Nazariadli, 2018; Nyaupane, Morais & Dowler, 2006).

The demand for authentic local tourism experiences (i.e., travel to non-touristy, off-the-beaten path, unspoiled places, and doing what locals do) has grown steadily over recent years (Destinations International, 2019; Week, 2012), but the question of who should train, organize, support, and promote these microentrepreneur providers of experiences remains largely unanswered (Morais, Ferreira, Nazariadli, & Ghahramani, 2017). These and other tasks would normally fall under the local Tourism Development Authority (TDA) sphere of influence. However, the informal nature of these businesses coupled with the TDA's revenue model, largely dependent on the collection of "bed tax" from the formal hospitality sector, have been a hindrance to investment in the

creation and nurture of networks of microentrepreneurs. With scarce institutional support and limited opportunities for role modeling, individuals may doubt their ability to become entrepreneurs and shy away from economic opportunities.

Self-efficacy Theory

Self-efficacy, defined as one's belief in one's ability to succeed in a target behavior, is a dominant theoretical paradigm used to explain people's motivation, effort, and perseverance in a task (Bandura, 1977). Self-efficacy theory holds that if people perceive themselves to be capable of accomplishing certain activities, they are more likely to undertake them in the future (Alkire, 2005). Moreover, self-efficacy will also influence an individual's level of motivation, as reflected in how much effort one will exert in a task, and how long one will persevere in the face of obstacles (Bandura, 1980). Ferreira et al. (2018) adapted the construct to the context of tourism microentrepreneurship, and developed the Tourism e-Microentrepreneurial Self-Efficacy (TeMSE) scale, which can be used to measure the five facets of the construct: *Pursuing Innovation, Marshalling Resources, Adapting to Externalities, Aligning Core Purpose with Self,* and *e-Marketing* (see Table 1). They defined TeMSE as one's belief in one's ability to successfully perform the various roles and tasks of microentrepreneurship in the tourism e-business sector.

It should be noted that one distinctive feature of self-efficacy theory is that, unlike other motivational theories, it is task-specific (Bandura, 1977). This is important because diversified farming is inherently entrepreneurial. Accordingly, McKee (2018) notes that small-scale farmers find themselves in a constant battle "to innovate new ways to distinguish themselves and their offerings, though successful strategies may then be taken up by competitors with more resources, forcing these farmers to innovate again" (p. 67). While these experiences may contribute to efficacy expectancies generalizable to other domains of the farmers' lives (Sherer et al., 1982), we argue that the roles and tasks of agritourism are significantly different from farming. Therefore, specific examination of TeMSE is both relevant and necessary for the purpose of this study.

Training and Mentoring

Compared to their urban counterparts, rural entrepreneurs may be at a disadvantage for a number of reasons, such as limited opportunities for financial capital and access to grants, insufficient transportation systems, local politics incompatible with entrepreneurial freedom, and lack of support networks and entrepreneurial role models (McGehee & Kline, 2008). Accordingly, in the broad scope of entrepreneurship, mentoring has been identified as an effective vehicle for acquiring networking opportunities (Dymock, 1999), as well as elevating self-efficacy, validating one's entrepreneurial self-image, and lowering a sense of solitude (St-Jean & Audet, 2013).

Mentoring is a voluntary, committed, dynamic, extended, intensive, and supportive relationship characterized by trust, friendship, and mutuality between an experienced, respected person and a novice, with the purpose of socializing the latter in a new role and promoting self-efficacy (Hayes, 1998). Although mentoring has become a common practice in the tech start-up apparatus (Memon, Rozan, Ismail, Uddin, & Daud, 2015), such an approach has not been deployed yet in the realm of tourism microentrepreneurship, certainly not systematically and not to scale. Accordingly, Halim (2016) called for the establishment of a system that would enable mentoring in rural areas, in which established entrepreneurs mentor young or start-up farm tourism microentrepreneurs. The absence of such a system seems to undermine the success of these ventures, especially when entrepreneurs find themselves on their own amidst a highly volatile regulatory environment and a changing economic landscape at the intersect of tourism, agriculture, and local politics (Halim, Morais, Barbieri, Jakes, & Zering, 2016).

Although further research is needed to ascertain the effectiveness of a mentoring program under these specific conditions, the question we ask for the moment is who should start such a system? Who has privileged access to the communities and, more importantly, to the individuals who might choose to operate underground to survive the inquisitive arm of regulatory bodies? Who has the institutional framework to take this effort to scale?

The Role of Cooperative Extension

Cooperative Extension is the largest outreach program at North Carolina State University, reaching millions of North Carolinians each year through local centers in the state's 100 counties plus in the Eastern Band of the Cherokee Indians (NC State Extension, n.d.). It was established through the Smith–Lever Act of 1914 with the aim of providing all citizens with access to the wealth of knowledge generated by public universities. It provides educational programming in five key areas, including maintaining viable communities, which seems to align well with opportunities for the economic rejuvenation of depressed rural areas enabled by new economies like tourism.

Given the role of Cooperative Extension in rural North Carolina, it is arguably the agency best positioned to establish and scale up a much-needed culture of entrepreneurial mentorship outside the state's urban centers. This may trigger a new set of questions: are extension field agents subject-knowledgeable to mentor tourism microentrepreneurship? Are they confident they could actually mentor farm tourism microentrepreneurs? In other words, are field agents efficacious in mentoring farm tourism microentrepreneurship?

While conventional entrepreneurial training has focused on business processes, from basic management practices to identifying and exploiting opportunities, Lucas and Cooper (2004) call for approaches that demystify the entrepreneurial process and build self-belief that aspiring entrepreneurs might have what it takes to succeed in business. The route we are exploring is mentorship. We propose that government agencies such as Cooperative Extension in North Carolina stand in a privileged position to take on the much-needed role of mentoring farm tourism microentrepreneurs.

Land-grant universities and Extension emerged from the growing need to have higher education available and geared toward the practical interests of common people (Key, 1996). In particular, Cooperative Extension provides educational programming in five areas: (1) sustaining agriculture and forestry; (2) protecting the environment, (3) maintaining viable communities; (4) developing responsible youth; and (5) developing strong, healthy and safe families. Efforts toward creating a vibrant tourism scene consisting of responsible locally owned businesses could foster any of these five areas in any given small town. Finally, Weber (1987) states that it is incumbent on Cooperative Extension to offer training curricula to increase the community's knowledge base with the goal of building local capacity. However, while we acknowledge the role of Extension and the dedication of its agents, there is some evidence that training curricula are adapted from formal business sectors and are not based on assessments of the rural tourism microentrepreneurs' specific needs (Ferreira, Morais, Bunds, & Pollack, 2016). Also, as posited by Morais, Ferreira, Nazariadli, and Gharamani (2017), when the agency's efficiency is measured primarily by the number of clients (farmers) served, the incentive is for agents to deliver one-time workshops with large groups, in lieu of personalized accompaniment in the field, along the lines of mentoring.

The work of Cooperative Extension agents is even more important when we zoom out and consider the place that small farms and farmers occupy in the U.S. food system. Increased concentration of food production in the hands of partial oligopolies (Howard, 2016) and the financialization that prioritizes shareholder value over nutritious food and decent livelihoods, occlude social concerns as mere "externalities" (Clapp & Isakson, 2018) and leave small farms and farmers in a vulnerable market position. As they cannot compete by price with the heavily subsidized, large-scale producers, these microentrepreneurs need to bet on quality and diversify their offer beyond the actual crops, to include knowledge as a product. Specifically, it is no longer enough for the microentrepreneur to advertise "local" produce, since large retailers such as Wal-Mart have moved in to capitalize on this label, alienating the actual producers (Bloom & Hinrichs, 2017). Small producers then need to creatively adapt to such power imbalances, and it is here where the work of Extension agents can complete the puzzle: in inviting the foodies and the travelers to the farm, microentrepreneurs are at the forefront of agri-food movements that challenge the status quo of industrial food production, which alienates people from the land (Hinrichs &

Eshleman, 2014) and deskills consumers (Jaffe & Gertler, 2006). Local entrepreneurs are key actors in rural development, but they need institutional and infrastructure support and an incentive structure that allows them to gain a foothold in the contested economic market (Dickes & Robinson, 2014). Extension agents are in a position to offer the kind of assistance that allows microentrepreneurs to diversify their abilities and overcome institutional barriers.

Purpose

Tourism microentrepreneurship stands to be a critical mechanism through which host communities gain access to socio-economic benefits from tourism and may even gain a degree of control of the tourism development in their communities (Ditta-Apichai et al., 2020; LaPan, Morais, Wallace, & Barbieri, 2016; Nazariadli et al., 2019). However, little is known about the process through which host community members become involved in tourism microentrepreneurship and about the ability of public systems to enable their growth and success. Accordingly, this study examines the microentrepreneurial self-efficacy of 29 farm tourism microentrepreneurs, as well as the perceived ability of local empowerment agents in the region to become mentors to those farmers. The purpose of this study was to identify areas in tourism microentrepreneurial activity where farmers could benefit from long-term accompaniment by Extension agents, as well as other areas where the flow of information could be in the opposite direction—that is, farmers may have accumulated experience and specific knowledge unknown to the agent. We hypothesize that this bidirectional flow of information could have two major implications:

(1) Increase the success of farm tourism enterprises,[1] and
(2) Increase farm tourism specific knowledge of the Cooperative Extension institution.

Methods

This study is grounded in a strong emic perspective of rural and farm tourism microentrepreneurship, drawing on the team's extensive experience in the development of networks of microentrepreneurs in North Carolina. Part of this work was done in tandem with Extension agents, who nominated and introduced potential tourism microentrepreneurs in the community. This endorsement was instrumental because it granted us access to community members and dissipated suspicions about our intentions.

This study is composed of two complementary parts, which involved surveying two distinct populations using two different instruments. The first part refers to the measurement of tourism microentrepreneurial self-efficacy among 29 farmers in North Carolina, via phone. The second part refers to the measurement of mentoring self-efficacy among 54 extension agents, via an online survey. To make sense of the data, we plotted the results from both samples on a bidimensional matrix and compared the relative location of each pair of datapoints.

Measuring TeMSE

The development of the TeMSE scale was informed by longitudinal participatory action-research with rural tourism microentrepreneurs by Ferreira, Morais, Pollack, and Bunds (2018), and has been applied successfully to measure tourism microentrepreneurial self-efficacy of farmers (Ferreira, 2019). We administered the scale via phone to 29 farm tourism microentrepreneurs participating in the People-First Tourism project (P1t) in North Carolina, an initiative led by North Carolina State University with the aim of supporting individuals interested in pursuing sustainable livelihoods through tourism microentrepreneurship.

[1] Farm tourism enterprise success can be defined in a variety of ways beyond just profit. For example, in a study about women in agritourism, Halim (2016) found that in addition to general indicators of entrepreneurial success (e.g., contentment, peer-recognition), microentrepreneurs felt successful because agritourism also provided appreciative customers and ensured the perpetuation of their farms.

Defining Tourism e-Microentrepreneurship Mentoring Self-Efficacy and Developing a Scale

The TeMSE questionnaire (i.e., the scale used to survey the 29 farmers) was modified to capture the new construct—Tourism e-Microentrepreneurship Mentoring Self-Efficacy—defined as one's belief in one's ability to successfully provide guidance and promote self-efficacy among tourism e-microentrepreneurs. Thus, the segment "I am able to…" which started all items of the TeMSE scale, was replaced with "I am able to provide guidance to microentrepreneurs on how to…". For example, TeMSE item "I am able to create experiences that fulfill tourists' interests" was changed to "I am able to provide guidance to microentrepreneurs on how to create experiences that fulfill tourists' interests." The scale was pilot tested with 24 participants in a statewide Cooperative Extension conference who registered for a workshop on tourism web marketplaces. No wording issues were detected, and item variances and means were within acceptable values.

Measuring Tourism e-Microentrepreneurship Mentoring Self-Efficacy

A link to an anonymous survey on Qualtrics was sent to select departments through the official NC Cooperative Extension listserv. Respondents selected themselves on the basis of whether their work entailed, to some extent, direct contact with farmers, artisans, storytellers, or entrepreneurs of any kind, as instructed in the e-mail message. To increase response rate, two follow-up emails were sent on different days of the week and different times. Fifty-four valid surveys were returned.

Findings and Discussion

Farm Tourism Microentrepreneurs' Self-Efficacy

Most respondents held either a bachelor's degree or postgraduate studies (61%), there were more males (71%), the average age was 54 years old, and Caucasian/White was the most prevalent ethnicity represented by far (64%). The USDA (2017) statewide census of NC agriculture reports that 67% of farmers are male, averaging 58 years old, and predominantly White (94%). Ten farmers reported not having any earnings from tourism at the time but were setting up to start receiving visitors. Average earnings from those who were currently offering experiences were 14% of their total livelihood.

In Table 1, it becomes apparent that elevating TeMSE dimensions *Adapting to Externalities, e-Marketing, and Marshalling Resources* is a priority and warrants dedicated attention from rural development authorities, if farm tourism microentrepre-

Table 1. Descriptive Statistics and Reliability for Microentrepreneurs' TeMSE

Dimension	Brief description	Number of Items	Cronbach's Alpha	Mean (1–5)
Pursuing Innovation	Striving for better ideas or methods, or integrating new approaches that address ever changing market demands, and improve competitive advantage	2	.49	4.18
Adapting to Externalities	Capitalizing on or mitigating nuances in the legal landscape affecting conditions the tourism sector that are out of their control	3	.51	3.66
Aligning Core Purpose with Self	Articulating to stakeholders a core purpose of the business in line with personal idiosyncrasies and in support of a desired lifestyle	4	.54	4.24
e-Marketing	Effectively using social media and web applications to market their businesses and engage with visitors and peers	2	.90	3.57
Marshalling Resources	Assembling resources of different kinds (e.g., communal labor, business partnerships, support from local agencies) to support business	3	.50	3.67
			Mean	**3.86**

neurship is to fulfill its role of a powerful rejuvenator of underresourced areas.

Low values on *Adapting to Externalities* could reflect the ambiguity of information in respect to licenses, insurance, and taxes due for a tourism business. Airbnb is a good example: some cities have opted for full prohibition, whereas others have taken a laissez-faire approach (Nieuwland & Van Melik, 2020); in specific jurisdictions, occupancy taxes are collected and paid automatically by the platform, while in others the microentrepreneur may need to collect them manually (Airbnb, n.d.). Regulatory ambiguity is apparent in a peculiar anecdote wherein one of the participating farmers was denied a lodging license for his log cabin by county authorities, but would be abiding by the law if he chose to rent it through Airbnb.

Some entrepreneurship theorists argue that the ability to adapt to change and leverage ambiguity are among the most important entrepreneurial skills (Moberg, 2013). Mladjenovic (2013), in the scope of microentrepreneurship, advises that being aware of taxes and other legal issues such as business structure (i.e., sole proprietorship, limited liability company, corporation, or partnership) is important to protect one's business interests. For example, until recently, outsourcing was considered unnecessary and too costly for microenterprises, but now is considered an available and affordable resource to save money and time and add efficiency to the venture.

Finally, *e-Marketing*, also shows a low mean value.[2] Although it could be argued that the reason behind the low mean is the relatively old age of farmers in the sample, this argument falls short when one looks at the high education level, with 61% holding either a bachelor's degree or postgraduate studies. In fact, doing social media diligently can be a cumbersome task and take away from pressing tasks at hand (McKee, 2018). Doing it haphazardly undermines audience engagement and might lead to content becoming outdated, which can be perceived as sloppy management. However, if used judiciously, social media platforms such as Facebook, LinkedIn, and Twitter can help the microentrepreneur meet people and build relationships that in due course can translate into sales (Mladjenovic, 2013).

In order to reach underresourced tourism microentrepreneurs, Ferreira, Morais, and Lorscheider (2015) used the NC Cooperative Extension publication system to diffuse a fact sheet that explains in plain language how to use web marketplaces to reach untapped markets. Two hundred hard copies were distributed to a number of Cooperative Extension offices and local destination management organizations throughout the state, and a link was made available.[3] In addition, the research team paired with leading Extension directors to deliver train-the-trainer workshops to field agents, with the purpose of elevating the agents' tourism e-microentrepreneurship mentoring self-efficacy, enhancing and multiplying the impact of the research.

The results on *Marshalling Resources* seem to capture farmers' difficulty in getting the institutional support necessary to validate their business and grant access to financial resources, certifications, training, and expertise. Halim (2016) found this struggle to be even harder among women farm tourism microentrepreneurs, as they lack the resources and credibility as farmers while at the same time juggling traditional roles. Secondly, there might be some concern and mistrust from other local businesses that might undermine the strengthening of bonds between tourism businesses and those in the primary and secondary sectors. For example, Nyaupane, Morais, and Dowler (2006) reported a disruption of traditional kinship and community bonds, in particular conflict and disharmony, between lodge owners and farmers in a tourist destination in Nepal. Finally, the unavailability of helpers when the need arises might have to do with the seasonal character of tourism and that demand is stronger on weekends and holidays. Halim, Morais, Barbieri, Jakes, and Zering (2016) found the latter to be the most prominent challenge among women in agritourism in North Carolina, for it adds to their already heavy burden of work, which keeps them from investing in long-

[2] While contextual factors such as rural broadband issues may play a role, they are outside the scope of this paper.
[3] http://content.ces.ncsu.edu/using-web-marketplaces-to-reach-untapped-markets

term planning for the farm and thus hinders their capacity to harness its growth potential.

Some authors have proposed strategies to overcome the inability to marshal resources among rural microentrepreneurs. Morais, Ferreira, Nazariadli, and Ghahramani (2017) described how P1t microentrepreneurs are organized in networks that promote both cooperation and competition, or "co-opetition" (Nalebuff & Brandenburger, 1997), to improve social capital, namely bonding ties between microentrepreneurs, and bridging ties with organizations and partners that might bring them opportunities and access to resources not readily available within the network (Narayan & Cassidy, 2001).

Agents Mentoring Self-Efficacy

Data from the survey with Extension agents revealed that the majority of respondents (70%) were White, 43% were aged between 50 and 59 years, and 54% were male. Regarding time spent face-to-face with microentrepreneurs (i.e., in-person interaction with one individual or a small group), 35 of 54 respondents reported spending less than 20% of their working hours, whereas only 9 reported spending more than 50% interacting directly with microentrepreneurs (Figure 1). These sobering figures are consistent with Ensle's (2005) assertion that agent's "enjoyment of teaching and working with the public often gets sidelined for endless paperwork with unrealistic due dates" (para. 2).

The relatively small sample size unfortunately did not enable a thorough exploration of the underlying structure and relationships between variables. However, the exceptionally high alphas (Santos, 1999) found in the sample of mentors reveal great dimension consistency and anticipate an underlying structure identical of the structure of the original scale (Table 2).

Microentrepreneurship Mentoring Matrix

To ascertain whether agents are equipped and confident to mentor their clients, or, in other words, are "able to provide guidance to microentrepreneurs," we developed the Microentrepreneurship Mentoring Matrix (M^3). This tool is loosely adapted from the performance-importance analysis, a framework used extensively in hospitality and tourism research because of its simplicity (Lai & Hitchcock, 2015). The M^3 analyzes quality attributes on two dimensions, in this case microentrepreneurs' and mentors' self-efficacy. These dimensions are then integrated into a matrix that helps to identify pressing training needs in the field and devise the most appropriate strategic options to overcome them. Moreover, the M^3 can be defined by orthogonal axes that intercept at mean values of TeMSE and TeMSE-Mentor, creating four quadrants that inform four different strategies of intervention depending where the data points fall:

Figure 1. Percent of Working Time Spent Mentoring Microentrepreneurs Face to Face

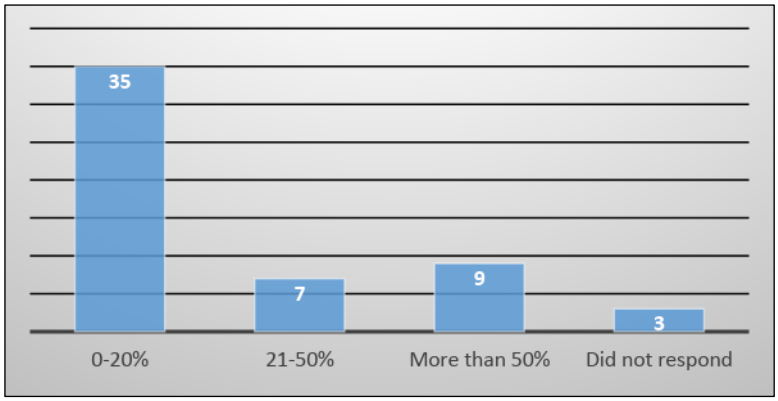


Table 2. Descriptive Statistics and Reliability for Mentors' TeMMentSE

Dimension	Number of Items	Cronbach's Alpha	Mean
Pursuing Innovation	2	.90	3.38
Adapting to Externalities	3	.87	2.40
Aligning Core Purpose with Self	4	.91	3.28
e-Marketing	2	.91	3.17
Marshalling Resources	3	.78	3.25
		Mean	**3.10**

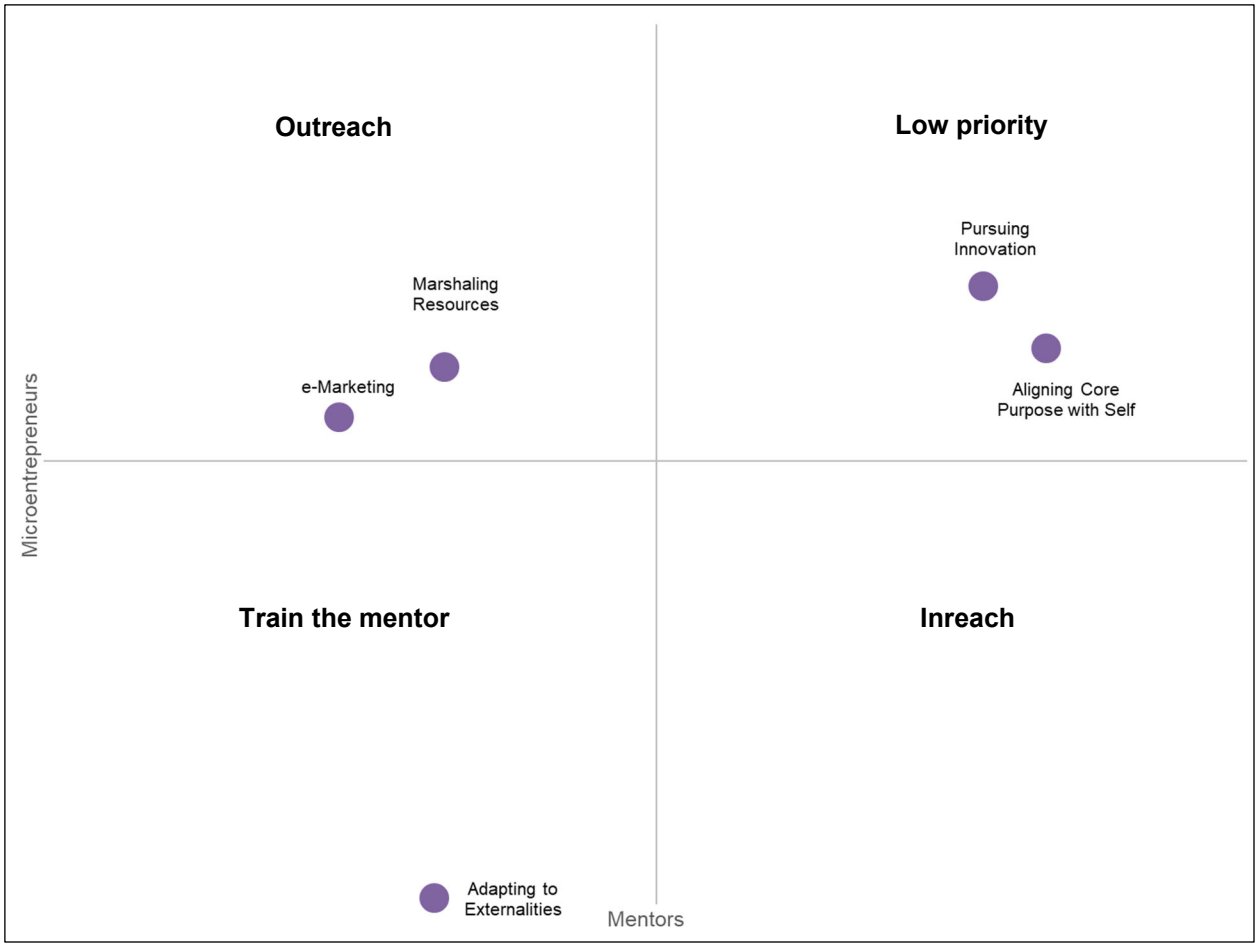
(1) **Outreach:** Mentors are self-efficacious whereas microentrepreneurs are not; need for top-down flow of knowledge.
(2) **Inreach:** Microentrepreneurs are self-efficacious but mentors are not; opportunity for bottom-up flow of knowledge.
(3) **Train the mentor:** Neither mentors nor microentrepreneurs are self-efficacious; training the mentors has a multiplier effect, increasing the number of microentrepreneurs exposed to applied research.
(4) **Low priority:** Both mentors and microentrepreneurs are self-efficacious; resources should be directed to other areas.

Analysis of the M³ (Figure 2) allows us to clearly discern that the pairs TeMSE/TeMSE-Mentor fall under three distinct categories, namely Outreach, Low Priority, and Train the Mentor. The data also indicate that there is not a category in which tourism microentrepreneurs are sufficiently self-efficacious to enable *inreach* to agents, that is, a bottom-up distribution of entrepreneurial knowledge that would serve the agents in future mentoring occasions.

Pursuing Innovation and *Aligning Core Purpose with Self* are areas of least concern. The already reported high level of ingenuity of microentrepreneurs, as well as their strong ability to create and run a venture that encompasses their idiosyncrasies, are matched by the agents' mentoring self-efficacy in these dimensions.

Conversely, the dimension *Adapting to Externalities* is a matter of high concern because neither

Figure 2. Microentrepreneurship Mentoring Matrix



farmers nor mentors believe they are efficacious. Here, the specificity of tourism in the marketplace and the particular, often ambiguous, legal framework it falls under might contribute to the low values of mentoring self-efficacy reported by mentors, who have been trained and are experienced in other more traditional rural economic activities such as agriculture, forestry, or fishery. Furthermore, our experience engaging with Extension agents suggests that they are generally apprehensive to comment on topics that may be related to farm liability and permitting because there is ambiguity about these topics and they have very tangible consequences to the welfare of the microentrepreneurs they mentor. Considering that Extension agents are public employees, they are naturally very apprehensive to provide advice about these topics out of concern that it might get them into legal trouble. In North Carolina this gap has been partially filled by agritourism associations that invite insurance agencies to give presentations about their products during meetings and provide lists of insurance agencies interested in selling products for this kind of risk protection. In addition, academic programs engaged with this population (e.g., P1tLab) periodically invite county and municipality permitting authorities to informal microentrepreneur gatherings with the goal of providing clarification about applicable policies and enforcement in a nonthreatening context.

The third and last category, Outreach, comprises the dimensions *Marshalling Resources* and *e-Marketing*. Here, mentors appear to be slightly more efficacious than farmers; therefore, in these areas, Extension mentors seem already qualified to support farm tourism microenterprises. Accordingly, agents should think of themselves as contacts who can connect farmers with key local leaders, grants, and support services that can enable microentrepreneurial success in the form of access to new markets, partnerships with formal sector companies, funding, or help with marketing efforts. Likewise, by virtue of the intense online component of Extension agents' work, they are generally well-positioned to mentor farmers on how to use social media effectively to connect with current and potential customers. In addition, agents can establish virtual networks of local farmers to fuel communication between members for enhanced intragroup support and to efficiently disseminate information among them.

Results from this study confirm the innovative character of current small-scale farming, as farmers are pushed to diversify their agricultural and non-agricultural offerings, explore new markets, and stay relevant in the local foods scene (McKee, 2018; Mikko Vesala, Peura, & McElwee, 2007). For farmers, agritourism is an expansion of their selves, a stage where they have a voice and a devoted audience (Nazariadli et al., 2019), and a meaningful and rewarding way to enable a desired lifestyle (Ateljevic & Doorne, 2000; Barbieri, 2017). Whereas innovation, passion, and meaning abound among farmers, many still struggle to effectively deal with liability, secure resources from a variety of sources, and make effective use of web marketplaces.

Extension agents are recognized by farmers involved in agritourism as a reliable source of assistance (Halim et al., 2020). Results also seem to indicate that agents, in general, are comfortable in such role, denoting the necessary skills, means, and disposition to act as mentors. This is encouraging because, in theory, agents can be effective sources of guidance in matters related to two of the lowest-scoring dimensions among farmers. These are arguably the two most important areas in the feasibility of an agritourism venture: the ability to marshal resources and the ability to reach out to customers.

Conclusions

Farm tourism microentrepreneurship has great potential for rural development. It brings in new money to those most likely to spend it locally, it builds opportunities for place-based work and income generation, it provides the authenticity demanded by urbanites looking for genuine experiences of knowledge, people, and places different from their own. As agribusinesses differentiate themselves to include the provision of lodging, experiences, and food products to tourists, so does Extension's role expand to encompass mentoring of tourism microentrepreneurship. This study reveals the specific needs and competencies of farm tourism microentrepreneurs and contrasts

those with the mentoring capabilities of Extension agents. This is the first study of this kind; therefore, the findings provide only initial insight into the mentoring context in rural North Carolina.

One apparent limitation of this study is the low size of the sample of farm tourism microentrepreneurs. This, of course, is a consequence of our resolve to administer the survey via phone in order to include individuals whose perspectives would likely be excluded had we opted for online surveying. Also, modest reliability scores on some of the TeMSE dimensions suggest that the scale may need refinement for application in the context of farm tourism, and thus prudence is recommended when considering scores for each dimension.

More research exploring needs and Extension programs and resources should follow, in North Carolina and in other regions. Additionally, a similar approach to study mentoring gaps should be employed in contexts markedly different from North Carolina where other kinds of organizations (e.g., international NGOs) fill in the role of developing local tourism capacity.

The COVID-19 pandemic supershock brought the entire service industry to its knees, but small and microbusinesses have been affected the most (Bartik et al., 2020; Fairlie, 2020). Moving forward, as authorities implement recovery plans and make resources available for microentrepreneurs, we argue that mentorship can play an important role in accelerating entrepreneurial action (Bacq, Geoghegan, Josefy, Stevenson, & Williams, 2020).

Overall, it is noteworthy that this study departs from traditional tourism capacity-building approaches that have focused on training local people for qualified hospitality employment (see Hoefle, 2016; Massyn, 2008; and Nepal, 2007). Contrary to earlier tourism research paradigms limited to exploring ways for local people to passively support a tourism industry primarily concerned with meeting demand, this study subscribes to the Manifesto of the People-First Tourism Movement (Morais, 2017) that advocates research that advances ways for local people to harness the economic muscle of tourism in their own terms through tourism microentrepreneurship.

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Oregon farmers' perspectives on motivations and obstacles to transition to certified organic

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Abstract

This exploratory study investigates perceptions of the transition to certified organic production among farmers in the U.S. state of Oregon who were actively transitioning all or part of their operation to certified organic production. It examines the influence of farmer experience with organic farming systems on motivations and obstacles to transition to certified organic farming. The analysis creates and compares three categories of farmers based on their total years of farming experience and years of farming using organic methods—*Experienced Organic Farmers, Beginning Organic Farmers,* and *Experienced Farmers Beginning Organic*—and provides insights into the economic and ideological motivations for transitioning to certified organic, as well as the economic, production, and marketing obstacles inherent to certified organic transition.

Keywords

Organic Farming, Organic Certification, Organic Transition, Oregon

Introduction

Market demand in the United States for certified-organic products has shown double-digit growth nearly every year since the implementation of the National Organic Program and the "USDA Organic" label in 2002. In 2018, certified organic food sales increased to US$47.9 billion while non-food sales increased to US$4.6 billion. Almost 6% of total U.S. food sales are certified organic (Organic Trade Association, 2019).

Despite the growth in market demand, there is a lag in the growth of domestic organic production with less than 1% of total U.S. cropland being certified organic in 2015 (Greene, Ferreira, Carlson, Cooke, & Hitaj, 2017). Research has indicated that

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farmers may be hesitant to transition their land and production systems to organic due to a number of obstacles, either real or perceived (Cranfield, Henson, & Holliday, 2010; Farmer, Epstein, Watkins, & Mincey, 2014; Johnston, 2010; Lau, Hanagriff, Constance, York, VanDelist, & Higgins, 2010; McBride, Greene, Foreman, & Ali, 2015; Veldstra, Alexander, & Marshall, 2014).

In order to transition acreage from conventional to certified organic production, the U.S. Department of Agriculture (USDA)'s National Organic Program requires a three-year transition period. During this time, farmers must comply with all organic regulations, abstain from using prohibited inputs, establish and maintain records of actions and inputs, create an organic system plan, and finally complete the certification process (Organic Foods Production Act Provisions, 2000).

Farmers may manage the transition process using a variety of approaches. For instance, DiGiacomo and King (2015) identified four transition strategies farmers can follow. "Full" transition involves transitioning crops, land, and livestock all at the same time. A "gradual" approach involves transitioning one parcel at a time with the eventual goal of certification for all parcels whereas "split" operations have some land managed conventionally and some certified organic. "Immediate" transition is an option for land that has been fallow, under conservation easement, or can be proven to have received no prohibited inputs in the previous three years. This latter strategy does not require the three-year transition period and can result in immediate certification.

Understanding the motivations and attitudes that influence the decision-making of farmers in transition to organic certification will assist advocates, educators, and researchers to better communicate and support the transition process. Comparative studies have focused on how differences in farmer values and perceptions influence the decision to farm organically (Best, 2008; Beus & Dunlap, 1990; Cranfield et al., 2010; Stofferahn, 2009). These studies highlight a distinction between economic-motivated farmers and values-motivated farmers.

Other studies indicate that farmers may be categorized along a spectrum of pragmatism to idealism (Darnhofer, Schneeberger, & Freyer, 2005; Fairweather, 1999; Padel, 2001; Schoon & te Grotenhuis, 2000). The various perspectives and motivations of farmers influence whether they approach transition with an input substitution paradigm or through system redesign (Lamine & Bellon, 2008). This in turn influences what challenges farmers face during transition.

The literature related to farmer challenges to organic transition and production notes four general categories: economic challenges, production challenges, marketing challenges, and social challenges (Cranfield et al., 2010; Duram, 2000; Johnston, 2010; Koesling, Loes, Flaten, Kristensen, & Hansen, 2012; Lau et al., 2010; Sahm et al., 2012; Stephenson, Gwin, Powell, & Garrett, 2012; Strochlic & Sierra, 2007). The perception of these challenges differs between conventional and organic farmers (Johnston, 2010; Lau et al., 2010).

This study focuses on farmers in the U.S. state of Oregon who have recently transitioned a portion or all of their land to organic production and received organic certification. The 2016 USDA Organic Survey indicates there were a total of 194,769 certified organic acres (78,820 hectares) and 461 certified organic farms in the state of Oregon. This accounted for 3.9% of U.S. certified organic acreage and 3.2% of its certified organic farms (USDA National Agricultural Statistics Service [NASS], 2017). Oregon has steadily ranked fifth in the amount of certified organic acreage after California, Montana, Wisconsin, and New York, but the state has seen a decline in the number of certified organic farms. In 2014 there were 525 certified organic farms in Oregon, but by 2016 the number of certified organic farms decreased to 461, a 12.2% reduction in the number of farms and a loss of 9,397 certified organic acres (3,803 ha) (USDA NASS, 2015; 2017).

Objectives

Although there are many factors affecting the lagging domestic response to the marketplace demand for organic products, this study is focused on the influence of farming experience on motivations and obstacles Oregon farmers face when transitioning to organic agriculture; this knowledge will

inform research, education, and policy responses. The objectives are to (1) identify what motivates farmers to make the transition to organic agriculture, and (2) determine the economic, production, and marketing obstacles that farmers face when transitioning to organic agriculture.

The Oregon State University (OSU) Center for Small Farms & Community Food Systems and Oregon Tilth, Incorporated, collaborated on this study. Oregon Tilth, Inc., a nonprofit organization that focuses on education and advocacy in addition to certification, is interested in learning more about what motivations farmers have and obstacles they face with organic transition so it can tailor its education programs and advocacy efforts to meet farmers' needs. Similarly, the OSU Center for Small Farms & Community Food Systems is interested in, and dedicated to addressing, the research and educational needs of transitioning farmers.

Methods

Farmer participants were selected utilizing purposive sampling, a type of non-probability sampling (Bernard, 2013). Oregon Tilth, Inc. provided a list of all farms that were actively transitioning or had certified new land to organic between January 1, 2014, and July 31, 2015. The list yielded 44 Oregon farms. Eleven farms were eliminated from the list: five were noncommercial research or demonstration sites, and an additional six farms were participating in a similar national survey.[1] This resulted in a final sample of 33 farms. Survey research began during November 2015. For this study, the term "organic" refers to only *certified organic* farms, methods, inputs, etc., and does not include farms that may practice organic methods without organic certification.

The survey was administered by the Oregon State University Center for Small Farms & Community Food Systems using paper questionnaires. Survey methods followed the protocols of Salant and Dillman (1994) and Dillman, Smyth, and Christian (2014), with guidance from the Oregon State University Survey Research Center (OSU-SRC). During November 2015, Oregon Tilth, Inc., sent the 33 participants an introductory letter and a copy of the questionnaire with a prepaid business reply envelope by U.S. mail. The letter provided background on the purpose of the survey, introduced the OSU Center for Small Farms & Community Food Systems as a research partner, and requested the recipient's participation. Each participant received a follow-up postcard two weeks later. One month later, all nonrespondents were mailed a reminder letter and copy of the questionnaire with a prepaid business reply envelope. Twenty-four surveys were completed and returned by mail, and six were completed over the telephone. Of the 33 farms in the sample, two declined to participate and the contact information was incorrect for one, resulting in 30 completed questionnaires and an adjusted response rate of 91%.

Survey Content

The questionnaire was designed to be short in order to improve the response rate; however, there was a trade-off in that this limited the number of variables that could be examined. The questionnaire conveniently fit on one page with questions on front and back. The questionnaire had four sections: The first section collected basic farm and farmer demographic information, the second section addressed motivations related to transitioning to certified organic production, and the third and fourth sections addressed obstacles to organic transition and production. In these sections, respondents were asked to indicate whether a factor was "a major obstacle," "a minor obstacle," "not an obstacle," or "not applicable/not sure." For both the motivations and obstacles sections, factors identified in published literature helped shape the questions (Cranfield et al., 2010; Johnston, 2010; Lau et al., 2010; Stephenson et al., 2012; Strochlic & Sierra, 2007). Finally, two open-ended questions probed for advice these farmers had for those considering transition and if there were any additional

[1] During the same period of this study, the OSU Center for Small Farms & Community Food Systems and Oregon Tilth, Inc., were conducting a national organic transition survey of farmers in the Organic Environmental Quality Incentives Program (EQUIP) through the USDA Natural Resources Conservation Service (NRCS). To avoid confusing participants, the selection criteria were refined to exclude any farms that had participated in the national survey.

comments about their transition to organic. This study was conducted with approval from the Oregon State University Institutional Review Board to ensure the rights and welfare of the participants.

Data Analysis

Data were compiled and analyzed using IBM SPSS software (version 23). Initial analysis utilized descriptive statistics including frequencies and cross tabulations to obtain a broad understanding of the data. The small sample size is a constraint, and the statistical analysis was limited to calculations most appropriate for small sample sizes as recommended by the Oregon State University Statistics Department. Fisher's exact test was used to compare a binary response for three farmer groups. Generally, this test is used to compare two groups, but it can be used to compare three groups when used to detect significant differences in the proportion of responses, rather than to prove a hypothesis.

The use of purposive sampling also limits the extent to which the findings can be applied to other farmer populations. In particular, limiting the sample population to farms certified by Oregon Tilth, Inc., prevented us from taking into consideration the viewpoints of farmers who utilize other organic certifiers. However, sampled farms represent a wide spectrum and similar motivations and obstacles that may be found with other farms throughout Oregon and the nation.

Results

Study Population Characteristics

Oregon has a diverse agricultural economy partly because of the differences in bioregions throughout the state. Survey participants were distributed across seven of Oregon's eight bioregions. However, the majority of participants (60%, n=18) were from the Willamette Valley in northwestern Oregon, a hub of agricultural productivity that contains the state's major population centers. The other regions were less represented, but this is likely due to fewer but larger organic farms operating in those areas.

The farms surveyed ranged in size from one-third of an acre to 4,000 acres (0.13 ha to 1,620 ha). The most common production system was vegetables, followed by tree fruit, nuts, and berries (Table 1). While 21 farms focused on one production system, six farms integrated two, two farms integrated three, and one farm integrated four systems.

Of the 30 farms surveyed, 50% had their entire operation certified organic, while 40% of respondents managed a split operation with part certified organic and part conventional. Ten percent of respondents were in the process of transitioning all or part of their farm to certified organic but had yet to receive official certification.

Respondents ranged in age from 26 to 75 and were somewhat evenly distributed, with 21% aged 26–35, 34% aged 36–55, and 45% aged 56 years or older.

Farmer Experience

The number of years of farming experience ranged from 1 to 44 years. The USDA defines a beginning farmer or rancher as an individual who has not operated a farm or ranch, or who has operated a farm or ranch for not more than 10 consecutive years (Ahearn & Newton, 2016). Using this definition, 13 respondents (43.3%) are beginning farmers.

Table 1. Farm Production Systems

Production system	Number of farms*
Vegetables (includes seed and cut flowers)	15
Tree fruit/nuts/berries	12
Grain/legumes/forage	9
Livestock/dairy	4

* Total number of farms equals more than 30 due to some farms integrating multiple production systems.

Three farmer categories were generated based on the farmers' number of years farming and their number of years of experience with organic and conventional production. Using the USDA definition of 10 years or fewer experience as the dividing line between beginning and experienced farmers, and using the same criteria for beginning or experienced organic farmers, the study population fell into three distinct farmer categories when the question "how many years have you been farming?" was cross tabulated with "how many years farming have you been using 'organic' methods?" (Table 2).

By cross tabulating the data, a *Beginning Organic Farmer (BOF)* was defined as a farmer with 10 or fewer years of farming experience and who has been farming organically for that same period of time. An *Experienced Organic Farmer (EOF)* was defined as one who has been farming and farming organically for 11 or more years. The farmer of most interest to this study is the *Experienced Farmer Beginning Organic (EFBO)*. An EFBO has 11 or more years of farming experience total but 10 or fewer years of experience with organic farming. In other words, an EFBO is considered a beginning farmer regarding their organic farming experience. This clear division of producer experience allowed for more detailed analysis of demographics, motivations, and obstacles based on these three categories.

Table 2. Farmer Categories and Sample Size

		Number of years farming using organic methods	
		0–10	11 or more
Number of years farming	0–10	Beginning Organic Farmer *(13 farmers)*	N/A
	11 or more	Experienced Farmer Beginning Organic *(10 farmers)*	Experienced Organic Farmers *(7 farmers)*

The 13 farms in the BOF category have an average of 4.7 years of farming experience and the same number of years of organic farming experience. The seven farmers in the EOF category have an average of 34.1 years farming experience and 27 years farming using organic methods. The 10 farmers in the EFBO category have an average of 25.8 years farming experience, but only 3.7 years of organic experience (Table 3).

There is a difference in age of the farmers in the three categories. The EOF category includes six farmers (86%) 56–75 years old, while the EFBO category has six farmers (60%) 56–75 years old. The BOF group has two farmers (15%) 56–75 years old, but overall this group is younger than the other two groups. Nine BOF farmers (69%) are under the age of 45 years, with five of those farmers (38%) 26–35 years old. This age difference is expected since the categories are determined based on years of farming experience.

The average size of farm is notably different among farmer categories (Table 3). In general terms, the more experience one has, the larger the farm, although this may be due to the cropping systems of the different farms. The EFBO farms range in size from 30–4,000 acres with the average size being 1,232 acres. The EOF farms range in size from 1–380 acres, with the average size being 63.3 acres and only one farm having more than 100 acres. The BOF farms range in size from 0.3–56 acres and have the smallest average farm size at only 11.4 acres.

Regarding organic certification, the BOF group had a high percentage of farms that had their entire farm certified organic (77%), whereas

Table 3. Average Years of Farming, Average Years of Farming Using "Organic" Methods, and Average Farm Size (Acres)

Farmer category	Average years of farming experience	Average years of farming using "organic" methods	Average farm size (acres | hectares)
Beginning organic farmer (BOF)	4.7	4.7	11.4 | 4.6
Experienced farmer beginning organic (EFBO)	25.8	3.7	1,232.0 | 499
Experienced organic farmer (EOF)	34.2	27.0	63.3 | 25.6

the EFBO group had a high percentage (70%) of respondents who utilized split operations (Table 4). Havingestablished markets for their conventional products could be a possible reason for the high percentage of split operations among EFBO farmers.

Farmer Motivations to Transition to Organic

Respondents were asked to reflect on when they first decided to pursue organic certification and indicate whether items on a list were factors in making that decision. There was no restriction on the number of items from the list that could be identified as motivations; respondents were asked to identify all that were applicable. For analysis, two broad categories of motivations were identified: motivations related to ideological/philosophical values and those related to economic/market values. Ideological/philosophical motivations were "fits my and/or my family's values," "concerns about the environment," and "concerns about human health." Economic/market motivations included "potential increase in profit," "access to expanding market for organics," and "specific market opportunity or contract from buyer." Participants were also asked to provide other motivating factors for transition. Aggregate and farmer category responses to each motivation are recorded in Table 5.

Examining the two categories of motivations,

Table 4. Farm Status with Organic Certification

Farmer category	Aggregate	Beginning organic farmer (BOF)	Experienced farmer beginning organic (EFBO)	Experienced organic farmer (EOF)
Entire operation certified organic	15 (50%)	10 (77%)	4 (57%)	1 (10%)
Split operation with part certified organic, part non-organic	12 (40%)	3 (23%)	2 (29%)	7 (70%)
Transitioning all or part of their farm to certified organic	3 (10%)	0 (0%)	1 (14%)	2 (20%)

Table 5. Number and Percentage of Farmers Indicating a Factor was a Motivation to Pursue Organic Certification

	Aggregate	Beginning Organic Farmer	Experienced Farmer Beginning Organic	Experienced Organic Farmer
	N=30	*n*=13	*n*=10	*n*=7
Fits my and/or my family's values	22 (73%)	**12 (92%)**	**4 (40%)**	**6 (86%)**
Potential enhancement of farm sustainability	22 (73%)	11 (85%)	5 (50%)	6 (86%)
Concerns about environment	21 (70%)	**12 (92%)**	**3 (30%)**	**6 (86%)**
Concerns about human health	20 (67%)	**12 (92%)**	**2 (20%)**	**6 (86%)**
Specific market opportunity or contract from buyer	18 (60%)	7 (54%)	8 (80%)	3 (43%)
Access to expanding market for organics	16 (53%)	6 (46%)	5 (50%)	5 (71%)
Potential increase in profit	15 (50%)	4 (31%)	7 (40%)	4 (57%)

Bold values significantly different at the $p<0.05$ level between the responses of the Beginning Organic Farmer and Experienced Organic Farmer groups versus the Experienced Farmer Beginning Organic group

economic/market values were noted in the aggregate as less frequent motivations to transition than the ideological/philosophical values. When the respondents are separated by farmer category, however, the EFBO group expressed economic/market motivations more frequently than ideological/philosophical values. Eighty percent of the EFBO group indicated "Specific market opportunity or contract from buyer" as a motivation, and this was the most commonly stated motivation for transition for these farmers (Table 5).

For the BOF and EOF groups, ideological/philosophical motivations were of greater importance in their decision to pursue organic certification than economic/market factors. This contrast in motivations can be seen with a statistically significant difference in the category response to all three of the ideological/philosophical motivations (Table 5). The "fits my and/or my family's value" motivation gains its ranking from the strong importance EOF and BOF farmers place on it, despite the EFBO group having a statistically different relation to this factor.

Other motivations to transition to organic offered by the farmers included "getting a new farm" (EOF), "to have a voice" (BOF), and "sustainable nutrient cycling" (EFBO).

Obstacles in Transition to Organic

Respondents were asked to indicate to what extent specific factors were obstacles to their transition to organic production. Obstacles were grouped into three categories: cost, production, and marketing. Choice of responses to each factor included "a major obstacle," "a minor obstacle," "not an obstacle" or "not applicable/not sure." Due to the small sample size, responses were grouped together for ease of analysis. "A major obstacle" and "a minor obstacle" responses were grouped to indicate that the factor is an obstacle and "not an obstacle" or "not applicable/not sure" responses were taken to indicate a factor not to be an obstacle. The "not an obstacle" and "not applicable/not sure" responses were grouped together because, upon analysis of cropping systems of each respondent, it was determined that the "not applicable/not sure" responses were chosen because they were not applicable to that participant's farming system and thus not obstacles. Table 6 shows the number of respondents who

Table 6. Ranked Obstacles to Organic Transition

	Obstacle category	Aggregate *N*=30
Cost of labor	Economic	22 (73%)
Recordkeeping requirements of organic certification	Production	22 (73%)
Cost of organic certification	Economic	21 (70%)
Weed management	Production	21 (70%)
Pest or disease control	Production	18 (60%)
Cost of organic inputs*	Economic	16 (55%)
Learning process	Production	16 (53%)
Availability of labor	Production	16 (53%)
Managing soil fertility	Production	14 (47%)
Finding buyers/market for my organic products	Marketing	14 (47%)
Access to knowledgeable technical expertise on organic production	Production	12 (40%)
Obtaining adequate prices during transition*	Marketing	11 (38%)
Availability of organic inputs (seed, fertilizer, etc.)	Production	11(37%)
Availability of organic processing facilities	Marketing	11 (37%)
Planning crop rotations	Production	7 (23%)
Reduced yields	Production	5 (17%)

* *N*=29 due to nonresponse.

indicated which factors were obstacles to them on their farm.

Obstacles: Aggregate

Fifty percent or more of the farmers ranked eight factors as obstacles to organic transition (Table 6). The most highly ranked obstacles were "cost of labor" and "recordkeeping requirements of organic certification." Both were identified as an obstacle by 73% of farmers. Other obstacles noted by over 50% of farmers included "cost of organic certification" (70%), "weed management" (70%), "pest or disease control" (60%), "cost of organic inputs" (57%), "availability of labor" (53%), and "learning process" (53%).

Economic obstacles on the survey were highly ranked by the aggregate occupying the first, third, and sixth highest ranked obstacles related to costs. The other five obstacles noted by the majority of the aggregate were considered production challenges. No marketing challenges were identified as obstacles to organic transition by 50% or more of the farmers.

Five of the eight major obstacles noted by the aggregate could be considered external to the farmer. These obstacles ("cost of labor," "recordkeeping requirements of organic certification," "cost of organic certification," "cost of organic inputs" and "availability of labor") are influenced by factors beyond the farmers' control, including domestic policy, market forces, and global affairs.

Obstacles: Beginning Organic Farmers

The BOF category ranked "cost of labor" (77%), "recordkeeping requirements of organic certification" (69%) and "cost of organic certification" (62%) as the highest ranked issues in the same order as the aggregate (Table 7). Also aligning with

Table 7. Number of Farmers within Each Category Ranking a Factor as an Obstacle

Factor	Aggregate	Beginning Organic Farmer	Experienced Farmer Beginning Organic	Experienced Organic Farmer
Cost of labor (E)	22 (73%)	10 (77%)	7 (70%)	5 (71%)
Recordkeeping requirements of organic certification (P)	22 (73%)	9 (69%)	8 (80%)	5 (71%)
Cost of organic certification (E)	21 (70%)	8 (62%)	7 (70%)	6 (86%)
Weed management (P)	21 (70%)	**6 (46%)**	**10 (100%)**	5 (71%)
Pest or disease control (P)	18 (60%)	6 (46%)	8 (80%)	4 (57%)
Cost of organic inputs* (E)	16 (55%)	6 (46%)	6 (67%)	4 (57%)
Learning process (P)	16 (53%)	7 (54%)	7 (70%)	2 (29%)
Availability of labor (P)	16 (53%)	7 (54%)	5 (50%)	4 (57%)
Managing soil fertility (P)	14 (47%)	6 (46%)	7 (70%)	1 (14%)
Finding buyers/market for my organic products (M)	14 (47%)	4 (31%)	6 (60%)	2 (29%)
Access to knowledgeable technical expertise (P)	12 (40%)	7 (54%)	3 (30%)	2 (29%)
Obtaining adequate prices during transition* (M)	11 (38%)	3 (25%)	6 (60%)	2 (29%)
Availability of organic inputs (seed, fertilizer, etc.) (P)	11 (37%)	3 (23%)	7 (70%)	1 (14%)
Availability of organic processing facilities (M)	11 (37%)	3 (23%)	5 (50%)	3 (43%)
Planning crop rotations (P)	7 (23%)	3 (23%)	3 (30%)	1 (14%)
Reduced yields (P)	5 (17%)	**0 (0%)**	**5 (50%)**	**0 (0%)**

* I=29 due to non-response

(E) – Economic obstacle, (P) – Production obstacle, (M) – Marketing obstacle

Bold values are significantly different at the $p<0.05$ level between the responses of the Beginning Organic Farmer group versus the Experienced Farmer Beginning Organic group (for weed management) and the Beginning Organic Farmer and Experienced Organic Farmer groups versus the Experienced Farmer Beginning Organic group (for reduced yields).

the aggregate was the BOF category perception of "learning process" (54%) and "availability of labor" (54%) as obstacles. A majority of this category ranked "access to knowledgeable technical expertise on organic production" (54%) as an obstacle, whereas only 40% of the aggregate identified it as a challenge (Table 7).

Other challenges, including "weed management," "pest or disease control," "cost of organic inputs," and "managing soil fertility," were noted by 46% of the BOF as obstacles. Similar to the aggregate, marketing challenges were not identified as obstacles by a majority of the BOF category.

Of the six obstacles identified by over 50% of the BOF group (Table 8), only one ("learning pro-

Table 8. Obstacles of Concern for Majority of Each Farmer Category

Rank	Aggregate	Beginning Organic Farmer	Experienced Farmer Beginning Organic	Experienced Organic Farmer
1	**Cost of labor (73%)**	**Cost of labor (77%)**	**Weed management (100%)**	**Cost of organic certification (86%)**
2	**Recordkeeping requirements of certification (73%)**	**Recordkeeping requirements of certification (69%)**	**Recordkeeping requirements of certification (80%)**	**Cost of labor (71%)**
3	**Cost of organic certification (70%)**	**Cost of organic certification (62%)**	**Pest of disease control (80%)**	**Recordkeeping requirements of certification (71%)**
4	**Weed management (70%)**	**Learning process (54%)**	**Cost of labor (70%)**	**Weed management (71%)**
5	**Pest or disease control (60%)**	**Availability of labor (54%)**	**Cost of organic certification (70%)**	**Availability of labor (57%)**
6	**Cost of organic inputs (55%)**	Access to knowledgeable technical expertise (54%)	**Cost of organic inputs (67%)**	**Pest or disease control (57%)**
7	**Availability of labor (53%)**	-	**Learning process (50%)**	**Cost of organic inputs (57%)**
8	**Learning process (53%)**	-	Managing soil fertility (70%)	-
9	-	-	Availability of organic inputs (70%)	-
10	-	-	Finding buyers/market (60%)	-
11	-	-	Obtaining adequate prices during transition (60%)	-
12	-	-	**Availability of labor (50%)**	-
13	-	-	Reduced yields (50%)	-
14	-	-	Availability of organic processing facilities (50%)	-

Note: Obstacles in **bold** are common to all farmers.

cess") could be considered internal to the farmers. The other five obstacles all relate to external factors that could be considered beyond the farmers' sphere of influence.

Obstacles: Experienced Farmers Beginning Organic

Over 50% of the EFBO group identified 14 out of 16 issues as obstacles to organic transition (Table 8). The only challenges not noted by the majority were "access to knowledgeable technical expertise on organic production" (30%) and "planning crop rotations" (30%).

"Weed management" was identified as a major obstacle to organic transition by 100% of the EFBO group. There was a statistically significant difference ($p<0.05$) between the EFBO response and the BOF response, with only 46% of the BOF group identifying weed management as an obstacle (Table 8).

"Reduced yields" was another obstacle with statistically significant difference between the farmer categories ($p<0.05$). None of the BOF or EOF farmers noted reduced yields as a barrier, but 50% of the EFBO group did. Additionally, when the BOF and EOF groups were grouped together and compared to the EFBO group, "availability of organic inputs (seed, fertilizer, etc.)" was an obstacle that, although not statistically significant, had substantial differences in response. The EFBO group had 70% of respondents highlight the availability of organic inputs as an obstacle compared to only 14% of the EOFs and 23% of the BOFs. Other obstacles were not statistically significant between groups.

Marketing obstacles ("finding buyers/market for my organic products," "obtaining adequate prices during transition" and "availability of organic processing facilities") were identified by the majority of the EFBO group, in contrast to the other categories and aggregate. Interestingly, 60% of the EFBO group noted "finding buyers/market for my organic products" as an obstacle, while 80% had listed "specific market opportunity or contract from buyer" as a motivation for transitioning to organic.

Obstacles: Experienced Organic Farmers

All seven of the obstacles highly ranked by over 50% of the EOF group were also highly ranked by the aggregate, although in a different order (Table 8). The only obstacle that the majority of the aggregate identified that the EOF group did not was "learning process."

Only two of the seven obstacles ("weed management" and "pest or disease control") could be considered internal to farmers and their operations. The other five obstacles that were highly ranked by the EOF group could be considered to be external obstacles.

Discussion

This study focused on Oregon farmers' motivations and perceptions of the obstacles to organic transition. While the literature has identified differences in motivations and obstacles to organic farming between organic and conventional farmers (Johnston, 2010; Lau et al., 2010), by gathering and cross-tabulating demographic data, this study identified distinct farmer categories among organic producers. The clear delineation between the "beginning organic farmer" (BOF), "experienced organic farmer" (EOF), and "experienced farmer beginning organic" (EFBO) was a significant finding and allowed for a more comprehensive interpretation of differing perceptions.

When farmers were asked to consider their motivations for transitioning to organic, differences between farmer categories emerged. The BOF and EOF groups placed more emphasis on the ideological/philosophical motivators, while the EFBO identified economic/market values as more significant motivators to transition. Surprisingly, a higher percentage of the EOF group was more motivated by access to expanding markets and the potential for increased profit compared to the EFBO group. This may be attributed to the respondents falling along different levels of the farmer spectrum, identified by Darnhofer et al. (2005), which spans from pragmatic to idealistic. "Fits my and/or my family's values" and "potential enhancement of farm sustainability" were the most frequently noted motivations for organic transition by the aggregate. This aligns with the findings of a national survey of farmers transitioning to organic certification that determined "fits my and/or my family's values" was the major motivation for

organic transition among their aggregate (Stephenson, Gwin, Schreiner, & Brown, 2017).

When examining barriers to organic transition identified by the aggregate, eight obstacles were noted by more than 50% of farmers. Of the eight obstacles, five could be considered influenced by factors outside the direct control of farmers, such as policy, market dynamics, and global affairs. These external obstacles included cost of labor, recordkeeping requirements of organic certification, cost of organic certification, cost of organic inputs, and availability of labor. This aligns with the work of Stephenson et al. (2012), who found that similar external obstacles were of major concern for organic farmers in Oregon.

The cost of labor was the most noted obstacle to organic transition. This aligns with the overall agricultural trend that labor costs are a significant operational expense. When organic and nonorganic production systems were aggregated in the 2017 Census of Agriculture, labor expenses (wages, salaries, and contract labor) represented approximately 12% of total variable farm expenses and up to 43% of expenses in greenhouse, vegetable, fruits, and other labor-intensive production systems (USDA ERS, n.d.). Focusing explicitly on organic production, of the US$4 billion that organic farmers spent on production costs in 2012, US$917 million, or 23%, went to hired labor (USDA NASS, 2015). In fact, cost of labor was the second highest production expense for organic farmers according to the 2012 Census of Agriculture (USDA NASS, 2015). This is a serious consideration for farmers examining the financial sustainability of their business and may influence their decision-making around scaling up. As one EFBO noted, the future availability of farm labor may also become an obstacle and has also been noted in the literature as a concern (Taylor, Charlton, & Yunez-Naude, 2012).

The economic obstacles of cost of labor, organic certification, and organic inputs were each highly ranked by all farmer categories. The cost of organic certification is required only for certified organic producers and farmers; it was consistent across categories that this was an obstacle and was also found to be a major obstacle for respondents to the national survey of transitioning farmers (Stephenson et al., 2017). Seventy percent of the aggregate identified this cost as an obstacle to transition. The Organic Certification Cost Share Program is a federal subsidy available for farmers receiving certification, and some participants in their open-ended question responses noted its use. One farmer stated, "…with the government cost share program, it [cost of certification] is not that expensive."

Cost of organic inputs has been noted in the literature as a potential obstacle for organic farmers (Cranfield et al., 2010; Johnston, 2010; Lau et al., 2010), and over half of the aggregate (57%) noted this as an obstacle. Other cost-related obstacles noted by respondents included the cost of infrastructure and the cost of equipment. As an EFBO wrote, obtaining a "no-till drill, chipping equipment, compost turner and wagon for compost" were significant cost-related obstacles to transition. A BOF echoed this cost challenge, noting the cost of "farm start-up and equipment" as a substantial obstacle.

Among production obstacles, weed management was highly ranked both in our study and in the national survey of transitioning organic farmers (Stephenson et al., 2017). This is definitely a challenge for all producers, but it was interesting to note that only 46% of the BOF group ranked this as an obstacle, while 100% of the EFBO and 71% of the EOF noted it as a challenge. While it is understandable that weed management may be more of a challenge for the EFBO who can no longer use synthetic management approaches, there are other factors that may be contributing to this outcome. One possible explanation is farm size. The BOF group has the smallest acreage of the three categories (averaging 11.4 acres or 4.6 hectares), whereas, the EFBO group has the largest (averaging 1,232 acres or 499 ha). The more acreage to manage, the more difficult weed control may be, but this is also dependent on the number of different crop types grown on a single farm. An EFBO managing 4,000 acres (1,619 ha) emphasized the importance of weed management and the land that is transitioned stating, "get ground that's not 'dirty' with hard-to-control perennial weeds."

Reduced yield has been identified as a concern for farmers considering the transition to organic

(Cranfield et al., 2010; Johnston, 2010; Lau et al., 2010). While none of the BOF and EOF respondents identified reduced yields as a challenge, 50% of EFBO respondents did, a statistically significant difference from the BOF and EOF categories. Considering that the EFBO group most recently transitioned, are coming from conventional production, and may still be learning how to incorporate organic techniques, this response can be expected. It would be interesting to follow up with these farmers after they have had more time to practice organic techniques to determine if yields stayed suppressed or if they rose with increased experience and/or changes in soil health, as has been noted in the literature (MacRae, Hill, Mehuys, & Henning, 1990; Smukler, Jackson, Murphree, Yokota, Koike, & Smith, 2008).

Within the EFBO group, 70% identified managing soil fertility as an obstacle, but only 47% of the aggregate identified it as such. Although many issues were greater obstacles for the aggregate, properly managing soil fertility and health is a key tenet of organic farming; Its importance was further emphasized when farmers were asked to share advice or comments about their transition. In the open-ended response section of the survey, soil health was the most frequently addressed issue after recordkeeping. Comments were remarkably similar and included "work on soil health first," "invest in your soil first," and "there are few shortcuts to soil that is ready to grow!"

While weed management and cost of labor are challenges that could plague both conventional and organic farmers, the recordkeeping requirements of organic certification is a challenge unique to organic production. This task was noted by all categories as an obstacle, and when asked what advice they would share with transitioning farmers, respondents frequently addressed recordkeeping. As one respondent wrote, "The paperwork and inspections are still sort of on the steep part of the learning curve for me, but I do feel the records the certifier require[s] me to keep are pretty much all important in running a farm business." The sentiment about paperwork being an obstacle, albeit an important and useful one, was echoed by other farmers, who stated, "I would say you should be keeping the records regardless of certification (if that is an obstacle)" and "Becoming certified has been good for my farming practices. It was an additional nudge to keep better records and be very deliberate about everything I do." The difference in perception of recordkeeping as an obstacle may be explained by farmers' preference for actual farming. Recordkeeping may be more of a philosophical obstacle because, as one beginning organic farmer noted, "…my entire profits for 2015 go to pay to prove I don't use chemicals. Why should organic farmers bear the burden of proof?"

The majority of farmers did not perceive market obstacles, but these were important to the EFBO group. "Finding buyers/market for my organic products," "obtaining adequate prices during transition," and "availability of organic processing facilities" were all noted by 50% or more of the EFBO group as barriers to organic transition.

Following up with EFBO farmers after they have practiced organic techniques for a number of years could provide insight into whether farmers' perceptions change once they have more experience using organic techniques. Further research is needed to determine whether concern for environmental and human health would increase after practicing organic methods, if economic and market values would still dominate decision-making for EFBO farmers, and if they would maintain split operations or move all production to organic.

More research on these categories within larger organic producer groups could allow for a better understanding of the different motivations and obstacles of transitioning organic farmers. To build a more robust understanding of these issues, expanding the sample size and increasing geographic inclusivity would be valuable. The vast majority of organic farmers in Oregon reside within the Willamette Valley, and this is where the majority of survey respondents (60%) are located, but Oregon contains seven other distinct agricultural zones. Having adequate representation from each of these zones would bolster understanding of the motivations and obstacles faced by organic producers throughout the state of Oregon.

Conclusion

This small study is exploratory but significant. It created a new rubric for categorizing organic farm-

ers based on their years of farming experience and farming system experience that will provide a solid base for future studies. These three distinct categories—experienced organic farmers, beginning organic farmers, and experienced farmers beginning organic—have not been previously identified and explored in this way. In addition, this work explored differences between the three categories. This study will inform more in-depth research and allow for more targeted, and therefore effective, educational and outreach efforts to specific subsets of the organic farmer population and to the spectrum of farmers contemplating transition.

In addition to increasing the number of new beginning organic farmers, more experienced farmers are needed to transition to organic in order to increase the availability of domestic organic products to meet market demand. Outreach and education programs for these farmers should focus more on economic and/or market opportunities as opposed to ideological and/or philosophical motivators (e.g., concerns about human health or the environment).

There are obstacles to organic transition and production that span all farmer categories. Many of the obstacles could be considered external to the farmer and their operation. These external barriers (e.g., recordkeeping requirements of organic certification or cost of organic inputs) are influenced by factors beyond the farmers' control, including policy, market forces, and global affairs. These can be challenging to address, but increasing farmer awareness about these factors and how to moderate their impact through skills such as business planning, recordkeeping, and accounting could be useful for all farmer categories. Additionally, the emphasis on these obstacles suggests a need for more research on and analysis of how farmers are affected by external factors and how they mitigate those impacts.

In order to reach experienced farmers interested in transitioning to organic, education and outreach programs should address obstacles that farmers of all categories regard as challenging, but also on obstacles specific to the farmers categorized in the Experienced Farmer Beginning Organic group. The production obstacles addressed should include weed management, pest or disease control, soil fertility management, and yield reduction. Providing tools and resources to help farmers in this category tackle market obstacles is important and should address how to find buyers or markets for organic products, obtain adequate prices during transition, and access organic processing facilities. Economic obstacles are of concern for every category and include the cost of labor, cost of organic certification, and cost of organic inputs. These economic and market obstacles could be considered external factors. A well-informed farmer will have a better chance of making it through the three-year transition period if they are aware of and have access to resources that address these challenges.

The aggregate, beginning organic farmers, and experienced farmers beginning organic all ranked the learning process as an obstacle. Providing farmers with mentorship and support through their transition could also be a tactic for increasing organic transition and fostering success.

While more in-depth investigation is needed to further understand the motivations and obstacles faced by the diversity of organic and transitioning farmers in the state of Oregon, this study provides information that can be compared to national trends. This work also provides initial insight into these topics and raises more complex questions that can then be fleshed out with more qualitative research approaches. Collaborating with and learning from farmers and their experience will provide the insights necessary to help more farmers successfully transition. As one respondent stated, "the more farmers who transition to organic . . . the more we can make it successful for more people."

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Incorporating local foods into low-income families' home-cooking practices: The critical role of sustained economic subsidies

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Abstract

Alternative food practices, including farmers markets and CSAs, are often inaccessible to low-income families. Subsidized CSAs and fruit and vegetable prescription programs have the potential to decrease food insecurity, increase fresh fruit and vegetable consumption, and generate better health outcomes. However, several challenges can limit

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the success of such programs, including the logistics of distribution and an inability to cook from scratch due to a lack of kitchen infrastructure, time, or skills. In this paper, we investigate two diet-related health programs conducted with community partners in Madison, Wisconsin, and Portland, Oregon. We used photovoice to evaluate and enhance these programs, which supplied low-income participants with free or subsidized weekly shares of local food, addressed transportation barriers associated with access, and offered recipes and cooking education. Drawing on social practice theory, we demonstrate how these programs altered food provisioning practices for low-income individuals and families by building their competence in the kitchen, fostering meaningful social relationships, and cultivating new meanings related to fresh, local food. The short-term gains were positive, and such community-based nutrition programs warrant continued support as part of a broader strategy to address poverty and food insecurity.

Keywords
Community-Based Participatory Research, Home Cooking, Community Nutrition Programs, Food Insecurity, Community Supported Agriculture, Local Food, Low-Income Families, Photovoice, Social Practice Theory

Introduction and Literature Review

Local food is often inaccessible to low-income consumers, many of whom lack the resources to purchase higher-cost produce and/or the infrastructure to cook fresh vegetables. Subsidized CSAs[1] have the potential to decrease food insecurity, increase consumption of fresh fruits and vegetables for adults and children, and generate better health outcomes (Bryce et al., 2017; Izumi et al., 2018; Landis et al., 2010; Ridberg, Merritt, Harris, Young, & Tancredi, 2019; Wilkins, Farrell, & Rangarajan, 2015). The growing popularity of local food has motivated new research on how to successfully incorporate CSAs into community-based nutrition programs (Cohen & Derryck, 2011; McGuirt et al., 2018; Vasquez, Sherwood, Larson, & Story, 2017) at a time when CSA farmers are facing increasing market competition (McKee, 2018) and declining consumer support (Trotter, 2018). However, several challenges can limit the success of such programs, including logistics of share pick-up and uncertainty about how to prepare unfamiliar produce (Andreatta, Rhyne, & Dery, 2008; Forbes & Harmon 2008; McGuirt et al., 2019; Quandt, Dupuis, Fish, & D'Agostino, 2013; White et al., 2018).

Furthermore, simply increasing physical access to local food is not enough to dramatically change long-term dietary behavior (Cummins, Flint, & Matthews, 2014). Successful dietary programs must also address socio-cultural factors—including nutrition knowledge, cooking skills, attitudes, motivations, and social support—which affect dietary intake and engagement in farmers markets, CSAs, and other alternative food practices (Castellanos, Keller, & Majchrzak, 2016; Farmer, Babb, Minard, & Veldman, 2019). It is also important to acknowledge the ways in which efforts to bring "good food" to others often universalize white values and consumption practices as normative and superior and reduce structural inequality to cultural difference (Alkon, 2012; Guthman, 2011; Slocum, 2006). More research is therefore needed to understand and appreciate the diversity of experiences that individuals have when participating in subsidized CSA programs in order to identify design features that facilitate the adoption of new dietary practices.

In this paper, we investigate two nutrition pro-

Disclosures
The two primary authors of this paper (Jennifer E. Gaddis and Amy K. Coplen) were directly involved in the data collection and analysis of these research projects, but not in the implementation of the programs analyzed in this paper. Molly Clark-Barol primarily supported data analysis and writing. Allea Martin and Claire K. Barrett were directly involved in both data collection and analysis and the implementation of the respective programs. Lauren Lubowicki was directly involved in the design and implementation of the Portland program as well as data collection. The authors have no conflicts of interest to disclose.

[1] Community supported agriculture (CSA) is a direct to consumer agriculture model. In its traditional form, members pay upfront for a season's worth of produce from a local farm and receive regular shares of produce.

grams conducted with community partners in Madison, Wisconsin and Portland, Oregon. Both programs attended to the limitations of subsidized CSAs identified by Andreatta et al. (2008) and White et al. (2018) by addressing transportation barriers associated with pick-up and providing recipe ideas, cooking education, and/or slow cookers. The Madison program coupled pick-up with weekly classes that participants were already attending, and the Portland program offered free ride sharing to pick-up locations. All participants were low-income and the majority were women.

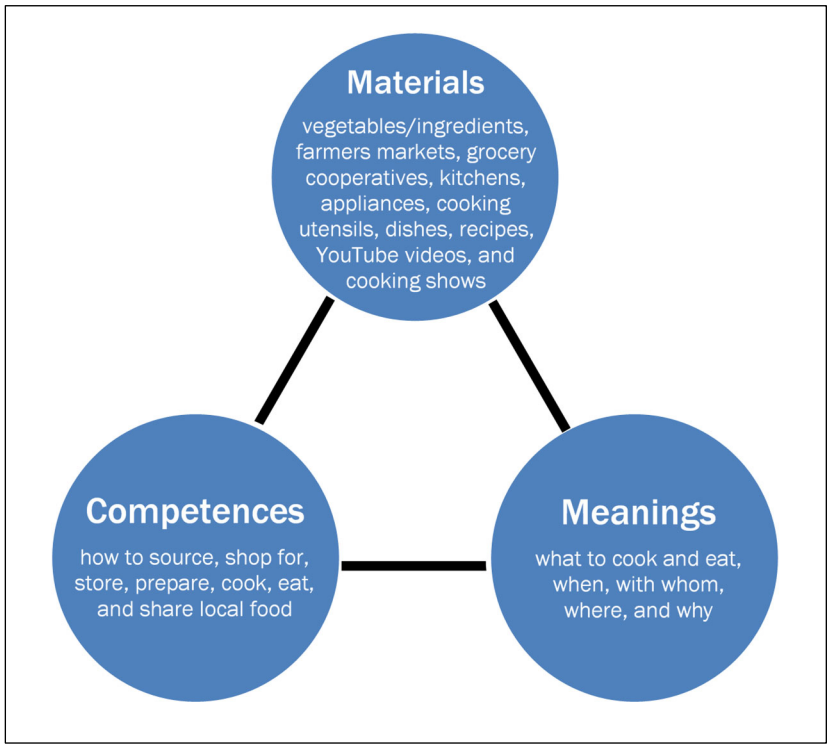
We analyze data from both programs to answer three primary research questions:

1. How does the introduction of new elements (i.e., local produce and slow cookers) shape participants' home-cooking practices?
2. How does the relationship that participants develop with producers and/or suppliers of local food shape their adoption of alternative food practices?
3. What effect does the practice of sharing locally produced food and/or recipes with others have on participants' attitudes toward experimenting with unfamiliar foods and/or culinary techniques?

We use social practice theory (SPT) to investigate how the introduction of local food and slow cookers altered low-income individuals' food provisioning practices, thereby building on a growing body of SPT scholarship within food studies (Devaney & Davies, 2017; Fonte, 2013; Kendall, Brennan, Seal, Ladha, & Kuznesof, 2016; O'Neill, Clear, Friday, & Hazas, 2019; Spaargaren, Oosterveer, & Loeber, 2013; Torkkeli, Mäkelä, & Niva, 2020; Tucker, 2019; Twine, 2015) and public health research (Delormier, Frohlich, & Potvin, 2009; Maller, 2015). The term "social practice" refers to routinized behaviors made up of interconnected elements, including bodily and mental activities, things and their uses, know-how, and emotions (Reckwitz, 2002). Shove, Pantzar, and Watson (2012) define a practice as the product of three types of elements: (1) *materials*—objects, tools, technologies, and infrastructures; (2) *competence*—skills and know-how; (3) *meanings*—norms, cultural conventions, and expectations. These elements shape how people perform practices, and vice versa (Mylan & Southerton, 2018).

Social practices emerge, evolve, and disappear, transforming over time and mediating the relations between consumers, producers, and systems of provisioning (Southerton, Chappells, & van Vliet, 2004; Spaargaren, 2003). For example, competences related to home gardening and food preservation—once widespread practices in the U.S.—were largely displaced by the practice of purchasing frozen and/or canned vegetables from grocery stores, but have recently undergone a resurgence. Figure 1

Figure 1. The Practice of Eating Local Vegetables



Source: Adapted from Maller, 2015.

illustrates the materials, competence, and meanings associated with the practice of eating local vegetables.

While individual performances of practices can reproduce or re-shape those practices over time, practices are not isolated or individually constructed. Rather, they are "bundled" together and shaped by other practices, and embedded in social contexts. For example, recipients of Supplemental Nutrition Assistance Program (SNAP) benefits must navigate restrictions on what they can and cannot purchase. Low wages and low benefit amounts often push SNAP participants to purchase cheap high-caloric processed foods instead of fresh fruits and vegetables. However, some recent SNAP policies—such as "Double Up Food Bucks" at farmers markets—make it easier for low-income families to purchase healthy local foods (Farmer, Babb, Minard, & Veldman, 2019; Mann, O'Hara, Goddeeris, Pirog, & Trumbell, 2018; Oberholtzer, Dimitri, & Schumacher, 2012; Woodruff et al., 2018). This demonstrates the ways in which food provisioning and other social practices are embedded in the context of (and also shaped by) ever-changing social, political, and economic systems.

By employing SPT, we strategically shift the unit of analysis from the *individuals* who participated in community-based nutrition programs in Madison and Portland to the food-related *practices* they engaged in during the programs. Both programs sought to change outcomes (i.e., cooking and consumption practices) by deconstructing and re-configuring the elements within the bundled set of practices known as "food provisioning." In Madison, this involved introducing new materials (i.e., a slow cooker and regular deliveries of vegetables and other healthy foods), new competences related to home cooking with potentially unfamiliar ingredients (cultivated by sharing recipes and knowledge through in-person discussion and a private Facebook group), and new meanings (particularly in relation to locally and organically produced foods and different cultural cuisines). In Portland, the program introduced new materials (i.e., a weekly CSA share) and new competences (via cooking demonstrations, recipes, weekly newsletters, and other programmatic events), while forging new meanings related to local food and the environment through interactions with farm staff and other CSA members who participated in a subsidized CSA program.

By focusing our analysis on these two programs, rather than a single program alone, we are better able to explore the range of experiences that low-income individuals have when asked to adopt new practices as part of a community-based nutrition program emphasizing local food. These cases also allow us to investigate how the "interlocking practices" of shopping, storing, cooking, and eating food are related to broader everyday spatial and temporal rhythms (e.g., of work and childcare) so that we can identify novel strategies that promote health and sustainability (Southerton, Díaz-Méndez, & Warde, 2012). Recognizing these practices as interlocking can, according to Southerton et al., redirect attention from ineffectual policies aimed at "persuading, influencing and encouraging attitudinal change in the hope that millions of people will simultaneously change their behaviours" (2012, p. 34) toward programs that address how daily practices are specifically reinforced and/or disrupted and then reconfigured in more healthy and sustainable ways.

Research Methods

After receiving IRB approval for both projects, we employed the community-based participatory research (CBPR) method photovoice to evaluate and enhance the subsidized CSA programs. Photovoice is a qualitative research method that enables participants to document and investigate their experiences through photography, discussion, and storytelling. Similar to other CBPR methods, photovoice is designed to elevate participants to the role of researchers, enabling them to build skills and cultivate relationships with fellow participants (Wang, Yi, Tao, & Carovano, 1998). Photovoice moves beyond isolated concepts or indicators to investigate the lived collective experiences of participants (Balvanz et al., 2011). Public health practitioners have used photovoice to evaluate health promotion and intervention practices (Jurkowski & Paul-Ward, 2007; Livingood et al., 2017; McMorrow & Saksena, 2017; Wang, 1999) and food justice scholars promote it as a way to

center the voices and needs of those experiencing food insecurity (Pine & de Souza, 2013; Porter, 2018; Vernon, 2015; Woodsum, 2018).

While both projects used photovoice and provided subsidized deliveries of healthy and local foods to program participants, there are some notable differences in the two CBPR projects. In the following sections, we describe the logistics, photovoice protocols, data collection and analysis procedures for each of the two community-based nutrition programs.

Madison Food Exploration Partnership

The Odyssey Project-Slow Food UW partnership in Madison began in 2016 as a community-based nutrition education and research partnership between the Odyssey Project and the University of Wisconsin-Madison (UW) student-led chapter of Slow Food International, called Slow Food UW-Madison (SFUW). Odyssey is an educational program run by the University of Wisconsin-Madison that offers a free humanities class and six college credits for adults living at or below the poverty level. Odyssey provides wraparound services for participants, including free textbooks, childcare and youth programming (facilitated, in part, by undergraduate SFUW volunteer interns), and a weekly dinner held during class. The SFUW interns participated in a weekly for-credit course in which they read articles related to food justice, including Julie Guthman's writing on the problematic nature of undergraduate students "bringing good food to others" (Guthman, 2008), and discussed strategies for engaging Odyssey participants in all aspects of the community-based nutrition project.

During the summer of 2016, one of the authors organized a focus group of former Odyssey students in which participants identified slow cookers as a culinary tool that could reduce time constraints on cooking from scratch. Thus, at the start of each academic year (2016-17 and 2017-18), all Odyssey students (30 each year) received a slow cooker. Only 12 adult participants, from a cohort of 30 returning adult-students, signed up during year one (2016-17) of the program. The Odyssey director requested that program recruitment procedures be altered for year two of the program (2017–2018) to allow students to join the study mid-project; however, no additional Odyssey students elected to join the program after it began. Across both academic year cohorts, 24 Odyssey students participated in this community-based nutrition program and were offered a modest incentive—a US$25 phone credit or farmers market gift certificate—for completing all components of the research study.

Participants received 10 to 12 free deliveries of groceries valued at US$16 each as an incentive to join the food exploration program. Thematic "food explorations" (e.g., fall harvest, Native foods, winter soups) included recipes utilizing the groceries as ingredients. SFUW undergraduate interns assembled food explorations by sourcing ingredients—fresh produce (often locally sourced and/or organic), grains/legumes, and some meat/dairy—from farmers markets, a local butcher, a cooperative grocery store, and several ethnic markets. They also sourced some nonseasonal produce from conventional and discount grocers in an attempt to balance the project aims with program participant requests for specific ingredients. Notably, this method of sourcing and delivering the foods was a workaround that the SFUW interns developed in collaboration with their graduate student mentor. Initially, Growing Power, a Milwaukee-based nonprofit organization, was intended to supply market baskets for the program, but they stopped delivery to Madison between the writing of the U.S. Department of Agriculture (USDA) Hatch grant proposal to fund the program and implementing the program over a year later.

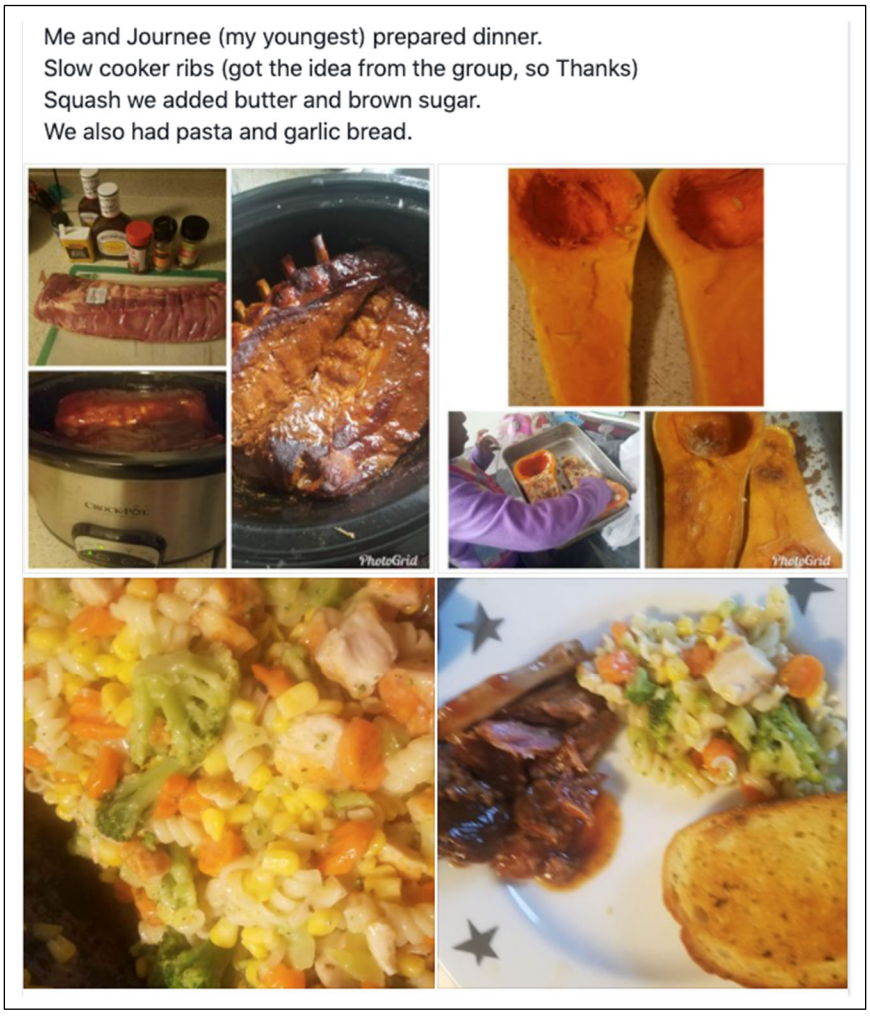
Deliveries were weekly for the first year of the program and switched to biweekly for the second year, based on participant feedback indicating that it would be easier to use the supplied ingredients if the deliveries were less frequent. On delivery days, a member of the research team, SFUW interns, and participants spent approximately 20 minutes discussing the contents of the food exploration, the theme, and the recipes in addition to debriefing the previous food exploration. Between in-person meetings, participants shared home-cooking triumphs and challenges via a private Facebook group. They were instructed to post at least three photos per food exploration of themselves and their families using the provided food items and

were invited to post recipe ideas and questions for the group.

When reviewing photos from the first year of the program, we found that participants most often shared pictures of the finished meals they prepared, as opposed to also sharing pictures of how or with whom they prepared the meals. Consequently, the SFUW interns developed a more specific photovoice protocol, the "3P," for year-two participants in order to encourage them to take a variety of photos that could generate different types of insights into the home food environment. The 3P consisted of the people involved in the process of food preparation or consumption, the processes involved in preparing the foods, and the final products created (Figure 2). The SFUW interns reminded participants about the 3P during the grocery deliveries and through periodic communication on the private Facebook group, producing a wider range of photos across the three categories. This paper reports on data from pre- and post-interviews (lasting 27–60 minutes), photos and captions shared in the Facebook group, and notes from weekly in-person participant discussions of the food explorations.

Pre- and post-interview questions focused on how participants learned to prefer and prepare different types of foods; the practices they engaged in to plan, procure, prepare, and consume meals at home; and a measure of participants' "food agency" (Trubek, Carabello, Morgan, & Lahne, 2017). Food agency is a conceptual framework that places people and their food practices within a broader social and environmental context by examining the extent to which people are empowered to access and prepare food in ways that align with their goals, needs, and beliefs. Post interviews also included questions about their experiences in the program, such as the use of specific ingredients and anticipated changes in household food provisioning practices. The research team also used a compiled set of each participant's Facebook photos, captions, and comments to generate specific prompts for the post interviews. Each participant's recorded and transcribed interviews (pre/post) were then analyzed in Dedoose, an online qualitative analysis software tool, using a deductive coding scheme created through thematic analysis of the first-year interview transcripts and

Figure 2. Participant Facebook Post Illustrating the 3P Photovoice Protocol Used by the Madison SFUW-Odyssey Project Partnership



the food agency framework, with modifications suggested by Morgan (2020) that enhance the framework in ways that better account for the structural barriers impacting low-income communities of color and the food-related aspirations, constraints, and strategies that influence their food agency.

Portland CSA Partnerships for Health

In Portland, CSA Partnerships for Health (CSAP4H) is a subsidized program aimed at improving food security, diet quality, and overall health and well-being (Izumi et al., in press). This ongoing program was launched in 2015 as a CBPR partnership between federally qualified health centers, local farms, and academic institutions. Participants are recruited by community health workers (CHWs) at the health centers and pick up their CSA shares weekly for 18 to 22 weeks. Participants pay US$5 per week using cash or SNAP benefits for a grant-subsidized share of locally grown produce valued at US$27. In 2018, the year of the photovoice evaluation project, five local farms and nine health centers collaborated to provide shares to 251 households.

At pick-up, participants select quantities of available produce and interact with farm staff and CHWs. The program aims to increase social support by providing nutrition and cooking education and other programmatic events (Izumi et al., in press). The program-provided nutrition education includes weekly newsletters with skill sheets with written and visual instructions for preparing vegetables, recipes for cooking with the week's share, and stories from the farmers who supply the produce. Programmatic events include monthly in-person cooking demonstrations and tastings and occasional classes and events, such as a pizza-making party hosted by one of the farms.

CSAP4H faces challenges common among diet-related health programs, including funding, attrition, and staff capacity. Grant funding cycles do not always align with the timing of CSA member sign-ups for the partner farms, and funding levels are uncertain and fluctuate significantly from year to year. These issues cause stress for those running the program and for farmers who might not be notified that funding was secured until just before the CSA season begins. CSAP4H is working to convince insurance companies to fund the program in future years, which would provide security and stability. In order to address high rates of attrition in the early years, CSAP4H secured funding from UBER to offer free rides to and from pick up, which significantly reduced attrition in later years. However, the issue of staff capacity remains unresolved, as the success of the program leans heavily on CHWs who already have a heavy workload at their respective clinics. Since the program began in 2015, CSAP4H partners have conducted research to identify challenges and evaluate the program.

We designed the 2018 photovoice project to augment findings from previous survey and focus group research (Martin, Coplen, Lubowicki, & Izumi, 2020) in order to further evaluate the impact of CSAP4H on food security, diet quality, and overall health and well-being. We recruited 28 photovoice participants during weekly vegetable pick-ups at two locations, one in its first year of participating in the program and the other in its fourth year, into three groups, two English-speaking and one Spanish-speaking. CSAP4H facilitators did not instruct program participants to use the 3P protocol used by the Odyssey Project-Slow Food UW partnership program. Instead, each focus group attended a 2-hour training session and had 3-4 weeks to take photos in response to the prompt: "How does this CSA program impact your life?" We downloaded and printed participants' photos for the focus groups. For each training and focus group, participants were offered transportation, childcare, and food. Participants also received a total of US$75 in cash, prints of their photos, and digital cameras (about a US$30 value).

During each focus group, participants selected up to five photographs and worked together using group dialog and consensus to organize them into three to five themes. These group-generated themes differed among focus groups, but included topics such as "growing," "cooking," "nutritional needs," and "community." We then facilitated a discussion using an abbreviated SHOWeD method (Wang, 1999): (1) What do we **S**ee here?, (2) What is really **H**appening here? (What is the story behind this photo?), (3) How does this relate to **O**ur

experience with CSA Partnerships for Health? Using these guiding questions, we asked participants to take turns sharing stories related to each theme and discuss how the photos they took captured their experience in CSAP4H. We then helped participants create captions for two of their photos, which we later displayed in printed booklets and on large banners at a public reception open to participants and their families, program staff, policymakers, and funders. The three focus groups were audio recorded, and the discussions were transcribed verbatim, translated in the case of the Spanish group, and uploaded to Dedoose. We used applied thematic analysis to code the focus group data and organize it into themes and sub-themes.

Combined Case Analysis

After the project-specific data described above was collected and analyzed by each respective CBPR team, members of the Madison and Portland research teams compared the results of the qualitative coding processes (both conducted in the Dedoose online data analysis platform) and identified three overarching themes that were present in both cases: (1) introducing materials, building competences, and shifting food practices, (2) impact of supplier relationships on the adoption of alternative food practices, (3) sharing food and recipes. In the following sections, we provide summary data and illustrative quotes related to each of these themes and discuss our findings using the social practice theory framework presented in Figure 1. We then outline the limitations of this study and make recommendations for future policy, practice, and research.

Results

Introducing Materials, Building Competences, and Shifting Food Practices

Both community-based nutrition partnerships reshaped food provisioning practices by introducing new materials and building (or renewing) participants' capacity and/or competence to cook healthy meals. For some participants, cooking from scratch with fresh vegetables was a new experience, while others had a much higher degree of competence and were inspired to draw on and revive recipes and from-scratch cooking practices which they had learned from their parents and/or grandparents. The programs also encouraged and enabled participants to learn how to prepare unfamiliar produce and helped them cultivate new tastes.

Participants in both programs were provided with a variety of free or low-cost local produce and/or protein items that they identified as fresher, tastier, more visually appealing, and even more aromatic than what they could otherwise find and/or afford in the grocery store. One Madison participant, for example, discussed how having an "abundance" of fresh vegetables allowed her to add more taste and flavor to her meals. Portland participants discussed learning about multiple varieties of eggplant and different parts of plants that they previously did not know were edible. One participant who reported being "raised on McDonald's and KFC" and not eating fresh vegetables as a child said, "You guys taught me how to eat the leaves of the beets. I didn't know that [before the program]. I threw that stuff away."

Madison participants emphasized how their program enabled them to both stretch their food budgets and substitute conventional ingredients with healthier, local, and organic ingredients. Many engaged in complex food provisioning practices (e.g., traveling to different stores in search of the best prices, clipping coupons, buying in bulk, freezing large quantities of food purchased at discount prices) and described their food exploration deliveries as supplementing or replacing these other practices. Participants who experienced a higher degree of food insecurity described the deliveries as a more significant element of the "bundle" of practices that they used to procure sufficient food for their families. "I appreciated it because we were going through hard times," one participant reported, "I didn't have any food stamps or anything. It was just one income in my house." This tough financial situation made it especially important for the participant to "use whatever" was in the food exploration. Madison participants noted that their ability to incorporate the items into their home cooking practices at no cost to their household budgets made culinary experimentation more enjoyable. Consistent with previous research (Clark-Barol, Gaddis, & Barrett, 2021), the

financial subsidy the programs offered lessened the risk that a recipe might not turn out correctly, be rejected by children, or otherwise end up in the garbage. This was especially true for participants who did not have much confidence in cooking meals from scratch.

In addition to free local produce and protein, the Odyssey-SFUW partnership introduced another material element into participants' home provisioning practices: a free 6-quart slow cooker. When viewed through the lens of SPT, slow cookers are a "de-skilling" technology that alters the relationship between the three elements of practice (materials, competences, and meanings) by folding competences (e.g., temperature regulation and cooking time) into the material element of the cooking technology itself. Our data confirms this insofar as participants consistently referenced how easy it was to prepare meals with the slow cooker. "I would cut up my vegetables at nighttime, season my meat, put it in the refrigerator, in the morning, add the juice, turn it on, and then by the time I got off work it was time to eat," explained one participant. In addition to the temporal convenience of slow cookers, the comparative user-friendliness and safety of the slow cooker enabled children to participate more actively in the practices of home-cooking, because it alleviated parents' fears that young children might mishandle a crucial, time-sensitive step in the cooking process or hurt themselves on an open flame. The slow cooker was not entirely a "deskilling" device, however, since it required those who were unfamiliar with the practice to develop and incorporate new temporal competences into their cooking routines (e.g., how and when to set up, add ingredients, and check the recipe). Moreover, several participants lacked functional kitchens with stoves and ovens, and the introduction of a slow cooker created new possibilities for preparing home-cooked meals.

The incorporation of new material elements and the expanded use of existing materials transformed participants' tastes. In Portland, for example, some participants recalled strongly disliking vegetables before the program, but reported that cooking from scratch made vegetables more appealing. Due to the CSA nature of their program, Portland participants expressed appreciation for the local vegetables produced by small farmers, which they identified as "more natural" and "much more appealing" than their "industrial" and "packaged" counterparts. The program changed some participants' expectations of what vegetables should look like, opening them up to (and even encouraging them to welcome) the imperfections of their locally sourced produce. Before joining the program, noted one participant, "I'd be like 'ew, this carrot has dirt on it, I don't want this. Where's my cute little shaved little bite-sized carrots?' . . . With this [program] I think I've eaten a lot more stuff I'd never even thought about eating." Participants also learned about seasonality, becoming, according to one participant, "more clued in to the way that our climate works and what things bloom when and locally, in this farm area." Having the opportunity to see vegetables in their "natural habitats," as one Portland participant phrased it, inspired some to adjust their home-cooking practices in order to consume more "natural" and "real" food in place of the "fake" versions purchased outside of the home. "I had [eggplant parmesan] at Olive Garden and theirs is all processed. It was all soggy," noted one participant, "So I really want to try [to cook it]." Likewise, in Madison participants expressed their desire to continue eating fresh, locally grown vegetables instead of frozen and canned vegetables, because they discovered how much better tasting they are, but noted that their income constraints would make this unlikely.

Impact of Supplier Relationships on the Adoption of Alternative Food Practices

Participants in both programs expressed appreciation for and developed relationships with the interns, CHWs, and farmers who managed, supported, and supplied their programs. While Madison participants learned how to cook unfamiliar foods from the SFUW interns and each other during in-person meetings and through the Facebook group, Portland participants took home useful recipes (sometimes with prepared samples) and learned how to prepare unfamiliar produce from farmers and CHWs at their farm stand pick-up. Some Portland participants presented photos of CHWs and farmers during photovoice focus groups, illuminating the critical role these actors

played in the program. "They're so happy and friendly and informative every week," reflected one participant on her photo of a CHW. "Without them, the program wouldn't [exist]." A Madison participant expressed a similar positive opinion of the interns: "I really like that the interns are so friendly and I think that means a lot, because then it makes us feel open to telling them if we—some recipe went wrong or something." However, some Madison participants indicated a cultural divide between themselves—many of whom were immigrants and people of color—and the interns, who were predominantly white, middle-class undergraduates, and communicated a desire for people more like themselves (i.e., low-income immigrants and people of color) to provide the food exploration deliveries.

Portland CSAP4H participants benefited from the opportunity to develop relationships with the local farm staff and interns who grow their food, a finding discussed in previous research on the program (Martin et al., 2020). While farmers did not reflect the overall demographics of participants in terms of race and ethnicity, they succeeded in connecting to participants in meaningful ways. Weekly interaction with farmers ranged from simple conversations about which seasonal, local vegetables were available that week to how unfamiliar vegetables taste and options for preparing them.

Portland parents reported that their children cultivated relationships with farmers, which changed their families' relationship to food. One participant discussed the role that farmers play for her son: "The farmers are truly like our family. . . . It makes me cry because he doesn't have that—our family isn't a bigger family—and so . . . with his special needs, he doesn't have a lot of community connection, but the farm is *his* farm." Participants and their children were also more willing to try unfamiliar vegetables because of their relationship with the farmers. One participant reflected on this phenomenon: "It's given us an opportunity to have [my son] try new things that he wouldn't necessarily try." Her son, who is an avowed tomato-hater, bit into a purple tomato that his farmer handed to him and "he absolutely loved it."

Participants also expressed deep respect for the hard work of farmers. "I can't imagine how much work it must be just to not only be planting," noted one participant whose disability prohibits her from gardening, "but to harvest them . . . [and] transport all those vegetables to [the health clinic] where we go pick them up." Another participant explained how her son's relationship to "his farmer" gives him "a different appreciation for food and a different appreciation for the work that goes into it . . . that it's not just the factories or machines that make [our] food, [but] there's people behind it."

Forming relationships with farmers deepened Portland participants' connection to and appreciation for the natural systems that support local food production. The photovoice project itself—which was hosted on one of the farms that supplies the CSA—allowed participants to explore the setting where their food was grown. One participant reflected on her observation of farming practices during this experience: "The farmer has tried really hard to also be friendly to wildlife—planting certain kinds of plants next to the rows of the vegetables that the bugs are also attracted to. It's more of a natural kind of trying to keep the pests away." This participant gained a new understanding of her CSA as the product of a local farmer working in relationship with nature. In doing so, she assigned new meaning to local food, which helped her distinguish the practice of eating CSA vegetables from the practice of eating conventionally farmed vegetables.

Sharing Food and Recipes

Participants discussed the important role that food plays in their families and communities, especially as a tool for expressing love and fostering connection. The Odyssey-SFUW and CSAP4H programs offered participants an opportunity not only to access healthy food for themselves and their immediate families, but also share food and recipes with fellow participants, extended family, and neighbors. Participants reported that this deepened their relationships, describing with fondness how they engaged in cooking as a practice of socializing, caretaking, and meaning-making. One Portland participant noted that before she entered the program cooking "was not my favorite thing to do," but since she began spending time cooking with her son, "I love it." Similarly, a Madison

participant identified one of the most meaningful outcomes of the Odyssey-SFUW partnership as "the connection I've made with my significant other." Likewise, a Portland participant who joined the program with her mother describes how the program offered them a way to spend quality time together: "Our schedules are always opposite, but with this program, on her days off, rather than just not really doing anything or hanging out or whatever, we always make it a point now to try to cook together."

Participants in both programs found joy in cooking fresh, healthy meals for their family, friends, and neighbors as a form of caretaking. A Madison participant expressed pride in using her slow cooker to prepare "good food" for her sons to eat while she was at work, while a Portland participant who works as a caregiver enjoyed using her CSA to make meals for the families of children in palliative care and hospice. Sharing a series of photos she took of different meals she prepared with a giant zucchini from her CSA, she noted, "it's not just about me. I get to share that the farm produced this vegetable. It didn't just come from a supermarket."

In Madison, participants belonged to a cohort, which facilitated peer-to-peer sharing. The practice of sharing with their adult classmates via short in-person discussions and through photos and videos, captions, and comments on the private Facebook group gave participants a window into their peers' home cooking practices, increasing their desire to try unfamiliar foods, recipes, and culinary techniques. In post-interviews, many participants commented on this dynamic and the excitement they shared when food exploration baskets were delivered to their classroom. "I felt like all of us were kind of on the same mission to just use the ingredients that were there," one participant explained. "So, there was some solidarity inside of all that, but you could see just everybody had their own kind of twist on that stuff," he continued, before describing how the photos and recipes fellow participants shared in the Facebook group helped inspire changes to his own home-cooking practices. These examples demonstrate the capacity for the cohort model to develop "communities of practice" (O'Neill et al., 2019) that enable participants to forge new social ties that facilitate adopting alternative food practices.

Notably, the Odyssey-SFUW partnership, which was situated within the practice of adult education, created opportunities for cross-cultural learning that transformed a broad range of participants' meanings around food. Many participants identified the practices of cooking with others and sharing stories as the most valuable components of the program. They especially appreciated learning about their classmates' home-cooking practices because it helped them understand the cultural backgrounds of their fellow learners, while imbuing the food exploration deliveries with new meanings and introducing potential culinary skills and techniques to test out in their own kitchens. "It's really awesome to just be able to accept and embrace different nationalities, different ethnicity groups, and learn from them," one participant explained. Another was impressed by the photos shared on Facebook. While she would "make just your standard Americana-type stuff," her peers would make soul food, vegetarian food, and Hmong food. "[Hmong food] looks pretty tasty," she said, "I would try to do that . . . and sometimes I wonder about eating vegetarian." As these examples demonstrate, the practices of preparing and sharing home-cooked food with others—including dishes that incorporated unfamiliar foods or relied on new culinary techniques—transformed participants' relationships to food.

Discussion and Conclusion

Community-based nutrition programs in Portland and Madison impacted food provisioning practices for low-income individuals and families by introducing new material elements (i.e., food exploration deliveries, CSA shares, and slow cookers) and programming that elicited new competences and meaning-making in relation to cooking locally sourced food at home. These programs built participants' food-related competences, cultivated relationships between fellow participants and farmers/suppliers of local food, and increased consumption of healthy, locally produced foods. Our findings are consistent with research by Andreatta et al. (2008) on a subsidized CSA program in North Carolina, which found that participants experi-

mented productively with new recipes, shared meals with family and friends, and forged meaningful relationships with farmers and volunteers.

It is important for such programs to continue, even when restrictions on face-to-face gatherings are in place, as with the COVID-19 pandemic. The private Facebook group and 3P photovoice protocol used by the Madison SFUW-Odyssey Program partnership offers one promising way for nutrition educators and others who provide community-based nutrition programming to continue to engage groups of participants in new social practices when face-to-face meetings are not possible. The photovoice focus groups in Portland and the interviews and Facebook group in Madison gave participants a place and time to articulate how these programs shaped their food practices, and to reflect on the meanings they attach to food and cooking. Through photovoice, we gained a personal, intimate, and embedded picture of the reconfiguration of practices within participants' home kitchens. By encouraging participants to take photos and interpret them through captions and conversation, we learned how they bundled certain practices together and how these bundled practices then became routinized into "complexes" (Shove et al., 2012) of behaviors that are regularly repeated. For example, participants framed budgeting as inseparable from food provisioning, and participants with children described their food-related practices in relation to parenting.

Based on our findings, we recommend that practitioners and policymakers utilize the insights of SPT to design more effective nutrition programs that not only lower barriers of accessibility and affordability, but also address the "complex architecture of factors" (i.e., cultural norms and habits, social and economic policies, and systems of provisioning) that impede adopting healthier and more sustainable diets (Devaney & Davies, 2017, p. 825). Our research demonstrates that offering useful cooking equipment, technologies, recipes, lessons, and other materials and competences helps facilitate the adoption of alternative food practices.

We also suggest that practitioners design nutrition programs that make use of social learning, since both communities of practice and existing social networks facilitate experimentation and learning that alter practice elements and their configuration (O'Neill et al., 2019; Shove et al., 2012). Change agents such as farmers, CHWs, and interns who are active "carriers" (Shove & Pantzar, 2005) or hosts of particular social practices are instrumental in recruiting more people to adopt desired practices. We found that encounters with people who were already growing, purchasing, cooking, and eating local food activated new forms of competence and meaning-making in relation to food, agriculture, health, and community. Participants were inspired to try new varieties of produce and cook new recipes because of their relationship to local food producers and suppliers. Forming relationships between participants and carriers of alternative food practices—particularly in the case of health clinic patients and local farmers in Portland—also helped alter how practices interlock by expanding the meanings that participants attached to locally produced food as a part of nature.

The Odyssey-SFUW partnership in Madison and the CSAP4H program in Portland created what O'Neill et al. (2019) refer to as a "fracture": a critical moment in which social practices become more open to change at the microscale of individuals, households, and small communities of practice. The programs created space for participants to alter their existing food practices by combining materials, competences, and meanings in new ways. However, community-based nutrition programs are inherently limited in terms of their ability to elicit transformative meso- and macro-scale change unless there is a parallel effort to address the structural constraints that make it difficult for low-income individuals to continue to reproduce these practices after the program is over. When these programs end, and the financial subsidies they provide are terminated, the alternative food practices they promoted may be "disintegrated" (Maller & Strengers, 2013) and certain practices (e.g. eating organic food or participating in a CSA) may become ex-practices. Such disintegration is a potential source of frustration and disempowerment for program participants when competences and meanings have been altered, but the materials required to perform alternative food practices are no longer financially accessible.

Grant funding for the Portland CSAP4H

fluctuates from year to year, creating uncertainty for program participants and the farmers who supply the CSA. However, since the program began in 2015, the program has been continuously funded and participants, who pay US$5 per week for a CSA share valued at US$27, have been able to re-enroll every year. Madison participants, on the other hand, were not eligible to continue receiving their food exploration deliveries after the Odyssey-SFUW grant-funded partnership ended. Some Madison participants reported that they plan to continue incorporating materials, competences, and meanings into their home-cooking practices, thereby making the new practices conform to their existing income-constrained food provisioning routines. However, most Madison participants reported that they would be unlikely to continue consuming organic and locally grown food because of the price premium attached to such foods. Without adequate financial resources to purchase more costly items, low-income carriers of alternative food practices may have no choice but to substitute cheaper foods into their diets, despite having acquired new food-related competences and meanings through their participation in community-based nutrition programming.

The potential disintegration of new cooking and dietary practices speaks to an important limitation of short-term nutrition programs and the need to address the structural issues of poverty and food insecurity. Raising wages and lifting low-income families out of poverty would have a profound effect on reducing dietary disparities in the U.S. by increasing their ability to afford healthy foods (Hough & Sosa, 2015; Otero, Pechlaner, Liberman, & Gürcan, 2015). Achieving such a macrolevel economic shift is a long-term organizing challenge for the U.S. food movement and one that will require strong academic-activist partnerships (Levkoe et al., 2016). In the meantime, our study provides useful insight into how community-based nutrition programs support the adoption of alternative food practices and demonstrates why the subsidies for healthy, local food provided by these programs should be part of a broader strategy to address poverty and food insecurity.

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Is the college farm sustainable? A reflective essay from Davidson College

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Abstract

Campus farms and gardens are proliferating across college and university campuses. While they may have unique missions, at their core those missions often include promoting student learning, campus sustainability, and strong campus-community relations. In this reflective essay, we share our perspective on the sustainability of one such farm, the Farm at Davidson College in Davidson, North Carolina, to encourage other analysts to similarly assess the interactions among these missions and sustainability's environmental, economic, and social pillars. We particularly emphasize the factors influencing the Farm's social sustainability, including the institution's pedagogical mission, treatment of

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Author Disclosure

Amanda Green was and David Martin is employed by Davidson College, the college discussed in this essay. Gracie Ghartey-Tagoe is a graduate of Davidson College.

Author Note

Portions of this paper were originally written by Gracie Ghartey-Tagoe as part of her undergraduate capstone thesis in Environmental Studies at Davidson College. The capstone was supervised by her co-authors on this paper, David Martin and Amanda Green.

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farm labor, impact on the local food economy, and equitable provision of food for students. We find that the Farm administrators misconstrue "economic" sustainability as "financial" independence and profitability. This hampers the social mission of equitably supplying students with the farm's food and offering curricular and extracurricular enrichment. We suggest ways forward that help administrators recognize the diverse values that fulfillment of additional social and environmental missions might provide, beyond direct revenues. We conclude with recommendations for institutions interested in pursuing a similar sustainability assessment of their campus farm or garden.

Keywords
Sustainable Agriculture, College Farms, Pedagogy, Sustainability, Environmental Education, Social Sustainability, Higher Education

Introduction

Over 300 campus farms and gardens, ranging in size from less than one acre to thousands of acres, have been created outside of the traditional land-grant institutions (LaCharite, 2016). The majority (87%) were started after 2001 (LaCharite, 2016), primarily driven by student and faculty interest in enhancing environmental sustainability, community engagement, and food security within and beyond their home institutions (Hoover & MacDonald, 2017). These farms and gardens were thus created to promote sustainability efforts on campus, to build links between the university and surrounding community, and to improve student learning through hands-on practice and interdisciplinary thinking (Hilimire, Gillon, McLaughlin, Dowd-Uribe, & Monsen, 2014). While teaching farms on college and university campuses are not new, the emphasis on sustainability, including economic, environmental, and social sustainability, as well as the contributions to emerging local food movements, is relatively new and serves as an important motivator to establish these farms for school administrators, faculty, staff, and students (Barlett, 2011; LaCharite, 2016; Sayre, 2011). Along with pursuing these missions, the farm must also meet a specific budgetary demand that it not create an additional burden on the college's operational budget (Holthouser & Terry, 2012). In this reflective essay, we evaluate how well the Farm at Davidson College in Davidson, North Carolina, meets its mission to promote sustainability, connect with the community, improve student learning, and meet financial goals. Our analysis serves the larger goal of providing a template for other schools wrestling with the difficult task of evaluating these multifaceted missions.

The difficulty associated with pursuing these varied goals has been evident since the Farm's founding. The Farm was created so that the college's Dining Services could serve students the "local and organic food" they had been advocating for since the 2000s (Holthouser & Terry, 2012, p. 1) with the following stipulations: the Farm should be a stand-alone, auxiliary business unit, "[causing] no additional burden to the college's operational budget" nor "additional burden on the operating budget of Dining Services, nor the price of meals"; the Farm should not detract from the local food market; the Farm should enhance the ability of other local vendors to sell to Dining Services; the Farm's produce should not compromise the quality and safety of food from Dining Services; the Farm should be a resource for student curricular and extracurricular activity; and the Farm should be a positive marketing tool for Dining Services and the college (Holthouser & Terry, 2012, p. 2). It is worth noting that the goals for the Farm to operate independently and to add no burden to the college's operational budget are explicitly financial, highlighting the emphasis Davidson College placed on the financial independence of the Farm rather than its overall sustainability. While perhaps more directly stated than at other campuses, these varied goals reflect common concerns across many campus farms as their managers and partners try to evaluate their respective challenges and successes (LaCharite, 2016; Sayre, 2011). Consequently, we intend that the example of the Farm be illustrative of the sometimes-contradictory set of operating goals and broader sustainability criteria used to answer the guiding question, is the college farm sustainable, and, if not, what aspects need to be improved?

We evaluate the Farm's sustainability within the context of the traditional triad of environ-

mental, social, and economic sustainability, commonly described as the three pillars of sustainability or the triple bottom line (Elkington, 1998; World Commission on Environment and Development, 1987). Historical analyses of sustainable development ignored the pillar of social sustainability and its primary focus on human well-being, accessibility, and equity (Jacobs, 1999). Similarly, sustainability analyses of agriculture initially largely ignored issues of social justice (Allen, Van Dusen, Lundy, & Gliessman, 1991; Altieri, 1988). Beginning in the 1980s, Allen and co-authors (1991) encouraged scholars and activists not to assume that environmentally friendly agricultural production (such as organic practices) were synonymous with sustainable agriculture. Rather than assuming that environmental benefits will naturally result in social benefits, they advocated that a sustainable agriculture was one that equally accounted for environmental, economic, and social relationships (Allen et al., 1991). In a more recent survey of campus sustainable agriculture projects, Barlett (2011) identified campus commitments to both environmental and social sustainability; however, environmental commitments outnumbered social commitments. Indeed, Pothukuchi's (2012) sustainable food systems case study illustrated universities' bureaucratic tendency to evaluate sustainability programming using the single economic bottom line rather than the multiple (and competing) bottom lines. This reflective essay concludes with a focused discussion on historically neglected social elements of sustainability for farms in the higher education setting. These elements include the pedagogical relationships that connect campus farms to students and teachers as well as the food justice relationship that determines who has the right to eat a college farm's food.

Methods

This reflection emerges from our collaborative teaching, research, and advocacy. David Martin, an economist, is a founding member of Davidson's Environmental Studies department, a faculty representative to the Associated Colleges of the South Faculty Environmental Studies working group, and one of Davidson's faculty liaisons to the Duke Endowment, the foundation that funded the start-up costs for the Farm. He collaborated on crafting a postdoctoral position at the Farm focused on evaluating the Farm's sustainability through research and teaching. Amanda Green, a cultural anthropologist, filled the postdoctoral position from 2016 to 2018. Green designed and taught the course, "Food and Sustainability: An Introduction to the Farm at Davidson," where students volunteered at the Farm while learning about food systems and sustainability. Martin served as Green's faculty mentor, and Gracie Ghartey-Tagoe completed an Environmental Studies undergraduate capstone under their mentorship. Given our training as social scientists, we have tended to focus on the social science data at the expense of the natural sciences and humanities data. Additionally, we are advocates for college farms, thus potentially biasing our reflection to overemphasize the positive attributes of college farms.

Our analysis is written post hoc, as a reflection using the case study approach described by Yin (2009) and elaborated in the food justice setting by Porter (2018). We did not initially set out to evaluate the sustainability of the Farm with a clear set of indicators. Instead, we gathered myriad empirical data from multiple sources that enabled us to evaluate the sustainability of the Farm and offer a set of analytic tools for other universities to consider. We conducted background interviews with Davidson faculty, staff, and students, including the Farm manager, five Farm work-study students, directors of Dining Services and physical plant, and faculty that use the Farm as a resource for teaching and research. We carried out a qualitative assessment of the "Food and Sustainability" course by examining students' journals to determine the Farm's contribution to student learning (Green, 2021). The Farm's accounting books were used to analyze the Farm's finances. Because we must protect the privacy of the one full-time employee of the Farm, we discuss the finances in general terms. Additionally, Davidson Environmental Studies faculty Brad Johnson, a geologist, aided us in our evaluation of soil erosion through the soil pits he maintains in and around the Farm. Thus, in our reflection, we pull qualitative data from interviews and course assessments as well as quantitative data from the Farm's accounts and production practices.

The Davidson-Specific Context

The Farm was established in 2012 on a historic 109-acre (44-hectare) cattle farm that was contiguous to the Davidson campus. The Farm operates on two acres (0.8 hectares) and includes two 96-foot long high tunnels and a 42-foot long greenhouse. One full-time manager oversees the Farm with the assistance of between four and eight part-time Davidson students whose wages are supported by federal work-study funds, as well as two full-time summer student interns. The Farm, according to its promotional materials, focuses on the production of "fresh, naturally grown, local produce" (Davidson College, n.d.-a)

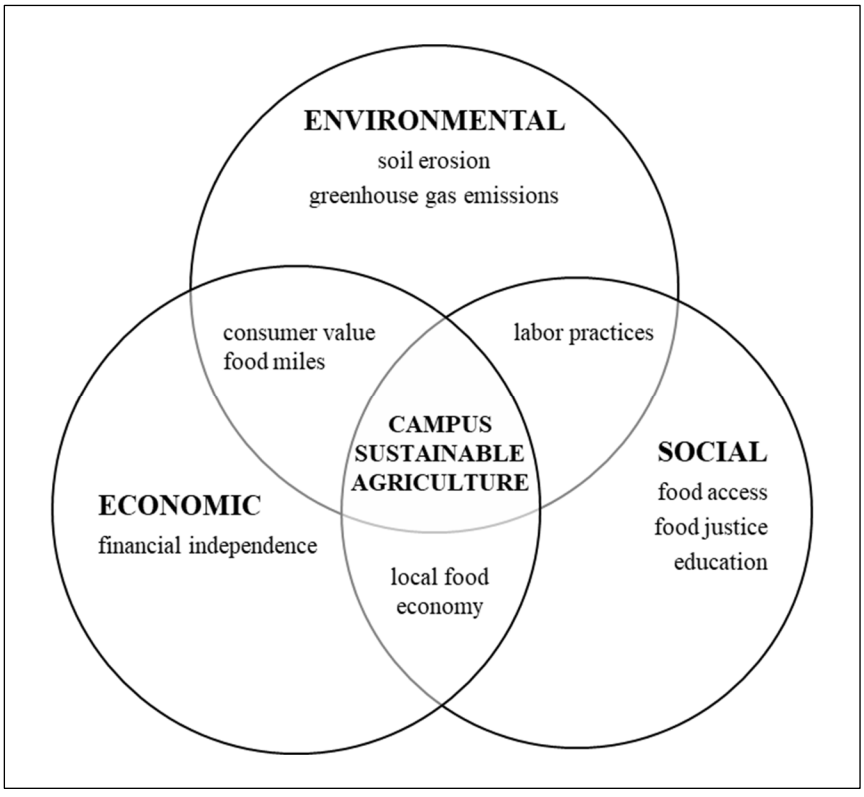
With regard to production practices, the Farm grows a diversity of plants, utilizing rotational cropping and seeds that are certified organic, non-GMO, and/or open-pollinated. Rather than using synthetic fertilizers or pesticides, the Farm uses lime and other USDA-approved organic fertilizers to adjust the soil's pH and fertility. Gasoline-powered plowing and tilling are used to prepare fields and beds, but the Farm is small enough that no mechanical devices are used for planting or harvesting.

The primary crops are seasonal vegetables and fruits. During the winter season, when school is in session, the Farm focuses on the production of greens including lettuce mix, arugula, spinach, and kale for the college's Dining Services. It also raises tomatoes, peppers, eggplant, cucumbers, beans, okra, zucchini, basil, melon, strawberries, and blueberries in addition to storage crops like carrots, beets, potatoes, and sweet potatoes. The produce is sold to Dining Services, a weekly farm stand, and a 40-member community supported agriculture (CSA) program, all of which are available only to Davidson students, faculty, and staff.

Sustainability Analysis

We use a Venn diagram of the sustainability triad (Figure 1) to guide our reflection on the Davidson College Farm and to generalize our approach to a broader analysis of the sustainability of campus farms. We examine the Farm's sustainability efforts through the lens of each criterion (environmental, economic, and social) and their interrelationships. Our measures of sustainability, diagrammed in Figure 1, include greenhouse gas emissions, soil erosion, cropping practices, labor practices, sources of revenue, expenses, impacts on the local food economy, pedagogical contributions, and student food access. Our selection and presentation of sustainability measures arose from a combination of the Farm's operational goals and practices as well as established guidelines for assessing sustainable agriculture (Food and Agriculture Organization of the United Nations [FAO], 2014). Through addressing these measures and their interrelationships, we highlight the need for interdisciplinary analyses of college and university farms in general. We conclude that sustainability analyses

Figure 1. Measures of Sustainability for the Farm at Davidson College



of farms in higher education must provide a richer and more holistic assessment than a simple financial spreadsheet or an environmental checklist.

Environmental Analysis

Soil Erosion and Greenhouse Gas Emissions

Given that each branch of the sustainability triad is not independent, we separate our discussion of environmental sustainability into two components. In this section we focus on aspects that one might consider "scientifically measurable" in the natural sciences. We rely on soil erosion as well as savings on greenhouse gas emissions as our primary indicators, though other metrics could be applied such as measures of soil health; water conservation; diversity of insects, plants, and animals; and cropping practices.

Given the documented shortcomings of organic standards and certifications to meeting the criteria of sustainable agriculture (Allen & Kovach, 2000; DeLind, 2000; Guthman, 2004; Jaffee & Howard, 2010), it is important to assess if the Farm's production processes are consistent with environmental sustainability. Historically, organic production was built upon several philosophies that include environmental and social concerns. When the 2002 USDA organic standards were introduced, scholars and activists were critical that "organic" had come to connote only the "absence of chemical residues" rather than a larger set of sustainability ideals (DeLind, 2000; Jaffee & Howard, 2010). In our background interviews, Farm staff and administrators often cited this definitional weakness of organic combined with the cost of organic certification as the reason for why the Farm at Davidson College is not certified organic. Instead, the Farm plants seeds that are certified organic, non-GMO, and/or open-pollinated and utilizes only non-synthetic fertilizers, lime, and pesticides. In addition, the Farm grows a diversity of fruits and vegetables (as opposed to monocropping) and utilizes rotational planting to maintain soil fertility and reduce pests (T. Allen, personal communication, August 4, 2016).

However, rather than utilizing a no-till approach (Coleman, 1989) or draft animals for plowing as other schools do (e.g., Warren Wilson College Horse Crew, 2017), the Farm relies on tractor cultivation for the preparation of new fields and beds, which can contribute to soil erosion and the loss of soil fertility (Montgomery, 2007). Soil erosion in the Davidson region appears to have begun in the 1780s, plus or minus 20 years (Spell & Johnson, 2019). This erosion not only caused significant gullying in the region (Ireland, Sharpe, & Eargle, 1939; Sutter, 2015), but also resulted in a nearly total loss of the region's A horizon (i.e., top soil) (Trimble, 1972, 2008). The grazing and haying that the Farm's subsequent owners practiced may have improved the soil by allowing organic material to build back into the A horizon. However, because the Farm practices plowing, which increases the rate of organic breakdown, this historic impact is likely eliminated (B. Johnson, personal communication, January 7, 2020). Thus, there is some topsoil erosion associated with the plowing, but we lack adequate measures of it to definitively determine the Farm's impact on soil erosion and soil fertility.

The use of a tractor also releases greenhouse gases, a known contributor to climate change. According to research conducted by Kramer, Moll, and Nonhebel (1999) and cited by Cooper, Butler and Leifert (2011), plowing generates 131.6 kilograms of carbon dioxide equivalents per hectare ($kgCO_2eha^{-1}$), which translates to 0.053 metric tons of carbon dioxide per acre. Using US$62 as the social cost of a metric ton of carbon dioxide released into the environment (Interagency Working Group on the Social Cost of Greenhouse Gases, 2016), we estimated that the Farm costs society US$3.30 per acre or US$6.60 in total as a result of its use of the tractor. So, in sum, the Farm produces some localized soil degradation and a small social greenhouse gas cost. Most of the production practices on the Farm roughly offset the operation's contributions to soil erosion and greenhouse gas emissions.

Food Miles and Labor Practices

Here we turn to the components of environmental sustainability that are more directly related to social sustainability, specifically the presumed sustainability of local food. The Farm was created in response to students' growing interest in consuming

local and organic food. While that motivating factor is important to document, it is equally important to note that these two labeling criteria may not indicate that the food was produced sustainably, and, as we stated in the introduction, social factors have often not been the focus of sustainability analyses of agriculture.

Although there is no set definition for "local," the Farm fits into the mold of local food as defined by geographic location (Lev, Hand, & DiGiacomo, 2015; Martinez et al., 2010). The Farm's produce travels only two miles (3.2 kilometers), directly from the Farm to Dining Services. The framework of food miles, the estimated distance between where food is grown and where it is ultimate consumed, is relevant for determining if reducing the travel of certain foods results in a reduction in greenhouse gas emissions (Pirog, Van Pelt, Enshayan, & Cook, 2001). It is also relevant when determining if locally produced food encourages shoppers to walk, bicycle, or drive fewer miles to purchase foods that they would have purchased anyway. In the case of the Farm, some of the produce is sold at a price premium through the farm stand and CSA on campus, suggesting that the combination of convenience and purchasing high-quality food offsets the higher price, which is consistent with previous research (Katt & Meixner, 2020). Without data from customers, we cannot ascertain to what extent convenience and quality are driving those purchases. Hamilton and Hekmat (2018) concluded that Brescia University College (a Canadian women's liberal arts college) students would be willing to pay a small premium for the organic versions of individual food items such as yogurt and tomatoes. Consequently, it is fair to assert that some portion of the Farm's sales on campus are resulting in more sustainable consumer behavior consistent with the concept of "local" food.

Yet, as is well documented in the literature on the "local trap" (Purcell & Brown, 2005), there is a distinction between "local food" and "sustainability" (Hinrichs, 2000; Hinrichs, Kloppenburg, Stevenson, Lezburg, Hendrickson, & DeMaster, 1998). Indeed, it is now recognized through life cycle analysis that a reduction in food miles does not necessarily mean that the food is more environmentally sustainable (Pirog et al., 2001; Weber & Matthews, 2008) or nutritious (Frith, 2007). Local economies may grow unequally and may increase local-scale inequality (Hinrichs, 2000), and therefore management of agricultural labor at the local scale is not necessarily more socially just (Gray, 2013). In contrast to the scholars and activists who have confused a means (localizing the food system) with the desired outcomes (promoting environmental, social, and economic sustainability), Born and Purcell (2006) and Kleppel (2014) emphasize assessing the results of the production process that transforms the seed into food. Consequently, beyond analyzing food miles and the transformation of seed into food, analysts of the sustainability of college and university farms need to address the critical social aspects of the production process in the assessment of social sustainability, in particular the relationship of the farm with its laborers. Analysis of a farm's labor practices may best fit within the pillar of social sustainability, but to maintain the integrity of our discussion of local food and sustainability we include labor practices herein.

To be sustainable, a farm should ensure the livelihood security and health of its workers, which includes providing a living wage, overtime pay, rest time, and paid leave (FAO, 2014). The Farm has two types of employees: the farm manager and college students. The farm manager is paid a salary per the requirements of Davidson College and is entitled to the same benefits and rights of all full-time employees as required by U.S. law (e.g., employee-sponsored health insurance and paid sick leave), which is above and beyond what most U.S. agricultural laborers are guaranteed (or not) in U.S. agricultural labor laws (Rodman et al., 2016; U.S. Department of Labor, 2020). Students work at the Farm through the Federal Work-Study program during the fall and spring semesters or are hired as summer interns through grant-supported initiatives. The work-study students have a fixed number of hours they should work each week as part of their financial aid package, and they do have some flexibility in choosing their work-study assignment. Most summer interns are contracted to work 40 hours per week with the number of weeks spent working dependent upon the specific funding

source. In all cases, the minimum student hourly wage is US$7.50 (Davidson College Human Resources, n.d.), a bit above the North Carolina minimum wage of US$7.25 (North Carolina Department of Labor, n.d.) but below the (admittedly overestimated) average wage of US$11.78 for crop production workers in North Carolina (Department of City & Regional Planning Master's Workshop, 2014). This figure of US$7.50 is well below the estimated living wage of US$12.83 for the Charlotte region (Living Wage Calculator, n.d.). In our background interviews on the challenges and benefits of working at the Farm, many work-study students reported feeling frustrated that they earned such low wages for intensive labor, particularly when other work-study students were paid the same amount for less physically demanding jobs that also allowed them to study. Simultaneously, all work-study students enjoyed their positions and felt that they gained significant personal and career benefits. Finally, the farm manager, student workers, and volunteers have access to a fully functioning toilet, running water, rest breaks, and shade, unlike many U.S. agricultural workers (Gray, 2013; Holmes, 2013). They are also not exposed to non-organic pesticides, herbicides, and fertilizers.

Therefore, we conclude that the Farm meets sustainability criteria for its reduction in food miles and its ethical working environment. Although the work-study students could be paid a better hourly wage, that wage decision is prescribed by college policies and is not under the control of the farm manager. While one might dismiss the significance of this assessment due to the Farm's small size and hence small impact in the food system, it is significant that college farms serve as a counter-model to the labor practices that many farmworkers experience. This feature fits directly into the Farm's educational contribution, which we discuss under the aspects of social sustainability, as well as the Farm's financial sustainability, which is impacted by the fair wages paid to our farm manager, bridging the social and economic nexus we discuss next.

Economic Analysis

To measure the Farm's economic sustainability, we rely on the Farm's financial performance, its economic value to consumers, and its impact on the local food economy. Younger college and university farms are "likely to aim for financial self-sufficiency as a rationale for their continued existence" (Sayre, 2011, p. 13). Younger student farms will pursue donor funding and create a diversified market portfolio that includes direct sales through farmers markets, farm stands, and CSAs, and intermediated sales through dining halls. The Farm fits the description of a young operation, as it was established on farmland that the college had purchased four years earlier and, in 2012, the Duke Endowment funded the startup costs needed to establish farming operations. Furthermore, like younger farms, the Farm is intended to be financially self-sustaining so that it does not add to the College or Dining Services budget (Holthouser & Terry, 2012, p. 2).

Financial Independence

The two primary operating expenses for the Farm have been the salary and benefits of the farm manager. After removing these expenses, revenues have exceeded those remaining operating costs by a growing amount annually. Still, as currently structured, the Farm is not financially sustainable because it cannot operate without a full-time manager.

The real question is whether the total economic value exceeds total costs, and that measure of economic value includes incremental value gained by the students, faculty, and staff who eat the Farm's produce. Bruno and Campbell (2016) made an important methodological advance by analyzing whether students at the University of Connecticut (a large land-grant university) would be willing to pay more for their meal plan in order to consume organic and local food. They found that 50% of their survey respondents with meal plans would be willing to pay more to have organic food options, and, similarly, 50% of their survey respondents with meal plans would be willing to pay more to have local food options available. Those University of Connecticut respondents with meal plans were willing to pay small premiums for the organic and local food options of US$42 and US$35 per semester, respectively (Bruno & Campbell, 2016).

Because all enrolled Davidson College students

must purchase a meal plan, the Farm could break even financially if all students were required to pay an annual premium to Dining Services of less than US$20 for the Farm's food. Requiring payments for food that one does not value is not the same as asking how much one would be willing to pay for local and/or organic food. Nevertheless, we assume that the price premium for Davidson College students is likely within range of the values reported for the University of Connecticut respondents, as they are demographically similar student populations. Thus, it might be the case that the incremental value of the Farm's produce does exceed its costs; so, operating the Farm at a financial loss would be the rational economic choice.

Consequently, the economic sustainability of the Farm is an open, empirical issue. If a follow-up analysis did determine that the small premium individual students would be willing to pay would cover the remaining costs, then there are genuine managerial issues for the college to consider.

Although we need to respect privacy concerns, we can say that the Farm's operating costs have been rising because the farm manager's salary and benefits have been increasing due to the increasing longevity of tenure. However, the Farm's revenues have still been increasing faster than its operating costs, and, as such, the annual losses have been decreasing. In the analysis of Farm revenues, we found, first, that the absolute level of sales to and the percentage of revenues earned from Dining Services has decreased annually. Second, the revenue growth is a result of the Farm broadening its market channels to include sales through the farm stand, CSA, and local coffee shop that operates on campus.

Such market broadening is exactly what many would recommend to a small farm that seeks to improve its resilience and reduce its vulnerability by relying on a diversity of buyers and streams of income (FAO, 2014; Matteson, 2017). Indeed, our farm manager insightfully identified an optimal point in financial sustainability by combining production for both direct sales and intermediated markets. To maximize revenues through the CSA, farm stand, and coffee shop, the farm manager has grown a wide variety of fruits and vegetables in order to meet consumer interest and accomplish season extension and rotational cropping, as recommended by small-farm guru Eliot Coleman (1989). Additionally, the farm manager continued sales to Dining Services, so she also specialized in salad greens by growing a variety of lettuces that allowed her to accomplish year-round production (e.g., winter and summer lettuces) and effective crop rotations (Coleman, 1989). Our primary concern, however, is the observation that sales to Dining Services have declined while direct sales have increased, thus shifting the consumer base from all students to those students, faculty, and staff willing to pay for the Farm's food, which we discuss with regard to social sustainability. We conclude that the Farm's shifting customer focus appears to be consistent with economic sustainability if it is to be considered an independent economic entity. Yet, and consistent with our theme of emphasizing the social aspect of sustainability, this broadening of revenue channels needs to be viewed from the social sustainability criteria lens as well.

Local Food Economy

As we noted in the introduction, the social aspects of sustainability need greater emphasis in the missions, operations, and assessments of many campus farms (Aftandilian & Dart, 2013; Barlett, 2011; Chollett, 2014; Galt et al., 2013). To measure one aspect of the Farm's social and economic impact on the surrounding food system, we reflect on the Farm's influence on the local food community. We begin our analysis by turning to one of the Farm's explicit goals, that it "should not detract from the local food market" (Holthouser & Terry, 2012, p. 2). That goal arose from the recognition that, historically speaking, the Davidson region is an agricultural area (even as Charlotte's suburban sprawl continues in this area). Many of our immediate neighbors are farmers, including approximately 216 in our county of Mecklenburg (of which 11 operate direct sales) and over 2,000 in the nearest surrounding counties (USDA, 2017). Further, the college did not want to be perceived as exploiting its nonprofit status to undercut the prices its neighbors might charge, reflecting a common trend among campus farm operations (Sayre, 2011).

The Farm's financial losses have been decreasing as sales through the Farm Stand, CSA, and coffee shop increase, and these might detract from sales by neighboring farmers. Although the Farm limits its direct sales to college students and employees only, those same students and employees might be shifting their purchases of at least some products away from the town of Davidson Farmers Market and our neighbors' farms. For example, CSA data indicate that those who participate in the Farm also participate in the Davidson Farmers Market (Green, Hunt, & Orner, 2018). However, from student observations, it appears that other farmers do not see the Farm as a threat (Green et al., 2018). Still, there is an opportunity to extend the research at Davidson College to address such questions as saturation or opportunity in the local food system and perception of the Farm within the regional food system.

In recognition that Dining Services had not been buying any food locally for some time, the college added the goal that "the labor, logistics, and economic resources of the Farm shall strive to enhance the ability for external local vendors to incorporate more products into the Dining Service operation" (Holthouser & Terry, 2012, p. 2). In short, the college believed that collaborating with the Farm could serve as a learning experience for Dining Services so that it could then purchase and serve other farms' local produce. However, Dining Services does not yet purchase food from other local sources and the Farm is not assisting other local farmers in selling their produce to the college (D. Holthouser, personal communication, March 14, 2018). Given the complexities involved with managing dining services in schools, we view the good-faith efforts of all parties as a positive signal. However, due to the possibility that the Farm may be competing with other local food providers and Dining Services is not purchasing from other local food providers, this measure of social and economic sustainability is not met at this time.

Social Analysis

Education

A critical nexus exists between the social and economic pillars of sustainability and a second critical nexus exists that links all three pillars. First, linking the social and economic pillars, Davidson College formally recognized that the Farm should be a resource for curricular and extracurricular activity (Holthouser & Terry, 2012, p. 2). The pedagogical value of the Farm may be substantial. The Environmental Studies department offered the interdisciplinary course "Food and Sustainability" to introduce students to the Farm using the framework of sustainability. An assessment undertaken in this course sought to understand if volunteering at the Farm improved students' knowledge of sustainability and the food system as well as if it strengthened students' commitment to acting sustainably and transforming the food system, using frameworks established by Aftandilian and Dart (2013), Hilimire and co-authors (2014), and Meek and Tarlau (2016). We found that students became much more knowledgeable about sustainability, including about their own positions in the food system, food systems stakeholders, sustainable agriculture practices, and the competing sustainability demands within food systems (Green, 2021). These hands-on learning experiences, combined with a critical food literacy approach (Yamashita & Robinson, 2016), made visible the challenges of creating sustainable food systems.

The linkage between the economic and social pillars arises because many colleges and universities currently frame the financial considerations of their academic activities in terms of the impacts on employee salaries and benefits (Ehrenberg, 2012). At Davidson, administrators consider, for example, if it makes more sense financially to spend academic funds to build a new computer lab or hire one new professor of economics or, perhaps, some administrative assistants. More specifically, the operating loss that the Davidson College Farm sustained in fiscal year 2016-2017 was 40% of the median salary of a Davidson College assistant professor in fiscal year 2015-2016 (Davidson College Faculty Committee on Professional Affairs, 2017). Given that Davidson faculty teach five courses each academic year (and ignoring all of their other professional commitments), that annual loss can be framed as being equal to the teaching of two classes a year. The Farm's annual loss could also be framed in terms of four courses per year if one argued that

the appropriate measure should be in terms of hiring adjunct faculty on a per-course basis.

Thus, within the context of the overall college budget, the social considerations involved with pedagogy are already routinely linked to the economic pillar of sustainability. We simply argue that this questioning should be extended to the context of college farms when they, like at Davidson, are housed outside of the academic budget (in the physical plant budget) but have a measurable impact on student learning. For example, in the same way that the college Physical Plant charges the Academic Affairs Office for various services, it could charge the Academic Affairs Office for the pedagogical services that the Farm offers, thereby making the economic assessment of the social contribution explicit. While we believe that the pedagogical contributions of the Farm are worth the costs expressed in terms of faculty services, the more general point is that this mechanism would make the nexus between the economic and social pillars clearer to college officials. Therefore, more studies like this that focus on the unique contributions of school farms to student learning would buttress the argument that school farms contribute positively to sustainability from a pedagogical perspective.

Food Access and Food Justice

The nexus that brings together all three sustainability pillars relates to the Farm's cropping patterns. The Farm does not monocrop but instead raises a diverse mix of crops that generate revenue and serves both the customers at the farm stand, CSA, and coffee shop as well as customers at the college's Dining Services. Those benefits are positive indicators of the Farm's sustainability.

However, shifting production to direct sales and charging a price premium may result in some students being unable to afford the food, particularly the 51% of students who are receiving financial aid at Davidson College (Davidson College, n.d.-b). Thus, by meeting one social objective and working toward its financial goal, the college is missing the opportunity to address a legitimate food justice issue through serving its own Farm's produce to students who would otherwise be unable to afford it. Food justice is critical in farm-to-school movements (Gottlieb & Joshi, 2010) with its focus on racial and economic disparities in the production, distribution, and consumption of healthy and sustainably produced foods (Alkon & Agyeman, 2011). Across college campuses, food insecurity negatively affects students' dietary health, learning experience, and mental well-being (Henry, 2017; Silverthorn, 2016). Colleges and their farms and gardens are uniquely positioned to provide equitable food access for all students (Dubick, Mathews, & Cady, 2016), and in Davidson's case, due to the mandatory meal plan, the dining hall is the most equitable access point.

Discussion

Separating the definition of sustainable agriculture into its individual elements permits useful, incremental analyses of college farms, and it allows one to be certain that all of the necessary components are evaluated. The ultimate step is to determine if their combination, including interactions, "equitably balances concerns of environmental soundness, economic viability, and social justice" (Allen et al., 1991, p. 37). At the same time, there are important overlaps between the three traditional pillars of sustainability that are critical to a sustainability analysis, particularly in the social pillar. We return to a Venn diagram of the sustainability triad (Figure 2) to guide our concluding reflection.

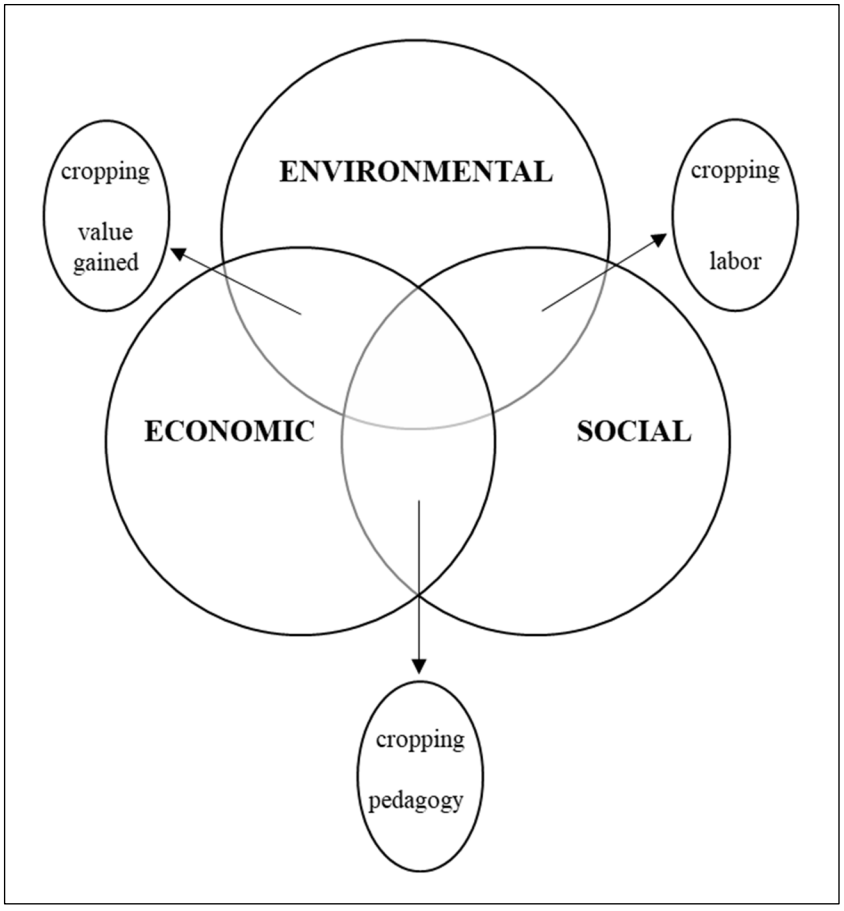
Beginning at the top of the diagram with the "pure" environmental pillar, the Farm's environmental impacts were minimal due both to the Farm's small size and the balance it struck between sustainable cropping practices and unsustainable tractor cultivation. Economically, our findings illustrate that the Farm is not financially sustainable because revenues are less than operating costs. Yet, when moving to the intersection between the environmental and economic pillars, the perceived "local" and "organic" value consumers gained from consuming the Farm's produce exceeds its costs. In terms of the social and economic overlap, our findings indicate that the Farm has not yet succeeded in integrating local farms into the college's Dining Services operations and may be competing with local farms for customers. Finally, at the intersection of the social and environmental pillars, our findings show that the Farm is operating sustain-

ably for a number of reasons: (1) the Farm is proximate, or local, to the college; (2) faculty, staff, and students are substituting by purchasing the Farm's produce instead of nonlocal crops; and (3) the Farm is treating its locally hired laborers fairly, with the exception of low hourly wages for students. In conclusion, our assessment has revealed that the Davidson College Farm is benign with respect to sustainability.

Yet, this analysis ignores two critical components noted in Figure 2: "pedagogy" and "cropping." Both components merit special attention at Davidson and at other colleges and universities with farms.

We turn first to cropping. At the Davidson Farm, this aspect concerns whether the farm manager should plant and harvest diverse crops for the most profitable market channels or plant and harvest a narrow set of crops so as to maximize sales to Dining Services and to serve the broadest student constituency. This raises an important question for the Farm's financial sustainability. Currently the Farm sells produce to Dining Services through an informal approach based on a relationship of mutual trust and shared interest. According to a study by Barlett (2017), a commitment to spend a portion of the food service budget on specific foods, or a metrics-based approach, would ensure continued purchasing. This approach, we argue, would maintain equitable access to the Farm's food, thereby validating the fairness involved by distributing the farm's bounty to all of the school's students. This raises the question: should the Farm codify an arrangement with Dining Services so that Dining Services commits to spending a portion of its budget on the Farm's produce (Barlett, 2017)?

Figure 2. The Sustainability Interrelationships of the Davidson College Farm



Given that the stated *raison d'être* for many colleges and universities is their pedagogical mission, an assessment of a college farm's sustainability must include its contribution to the school's educational goals. We propose that this can be accomplished by comparing any financial operating losses to the cost of hiring teaching faculty. The cost of hiring faculty must, by definition, be less than the value gained. While Sayre (2011) found that younger college and university farms were more driven to attain financial self-sufficiency, long-term student farms were more likely to characterize student farms as educational resources that should not be expected to pay for themselves.

From the educational resource perspective, our findings encourage universities to measure the pedagogical value of campus farms instead of their financial costs. Even though our

Farm operated under a financial independence model, we found in our course assessment that it was still able to positively affect the education of our students. We encourage colleges to not only look for potential curricular and extracurricular uses of campus farms, but also ways to evaluate these farms' contribution to those experiences. Effective assessment of an academic experience begins with knowing the desired learning outcomes (Bol & Strage, 1996), as well as knowing the extent of the student-centeredness of the activities designed to help the students achieve those outcomes (Holt, Young, Keetch, Larsen, & Mollner, 2015). As in our course assessment, one option would be to collect information about those learning outcomes and the farm-related activities to better understand the class-related value gained from campus farms (LaCharite, 2016). Similarly, the research goals and activities need to be understood to assess the pedagogical value of campus farm–related research. Understanding the different educational and research potential of a campus farm will help schools as they consider integrating campus farms into their educational missions, creating or expanding farms, and, particularly, as they make the shift that Sayre (2011) emphasized, from focusing on narrow financial goals when they are relatively new to focusing on the economic value of pedagogical goals as they mature.

Recommendations for Assessing the Sustainability of College Farms

Our analysis indicates that the Farm at Davidson College is benign on most measures of sustainability. The Farm is strong in its educational contribution to sustainability; however, it needs continued improvement in the areas of the local food economy, labor practices, student food access, and tractor cultivation. Yet, in determining both the sustainability of the Farm and its value to the college, administrators have tended to focus on its financial independence (not its economic sustainability) as well as the value students, faculty, and staff place on its produce. We suggest that Davidson College, and other institutions with campus farms, may benefit from balancing these concerns with food justice and curricular goals. For example, campus farms should pay fair wages for farm personnel, provide equitable access to farm food for the student body, and facilitate educational experiences that equally integrate all three pillars of sustainability. These concerns lead us to re-emphasize the importance of the social pillar of sustainability.

We conclude with the specific recommendations below for faculty, staff, and students who are interested in assessing the sustainability of their college farms. The first four points follow from our experience. The last five suggestions propose collaborations that would enhance the breadth of future analyses.

- Prepare, pre-test, and codify systems for data collection related to agricultural practices, including environmental, economic, and social indicators. We make this recommendation because we found it difficult to assess all the sustainability aspects from a post hoc perspective.
- Collaborate early and ensure buy-in from key stakeholders, including farm, dining services, physical plant, and student life personnel, and make data collection functional, easy, and of value to all parties. This recommendation is based on our success in working closely with faculty, staff, and students.
- Publicize the project often and widely to guarantee equitable access to participation. We make this recommendation in order to guarantee that all faculty, staff, and students who are interested in contributing to the campus farm feel welcome to participate.
- Create a framework and repository for student-directed research and data to prevent data loss and repetition of research. We make this recommendation based on our experience as faculty mentors to undergraduate research. This research is often not published or widely distributed but may be of value for institutional decision-making.
- Consult with education faculty and their students to create a framework for assessing the pedagogical value of the farm.
- Consult with environmental studies, biology, and chemistry faculty and their stu-

dents on topics such as soil and water quality and wildlife surveys.
- Consult with economics faculty and their students on topics such as consumer and vendor surveys, extent of the market studies, etc., so as to assess the value of the farm instead of simply the financial flows.
- Consult with public health, anthropology, sociology, and psychology faculty and their students on topics such as food security, food access, food justice, food and culture, connections to nature, etc.
- Consult with history, gender, Indigenous, Latinx, Africana, and Asian studies faculty and their students to consider topics such as decolonization, social justice, and the histories of place and people of the specific farm landscape and the region.

While we necessarily focused on the context of the Davidson College Farm to answer our guiding question "is the college farm sustainable," we hope that our analytical template and the suggestions above develop the appropriate foundation for others to build upon our analysis and assess and enhance the sustainability of other campus farms. One lesson from this exercise is that faculty, staff, and students at schools with farms should view the inexactness of our conclusions as opportunities for more rigorous assessments of these farms in future research and engagement. For example, because of the value a farm's produce may bring to a college's dining services, questions arise such as: could a system be implemented for transferring additional funds from dining services to the farm? What financial requirements do dining services incur and would they want to extract payment from students for the additional value gained from eating a farm's produce? These questions go beyond the question of "if the university would pay a premium" to more fundamental questions of "should they pay a premium?" Regarding the local food economy, research on saturation and opportunity in the local food system as well as perceptions of college farms within the regional food system would be of value. Finally, we encourage administrators and faculty to holistically assess the sustainability of campus farms by exploring ways to compare and evaluate their operational losses alongside their educational contributions. We encourage administrators and faculty to ask: what educational value is gained from campus farms and how can that pedagogical value be compared with financial operating losses?

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Toward a framework for assessing managerial intentions: A review of support for market managers' engagement with nutrition incentive programs

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Abstract

The last several years have seen a rapid expansion in the number of nutrition incentive programs implemented at farmers markets. While there has been increased attention paid to these efforts in terms of influencing consumer health indicators, there has been less focus on the farmers market managers responsible for implementing and administering the programs. To date, most studies that have addressed manager perspectives have been qualitative case-studies where findings may have limited generalizability to other market contexts. In this integrative review of literature, we examine the current state of both scholarly and practitioner literature regarding market manager perspectives on nutrition incentive programming. Given the identification of critical gaps and salient factors in efforts to promote nutrition incentive programming at markets, we call for the advancement of a framework that may be shared between organizations. This framework will capture essential data that inform market managers' behavioral intention towards the nutrition incentive programs they currently administer. We propose that the development of a comprehensive survey tool designed to capture managerial intentions may ultimately prompt multistate, cross-organizational collaboration on improving nutritional program outcomes at farmers markets.

Keywords

Literature Review, Barriers, Farmers Markets, Food Access, Market Managers, Nutrition Incentives, SNAP, Behavioral Intentions

Introduction

Farmers market managers in the United States increasingly leverage federal funds to offer Supple-

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mental Nutrition Assistance Program (SNAP)-based incentive programs (SBIPs) to help resource-limited shoppers afford fresh fruits and vegetables (FFVs) at local markets through price matching (Misiaszek et al., 2020). While there are a variety of nutrition incentive program models, many adopt the "Double Up" framework practiced by early incentive pilot programs (Durward et al., 2018). This model typically involves an internal currency system at farmers markets. An internal currency system may involve the circulation of chips, tokens, paper notes, or some other object to be used as a medium of exchange exclusively within the market space (Oberholtzer, Dimitri, & Schumacher, 2012). A SNAP shopper interested in purchasing FFVs can swipe their Electronic Benefits Transfer (EBT) card to exchange the benefit amount for a predetermined match amount in some internal currency (Oberholtzer, Dimitri, & Schumacher, 2012). Encouraged by successful outcomes through related SBIP models, federal support for these programs continues to grow. Title IV reauthorizations with the 2018 Agriculture Improvement Act (commonly known as the farm bill) have boosted the continued expansion of SBIPs across the U.S. (U.S. Department of Agriculture Economic Research Service [USDA ERS], 2019). The bill authorized permanent funding of approximately US$50 million per year to the Gus Schumacher Food Insecurity and Nutrition Incentive Program (GusNIP) to match funds for projects that incentivize the point of sale purchase of FFVs for SNAP recipients. This financial support has stimulated a complex and continually evolving organizational ecosystem, a phenomenon that is addressed in more detail in the organizational literature review section.

It is expected that the proliferation of nutrition incentive programming around the country is due to the concomitant rise of both academic interest in the subject, as well as practitioner-based efforts to evaluate programmatic outcomes. Approaches in the academic literature range from nutritional impact modeling on consumers to quasi-experimental analysis of FFV purchase and consumption trends (Dimitri, Oberholtzer, Zive, & Sandolo, 2015; Olsho et al., 2015). Practitioner literature (e.g., organizational evaluation reports) published for public consumption predominately focuses on overall market sales, produce consumption rates, and the discrete impact nutrition incentives have on SNAP redemption rates. Public organizational reports often leverage economic assessment standards (e.g., IMPLAN), models to assess changes in consumers' nutritional knowledge, or frameworks designed to determine a market's characteristics (e.g., Rapid Market Assessments) (Anderson, Blackwell, Gerndt, & Martin, 2015; Dimitri & Oberholtzer, 2015; Lev, Brewer, & Stephenson, 2008).

While SBIPs have been analyzed through distinct orientations and methodological frameworks in both academic and organizational literature, many of these assessments focus on consumer-driven outcomes (e.g., improved economic access or increased consumption of FFVs). This collective emphasis skew is expected, considering that SNAP shoppers are the end-state subjects of incentive interventions. As the nutrition incentive field advances, however, researchers and practitioners alike are recognizing the importance of exploring the views of farmers, vendors, and market managers relative to their general attitudes towards SBIPs and their perceptions of the barriers that engagement with SBIPs presents (Misiaszek et al., 2020; Payne et al., 2013). Market managers remain an under-researched subpopulation despite the critical role they play in the success and sustainability of SBIPs at markets (Hasin & Smith, 2018). Where market managers *have* been the object of study, researchers have either examined their perspectives in relation to a different behavior (e.g., offering EBT technology at markets) or have only explored their views through exploratory case studies where generalizability is limited (Gusto, Diaz, Warner & Monaghan, 2020; Hecht et al., 2019; Roubal, Morales, Timberlake, & Martinez-Donate, 2016). In this integrative review of academic and organizational literature, we examine these and other related tendencies to frame our purpose and objectives as well as recommendations for future research.

Purpose and Objectives

The purpose of this review is twofold. First, we aim to determine the gaps in researchers' and

organizational administrators' evaluation of market managers' experiences with implementing and administering SBIPs. We then leverage these findings to recommend a systematic framework that may be adopted by researchers and practitioners alike to capture market manager feedback and, ultimately, better assess the barriers associated with implementing and administering SBIPs. We pursue this overarching effort through three distinct objectives.

First, we examine academic literature that centers on the attitudes and perspectives of farmers market managers. Here, we aim to establish how researchers situate, prioritize, and interpret meaning from the views of market managers relative to other actors in a market environment (e.g., shoppers, vendors, farmers). We demonstrate the importance of distinguishing between two salient behaviors of interest: managerial implementation and administration of SNAP EBT infrastructure, and managerial implementation and administration of SBIPs. We show that the latter area of inquiry is featured less prominently in the literature and deserves greater representation, especially given the proliferation of innovative programs across the country (USDA ERS, 2019).

The second objective is to establish the prevailing consensus of evaluative strategy from organizational and practitioner-based literature. We review a segment of practitioner literature from the various organizations that either advocate for or directly administer SBIPs at local, regional, and national scales. In addition to the annual reports, white papers, and executive summaries produced by these organizations, we incorporate findings from relevant USDA studies to build a holistic picture of the state of SBIP evaluations.

To meet our third and final objective, we synthesize findings between the academic and organizational outputs to identify and contextualize a gap in assessing market manager attitudes and perceptions regarding SBIP implementation and administration. Through this effort, we demonstrate not only that such a gap exists, but that the gap must be bridged in order to assess overall SBIP impact at markets effectively.

Methods

We applied Torraco's (2005) integrative literature review method to guide our examination of manager-centered literature produced by academic researchers and organizational evaluators alike. An integrative literature review "is a form of research that reviews, critiques, and synthesizes representative literature on a topic in an integrated way such that new frameworks and perspectives on the topic are generated" (Torraco, 2005, p. 356). Although researchers organize integrative reviews in various ways according to context and need, adherence to the method requires applying standard conventions for reporting how each study was conducted (Torraco, 2005). These conventions refer to how an author identifies, analyzes, synthesizes, and reports findings from the literature. Torraco's method was chosen for this study because of the detailed guidance it provides in the identification, organization, analysis, and synthesis of literature resources.

Our data collection approach differed between the search for academic literature and organizational literature. For the former, we collected data from various online library databases and indexing search engines. We used ProQuest, EBSCOhost, Google Scholar, and the University of Florida's George A. Smathers digital library archives as our primary search outlets, applying select keywords in search of existing literature. Key search terms used included *farmers market managers, nutrition incentive programs, market manager perspectives, Double Up Food Bucks, SNAP-based incentive programs,* and *market manager evaluations*. The resources we found through this initial search phase helped us generate additional sources, such as relevant new articles from the reference lists of preceding articles.

We applied a more deliberate and targeted search approach to examine organizational and practitioner literature due to the lack of these types of resources represented within indexed databases. Instead of indexed databases, we explored the websites of specific organizations to find any published resources (e.g., white papers, annual reports, evaluation summaries) that might include data on partner markets generally or market manager perspectives specifically. While there are dozens of organizations at various scales that directly administer

SBIPs or provide administrative support to market managers, we specifically targeted organizations that were regionally and nationally scaled (e.g., Wholesome Wave, Fair Food Network), recognizing that these organizations are more likely to have the capacity to either conduct evaluations internally or contract evaluation specialists to assess their program's impact. We added relevant resources from both categories to a database spreadsheet with structured fields for resource category, topic, population or audience segment of interest, methods used, research questions posed, and implications generated. This categorization process allowed us to create and synthesize new knowledge more effectively (Torraco, 2005). Overall, we conducted full-text reviews of 32 resources, several of which we reference in the following sections. We compiled those resources (n=26) that addressed (directly or tangentially) the role of managers in SBIP processes into Table 1, which we included in the Appendix. While this sample is relatively small, we recognize that it may soon be subject to amendment as the topic continues to gain more scholarly attention. At present, the list represents known current efforts to address the role of market managers in SBIP programming.

Results

Academic Review

Towards a managerial perspective on process

The implementation of federal assistance benefits and SBIP at farmers markets is evolving as an emerging research topic. To date, most research addressing the subject has been outcome-oriented, focusing on metrics such as generated revenue for vendors, SNAP redemption rates, or increased FFV consumption by limited-resource shoppers (Savoie-Roskos, Durward, Jeweks & LeBlanc, 2016). Research centering on consumer experiences and perceptions has aided this broad effort by identifying economic and environmental factors that both inhibit and facilitate farmers market use (Amaro & Roberts, 2017; Conner, Colasanti, Ross & Smalley, 2010; Freedman et al., 2016; Savoie-Roskos et al., 2016). Karakus, MacAllum, Milfort, and Hao (2014), for example, reported that SNAP recipients were significantly more likely to shop and become repeat customers at a farmers market if they knew the market offered a nutrition incentive service. Abelló, Palma, Waller, and Anderson (2014) found that shoppers in certain demographic brackets responded positively to the presence of educational activities and events at markets, suggesting targeted promotional activities could positively influence the frequency of market visits and FFV consumption.

These and other related efforts explicitly consider shoppers' perceptions of factors that either inhibit or facilitate their sustained patronage. These factors produce tangible implications for assessing the impact of farmers markets through common metrics such as SNAP redemption rates and FFV intake. As Karakus et al. (2014) conclude from their nationally scaled mixed-method study for the USDA Food and Nutrition Service, capturing SNAP shoppers' perceptions of price, value, convenience, and other factors provide "valuable insights…to guide ongoing initiatives to improve access to healthy foods for SNAP participants, particularly the effort to work with [markets] and direct marketing farmers to improve participants' access to locally grown produce" (p. 123).

These studies illustrate the logic of leveraging the attitudes and perceptions of market stakeholders to inform operational decisions and SBIP intervention efforts. Researchers indicated that understanding consumer perspectives was a critical first step to achieving and evaluating outcome-oriented objectives (Ritter, Walkinshaw, Quinn, Ickes, & Johnson, 2019; Wetherill & Gray, 2015). Survey data indicating that shoppers would spend more of their SNAP dollars at markets if they saw more explicit and more frequent inventive program advertising, for example, is an actionable insight that may help achieve a desired outcome. While acknowledging the importance of consumer perspectives, other researchers have called for greater representation of the views of farmers market managers in research. (Cole, McNees, Kinney, Fisher, & Krieger, 2013; Roubal et al., 2016).

While consumercentric research informs outcome-oriented evaluations (e.g., the impact of a SBIP on FFV intake) at a market, studies addressing the perceptions of those actors responsible for

implementing and administering the program appear critical to several of the *process* evaluations we reviewed. In their investigation of the barriers and facilitators managers face to successfully implement EBT infrastructure, Roubal et al. (2016) concluded that manager feedback provided "a deeper understanding of the processes market managers interweave and navigate in the course of establishing an EBT program" (pp. 151–152). The authors reiterated that "understanding the main barriers as well as effective strategies for successful implementation of EBT in farmers markets is imperative to realize the full potential of these outlets" (p. 155).

Currently, scholarly emphasis on market manager perceptions exists outside of SBIP contexts, with a specific focus on the provisioning of SNAP EBT access at markets. We conducted full-text reviews of nine articles with this criterion. Researchers employed distinct methodological approaches and reached unique conclusions, despite the topical similarities between the studies. Roubal et al. (2016) found that managers' attitudes toward the implementation of EBT were affected by considerations related to training, advertising, and community support. Managers expressed dissatisfaction with the excessive paperwork, high fee payments, and the time required to maintain EBT equipment. Additionally, managers indicated that supervising vendor reimbursements and staff training were also time-intensive and ultimately served as barriers to implementing and sustaining the EBT program (Roubal et al., 2016).

Ward, Slawson, Wu, and Jilcott Pitts (2015) similarly examined manager attitudes to better understand factors that facilitated increased SNAP EBT adoption at markets. The authors found that managers' perception of economic growth (or the potential for economic growth) for the market and increased financial security for themselves were central motivators to adopt and maintain use of the SNAP EBT system (Ward et al., 2015). They also found that managers' internal motivations (e.g., a concern about food access for underserved communities) moderately influenced managers' adoption or sustained use of EBT at their markets (Ward et al., 2015). Hasin and Smith (2018) applied the diffusion of innovations theory to analyze how market managers' communication and technology use affected EBT adoption rates. The authors identified a range of sociodemographic characteristics, communication techniques, and technology use levels as influential to EBT adoption for managers. From logistic regression results, the authors concluded that managers who established partnerships with external organizations and actively maintained their market's presence on social media were more likely to adopt EBT technology (Hasin & Smith, 2018).

Mino, Chung, and Montri (2018) used an ethnographic approach to explore the day-to-day operational experiences of market managers and other market staff administering food assistance programs at select markets in Michigan. The authors demonstrated that all market staff experienced administrative burdens (e.g., engaging in tasks such as SNAP-specific sales tracking) in maintaining SNAP EBT access that affected the time they could dedicate to normal market functioning. Not all markets, however, experienced these burdens to the same degree, as markets with fewer staff members and less overall resources struggled more acutely with the surge in EBT transactions. The authors argued this finding suggests that a market's organizational capacity (i.e., its access to adequate staffing, financial resources, and professional partnerships) is a highly salient factor in whether managers are successful in implementing and administering SNAP (Mino et al., 2018). While this finding had been previously identified in outcome-oriented evaluation efforts, this conclusion reflected the self-efficacy and agency perceptions of managers and other market personnel. The authors reached these conclusions by centering the *process* of SNAP (and in one case, SBIP) administration, providing market managers an opportunity to share the logistic burdens of incorporating such efforts at their markets in an in-depth format. The authors justified their decision to focus on managerial perspectives, citing an earlier effort to collect data on the internal decision-making processes at markets:

> Very little work examines the nature of farmers markets as providers of these programs. Stephenson (2008) took an in-depth look at farmers markets in Oregon and put an ethno-

> graphic lens to the functioning of these markets. Acknowledging that each market faces a unique set of constraints, Stephenson (2008) makes the case for understanding the decision-making that occurs at farmers markets in context and concludes that organizational development is important for sustained market success. (Mino et al., 2018, p. 824)

Increasingly, researchers recognize that "there is a gap in the understanding" of how farmers market managers experience the implementation and administration of SNAP EBT programs, and attempt to close this gap by investigating the "processes, facilitators, and barriers" encountered by them (Roubal et al., 2016, p. 145; Ward et al., 2015, p. 128). Other researchers, however, have also realized that the issue of SNAP EBT adoption is a different process than the implementation and administration of SBIPs, and therefore requires specific examination. We address the emergence of these inquiries and trace their progression towards calls for a systematic framework to examine managerial attitudes, perspectives, and motivations.

Incentive programming: Beyond the exploratory

To date, there is little research that explicitly centers the perspectives of farmers market managers regarding their experiences with administering SBIPs (particularly with "doubling" incentive programs). We could only find three articles that directly examined market manager perspectives on SBIP implementation and administration. We conducted full-text reviews of these studies and synthesized the similarities and differences between them.

Two of the three articles we reviewed used the case study method, conducting semi-structured interviews with managers to "understand [farmers market] managers' perceptions of barriers and facilitators" with implementing and administering SBIPs (Hecht et al., 2019, p. 927). Within formative, exploratory frames, these studies collected valuable in-depth feedback, highlighting "the wealth of accumulated knowledge" from managers (Hecht et al., 2019, p. 933). In a case study by Gusto et al. (2020), the authors applied a behavioral framework known as the Integrated Behavioral Model (IBM) as an analytical tool to better understand how market managers who had already adopted a SBIP viewed their engagement with the program, the experiences of their vendors and customers with the program, their level of confidence with the future of the program, and the likelihood they would continue offering the program given particular barriers. The authors focused on managers' perceptions of the degree of personal agency they felt regarding the implementation and administration of a SBIP "doubling" program, where personal agency refers to one's perceptions of one's ability to exert influence and control in the face of environmental constraints (Bandura, 2006). The authors found that certain environmental constraints, such as the level of funding managers received from their SBIP organizational support partners for staffing, equipment, and marketing, affected managers' sense of control at the market (Gusto et al., 2020). While the authors identified related environmental and interpersonal barriers (e.g., lack of buy-in from vendors in implementing the SBIP), they also discovered strategies managers had employed (e.g., using grassroots or word-of-mouth advertising) that facilitated their sense of self-efficacy or self-confidence (Gusto et al., 2020).

The qualitative case study by Hecht et al. (2019) produced similar conclusions from the barriers identified by managers. Managers made several recommendations to address these issues, including "increasing funding security, improving promotion and education, and reducing the data collection burden through program digitalization" (Hecht et al., 2019, p. 933). Managers also provided strategic recommendations to improve SBIP functioning at the respective markets, suggesting that more experienced managers "could share strategies they developed related to increasing vendor buy-in, better promoting the incentive within the market, and explaining the program to customers" (Hecht et al., 2019, p. 933). As the authors note, while these barriers and facilitators may have currency for other researchers and practitioners, results are context-bound by the nature of the methods used. The authors, therefore, recommend a continued focus on market manager perspectives regarding SBIP implementation and administration, including the suggestion that program organizers consider

"systematically soliciting feedback from managers, vendors, and customers to identify targeted strategies to strengthen their programs" (Hecht et al., 2019, p. 934). In the following section, we investigate the extent to which organizational evaluators heed this call.

Organizational Literature Review

Evaluative praxis

We reviewed 13 publications to determine prevailing standards for how organizations evaluate SBIPs. Eleven of these resources were evaluative outputs from various nonprofit organizations that provide administrative support for SBIP implementation at state, regional, or national-scale markets. The remaining two resources are reports from the U.S. Department of Agriculture's Agricultural Marketing Service (USDA AMS) and Food and Nutrition Service (USDA FNS) departments (King, Dixit-Joshi, MacAllum, Steketee, & Leard, 2014; USDA AMS, 2014). Several of these resources were aggregative, compiling data from several smaller-scale evaluation reports from SBIP projects around the country. We therefore believe that the apparently small number of reviewed resources in fact provides a reasonably comprehensive snapshot of how SBIP impact is evaluated nationally. We found a consistent focus across the organizational literature on outcome-oriented market performance indicators, such as SBIP sales volume, rates of increased FFV consumption by shoppers, and self-reported intentions to boost FFV supply by farmers. In an end-of-year report for 2016, the California-based Market Match program (an effort run by the Ecology Center) shared a series of survey data from partner markets across the state. The report includes snippets of data regarding consumer impact, such as "79% of Market Match customers are return shoppers" and "80% of Market Match customers report their families' health has improved due to Market Match" (Ecology Center & Market Match, 2017, p. 1). The report represents farmer impact by asserting that "81% of farmers report increased sales due to Market Match" (Ecology Center & Market Match 2017, p. 1).

Another report produced by the Farmers Market Coalition (2017) aggregated data from 13 mid- and large-scale organizations and projects that were the original recipients of the 2015 GusNIP grant (then known as the FINI grant). By representing data from the major SBIP-providing organizations operating in 27 states across the U.S. at the time, the document provides a critical snapshot of the types of evaluative data collection protocols organizations prioritized. The report contains a series of summary statements addressing FFV purchasing and consumption, food security alleviation, revenue generation for farmers and rural communities, and incentive redemption rates (Farmers Market Coalition, 2017). In addressing the aggregated consumption rate increases, the report suggested that:

> Combined across all sites, during the first year of the FINI program, farmers markets distributed over $3,000,000 in nutrition incentives and over $5,000,000 in SNAP through more than 200,000 transactions. These purchases resulted in approximately 16-32 million additional servings of fruits and vegetables for SNAP households. (Farmers Market Coalition, 2017, p. 2)

The report also included data on SNAP-based incentive redemption rates:

> Grantees reported consistently high rates of redemption for incentives in farmers market settings, with most reporting rates between 88% and 95%. Only three grantees reported redemption rates lower than 88%, with the lowest at 78%. These redemption rates refer to the percentage of tokens/vouchers redeemed by farmers as compared with those given out to customers, or in the case of loyalty cards, the percentage of funds redeemed with farmers versus the amount loaded onto the cards. (Farmers Market Coalition, 2017, p. 4)

A report jointly issued by three nationally scaled incentive organization projects, Fair Food Network, Wholesome Wave, and The Food Trust echoed the emphasis on these types of outcomes. Beyond providing an overarching history of the evolution of SBIPs and the state of current SBIP

operations in the U.S., the report aggregated data regarding redemption rates, FFV consumption rates, and market revenue increases, among other indicators. In addressing nutritional impact, for example, the report indicates "over 3/4 of farmers market shoppers using incentives reported that they were buying or eating more fruits and vegetables" (Fair Food Network, Wholesome Wave, & The Food Trust, 2018, p. 9).

We found a significant presence of these types of external impact metrics, but little discernable focus on internal *process* evaluation metrics centering market managers' experiences. We did find instances of evaluations that tangentially addressed managers' attitudes towards the incentive programs they implemented at their markets. The previously mentioned Farmers Market Coalition report (2017) did briefly mention manager sentiment, but without any indication of how the feedback was collected or how many managers were able to express their views:

> Market managers and FINI Grant administrators report that incentive programs help anchor farmers markets, particularly in communities with high SNAP eligible populations where access to healthy, high-quality produce is often limited. Market operators reported that incentive programs increased SNAP spending at farmers markets, increased the number of both new and repeat shoppers, and increased the diversity of customers. (Farmers Market Coalition, 2017, p. 3)

One of the most likely places to find direct explorations of manager views in the organizational literature, given its scope and degree of methodological rigor, would be the USDA FNS Farmers Market Incentive Provider Study, or FMIPS (King et al., 2014). As the first nationally representative examination of the SBIP environment, the FMIPS had three core objectives:

1. Understanding the characteristics of organizations involved with SBIPs, their SBIP objectives, role in SBIP implementation, and involvement in SBIP monitoring and evaluations.
2. Exploring the relationships among SBIP organizations and between these organizations and FMs.
3. Examining and assessing SBIP organization self-evaluation data to measure the impacts of SBIPs on the individual FMs. (King et al., 2014, p. xi)

These objectives set expansive parameters for the study. The FMIPS examined a host of factors related to the SBIP ecosystem and remains the most comprehensive examination to date of how SBIP organizations are classified, how they function, and, relevant to our interests, how they evaluate the success of their programs at markets (articulated through the study's third objective). Despite the scale of issues examined, King et al. (2014) explicitly addressed the types of evaluation methods these organizations employ as one of only a handful of key findings:

> About 80 percent of the organizations are involved in data collection and evaluation activities. For the most part, data collection and evaluation revolve around tracking the volume of EBT and incentive redemptions with some organizations also tracking the number of redemptions. (King et al., 2014, p. 107)

King et al. (2014) based this finding on original data collected from 75 representatives from distinct organizations, as well as a descriptive analysis of internal evaluation data. The result corroborated our findings from other organizational reports that there is a distinct lack of emphasis, at least within publicly accessible resources, on addressing the views, attitudes, perspectives, and motivations of farmers market managers.

Discussion

Making Motivations Visible: Toward a Systematic Behavioral Framework

In our review of both academic and practitioner literature, we found a distinct lack of focus on farmers market managers' perspectives as a method to evaluate the success of SBIPs. With an overwhelming academic and organizational focus on

consumer-driven outcome metrics such as total FFV sales and SNAP redemption rates, there appears to be a reinforced tendency to consider managers only insofar as they service those goals. In their process evaluation of the implementation of New York City's Health Bucks Program, Payne et al. (2013) suggested that targeting managers' views on implementation and administration processes is critical to achieving a program's core outcomes:

> Farmers market managers are integrally involved in implementation and day-to-day Health Bucks program operations. They are responsible for program administration and oversight at the market level and often directly distribute coupons to SNAP participants at the market. In some cases, managers serve a dual role as market owner/operator and can provide additional insight into a market's decision about participating in Health Bucks or accepting SNAP benefits. (p. 3)

From the organizational perspective, we found that organizations that have solicited manager perspectives have typically done so only in a tangential way. These efforts cited manager consensus on a topic untethered from specific details on how manager views were collected or how many managers participated in feedback sharing (Fair Food Network et al., 2018). As King et al. (2014) indicated, evaluation data from organizations revolve almost exclusively around tracking the volume of EBT and incentive redemptions and other, related, outcome measures. To be sure, these types of data are indispensable for markets and SBIP facilitating organizations to use to demonstrate the impact of their efforts to external funders. We identify this dynamic not as an ipso facto issue, but rather to indicate that the lack of systematic data concerning the logistical and environmental constraints that managers experience when implementing these innovative programs inhibits the goals and objectives of these organizations. In other words, pursuing a standard organizational objective such as improving FFV intake for SNAP shoppers may be fundamentally constrained if organizations do n*o*t seriously consider the role market managers play in implementing and administering SBIPs, and the significant barriers they face in doing so (King et al., 2014).

In the academic literature, researchers have increasingly recognized market managers as critical facilitators of nutrition incentive campaigns at markets across the country (Freedman et al., 2016; Roubal et al., 2016). As we have shown, many studies that do address the perspectives of market managers employ an exploratory case study frame (Gusto et al., 2020; Hecht et al., 2019). The findings produced in these studies are compelling due to the emphasis placed on an open-ended, in-depth approach to data collection and analysis. They are limited, however, in their capacity for generalizability and transferability to other market contexts. This is, of course, not a novel observation—a case study focuses on a granular unit of analysis (i.e., a case) by design (Merriam & Tisdell, 2015). That this in-depth focus on contextual conditions may be salient to the phenomenon under study is an undisputed strength of the method and not the subject of criticism (Baxter & Jack, 2008). While exploratory studies designed to capture market manager perspectives are useful to explore an emergent context with an underrepresented population segment, the current state of need necessitates that future researchers should consider advancing the subject through a more expansive frame. Researchers have explicitly called for this shift. While referring to their role in implementing SNAP EBT access at markets, Ward et al. (2015) addressed their focus on market managers

> as a starting point for elucidating specific managerial characteristics that could converge with other important facilitators to maximize the potential of farmers markets to simultaneously improve food access for customers and business opportunities for farmers. Future studies with a larger sample of managers should aim to clarify which characteristics influence these opportunities. As our study suggests, this could lend more insight into how managers' business motivation and pay influence vendor participation at farmers markets. . . . Additional work is needed to identify barriers to offering SNAP/EBT at farmers markets, particularly among

> managers who perceive food access issues as being important, but do not operate markets with SNAP/EBT. Addressing managers' motivations, whether they are business-oriented, healthy food access–oriented, or both, will be critical to improving the food environment through farmers markets. (p. 128)

This recommendation echoes calls from other researchers for the need to systematically address the barriers and facilitating factors that affect the motivations of market managers, as well as the likelihood (i.e., the degree of intention) that they will adopt or effectively sustain a SBIP at their market (Gusto et al., 2020; Hecht et al., 2019). When they have been the subjects of study, market managers are asked to respond to highly contextual barriers to their work, or some broad feelings about a behavior or situation (Hasin & Smith, 2018; Mino et al., 2018). We demonstrate that while these inquiries are valuable exploratory contributions to the literature, they are limited in their generalizability, given that they occur as case-studies and are not grounded within a systematic theoretical framework. Hecht et al. (2019), addressing their own study's limitations, call for future researchers and practitioners to "consider systematically soliciting feedback from managers, vendors, and customers to identify targeted strategies to strengthen their programs" (p. 934).

Theoretically grounded examinations of manager experiences are rare. Hecht et al. (2019) used a framework designed to implement evidence-based change based upon the identification of barriers and incentives; the model is situated in the clinical literature (Grol & Wensing, 2004). Gusto et al. (2020) argued for the continued application of the IBM as a comprehensive behavioral framework to better understand and predict managers' behavioral intentions regarding SBIP adoption and administration. After applying a construct from the IBM to guide their analysis of managerial perspectives, the authors wrote that such a framework was

> crucial to understand in the broader effort to achieve long-term, sustained growth of related nutrition incentive programs at farmers markets. We, therefore, recommend more expansive examinations of managers' perceptions of nutrition incentive program management through either a personal agency frame specifically or a behavioral theory frame broadly. (Gusto et al., 2020, p. 13)

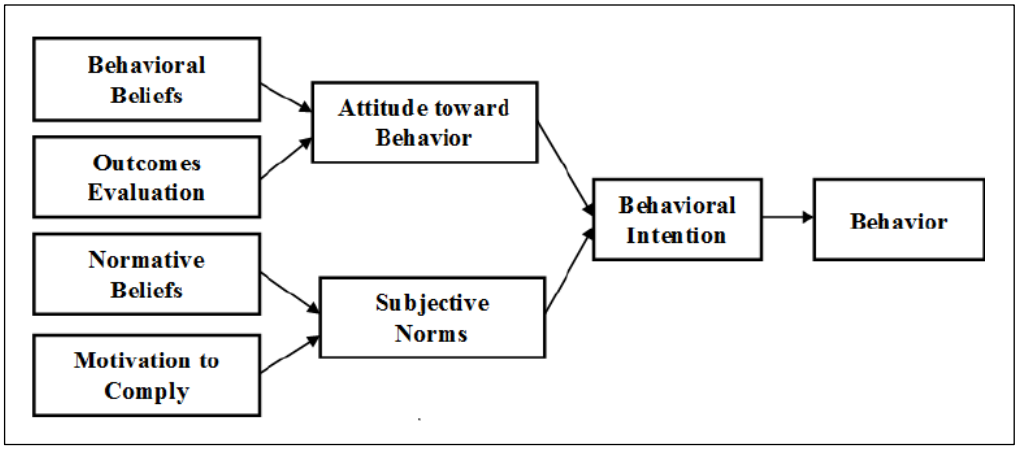
The IBM emerged from the historical development and synthesis of social psychology, persuasion models, and attitudinal and behavioral theories (Montano & Kasprzyk, 2015). The model integrates two prior behavioral frameworks describing individual motivational factors that influence the likelihood that an individual will perform an action or behavior (Montano & Kasprzyk, 2015). The IBM, like the Theory of Reasoned Action (Fishbein & Ajzen, 1975) and the Theory of Planned Behavior (Ajzen, 1991), states that behavioral intention is the most significant factor in whether an individual performs a behavior in a given context (Montano & Kasprzyk, 2015). Figures 1, 2, and 3 depict the TRA, TPB, and IBM, respectively.

The IBM appears unique in its comprehensiveness of factors and considerations that might affect the performance of a behavior. Beyond the attitudinal, normative, and agency beliefs that can have some predictive capacity for an individual's behavioral intention, the model includes four additional factors that may transcend intention and directly affect whether an individual carries out the desired behavior (Montano & Kasprzyk, 2015). With the addition of (1) knowledge and skills to perform the behavior, (2) salience of the behavior, (3) environmental constraints, and (4) habit, the IBM may account for factors that might escape or confound other research efforts. We address the potential utility of this framework to current academic and organizational efforts more explicitly in the following section.

Conclusion and Recommendations

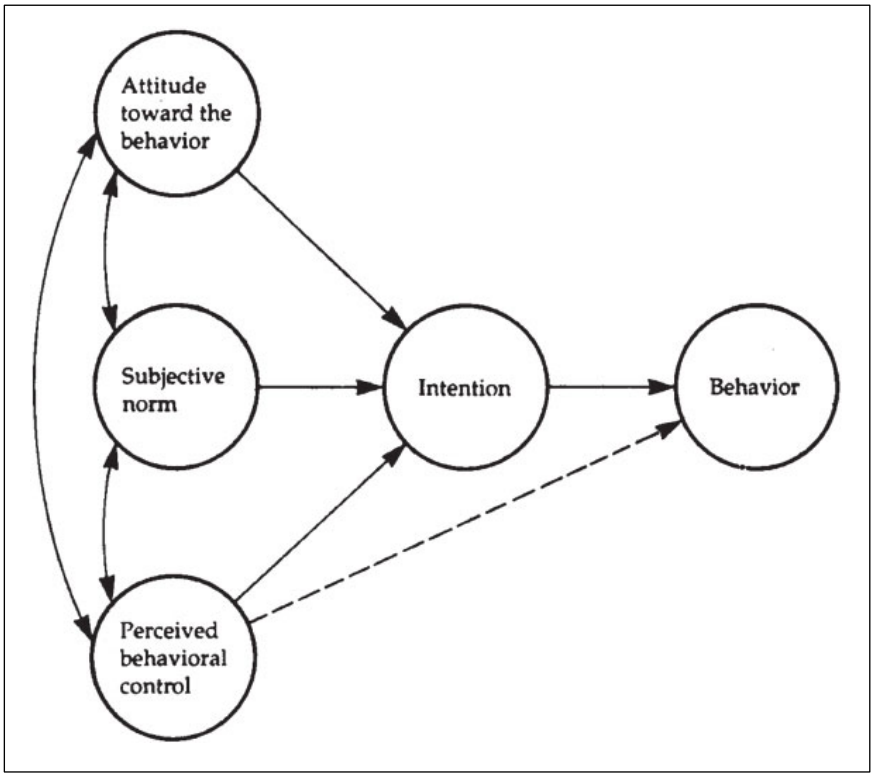
In this integrative review, we explored the current state of the academic and organizational literature relative to how researchers study market managers of SBIP contexts. As part of this effort, we assessed the extent to which researchers, governmental agencies, or nonprofit organizations (often the coordinating partners of SBIPs) have performed formal or informal surveying of market managers.

Figure 1. Theory of Reasoned Action



Source: Fishbein & Ajzen, 1975.

Figure 2. Theory of Planned Behavior

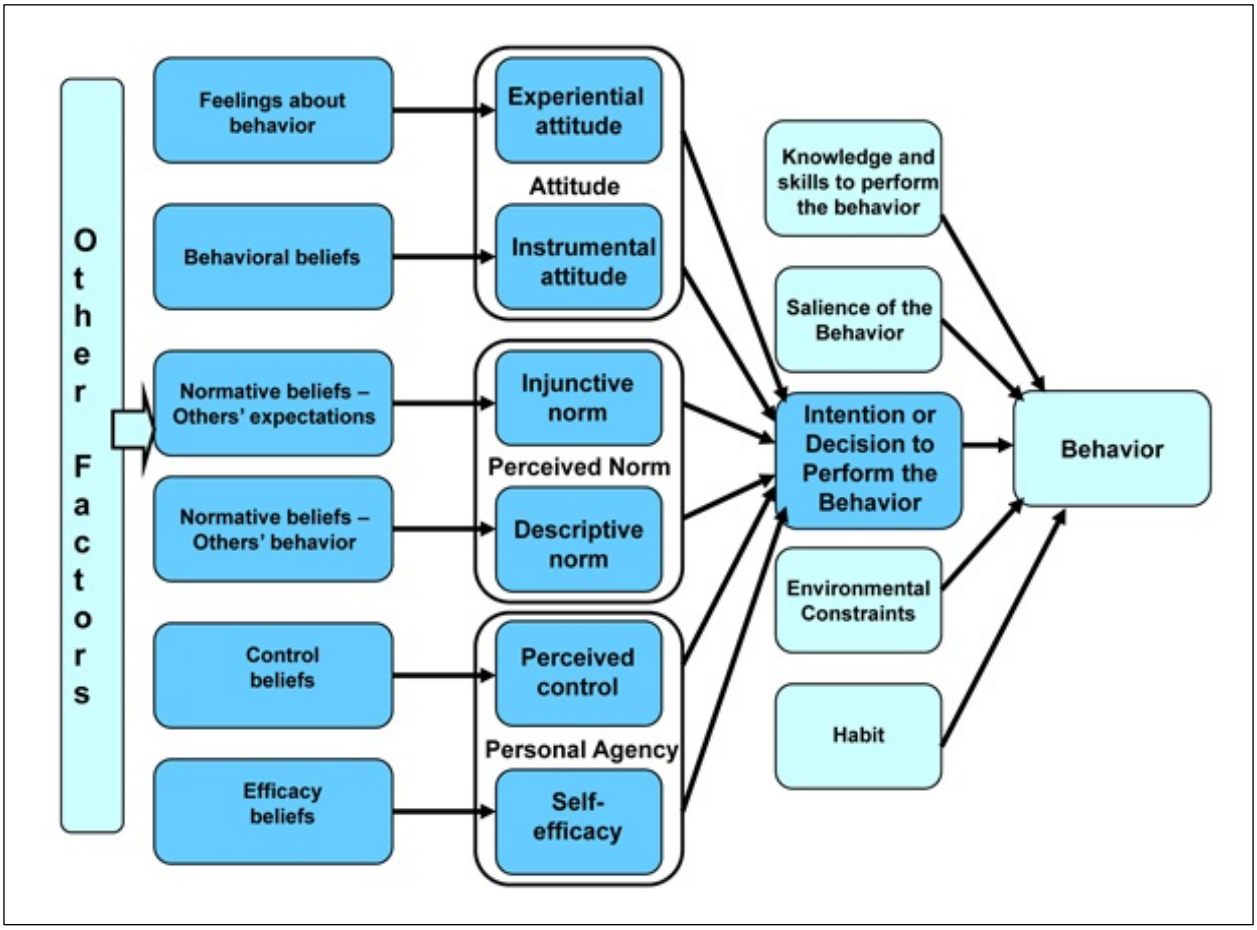


Source: Ajzen, 1991.

We found that farmers market managers' views on the experience of administrating nutrition incentive programs are currently underrepresented in both academic and organizational (i.e., practitioner) literature. Studies that address market manager perspectives on the subject are formative and exploratory, limiting their transferability and generalizability to other contexts (Gusto et al., 2020; Hecht et al., 2019).

We follow calls for the application of a more systematic, theoretically grounded, and generalizable approach to assessing managerial perceptions, motivations, and attitudes. We suggest that there is a need to advance an analytical framework for practitioners to capture essential data related to market managers' behavioral intention (i.e., their cumulative attitudinal, normative, and efficacy-driven perceptions) towards the nutrition incentive programs they currently administer at markets. We believe that frameworks such as the TRA, TPB, or IBM are appropriately equipped for this task. Given its advancement from the earlier models and its recent application in an SBIP context, the IBM may be particularly appropriate to center managers' experiences in future studies while also advancing an organization's objectives (Gusto et al., 2020). We suggest that by providing more incisive data on managers' perceptions, motivations, and the barriers they face in administering SBIPs, a framework such as the IBM can assist organizations of all scales and types in advancing their mission. In this way, researchers applying the IBM may reduce the

Figure 3. Integrated Behavioral Model



Source: Montano & Kasprzyk, 2015.

gap we found between process evaluation and outcome evaluation efforts and transform it into a more complementary form of institutional praxis. The issue of *how* to apply this framework is a salient one. While Gusto et al.'s (2020) exploratory focus on a select construct within the IBM provided valuable data, expanding the framework's application within a survey format would increase the number of normative, attitudinal, and efficacy-based variables that researchers could examine. A survey approach may also provide future researchers with the opportunity to expand their sampling frame to managers at various stages of engagement with SBIPs. Savoie-Roskos et al. (2016) called for this procedure, suggesting that "incorporating a theoretical model into the development of survey tools would strengthen future study results" (p. 74). A comprehensive survey tool could include question items that reflect each of the IBM's core constructs (e.g., attitudes, perceived norms, personal agency). The environmental constraints construct in the model, for example, could inform the creation of a survey item designed to characterize effects driven by differences between nutrition incentive organizations' internal structures. Gusto et al. (2020) identified that while some markets independently administer SBIPs, most partner with organizations that have the knowledge and resource capacity to navigate federal grant applications, deliver the programs, and appropriately evaluate their outcomes. King and co-authors' (2014) inclusion of a systematic typology of nutrition incentive-providing organizations by the scale, funding structure, and other characteristics contex-

tualized this observation. The report's findings demonstrate these organizational features are highly influential to the end-state success of SBIPs at markets. Survey items within each of the attitude, perceived norm, and personal agency constructs could also be developed to address a growing need to highlight the specific barriers Black, Indigenous, and other People of Color (BIPOC) managers face in adopting nutrition assistance programs in predominately BIPOC market spaces. As Meyers (2015) indicates, Black managers, farmers, and vendors in particular are increasingly participating in the development of alternative market spaces without traditional profit-based incentive structures, that is, where commerce and exchange serve a decolonial function and enhance the sovereignty of formerly disenfranchised Black communities. Given a general lack of research attention, collecting more data on these and other factors is critically important.

Finally, we recommend that multiple institutions drive such a collaborative survey development effort. While an IBM-driven survey may be useful if distributed within a single institutional or environmental context, we reaffirm the recommendations of previous researchers who suggest that multi-state, cross-organizational collaboration can advance our current understanding of market managers' perspectives towards engaging or sustaining SBIPs (Hecht et al., 2019; Ward et al., 2015). A systematic, standardized, and theoretically grounded survey tool could drastically improve the breadth and scope of findings that have import across market contexts. We believe a deliberately coordinated multi-institutional effort to develop the survey, validate its contents, pilot its distribution, and analyze the data it generates would significantly advance the state of SBIP literature. By expanding efforts to center managers' perspectives, we believe researchers and practitioners can bridge the gap between process and outcome evaluation, taking what may be an essential step toward improving nutritional access for SNAP shoppers at farmers markets around the country.

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Wholesome Wave. (2014). *2009–2013: SNAP-Doubling outcomes & trends summary*. Electronic copy in possession of the lead author.

Wholesome Wave. (2017). *Wholesome Wave 2016 annual report: Changing the world through food*. Electronic copy in possession of the lead author and the JAFSCD office.

Appendix. SNAP and SBIP Resources Addressing Manager Perspectives

Source	Resource Category	Topic	Population of Interest	Methodology
Anderson, C., Blackwell, S., Gerndt, E., & Martin, I. (2015). *Evaluation of Wholesome Wave Georgia's double value coupon program.*	Organizational Report	Incentive/ Double Up Programming	Cross-Section (Managers, Vendors, Farmers, Shoppers)	Evaluative Review
Cole, K., McNees, M., Kinney, K., Fisher, K., & Krieger, J. W. (2013). Increasing access to farmers markets for beneficiaries of nutrition assistance: evaluation of the farmers market access project.	Scholarly Publication	Incentive/ Double Up Programming	Market Managers/ Market Staff	Mixed-Method
Community Science. (2013). *SNAP healthy food incentives cluster evaluation 2013 final report.*	Organizational Report	Incentive/ Double Up Programming	Cross-Section (Managers, Vendors, Farmers, Shoppers)	Evaluative Review
Ecology Center & Market Match. (2017). *2016 FINI preliminary results.*	Organizational Report	Incentive/ Double Up Programming	Cross-Section (Managers, Vendors, Farmers, Shoppers)	Evaluative Review
Fair Food Network. (2012). *Double Up Food Bucks Program 2011 evaluation report.*	Organizational Report	Incentive/ Double Up Programming	Cross-Section (Managers, Vendors, Farmers, Shoppers)	Evaluative Review
Fair Food Network. (2019). *Food Insecurity Nutrition Incentive: Overview.*	Organizational Report	Incentive/ Double Up Programming	Cross-Section (Managers, Vendors, Farmers, Shoppers)	Evaluative Review
Fair Food Network, Wholesome Wave, & The Food Trust. (2018). *Special report: The power of produce.*	Organizational Report	Incentive/ Double Up Programming	Cross-Section (Managers, Vendors, Farmers, Shoppers)	Evaluative Review
Farmers Market Coalition. (2017). *Year one of the USDA FINI Program: Incentivizing the purchase of fruits and vegetables among SNAP customers at the farmers market.*	Organizational Report	Incentive/ Double Up Programming	Cross-Section (Managers, Vendors, Farmers, Shoppers)	Evaluative Review
Gusto, C., Diaz, J., Warner, L., & Monaghan, P. (2020). *Advancing ideas for farmers market incentives: Barriers, strategies, and agency perceptions from market managers.*	Scholarly Publication	Incentive/ Double Up Programming	Market Managers	Qualitative Case Study
Hasin, A., & Smith, S. (2018). *Farmers market manager's level of communication and influence on Electronic Benefits Transfer (EBT) adoption at Midwest farmers markets.*	Scholarly Publication	General Nutrition Assistance Programming	Market Managers	Quantitative
Hecht, A. A., Misiaszek, C., Headrick, G., Brosius, S., Crone, A., & Surkan, P. J. (2019). *Manager perspectives on implementation of a farmers market incentive program in Maryland.*	Scholarly Publication	Incentive/ Double Up Programming	Market Managers/ Market Staff	Qualitative

Source	Resource Category	Topic	Population of Interest	Methodology
Houghtaling, B., Serrano, E., Dobson, L., Chen, S., Kraak, V. I., Harden, S. M., . . . Misyak, S. (2019). *Rural independent and corporate Supplemental Nutrition Assistance Program (SNAP)-authorized store owners' and managers' perceived feasibility to implement marketing-mix and choice-architecture strategies to encourage healthy consumer purchases.*	Scholarly Publication	General Nutrition Assistance Programming	Store Owners/Market Managers	Mixed-Method
King, M., Dixit-Joshi, S., MacAllum, K., Steketee, M., & Leard, S. (2014). *Farmers market incentive provider study.*	Governmental Report	Incentive/ Double Up Programming	Cross-Section (Managers, Vendors, Farmers, Shoppers)	Mixed-Method
Krokowski, K. (2014). *Evaluating the economic and nutrition benefits and program challenges of EBT programs at farmers markets.*	Scholarly Publication	General Nutrition Assistance Programming	Cross-Section (Managers, Vendors, Farmers, Shoppers)	Mixed-Method
Market Match. (2018). *Impact report: Food Insecurity Nutrition Incentive (FINI) grant & California's Market Match*	Organizational Report	Incentive/ Double Up Programming	Cross-Section (Managers, Vendors, Farmers, Shoppers)	Evaluative Review
McCormack, L., Brandenburger, S., Wells, K., & Stluka, S. (2018). *Qualitative analysis of grocery store and farmers market manager perceptions regarding use of fruit and vegetable educational materials.*	Scholarly Publication	General Nutrition Assistance Programming	Market Managers/Market Staff	Qualitative
Mino, R., Chung, K., & Montri, D. (2018). *A look from the inside: Perspectives on the expansion of food assistance programs at Michigan farmers markets.*	Scholarly Publication	General Nutrition Assistance Programming	Cross-Section (Managers, Vendors, Farmers, Shoppers)	Qualitative
Misiaszek, C., Hecht, A., Headrick, G., Brosius, S., Crone, A., & Surkan, P. (2020). *Implementation of a farmers market incentive program in Maryland.*	Scholarly Publication	Incentive/ Double Up Programming	Cross-Section (Farmers, Vendors, Managers)	Qualitative
Payne, G. H., Wethington, H., Olsho, L., Jernigan, J., Farris, R., & Walker, D. K. (2013). *Implementing a farmers market incentive program: Perspectives on the New York City Health Bucks Program.*	Scholarly Publication	Incentive/ Double Up Programming	Cross-Section (Managers, Vendors, Farmers, Shoppers)	Mixed-Method
Roubal, A. M., Morales, A., Timberlake, K., & Martinez-Donate, A. (2016). *Examining barriers to implementation of electronic benefit transfer (EBT) in farmers markets: Perspectives from market managers.*	Scholarly Publication	General Nutrition Assistance Programming	Market Managers/Market Staff	Qualitative

Source	Resource Category	Topic	Population of Interest	Methodology
Savoie-Roskos, M., Durward, C., Jeweks, M., & LeBlanc, H. (2016). *Reducing food insecurity and improving fruit and vegetable intake among farmers market incentive program participants.*	Scholarly Publication	Incentive/ Double Up Programming	Cross-Section (Managers, Vendors, Farmers, Shoppers)	Quantitative
U.S. Department of Agriculture, Agricultural Marketing Service. (2014). *Farmers Market Manager Survey summary report 2014.*	Governmental Report	General Nutrition Assistance Programming	Cross-Section (Managers, Vendors, Farmers, Shoppers)	Quantitative
Ward, R., Slawson, D., Wu, Q., & Pitts, S. J. (2015). *Associations between farmers market managers' motivations and market-level Supplemental Nutrition Assistance Program Electronic Benefit Transfer (SNAP/EBT) availability and business vitality.*	Scholarly Publication	General Nutrition Assistance Programming	Market Managers/ Market Staff	Mixed-Method
Wholesome Wave. (2014). *2009–2013: SNAP-Doubling outcomes & trends summary.*	Organizational Report	Incentive/ Double Up Programming	Cross-Section (Managers, Vendors, Farmers, Shoppers)	Evaluative Review
Wholesome Wave. (2017). *Wholesome Wave 2016 annual report: Changing the world through food..*	Organizational Report	Incentive/ Double Up Programming	Cross-Section (Managers, Vendors, Farmers, Shoppers)	Evaluative Review

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Making seafood accessible to low-income and nutritionally vulnerable populations on the U.S. West Coast

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Abstract

Along the U.S. West Coast, sustainable management has rebuilt fish stocks, providing an opportunity to supply nutrient-rich food to adjacent coastal communities where food insecurity and diet-based diseases are common. However, the market has not successfully supplied locally sourced seafood to nutritionally vulnerable people. Rather, a few organizations make this connection on a limited scale. We used a "positive deviant" approach to learn how these organizations' efforts developed, how they overcame challenges, and what conditions enabled their interventions. We found that organizations in these positive deviant cases provided fish from a wide variety of species and sources, and distributed them through

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different channels to a diversity of end consumers. A key factor facilitating success was the ability to negotiate a price point that was both profitable and reasonable for organizations supplying nutritionally vulnerable or low-income consumers. Furthermore, securing access to grants overcame initial costs of establishing new supply channels. All cases highlighted the importance of individual champions who encouraged development and cultural connections between the initiative and the nearby community. Organizations overcame key challenges by establishing regulations governing these new channels and either using partnerships or vertically integrating to reduce costs associated with processing and transport. Oftentimes training and education were also critical to instruct workers on how to process unfamiliar fish and to increase consumer awareness of local fish and how to prepare them. These lessons illuminate pathways to improve the contribution of local seafood to the healthy food system.

Keywords
Fisheries, Food System, Seafood, Local Food, Food Access, Health, Low-income Populations

Introduction

In much of the world, overfishing and the consequent need to restrict fishing levels to sustain stocks is a key issue affecting people's access to fish as a nutritious food. This is not a problem on the West Coast of the United States, where almost all commercially harvested fish populations are now abundant enough to be classified as rebuilt due to science-based and conservation-focused management (National Oceanic and Atmospheric Adminstration Fisheries, 2019). Despite this, harvests for many species remain far below what biologists advise as sustainable, in part due to low demand for some abundant fish species, which are known as "underutilized" species.

These abundant and low-cost fishery resources exist alongside human populations that could benefit from affordable, culturally appropriate, and healthy food options. These include coastal tribes, populations traditionally reliant on seafood, as well as economically disadvantaged communities—some of which are or once were centered around industrial fishing (Sepez et al., 2007). The food environment along the U.S. West Coast reflects a familiar problem where an available source of healthy food—in this case underutilized local fish—is inaccessible to low-income and food insecure people in rural communities located near this significant food source (Larson, Story, & Nelson, 2009; Shannon, Kim, McKenzie, & Lawrence, 2015).

Seafood Consumption in the United States

Across the United States, seafood consumption is lower than recommended levels: between 80-90% of Americans who eat fish consume only one fifth to one half of the recommended weekly intake of 2 servings (Jahns et al., 2014; U.S. Department of Health and Human Services & U.S. Department of Agriculture [USDA], 2015), including along the West Coast (U.S. Environmental Protection Agency, 2014). Further, the amount of seafood individuals eat differs by age and social class: younger or lower-income populations eat less seafood than older and higher-income people (Jahns et al., 2014; Love, Asche et al., 2020). This disparity is not recent; a 1995 survey found that low-income pregnant mothers ate about half the recommended intake of fish needed for Omega-3 polyunsaturated fatty acids (PUFAs), which are critical to maternal and early childhood development (Lewis, Widga, Buck, & Frederick, 1996). Nutrition surveys found that the U.S. population generally has low concentrations of two PUFAs derived from marine-sourced foods—docosahexaenoic and eicosapentaenoic acid (DHA and EPA)—and rates of intake differ by race and ethnicity (U.S. Center for Disease Control & National Center for Environmental Health, 2012). For example, non-Hispanic Blacks and whites had higher concentrations of EPA than Mexican American adults (U.S. Center for Disease Control & National Center for Environmental Health, 2014). While there is limited publicly available data on consumer taste preferences for fish and price-related choices, existing data highlights consumers' lack of understanding about how to prepare and handle seafood alongside the perception that seafood is more expensive than other animal-based foods (Jahns et al., 2014).

Increasing the consumption of nutrient-rich fish can aid in addressing nutrient deficiencies that are prevalent in the U.S. The Dietary Guidelines for Americans notes that potassium, dietary fiber, choline, magnesium, calcium, and Vitamins A, D, E, and C are under-consumed; of these, calcium, potassium, dietary fiber, and Vitamin D are considered "nutrients of public health concern" because low intakes are associated with poorer health outcomes (U.S. Department of Health and Human Services & USDA, 2015). Several of these micronutrients are present in high concentrations (e.g., Vitamin A and calcium, Vitamin B12, iron, zinc) and in more bioavailable forms in fish and shellfish than they are in many vegetables, fortified staples, and food supplements (Bogard et al., 2015). Increasing consumption of local, sustainable fish in poorer communities on the West Coast is one pathway toward improving diet-related health outcomes. Fish and shellfish could contribute a nutrient-rich source of food if they were made more available and accessible.

Capture Fisheries on the U.S. West Coast and the Seafood Supply Chain

Seafood availability and accessibility is influenced significantly by supply chains, including the characteristics and management of large fisheries focused on particular species and jurisdictions. Fisheries along the West Coast vary considerably, from large volume fisheries targeting single species destined for export to small scale operators who target multiple species selling to metropolitan centers and restaurants. Despite this diversity, seafood products tend to follow a similar pathway through the supply chain (see Box 1 for a description of the traditional seafood supply chain).

The fishery predominantly in focus here is the West Coast groundfish, a complex fishery that harvests over 100 species in a variety of sea-bed habitats using multiple fishing gears. This fishery is guided by a science-based management plan overseen by the federal government and is increasingly considered a sustainability success story. However, it has not always been that way.

Landings of groundfish species on the West Coast increased through the 1970s, particularly by foreign vessels. The UN Convention on the Law of the Sea established exclusive economic zones along the coastline and by 1976 the U.S. passed federal laws that excluded foreign vessels from federal waters. Over the next decade, the domestic fleet saw high production, and new vessels were drawn to the fishery, leading to overfishing. By the late 1990s, many of the species were in rapid decline, and overcapitalization combined with resulting labor losses prompted the U.S. Secretary of Commerce, in 2000, to declare the West Coast groundfish fishery an official national disaster. Over the next decade, science-based and conservation-focused management restricted fishing harvests while stocks were carefully observed, and fish populations rebuilt. Now, almost all commercially important fish populations in the groundfish fishery are once again abundant enough to be classified as rebuilt by fishery managers.

Each year, the Pacific Fishery Management Council approves maximum total allowable catch

Box 1. Typical Seafood Supply Chain

Fishers participating in capture fisheries seek to harvest wild fish or shellfish that have strong markets. These "target species" are purchased by "first buyers" who are sometimes also processors who turn it into useable product, such as fillets. Once the fish are landed, some are exported (depending on the species) but those remaining in domestic markets are bought by wholesalers. Large-scale wholesalers distribute to broader geographies and major markets, potentially nationwide. Seafood produced from aquaculture often enters West Coast markets at this point, as much of it is produced internationally and imported through large-scale wholesaler operations. Small-scale wholesalers tend to distribute to more local markets. Distributors then sell the product to consumer-facing institutions (e.g., hospitals) or retail (e.g., supermarkets). Waste may occur at any node in the supply chain. This may include fish discarded by fishers at sea because they do not have market value (this is often regulated), processing byproducts from the creation of fillets, or spoilage. Spoilage may occur throughout distribution, or when stored by consumers. Much of the global volume of seafood passes through large businesses that own fishing vessels, processing plants, and transportation, and sell to larger-scale distributors (Österblom et al., 2015).

(TAC) levels that ensure harvests are sustainable for federal fisheries along the continental West Coast. Harvest rates have remained far below these levels for most species; TAC is reached only for high value species with demand in regional or international markets (e.g., Sablefish, *Anoplopoma fimbria,* for export and Petrale Sole, *Eopsetta jordani,* for domestic urban markets). For the majority of groundfish species that lack markets, continued low catch means inconsistent supply for processors and local markets which, in turn, perpetuates low demand. In the years following the collapse, processors and wholesalers were forced to switch to "less discriminating protein markets" to stay in business—presumably switching from the overfished species to more consistently affordable and available imported and farmed fish like tilapia (may include *Coptodon sp., Oreochormis sp.,* and *Sarotherodon sp.*) and Alaskan pollock (*Gadus chalcogrammus*) (Errend, Gilden, Harley, Morrison, Pfeiffer, Russell, & Seger , 2017).

Underutilized species provide an opportunity to sustainably supply affordable micronutrients for West Coast consumers. Underutilized species may be those that have weak markets and are therefore undesirable or they may include bycatch—fish caught unintentionally while targeting another species. While the global issue of bycatch remains a challenge in the U.S., U.S. federal fisheries are required by law to establish monitoring programs, to adhere to protected species programs, and to minimize bycatch to the extent practicable. A recent assessment indicated that current rates of U.S. bycatch have declined, especially on the West Coast and Alaska (Savoca et al., 2020). Bycatch rates also vary by the type of fishing gear used. The sources of fish in this study originate primarily from trawl-type fishing gears, which involves trawling a net over the seabed. Trawl fishing bycatch in the U.S. was found to be much lower than in much of the world, due in part to strong management (Pérez-Roda et al., 2019; Savoca et al., 2020). The results of relying on media messages focused on consumption of underutilized species are mixed. On the other hand, increasing the availability and diversity of underutilized species that originate from well managed fisheries gives consumers greater options and variety of sustainably harvested species (Farmery, van Putten, Phillipov, & McIlgorm, 2020).

Few analyses have evaluated how local seafood production may contribute to food insecurity and malnutrition in low-income communities residing in more developed country contexts such as the West Coast. In the Kenai region of Alaska, local seafood harvest supported rural livelihoods and nutrition for low-income households; they encouraged creation of more local markets for seafood to further strengthen coastal community food systems (Loring, Gerlach, & Harrison, 2013). In Southern California, access to seafood markets decreased mere kilometers inland from the coast, and even when seafood markets are present in these areas, local seafood is not often sold (Talley, Warde, & Venuti, 2016). To date, research in developed country contexts has not focused on initiatives that actively seek to supply seafood to low-income and nutritionally vulnerable communities.

Study Purpose

With evidence of low consumption of fish along the West Coast and increasingly abundant capture fisheries offshore, there are emerging opportunities to use seafood to help improve public health and nutrition. The goal of this study was to understand these opportunities more deeply through:

1. Identifying supply-chain actors that have successfully supplied nutritionally vulnerable consumers with affordable, available seafood; identifying how these actors and organizations intervened in the existing seafood supply chain and food system, and
2. Ascertaining the attributes and conditions facilitating their success as well as their strategies for overcoming challenges.

Methodology

To achieve these goals, we drew on our personal and professional networks as well as on media reports and internet searches to identify organizations, programs, and initiatives along the West Coast that are successfully connecting low-income and nutritionally vulnerable populations with local and underutilized fish (i.e., "positive deviant cases"). We conducted semistructured interviews

with actors directly involved in each effort and used a multiple case study approach and qualitative data collection and analysis techniques to describe, compare, and contrast key elements of the case examples. For each case, we aimed to elucidate how they operated within the dominant supply chain(s), how they created new supply chains, the enabling conditions for their success, and how they were able to overcome challenges associated with the distribution of landed fish.

Positive Deviance Approach

Positive deviance seeks to learn from the individuals or organizations who achieve success where the majority do not (Pascale & Sternin, 2005). In this case, positive deviant case studies have created interventions in seafood markets to supply low-cost but nutritious fish to the nutrition-poor communities of potential fish-eaters, while the majority of the seafood sector have not been able to do this. This juxtaposition of rich fishery resources with undernourished people is a global problem (Hicks et al., 2019); thus, understanding how it might be overcome is of interest beyond the West Coast.

Positive deviance analysis is similar to best practice case studies in that both seek to learn from success. However, positive deviance tends to focus on learning from communities that have found their own solutions rather than on transferring lessons from an external authority. Applying and transmitting knowledge using a positive deviance approach can help communities identify the practices used by successful actors in neighboring communities to encourage a change in attitudes and facilitate such success within the local context (Pascale & Sternin, 2005). The approach has been used to assess food and nutrition security strategies, for example to determine how—despite a positive correlation between diet cost and nutritional quality—some low-income households were able to sustain healthier diets without accruing more cost when prioritizing items for their nutrient quality (Marty et al., 2015). Research focusing on success encourages optimism and more effective collaboration and creative solutions for "navigating the interface of science, policy and practice" (Cvitanovic & Hobday, 2018, p. 4). Positive deviance not only empowers communities to recognize the potential for change in their own community, it also transforms the dialogue towards optimism, catalyzing collaboration and action. Further, it emphasizes the agency within communities, rather than just the need for change.

Based initially on initiatives known to the authors, we compiled a list of organizations that direct underutilized fish to food insecure and nutritionally vulnerable populations using web searches and snowball sampling from initial interviewees. Our main criteria were that the initiative must be actively distributing seafood to low-income consumers and that the lead agency be based on the West Coast. This process resulted in the identification of one nationwide and three local or regional cases (n=4). We acquired and used the organizations' websites, personal contacts, or information from other interviewees to identify contact information for one or more representatives to request interviews. For three of the cases, we interviewed multiple people involved in the effort, including multiple staff from the lead agency and/or stakeholders from partnering agencies. Interviews were conducted one-on-one or with multiple interviewees at a time. For the four case studies, we conducted six separate interviews—four in person and two over the phone, with a total of nine interviewees representing a diversity of organizations throughout the seafood supply chain (Table 1).

Semistructured Interviews

Semistructured interviews were conducted in-person or via phone. Interview questions related to how the organization's effort first began and which partners were involved, the fish supply (e.g., fishers

Table 1. Description of Interviewees

Note There are 10 organizations represented, but only nine interviewees because one interviewee represented two organizations.

Organizations represented	# of interviewees
Nonprofit food rescue/emergency food	5
Schools	1
Hospitals	1
Fish-related business/entrepreneur	2
Community food coalition	1

and method, amount and type of species caught, marketability and cost); how fish is acquired, processed, and distributed; and descriptions of consumers and how and where they access the fish (e.g., demographics, preferences, food environment). The interview guide also included questions about challenges experienced, factors or conditions that enabled success, and perceived potential for expansion. The interviews were designed to investigate whether and how the cases succeeded or overcame relevant challenges and to illuminate potential opportunities for adapting, replicating, or scaling up any successes. They were also designed to assess our conceptual framework of supply chain pathways for West Coast groundfish (see Figure 1). Interviews lasted up to sixty minutes and were audio recorded with participant permission. The study was approved by the University of Washington Human Subjects Division (IRB ID: STUDY00004939).

Data Analysis

Interviews were transcribed verbatim and analyzed using Dedoose (version 8.1.8). One team member developed a preliminary code list based on the interview guide. Two team members then separately and independently assigned codes to one transcript, compared their coding, and refined the coding guidance to ensure consistent coding applications. The two team members then coded a second transcript using the updated code list and assessed coding agreement. As only minor adjustments to the code list and definitions were required, one team member coded the remaining transcripts using the refined code list. Team members then reviewed and summarized the transcripts and coded excerpts to identify key elements of each effort (e.g., associated costs, facilitating factors). The team reviewed passages by code and by case to summarize the characteristics and note differences and commonalities across the cases. We then developed a conceptual framework for each case to determine how each either utilized existing market channels in traditional seafood supply chains or created their own channels to link the supply chain. The conceptual framework for each individual positive deviant case study was created separately, and then all case studies were overlaid into a single conceptual framework to visualize similarities and differences in how each of the positive deviants utilized and innovated the traditional seafood supply chain. Finally, we solicited feedback from interviewees on the complete report to ensure that the depiction of each case was accurate.

Results

First, we present the key characteristics of each of the four cases studied and discuss how these four cases fit into our conceptual framework for a seafood supply chain. Then, we present and describe findings from the interviews on the factors that are particularly important in developing low-cost distribution links for local seafood. These factors are organized into two categories: enabling conditions that facilitated success for the positive deviants and the strategies they used to overcome challenges.

Key characteristics of the positive deviant case studies

We describe key characteristics of West Coast cases in Table 2.

The positive deviant cases were all nonprofit organizations except for Bay2Tray, which is a program run by a for-profit fish distributor in California. The scale of sourcing and distribution for these initiatives ranged from one or a few adjacent counties to nationwide in the case of SeaShare's partnership with Feeding America. Seafood sourcing activities varied widely, however most products had lower or no value in standard supply channels. Commercially sourced low-value fish were used across all case studies, but food banks had slightly more regulatory latitude to distribute high value fish from sources that were prohibited to sell it (e.g., fish sourced from illegal harvest). For food banks, commercially sourced fish were donated from various points in the supply chain such as individual boats, surplus inventory from large-scale processors, or from vertically integrated large fishing companies. In some cases, species were profitable fish donated for philanthropic reasons, and in others, donated species were without existing markets. Some referenced species, like Opah (*Lampris guttatus*), are bycaught species caught alongside more desirable target species and have low market value. In delivering fish for schools or larger

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Table 2. Characteristics of U.S. West Coast Positive Deviant Cases Connecting Underutilized Fish to Food Insecure and Nutritionally Vulnerable Populations [a]

Case	Location	Description	How it bridged the supply chain	Scale	Food environment
SeaShare	Bainbridge (WA)	Established in 1994, this nationwide nonprofit directs donated fish harvested in the North Pacific from seafood companies across the U.S. to food banks. It connects the nation's largest network of food banks, Feeding America, to some of the largest domestic seafood companies based in the Pacific Northwest. SeaShare's role is to organize the supply chain to facilitate these donations.	Developed a pathway for major fisheries to contribute to emergency foods, unlike agriculture; by establishing relationships to create connection in existing supply chain.	Nationwide	Regional food banks and food pantries
Clatsop Community Action Regional Food Bank (Clatsop CARFB)	Warrenton (OR)	Starting in 2012, Clatsop county's largest regional food bank began sourcing and processing local seafood on a donation basis for its partner food pantries. It later outsourced custom processing to a nearby seafood processing plant. Once processed, the food bank picks up the fish and integrates it into its existing delivery to local food pantries.	Identified a supply of otherwise wasted seafood across a variety of sectors; used transportation to bridge gap between suppliers, processors and food pantries.	Single county	Food pantries
Bay2Tray	Moss Landing (CA)	This program was started in 2014 as part of Real Good Fish, a for-profit direct-to-consumer seafood firm based in Central California. Bay2Tray uses the firm's vertically integrated approach to source fish from fishers for direct-delivery to schools. Once the fish is purchased, it is processed, portioned into school servings, packed for delivery, and transported to schools where the school kitchens prepare the fish for service in the cafeteria.	Identified supply chain between local fishers and schools; by intervening in supply chain by purchasing, processing, marketing and distributing fish to schools.	Multiple counties in single region	School districts, and on to participating school lunch programs
San Diego Food Systems Alliance & Seafood Working Group (SDFSA)	San Diego (CA)	Launched in 2012, this collaborative works to support the sustainability and economic strength of the local food system. It convenes a seafood working group that supports connecting hospitals and schools to the local fishing industry and encourages distributors to source from local harbors instead of imported or nonlocal commodity species. The Alliance also works with fishers to advocate for regulations that allowed for permitting of a dockside fish market.	Kitchen workers had relatives or friends in fisheries, desire to support them and support local seafood industry.	Single county	Individual restaurants, hospitals, schools

[a] Information in this table was synthesized from initiative websites and from local news coverage. SeaShare's website is https://www.seashare.org/. CCARFB website is https://ccaservices.org/food/food-pantries/, information was also gathered on Clatsop CARFB from the Astorian, a local news outlet (Heffernan, 2017). Bay2Tray's website is https://www.realgoodfish.com/bay2tray, information was also gathered from food media outlet Civil Eats (Guth, 2016). The SD Food Systems Alliance Seafood Working Group website is https://www.sdfsa.org/sustainable-local-seafood, information was also gathered from Asparagus Magazine (Kwon, 2018).

organizations, some fish were caught on contract. For example, Bay2Tray described working with California fishermen to negotiate price and volume in sourcing fish for its school program.

Less traditional sourcing pathways for food banks also included fish hatcheries and illegally harvested fish seized by law enforcement. Hatchery-raised steelhead and salmon are released to the wild and years later they return to their natal stream—in front of the hatchery—where their eggs and milt are manually harvested; the remaining meat cannot be legally sold but can be donated to food banks. Hatchery returns are variable, but, in some years, millions of fish return and food banks receive hundreds of thousands of kilos of fish (Miller, 2015). Additionally, interviewees highlighted "seized" species apprehended by law enforcement or wildlife officials that were caught in excess of legal limits or were species whose catch is illegal. Enforcement officials contacted food banks as potential outlets for the unsellable, seized fish.

Using a depiction of a typical seafood supply chain as a foundation, we visualized how and where positive deviant interviewees' efforts might fit within the supply chain (see Box 1). Case study interview data were used to ground truth and adjust our conceptual map of the various pathways by which fish is harvested and reaches consumers (Figure 1).

The four positive deviant cases innovated within the typical supply chain in different ways. In all of these cases, they shortened the supply chain by bundling different aspects of the supply chain or strengthening the relationships with local seafood producers.

Enabling Conditions that Facilitated Success for Positive Deviants

Interviews pointed towards three specific enabling conditions that facilitated the success of positive deviant cases. Interview coding revealed that details of these conditions varied with the context (Table 3). Each of the cases utilized these enabling conditions to identify gaps and provide the means to bridge the supply chain.

Making connections that supported alternative fish supply chains were critical to establishing markets for large volumes of affordable fish. These

Figure 1. Conceptual Map of Entry Points of Seafood to Vulnerable Populations Used by the Positive Deviant Cases

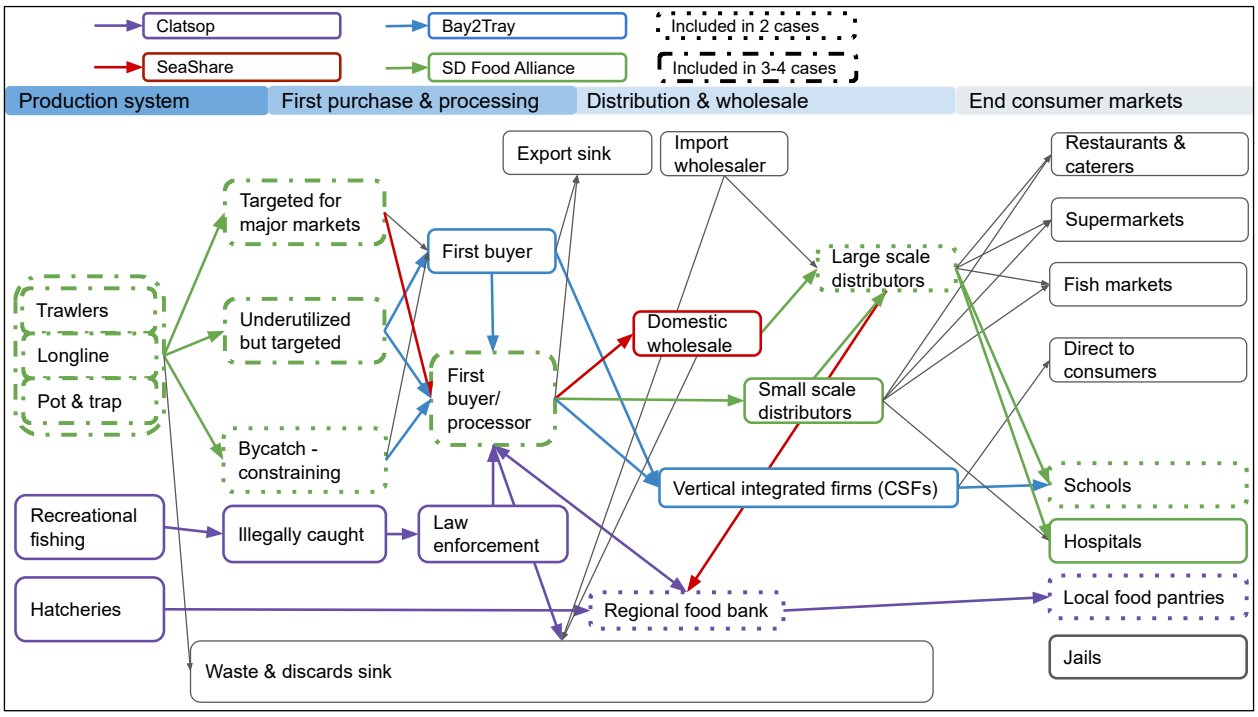

Table 3. Enabling Conditions of Positive Deviant Cases

Enabling conditions	Funding and Financial Incentives	Champions	Cultural Connection with Fishing Heritage
SeaShare	Grants; federal tax incentives enabled seafood company donations.	Board members representing heads of donating seafood companies.	Pantries located in neighborhoods with communities from cultures that saw high demand
Clatsop CARFB	Grants; labor and packaging donated by large, local processor.	Processor who donated fish cutting labor and packaging, after volume of fish became too large for food bank to complete in-house.	Proximity to local harbor meant many food bank and pantry workers were familiar with seafood processing and handling.
Bay2Tray	Grants.	Nutrition directors and superintendents willing to innovate; kitchen workers willing to learn to cook from scratch; high school student groups supported local food sourcing.	Kitchen workers had relatives or friends in fisheries, desire to support them.
SDFSA	Broader program funded by grants and donations.	Chefs at institutional kitchens willing to create and test new recipes with less familiar fish; members of the SDFSA Seafood working group advocating for advantageous regulations and local fish.	Desire to support local food producers.

connections often depended on, or were deepened by clear mutual benefits and shared values. For example, in connecting local fish to schools, Bay2Tray liaised between fishers, processors, and schools to negotiate products feasible for processors and for school settings, price points, and timing by working as a partnership:

> It's hard work changing the deeply entrenched school food system, so finding a partner who shared values was really important because … when there's challenges, you both are kind of in it to figure out solutions.

This partnership depended on finding the right balance of affordability for schools and profits for fish businesses. Likewise, in San Diego, the SD Food Systems Alliance saw value in creating local supply chain connections and thus facilitated relationships between regional and local hospitals and schools to more easily purchase local fish. In doing so, they helped fishers gain access to larger, urban markets.

> [A fisheries representative and a chef at hospitals] really connected through [the Alliance] and maintaining connections, doing things together, promoting local fishing. For him it's about the fishermen, for me it's about health.

In the San Diego case, large institutional buyers (i.e., hospitals, schools) were able to rely on contractual arrangements with broadline distributors who, once notified of the interest in local seafood, were able to source from nearby fishers and smaller distributors with whom they held existing relationships. These relationships also allowed fishers to work with processors to develop and sell incidentally caught Opah in a form that is processed locally into products that are affordable and useful for school meals (e.g., ground Opah chili).

Regional food bank initiatives needed to be creative in how they built relationships between previously unconnected actors in the supply chain. For Clatsop, relationships and communication between the hatchery, law enforcement, the local processing plant, and the regional food bank allowed them to establish a process for ensuring timely delivery of fresh product when fish became available. Finally, SeaShare's national effort provided a central point of entry to food banks for

companies with fish donations and food banks with the capacity to handle the product; intentional relationship-making between willing fishing businesses and regional food banks is core to their mission.

Of the four cases, two aimed to develop a program or arrangement that would eventually prove profitable for fishers and the two others relied on distributing and securing donated fish. In both models, costs were incurred in developing the alternative supply chain that the standard markets were unable to cover. All positive deviant cases described reliance on grants, at least initially, to broadly support program actions or to hire program coordinators. For partnerships between public entities and private enterprise (fishing business) it was stressed that scaling is necessary for the program to become economically viable, and up until that point it was also necessary to find funding from foundations or government. Fishing companies and processors acknowledged the benefit of tax deductions to offset the costs of their donations to food banks. While some large-scale fishing companies were taking advantage of tax deduction incentives, processors in Oregon found that their contributions to the regional food bank consumed so few resources relative to their overall business that they did not see the need to seek donation-based tax deduction. During the three- to four-month period that one large processor prepared fish for food banks, the daily volume of fish processed for donations never exceeded 2,000 to 3,000 pounds (900–1360 kg), compared to their total daily volume ranging from 300,000 to 400,000 pounds (136,000–181,400 kg).

> Whatever we can do to help a community and put [our company] in a positive light in our community is what we always strive to do. But other than that, it was just very little hassle for us. It's just a small thing we could do to help our community. And that was the whole purpose of it. It's like, is it an inconvenience for us? No, it isn't at all.

When asked, the afore-referenced interviewee speculated that they could increase donation-based processing by two- to three-fold before they would even begin to consider seeking tax reductions just based on the additional amount of labor.

For each of the four cases there were specific people, or champions, who shouldered the task of identifying and recruiting direct partners and circumventing the established supply channel. For example, these champions recruited people within the fishing industry who were willing to donate processing, storage, and freight (e.g., SeaShare board members, Pacific Seafoods processing company). For schools and hospitals, champions included those in leadership roles (e.g., nutrition directors, superintendents) who decided to innovate with programs like Bay2Tray, or kitchen workers, who were willing to learn to cook with fish from scratch, as stated by two interviewees:

> Participant 1: I think a big part of this … something that often gets overlooked, is … leadership in planning a community, or organizations that support that level of leadership. So it's one thing to have a Board making nutrition directives, it's another thing to have that Director in a school where the people actually support them to do that, make that an initiative. There's plenty of schools that wouldn't support that move for budgetary constraints, for union constraints.

> Participant 2: And so it then comes down to the leadership that's in place, specifically in the nutrition department. If you don't have a Nutrition Director that's really willing, really committed to something like this, then it's not very likely to happen.

It was not only persons in operational authority that were effective champions; in high school leadership councils, students were advocates for Bay2Tray and championed an improved connection between the environment and the food served in their cafeterias. Local media outlets also helped publicize and garner support for such programs. Along with the programs' internal media campaigns, this outreach expanded the message to other school districts and made them more receptive to new supply chains.

Finally, cultural connections to seafood helped

align workers throughout the supply chain with the missions of the positive deviant organizations. In communities with fishing heritage, people were more comfortable with fish processing and preparation. Where Bay2Tray operated, for example, many of the school kitchen workers either had relatives or friends who had worked or were currently working in the fisheries sector. Community fishing culture may facilitate the process of finding fishers or processors who are willing to innovate (e.g., keeping bycatch for use in schools). For communities in close proximity to harbors, processors are more available, transportation is less expensive, and the general population likely has more exposure to seafood and seafood processing. Interviewees working in food banks also discussed particular ethnic groups they serve as having strong connections to seafood in their cultural heritage (e.g., Filipinos, Japanese, Chinese workers) and therefore these communities often exhibit a stronger demand for fish. Cultural connections to local seafood, with respect to ethnicity or to place-based fishing heritage, was a strong enabling theme in the positive deviant cases; sourcing local fish was not only seen as cost-effective, sustainable, and healthier, it was also a way to revitalize the local food economy and support community members engaged in the fishing industry.

Challenges and How to Overcome Them

Positive deviant cases faced a number of challenges in establishing their initiatives but came up with a variety of strategies to overcome them (Table 4).

A significant challenge reported by interviewees focused on the management of costs and volumes to ensure that the price was low enough for organizations serving end-consumers but sufficient to cover costs or result in profit for fishers and processors. Processing was a major contributor to cost. One strategy used was to select fish that are easier to process in order to yield more salable product per whole fish.

Even when food banks receive fish for free, they may still have to pay for collection, distribution, and processing services or labor. Several programs relied on volunteer or donated labor to save the costs of paying another firm to process or distribute the fish. Early in its development, Clatsop food bank relied on in-house labor from workers who had grown up around fishing, but, as they grew, they sought to partner with a nearby processing facility.

> The key is food banks not being processors; it's them being delivery people. Delivery and distribution people. That's what we can do well. And that's the key to this.

Clatsop identified how to scale by partnering with key participants in the conventional supply chain. Similarly, in some cases, transportation costs to the processor and food service or retail settings are covered by partners (e.g., SeaShare relies on regional food banks' transportation network or on partner fishing companies); in other cases, the organization pays for transport associated costs, such as the truck and the driver's time, as well as refrigeration. Interviewees indicated that transport becomes a major challenge in rural regions or areas further from the coast, where mainstream distributors might be the only way to improve seafood availability.

> [Schools] needed distribution, they needed it dropped at each school site, which to like a small guy would kill you. But if you're SYSCO, it was like their mainstream distributor, it's no big deal … that was another hurdle that kept them from wanting to really go full-on with the program… how many school districts out there [would want] our fish if they could access it through their mainstream distributor?

Comments like these indicate that mainstream distributors may be called upon to increase the potential reach of local seafood, especially to areas where there are few alternatives:

> Interviewer: "Okay. Are there any other parts of the U.S. that are hard to reach?"
>
> Participant 1: "Just because of logistics there's more seafood consumption on the coast as you go around the states, so you get those seafood deserts kind of in the center part of the U.S."

> Interviewer: "Meaning there's less demand for product?"
>
> Participant 2: "Less seafood makes it there and less demand and it costs more to get it … It's improved over the years. And the food banks are much more sophisticated than they were 10 or 15 years ago. Most all of them have several nutritionists on staff and they're very interested in seafood and really do want seafood products."

In San Diego, purchasing organizations successfully applied pressure on their mainstream distributors to source local seafood options instead of imported product.

School food service providers and food banks talked about seafood as a protein source to be compared to other animal source foods, and occasionally referenced a single "protein budget" —or a price per serving of protein that was acceptable within their contexts. In several instances, chicken was the product that acted as a benchmark against which other protein sources (such as fish) were considered. Typically, the price of chicken is lower than that of most seafoods, but interviewees indicated that some underutilized and local species of fish can be cheaper than imported fish or chicken. For example, one bycaught species landed in San Diego is "comparable to what they would do if they were putting the usual chicken nuggets and pizza and the other USDA-kind of supplied process foods" (Interviewee). Another interviewee noted that, particularly for organizations with protein budgets such as hospitals or schools, a creative shift of ingredients can facilitate use of higher priced product (i.e., fish). A pound of protein need not be fish alone; it could be fish and beans.

Positive deviant cases indicated that underutilized fish were unfamiliar to many consumers, potentially creating challenges throughout the supply chain from processing to transportation to preparation. Respondents indicated that new species may require training in institutional settings, particularly in schools where scratch-based cooking is not often used. Interviewees also described the need for education to encourage consumers to become more comfortable with alternatives to the "big three" most consumed species: shrimp, salmon, and tuna. Interviewees in all four cases mentioned education as a complementary activity to their primary focus on making fish available. For example, in San Diego, schoolchildren worked with a local celebrity chef to develop recipes using local seafood. Some of these recipes have been integrated with school meal programs. Bay2Tray utilized taste testing with students to determine their preferences for new fish menu items.

Permitting and regulation created challenges to sourcing local fish and shellfish products that were not specifically aligned with commercial sale. In some cases, modifying the supply chain required policy change. In order for bycatch to be used by regional food banks, SeaShare worked with legislators and stakeholders in the pollock fishery to allow them to collect prohibited species catch (PSC) of salmon and halibut. Bycatch of PSC species all have harvest limits set by federal fisheries managers in the fishery that keep incidental harvest below unsustainable levels, and their sale from operators in the fishery is prohibited by law. Clatsop's regional food bank gained access to hatchery products or illegally harvested fish after the Oregon state legislature unanimously passed House Bill 4068 in 2012 which enabled seized fish, as well as fish returning to hatcheries, to be donated to regional food banks. It is important to note that the policy changes required for SeaShare and Clatsop CRFB operations *did not* authorize the sale of these species of conservation concern, seized fish, or hatchery caught fish. They only created a donation-based channel to distribute what was otherwise wasted to end consumers that may not otherwise be able to access local seafood. The SDFSA worked with fishers to advocate for regulations that would allow for permitting of a dockside fish market to facilitate connections between fishers and the local restaurants and retailers.

> Participant: "fishermen, part of their problem, and this is not San Diego, but it's all the small fishing communities that have managed to survive, the fishermen are working. They're out on their boats. They could be 200 miles

> offshore. It's not like they can just come in for a Wednesday afternoon two o'clock meeting without impacting their livelihood. They just can't do it. They'd love to, but they can't. So having a group like the Alliance who can help go to those meetings, and I mean speak for them, but we can certainly speak from our perspective about how important fishing is to the overall economy, health, wellbeing of San Diego and its food system."

In this case, the alliance advocated for policy change on behalf of the fishers in order to enable them to continue earning their living.

Discussion

The next five sections build upon the results of this study and suggest future actions needed to increase the contribution of local seafood to nutritionally vulnerable populations by discussing ways to address the supply chain adaptations, challenges, and enabling factors raised in the studied cases.

Sourcing Fish that Make Sense for Consumers and Suppliers

Findings from the cases studied demonstrated various ways that the positive deviants successfully adapted and shortened the traditional seafood supply chain, even while relying on a wide array of fish species and sources. Critical to understanding the fish sourcing and distribution process is that each link in the supply chain is costly, especially when the species is unfamiliar. Suppliers generally engage in a search to find buyers who are familiar with their product. For products with reliable demand, these links can be stable (e.g., weekly institutional deliveries) and maintained at a low cost. One species with reliable demand is Alaskan pollock, which is supplied in high volume to SeaShare for distribution to food banks. For products with occasional or highly variable supply (such "bycaught" fish that are caught incidentally while targeting other fish), a costly search is needed with each landing of fish at port. This can be a major obstacle for programs preferentially sourcing underutilized species that tend to have variable supply and little demand. It is difficult to source these underutilized species because fishers do not find them profitable, which in turn signals fishers to avoid catching them. Without consistent fishing effort directed towards underutilized species, their low and variable availability is difficult to market, especially towards large-volume purchasing organizations who need a consistent supply of fish of a specific size and form that their staff are sufficiently familiar with and will utilize.

As illustrated in the case studies, for-profit programs that seek to connect fish with low-income or low-access populations will need to focus on fish that have low value in the mainstream supply chain. It is unlikely that species with existing stable, high-value markets (e.g., salmon, halibut) would be viable selections for budget-based institutional buying programs. However, on the West Coast, these programs do have a considerable opportunity to source from a wide variety of underutilized or bycaught species that are affordable and could be available in nearby harbors. Large volume purchasing organizations like hospitals and schools can make large orders that make handling these species worthwhile for harvesters and processors.

Major shocks to global food systems highlight the importance of identifying local sources of healthy foods. The COVID-19 pandemic has cast harsh light on the vulnerabilities associated with relying on globalized food systems and highlights the critical importance of shortened food supply chains, especially with respect to low-income or food insecure communities (Cappelli & Cini, 2020). The seafood sector has seen massive negative impacts, especially on export-focused production and fish processing. It has also seen large increases in demand for locally sourced seafood, as well as a willingness among private firms to alter their business model to more directly supply consumers (Bennett et al., 2020; Love, Allison et al., 2020). COVID-19 impacts to the supply chain present a challenge and an opportunity for organizations seeking to learn from positive deviant case studies in order to get fish to nutritionally vulnerable consumers. Relying on fish associated with global trade (i.e., local bycaught species associated with export-driven high value target species) may expose consumers to inconsistencies of supply. Increasing consumer interest and demand for local seafood is

beneficial for firms seeking to shorten supply chains, but at the same time might push prices for otherwise affordable fish beyond what is viable for organizations seeking to supply low-income consumers. As the pandemic progresses, the fisheries sector will need to shift from short-term coping strategies to long-term adaptation to build resilience in the sector (Love, Allison et al., 2020). Sectors that focus on helping to stabilize food will benefit (i.e., people will rely on them, learn new habits that incorporate them, become aware of locally sourced products); the fisheries sector must harness these shifts in diets to emerge as a staple in the post-pandemic world.

Sustainability of Seafood Supply

Sustainability concerns could arise as the volume of fish increases to meet demand from large organizations serving low-income or nutritionally vulnerable communities. However, for species caught within the Pacific Coast Groundfish Fishery Management Plan, there is a management safeguard against excessive expansion. Many species have established Total Allowable Catches (TACs) that will be enforced, just as with the current major market species now. For species that are not currently exploited at a level to warrant assessment, mechanisms are in place to ensure they do not become overfished in the event that they experience more fishing effort. In that event, additional monitoring would take place to determine the sustainability of the stock using the same set of rules that were able to successfully rebuild most of previously overexploited stocks (Pacific Fishery Management Council, 2016).

While many of the examples from the case studies related to fish sourced from the ocean, the Clatsop CARFB procured fish from nearby hatcheries. Our results indicate that food banks are already utilizing these "farmed" fish, and the ascendency of aquaculture presents another considerable opportunity for meeting conservation and recreational objectives as well as for contributing to the healthy food system for low-income or nutritionally sensitive populations (Gephart et al., 2020). The growth of the broader aquaculture sector is both well documented and staggering: 15 billion tons of additional fish could be produced, "over 100 times the current global seafood consumption," all in areas that do not conflict with other uses of the marine environment like marine conservation (Gentry et al., 2017). Aquaculture is oftentimes overlooked as a viable alternative to land-based agriculture. The policy environment in the U.S., for example, has yet to embrace aquaculture; federal spending from 1990 to 2015 was just over US$1 billion while agriculture spending was US$41 billion (Love, Gorski, & Fry, 2017).

Marketing and Strategies to Improve Consumer Acceptance

Improving the understanding of consumer preferences within low seafood access communities will aid in the identification of preferred, but still underutilized species and in their integration into the healthy food system as an affordable food. For example, Yellowtail rockfish (*Sebastes flavidus*) is broadly distributed along the West Coast and is unfamiliar to many consumers, but has a familiar white flaky texture that is easy to cook. This work could be facilitated by partnering with private-sector organizations such as seafood marketing associations currently trying to improve consumption of regional species. At present, consumer surveys on current and potential seafood preferences are either sparse or rarely conducted. More information is needed about the preferences of nutritionally vulnerable or low-income communities and about the supply chain demands of high-volume organizations. Nonprofits working with regional food banks and local food pantries indicated remarkable flexibility in the utilization of a broad diversity of species either donated by fishing companies and hatcheries or seized by law enforcement. This indicates that local pantries were willing to try species outside of the "big three" and suggests that further sourcing of less typical fish might be possible.

Since consumers are unfamiliar with underutilized species, initiatives must first generate interest in and empower end users to use them. Education was an important component of the strategies used by both Bay2Tray and San Diego Food Systems Alliance to improve understanding of how to cook the fish in institutional settings or at home. Both cases also described innovative

recipes that make unfamiliar fish more approachable, like chili made from Opah. Respondents showed that kitchen preparation and familiarity were important enabling conditions for organizations, and we expect that previously unsourced species that are similar in preparation, taste, and appearance to already-consumed products are likely to be more readily adopted in these environments. Messaging is important and may require alternative strategies to the conservation or economic justifications commonly used when advocating for this kind of seafood. A recent study of North American consumers by the Marine Stewardship Council found that consumers make seafood selections based primarily on food safety, freshness, and health benefits rather than the sustainability of the resource or origin (Marine Stewardship Council & Globescan, 2018). While the dominant focus of local seafood advocates is on environmental sustainability, results of this survey indicate a need to increase health and nutrition messaging to better align with the concerns of consumers.

Policy disconnects present obstacles to the sourcing of domestically produced seafood that can readily contribute to the food system. While food policy originates within the USDA, fisheries and aquaculture policies are primarily the purview of National Oceanic and Atmospheric Association, and as such their goals regarding nutrition are oftentimes misaligned (Love, Pinto da Silva, Olson, Fry, & Clay, 2017). For example, because U.S. agricultural policy does not include fisheries and most aquaculture, they are not emphasized in federal food assistance programs like Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) and the National School Lunch program which are housed in the USDA. In U.S. nutrition education programs, seafood is also not well recognized, but it is mentioned alongside other fresh, lean proteins in USDA's nutrition education program SNAP-Ed as a better alternative to processed meats (USDA Food and Nutrition Service, 2020). Policy guidance is necessary to recognize the potential contributions that fish and shellfish can make alongside other healthy foods already being utilized to meet the goals of these programs.

Finding Financial Resources are Critical for Program Development

Establishing alternative supply chains requires entities that can play critical roles in processing and distribution. In this regard, reliance on grants was mentioned as critical to all case studies. They were essential to overcoming initial costs to establish an alternative supply chain, and sometimes in covering continuing operational costs. Finding a long-term, financially viable model is paramount, especially for private or public-private partnerships. In the cases studied, scale was consistently mentioned as critical. Oftentimes requisite or desired scaling up requires additional, costly infrastructure. Each node of the supply chain has its costs, and future initiatives need to consider whether they must internalize these costs or work with suitable partners to forward their mission.

While grant acquisition can be undertaken, there are growing opportunities for for-profit firms to seek private investment. Historically, there was limited investment potential for firms focused on nonmonetary or philanthropic objectives, but that has changed with the increases in social impact investment strategies that explicitly seek out firms that advance positive environmental or social outcomes (Pons, Long, & Pomares, 2011). In the U.S., there are a variety of additional public funding mechanisms that help support connecting healthy foods to food insecure populations, often with parallel goals of supporting farmers or economic development. These include USDA-supported farm-to-school programs and the Gus Schumacher Nutrition Incentive Program that incentivizes fruit and vegetable consumption at the point of purchase for low-income consumers participating in the Supplemental Nutrition Assistance Program (SNAP) (USDA, 2019b, 2019a). Parallel programs focusing on fish consumption could take place in state or federal programs to provide potential sources of demand for fish, particularly species that are currently underutilized.

There was little evidence among positive deviant cases studies on the use or feasibility of accessing funding via public-private ventures that connect private and public sector entities. For example, the Healthy Food Financing Initiative was designed to bring grocery stores to communities by

funding food retail projects that expand access to healthy foods in underserved areas and create quality employment. Such public-private ventures present another opportunity to support supply of fish and shellfish to low-income populations. For example, a similar financing mechanism could be created to fund efforts connecting fishers or processors to schools, hospitals, or jails.

Philanthropic actions of the fishing industry are buoyed by the ability of regional food banks to source fish, and responses suggest that there need not be tradeoffs for fishing companies between philanthropy and profitability. Some fishing companies reported passing on tax deductions for their contributions, motivated by the community impacts of their donated seafood seen in their community. In U.S. legal contexts, when an organization's volume and labor costs are high, tax deductions can create incentives for continued operational growth. SeaShare, which works with some of the largest American seafood companies, includes information on its website regarding how companies can qualify for tax deductions under the "Good Samaritan Act," which currently allows tax write-offs up to twice the cost of the donated product. Growing awareness of the incentives for philanthropy may encourage other large agents in the fishing industry to consider donating product or labor.

Supporting Champions Throughout the System

Champions were present in every positive deviant case and could arise at any level of influence in the supply chain. Some champions held positions of power in school districts or within the fishing industry; their decisions to increase availability of fish had considerable top-down effect. However, champions were not always the actors with the highest amount of influence in the food system; for example, the willingness of a group of kitchen workers to learn new cooking methods meant they had to spend additional time learning new preparation techniques. When considering the policy process, champions may also become necessary. Many fishers are engaged in *fishery* policy processes, but *food* policy is a different domain, often with different political representatives and therefore the relationships with these politicians are less developed. Champions here may involve bridging organizations with connections to policymakers or with policymakers themselves. Future initiatives should consider that successful interventions in the food system require buy-in from actors throughout the supply chain, regardless of their level of influence, and should actively support their participation with appropriate incentives.

Conclusion

Taken together, our positive deviant cases provide insight into how underutilized seafood can be directed to low-income and nutritionally vulnerable populations. First, low-income populations traditionally not consuming high volumes of seafood are generally not going to compete within the current supply chain. As a result, a supply of fish not valued by that system must be identified. Positive deviant cases were resourceful in the species they sourced, from species with low market value which are not caught because they are not valued in commercial distribution channels, to high-value species that cannot be sold because they are prohibited bycatch, seized fish, or hatchery products. Second, an alternative, low-cost supply chain can be constructed that keeps revenues high enough to be viable but low enough to be affordable to organizations serving low-income communities. The positive deviant cases cut out the network of fish distributors and traders who disaggregate bundles to the sizes demanded by particular downstream buyers: the new supply chain is shorter, and deals with large quantity so less effort is required to distribute it. However, constructing this supply channel is itself expensive and time consuming. Here, the energy of a champion of the initiative is key to identifying and developing relationships with others and ensuring work gets done, and grants cover direct costs. The lessons on enabling conditions for the positive deviant case studies and how they overcame challenges provide potential approaches for future initiatives seeking to improve the connection between local seafood and the food system

In future research to better understand the perspectives related to connecting low-income populations with fish, interviews should be directed towards the fishers, hatchery managers,

and broadline distributors that were not included in this research. Interviewing potential end consumers who are or could be the beneficiaries of these arrangements would also be critical to the development of pilot programs. With an improved understanding of the challenges and conditions enabling successful distribution of fish from local markets *throughout* the supply chain to nutritionally vulnerable populations, work can begin to implement and evaluate pilot programs in organizations and regions where they do not exist. In addition to the types of organizations that led the initiatives studied in these cases, others may be as or better suited to serve as champions for this work, including religious groups or cultural centers. Likewise, efforts like those studied may be successful in other food service and retail settings and mechanisms, such as correctional facility food services or direct-to-consumer approaches. Promising initiatives can then scale their impact to improve the flow of local seafood to nutritionally vulnerable people who access food through schools, food banks, hospitals, and other food service settings along the coast.

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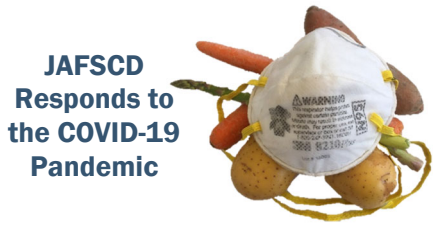
COMMENTARY ON COVID-19 AND THE FOOD SYSTEM

COVID-19 amplifies local meat supply chain issues in South Carolina



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Before COVID-19, livestock producers across the U.S. had been complaining to Congress about a lack of meat processing options closer to their farms (Swanson, 2015). Publications used examples of farmers shipping their animals hundreds of miles to be processed (Miles, 2012) and placed the blame on the U.S. Department of Agriculture (USDA) and industry regulations (Linnekin, 2016). Others have warned that decades of consolidation of meat-processing facilities have left fewer reliable options for livestock farmers, threatening the farm-to-table economy (Shanker, 2017).

The COVID-19 pandemic amplified these issues starting in April 2020, when U.S. meat packers shut down or scaled back operations to reduce the spread of COVID-19 among their workers. The resulting

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Steven Richards and Clemson's Agribusiness, Livestock and Forages, and Food Systems and Safety Teams will be leading the local meat supply chain study in South Carolina.

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dip in U.S. meat-packing volumes led grocery store chains to limit the amount of meat customers could buy (Guzman, 2020), and some hamburger restaurants actually had to take hamburgers off their menus (Stump, 2020). Both livestock producers and consumers experienced panic during this time. Worried that the U.S. was running out of meat, consumers started a meat-buying frenzy. In the meantime, animals ready for processing had nowhere to go, causing livestock farmers to lose money or, even worse, euthanize their animals (Repko & Lucas, 2020).

On April 28, 2020, President Trump signed an executive order mandating that U.S. meat processors were critical infrastructure and must remain open (Faulders, 2020). Most processing operations complied with this order, and a more dramatic shortage in the nation's meat supply was largely avoided (Bagentose, 2020; Conner, 2020). As a consequence of this close call, U.S. meat prices rose in response to the contraction in supply (Lusk, 2020), and prices remain high. Retail meat prices through the end of May 2020 show year-over-year beef prices up 21.7%, pork prices up 17.7%, and chicken prices up 10.5% (Bunge & Kang, 2020). Wholesale ground beef saw the largest price jump in May, increasing more than 100% from its mid-March price (Bunge & Kang, 2020). The August USDA Meat Price Spreads report shows that prices remain elevated for all three meats (USDA Economic Research Service, 2020).

South Carolina's Situation

South Carolina's situation reflects what is occurring in many other states. The threat of a national shortage and surging retail meat prices have spiked demand for local meat products. Local livestock producers have been swamped with calls from customers wanting to buy their meat products. In South Carolina, this golden marketing opportunity hit an obstacle when farmers called local processors and found that they were backlogged by six to nine months (M. Filion & B. Bowers, personal communication, July 28, 2020).

South Carolina livestock producers are currently petitioning for more processing facilities. And, while more processing capacity is needed, enhancing an entire supply chain involves a more comprehensive solution, as evidenced by past feasibility studies and research.

What Do Past Studies Feasibility Studies Tell Us?

Dozens of feasibility studies on local livestock processing have been performed across the U.S. (Table 1), and rarely did a new processing facility result, even if it was feasible. This is most likely a reflection of high investment costs, with a small, bare-bones facility starting at US$1 million (Niche Meat Processor Assistance Network [NPMAN], 2016). Another reason could be that some of these studies did not address the entire local meat supply chain. The literature would suggest that at least seven components of the local meat supply chain need to be researched to find comprehensive solutions.

1. Producer Supply: Surveying livestock producers to determine how many animals are available for processing each year and if producers plan on raising more animals in the future.
2. Logistics: Mapping current processing plants in relation to locations with the highest concentration of animals.
3. Aggregation: Exploring ways for producers to aggregate animals in batches, as most processors are dependent on a consistent supply of animals (Gwin, Thiboumery, & Stillman, 2013).
4. Addressing Inspection Systems: Many states have both state and federal meat inspection systems. In South Carolina, the two inspection systems have equal standards, but state-inspected meat products cannot be shipped across state lines, limiting the marketing area for some producers.
5. Slaughter and Processing Capacities: Surveying current processors to discover what capacity constraints exist and are the most critical.

6. Storage and Distribution: Assessing the local meat supply chain's cold and frozen storage and distribution capacity.
7. Consumer Demand: Surveying consumers' preferences for local meat and willingness to pay a premium. A consumer survey would also be useful to assess if the COVID-19 events described have caused a structural or temporary change in local meat demand.

Lessons Learned

A 2013 USDA study sums up the problem nicely: a lack of commitment and coordination along the entire supply chain is the primary reason local meat processing has not expanded (Gwin et al., 2013). Another study of 20 years of public investment into meat and poultry processing provides valuable tips on how to structure a comprehensive study and which investment projects are most likely to succeed (Gwin & Thistlethwaite, 2019). A holistic approach is needed to address the complex local meat supply chain, and a feasibility study that only addresses slaughter facilities is likely to fall short. While producers in South Carolina and across the U.S. are anxious to build additional meat-processing facilities, a well-designed supply chain study will likely provide more viable options for local meat producers, processors, and consumers.

Table 1. Components of Past Feasibility Studies by Location and Year

Study	Producer Supply	Aggregation & Logistics	Inspection Systems	Slaughter Capacity	Processing Capacity	Storage & Distribution	Consumer Demand
CT, 2008 [a]	Yes	No	Yes	Yes	Yes	No	No
WI, 2019 [b]	Yes	No	Yes	Yes	Yes	No	No
MI, 2014 [c]	No	No	Yes	Yes	Yes	Yes	No
Australia, 2017 [d]	Yes	Yes	N/A	Yes	Yes	Yes	No
NY, 2000 [e]	Yes	Logistics only	Yes	Yes	Yes	Yes	No
MD, 2006 [f]	Yes	Logistics only	Yes	Yes	Yes	Yes	No
VT, 2005 [g]	Yes	Yes	Yes	Yes	Yes	No	No
NC, 2012 [h]	Yes	No	Yes	Yes	Yes	No	Yes
MT, 2006 [i]	Beef only	Yes	Yes	Yes	Yes	Yes	Wholesale only
CA, 2009 [j]	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MA, 2013 [k]	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MI, 2007 [l]	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VA, 2014 [m]	Yes	Yes	Yes	Yes	Yes	Yes	Yes
GA, 2019 [n]	Beef only	Yes	Yes	Yes	Yes	Yes	Yes

Notes: [a] Community Involved in Sustaining Agriculture [CISA], 2008; [b] Grooms, 2019; [c] Schweihofer, Wells, Miller, & Pirog, 2014; [d] Australian Competition & Consumer Commission, 2017; [e] Shepstone, 2000; [f] Shepstone, 2006; [g] Sleeping Lion Associates, 2005; [h] ASAP Local Food Research Center, 2012; [i] Food and Livestock Planning, 2006; [j] Hardesty et al., 2009; [k] Dickenson, Joseph, & Ward, 2013; [l] Knudson & Peterson, 2007; [m] Matson Consulting, 2014; [n] Wolfe, Shephard, & Kane, 2019

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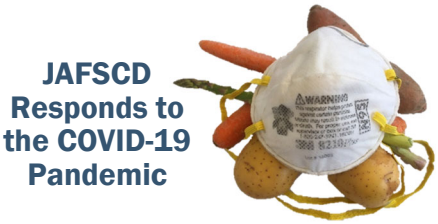
COMMENTARY ON COVID-19 AND THE FOOD SYSTEM



Leveraging informal community food systems to address food security during COVID-19

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The novel coronavirus (COVID-19) has dramatically reshaped the U.S. food system and how people interact with it—more specifically, how people interact with their community food environment. The food environment is the distribution of food sources within a community, including the number, type, location, and accessibility of retail food outlets (Glanz, Sallis, Saelens, & Frank, 2005). Systemic injustices shape our food system and lead to a lack of access to healthier food and beverages for low-income and communities of color (Baker, Schootman, Barnidge, & Kelly, 2006; Bower, Thorpe, Rohde, & Gaskin, 2014). These neighborhood disparities have concrete effects on health, including increasing people's risk for obesity, type 2 diabetes, heart disease, and stroke (Franco, Diez Roux, Glass, Caballero, & Brancati, 2008; Richardson, Boone-Heinonen, Popkin, & Gordon-Larsen, 2012). COVID-19 exacerbates these long-standing disparities, disproportionately affecting low-income people and communities of color. Brutal structural inequalities have resulted in Black and Latinx Americans being 2.7 and 3.1,

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respectively, times more likely to be diagnosed with COVID-19 (Moore et al., 2020).

Given emergent anecdotes about increasing food insecurity and health disparities with the onset of the COVID-19 pandemic, the authors collected statewide data about how individuals in North Carolina accessed and consumed food during the COVID-19 pandemic.[1] To understand COVID-19's impact on food, we distributed an online Qualtrics survey from May 5, 2020, until June 12, 2020. This study was approved by North Carolina State University's Institutional Review Board. Participants who completed the survey were offered the opportunity to be entered into a raffle to win a US$100 gift card.

A total of 383 individuals across North Carolina completed the survey. Nearly 84% (*n*=320) identified as female, 16% (*n*=61) as male, 0.26% (*n*=1) as gender queer/gender nonconforming, and 0.26% (*n*=1) preferred not to answer. More than 60% (*n*=248) were white non-Hispanic/Latino, 27% (*n*=110) were Black/African American (*n*=110), and 5% (*n*=18) were Hispanic/Latino.

The findings revealed the dramatic changes in the economic and food landscape of the state. For example, when asked whether participants combined household income would change during the next year as a result of COVID-19, 42% (*n*=160) of participants said they would make less money because of COVID-19, and 38% (*n*=145) said their income would stay the same. However, 14% (*n*=53) preferred not to answer, and 5% (*n*=19) said their income would change, but not because of COVID-19. Contrary to popular discourse that many were making more money because of unemployment and stimulus checks (Guina, 2020), only 1.6% (*n*=6) of participants stated they would make more money because of COVID-19.

We used the U.S. Department of Agriculture's (USDA) six-item food security screener to understand food security in the study population (USDA ERS, 2020). Food security is defined as "access by all people at all times to enough food for an active, healthy life" (USDA ERS, n.d., para. 1). Participants reported that their food did not last long enough and they did not have money to get more (see Table 1). Other responses generally shifted toward less food security during the pandemic; however, these were not statistically significant.

Table 1. North Carolina Participant Responses to Food Security Status Before and During COVID-19 (*N*=383)

	Before	*During*	*Before*	*During*	*Before*	*During*
USDA's Six-Item Food Security Screener Questions	**Often True**		**Sometimes true**		**Never true**	
The food that my household bought just did not last (not enough food), and I/we didn't have money to get more.[a]	1.8%	7.0%	10.4%	12.2%	83.5%	74.4%
I/we couldn't afford to eat balanced meals.	1.8%	6.1%	11.3%	11.6%	82.6%	76.2%
Did you or others in your household ever cut the size of your meals or skip meals because there wasn't enough money for food?	2.4%	5.5%	7.9%	10.1%	86.0%	78.7%
Did you ever eat less than you felt you should because there wasn't enough money for food?	2.4%	6.1%	10.1%	9.8%	82.6%	78.4%
Were you ever hungry but didn't eat because there wasn't enough money for food?	1.2%	4.6%	5.5%	7.0%	87.5%	81.4%
How often would you say you were worried or stressed about having enough money to buy nutritious meals?	3.4%	7.6%	17.7%	18.9%	74.4%	67.7%

[a] *p*-value < 0.05

[1] On March 27, 2020 North Carolina's governor issued a stay-at-home executive order to help slow the spread of COVID-19, which was extended until May 8, 2020. North Carolina continues to follow a phased reopening as of this article's publication.

Despite encountering financial struggles that led to decreasing food security during COVID-19, participants noted the importance of informal networks providing mutual aid that filled the gaps left by federal programs. When asked what food assistance services they received since the start of the pandemic, among 159 responses, even though 51% (*n*=82) reported receiving federal food assistance, 15% (*n*=24) stated they received food gifts from relatives or friends, 13% (*n*=20) relied on alternative food sources (such as personal gardens and wild food harvesting), 11% (*n*=17) received food from food banks or pantries, and 6% (*n*=10) purchased food from farmers markets or community support agriculture (CSA).

Additionally, we found that participants were overwhelmingly providing support to others in their community during the pandemic. Across 383 participants, 47% (*n*=180) picked up and delivered groceries or other essential supplies to family and friends; 31% (*n*=119) donated money to a local business or organization; 31% (*n*=117) donated food to family or friends; 26% (*n*=101) donated money to family or friends, and 17% (*n*=64) donated food to a food bank.

Finally, we asked participants what resources about food would be helpful for them during this time. While the most frequently requested resource was centralized information about food availability in their area (33% or *n*=126), 28% (*n*=108) wanted advice on how they could support local food producers, and 26% (*n*=101) wanted advice on how to support local food businesses. Lastly, 27% (*n*=103) wanted advice on home gardening, and 24% (*n*=93) wanted advice on food preservation (canning, freezing, and drying food).

While the federal government scrambled to provide resources and increase flexibility in food assistance programs, our survey reveals that when left on their own, North Carolinians were filling the gaps by providing food support to their families, friends, and local food producers and businesses. In the absence of a national strategy to address the COVID-19 pandemic, study participants relied on their own social networks for support during tough times.

This survey reveals the informal community food systems that exist in families and communities, which during the hardest of times—like the COVID-19 pandemic—help people make ends meet. While participants dealt with their own financial struggles by receiving help from friends, family, and food pantries, these struggles did not prevent them from assisting others in their community. The survey also revealed a strong interest in food sovereignty and local foods—with people naming gardening, canning, and foraging as important food sources during the pandemic.

When the history books are written and studies are published on how COVID-19 interrupted the U.S. food system, we must account for these stories of resilience and community support. Despite their own hardships, and in the face of systemic and persistent inequities, people demonstrated care and support for those in their local communities, highlighting the informal community food systems that exist throughout the U.S.

Acknowledgments

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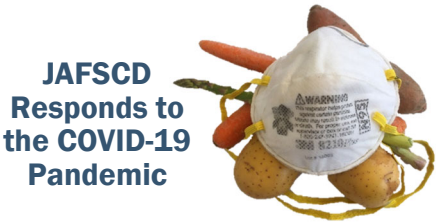
COMMENTARY ON COVID-19 AND THE FOOD SYSTEM

Communication helped UConn Extension address the needs of agricultural producers



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The worldwide pandemic due to COVID-19 (coronavirus) has produced unprecedented challenges around the world. Agricultural producers were still working on farms, in greenhouses, and along the coast in Long Island Sound during the early stages of the COVID-19 outbreak. Severe challenges related to labor, food safety, on-farm biosecurity, marketing, and distribution confronted producers. University of Connecticut (UConn) Extension educators understood that our audiences' needs had changed drastically, and communication would help us understand those changes and provide the services required for the success of their operations.

We addressed these challenges using a multifaceted approach. Our team curated resources on a single website for our statewide audiences, including agricultural producers. Extension educators developed resources for specific agricultural sectors, such as fruit and vegetable farms, aquaculture, and nursery and landscape professionals. Links to important updates from the Connecticut Department of Agriculture were also added to our website.

We added new information to the website as it became available. Agricultural producers received regular updates from Extension through multiple channels, including email, social media, other websites, and word of mouth. Resources on the website for all types of audiences include information on food safety and cooking, hand-washing and sanitizers, infection protection, financial advice, and listings of

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farms that are open to the public, farmers markets, and school emergency meal distribution options for children.

UConn Extension conducted surveys to assess the impact of the COVID-19 pandemic on Connecticut agriculture. The survey for agricultural producers was based on a survey developed by our Connecticut Sea Grant program for aquaculture producers. Other members of the UConn Extension team developed and implemented a similar survey for school grounds managers.

The survey for agricultural producers was anonymous and sent to farmers and growers in Connecticut. We had 178 responses to the March survey and 103 respondents to the follow-up survey in June. The institutional review board at the University of Connecticut determined that approval for the survey was not needed.

The results of the second survey showed that 47% of the respondents grew two or more commodities in their operation. Economic viability remained a concern for all businesses during the pandemic, including agricultural operations. Of the respondents, 47% indicated that farm income was up, while 28% indicated that income was down due to the pandemic. There was a wide range in the percent increase and decrease in farm income reported. The average income increase was 54%, and the average decrease was 61%.

We asked respondents about changes made to their agricultural operation in response to COVID-19. These included closing the farm to the public; limiting the number of volunteers; establishing contactless pickup and online pre-ordering; purchasing additional freezers to meet demand; requiring social distancing, use of hand sanitizers and masks; adding a new entrance; and investing in packaging and equipment for online sales.

Employee numbers closely aligned with responses to income. Eighteen percent of the respondents added between one and three employees, while 17% decreased the number of employees by two to five full- or part-time employees. Labor challenges cited by respondents included struggling to find extra help due to higher demand, health concerns, and the willingness of employees to practice sanitary practices.

Transportation has been an area of greater challenge for agricultural operations during COVID-19. Many of our respondents (56%) said they experienced difficulties securing supplies because of the pandemic. Challenges transporting products off their agricultural operation negatively affected 75% of respondents.

Negative effects on farm markets were minimal. Only 17% of respondents lost marketable product. We asked if customers were finding it difficult to pay invoices, and 72% of respondents said that none of their customers had had difficulties making payments.

Marketing products remains key to economic viability, and 65% of respondents had considered alternative marketing strategies as of June 2020. These include using an open food network for connecting consumers and farmers, offering online ordering and/or delivery options, increasing wholesale sales, adding food trucks, implementing pre-ordering, using social media, and participating in the USDA Food Box program.

We asked about the communication that farmers receive from Extension and our partners. The majority (84%) of agricultural operators who responded to our survey were receiving information in a timely manner. Respondents did request improvements in communication. They wanted to increase the availability of informational webinars. They suggested that farmers market status updates were useful. Respondents also requested a reduction in the number of emails with duplicate information.

Agricultural producers cited many concerns regarding COVID-19. Extension educators and our partners can address some of these concerns. These include financial risk management, understanding customers, establishing safety protocols and signage, and understanding regulations and recommendations.

Extension is modifying our programs to meet agricultural producers' needs. Our team refined our educational outreach resources and developed new materials to meet the challenges agricultural operators are facing. We streamlined communications among members of our agricultural Extension team since many respondents have multiple commodities. This helped reduce the number of duplicate emails that producers receive. Extension led an effort with the Connecticut Farm Bureau and Connecticut Department of Agriculture to create farm signs addressing biosecurity. Producers can purchase these signs at our cost, with no mark-up.

Extension educators continue curating information for producers and facilitating educational outreach to ensure that Connecticut's agricultural producers have all the information they need to operate their business successfully and remain economically viable. Our educators are using digital tools to connect with producers for farm visits, webinars, online classes, one-on-one consultations, crop scouting, and other services.

Agriculture is a challenging industry, yet farmers in Connecticut have remained resilient for centuries. Our role as Extension educators is to provide the resources and knowledge that will enhance their resilience and lead to their businesses' success. The COVID-19 pandemic is unprecedented, yet we can communicate with our agricultural producers and pivot the programs and resources available to help them address the challenges they are facing.

Agricultural producers are still adjusting to the challenges caused by the pandemic. UConn Extension educators are continuing to communicate with our audiences, adjust our programs to meet their needs, and support a strong and resilient agricultural community.

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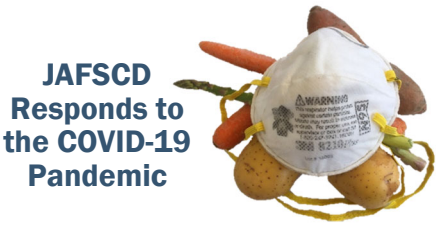
COMMENTARY ON COVID-19 AND THE FOOD SYSTEM



Providing planetary health diet meals to low-income families in Baltimore City during the COVID-19 pandemic

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Abstract

The COVID-19 pandemic has increased food insecurity, especially among low-income Black and Hispanic families in the United States. Food insecurity is associated with poorer health and higher mortality

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in adults and greater risk of impaired cognitive development and behavioral problems in children. Providing food for low-income families is an important priority of the COVID-19 response. *Food That Connects Us All* is a program that provides healthy meals to low-income Black and Hispanic families in Baltimore City. The meals follow guidelines for the planetary health diet, a reference diet developed by the EAT-Lancet Commission to optimize health and be sustainable within planetary boundaries. The planetary health diet consists largely of vegetables, fruit, whole grains, legumes, nuts, and unsaturated oils, with a low to moderate amount of seafood and poultry and with little or no red or processed meats, refined grains, starchy vegetables, and added sugar. In a food survey, participants showed a high level of satisfaction with the taste, appearance, and healthfulness of the meals. *Food That Connects Us All* is a direct approach to reducing health disparities and demonstrates the feasibility of providing an ideal reference diet to vulnerable low-income families at high risk for poor health outcomes during the pandemic.

Keywords
COVID-19, EAT-Lancet, Food Insecurity, Planetary Health Diet, Minority Health, Sustainability

Food Insecurity and COVID-19

Food insecurity, defined as the limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways (Holben & Marshall, 2017), affected 11.1% of households in the U.S. prior to the COVID-19 pandemic (U.S. Department of Agriculture Economic Research Service [USDA ERS], 2020). In 2018, 13.9% of households with children under age 18 years were food insecure (USDA ERS, 2020). Blacks and Hispanics are at a relatively higher risk of food insecurity (Hernandez, Reesor, & Murillo, 2017). Poverty, unemployment, and the high cost of food are closely tied to household food insecurity (Huang, Kim, & Birkenmaier, 2016). Food insecurity is associated with poor dietary quality, particularly a low intake of fruit, vegetables, and dairy products (Hanson & Connor, 2014).

Adults affected by food insecurity have a higher risk of obesity, chronic diseases, and mortality (Brown et al., 2019; Cook et al., 2004; Seligman, Laraia, & Kushel, 2010; Walker et al., 2019). Children are particularly affected by food insecurity; children from food-insecure households have higher morbidity (Cook et al., 2004; Ryu & Bartfeld, 2012) and increased risk of impaired cognitive development and behavioral problems (Alaimo, Olson, & Frongillo, 2001; Whitaker, Phillips, & Orzol, 2006). In addition, their mothers are at higher risk of depression and anxiety (Whitaker et al., 2006). Programs to address food insecurity in the U.S. include the Supplemental Nutrition Assistance Program (SNAP), Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), food banks, and community food programs (Loopstra, 2018). SNAP reached approximately 37 million people during the period of October 2019 to February 2020 (USDA Food & Nutrition Service, 2020a). There were 6.4 million participants in WIC in 2019 (USDA Food & Nutrition Service, 2020b). Under normal circumstances, the USDA National School Lunch Program, School Breakfast Program, and Children and Adult Care Food Program serve nearly 35 million children daily (USDA Economic Research Service, n.d.).

The COVID-19 pandemic has disrupted food supply chains and food access, caused massive job losses, especially among Blacks and Hispanics (Montenovo et al., 2020; U.S. Department of Labor, 2020) and has greatly exacerbated food insecurity (Niles et al., 2020). With the interruption of food programs and increases in food insecurity, feeding adults and children from low-income families has become an important priority of the COVID-19 response (Dunn, Kenney, Fleischhacker, & Bleich, 2020). Federal nutrition programs have been given greater flexibility on the state level to deal with the evolving situation. The U.S. Congress' Families First Coronavirus Act (FFCA) included provisions to expand federal assistance to US$114 per child per month and increase SNAP allotments up to the maximum benefit

amount, but many households with children are already at the maximum amount (Kinsey, Kinsey, & Rundle, 2020). Given the lack of federal guidelines, an uneven patchwork of support has emerged across the country, causing concerns that COVID-19 will exacerbate existing health disparities and have profound lasting negative impacts (Kinsey et al., 2020).

The Planetary Health Diet

In 2019, the EAT-Lancet Commission proposed an ideal diet known as the 'planetary health diet' (EAT-Lancet, 2020; Willett et al., 2019). The diet is based on the best nutritional evidence available for optimizing health (defined by the World Health Organization as a state of complete physical, mental, and social well-being, and not just absence of disease [Preamble to the Constitution of WHO, 1948]) without surpassing planetary boundaries. The planetary health diet is a universal healthy reference diet that consists largely of vegetables, fruit, whole grains, legumes, nuts, and unsaturated oils, with a low to moderate amount of seafood and poultry and with little or no red or processed meats, added sugar, refined grains, and starchy vegetables (Table 1). The diet is sustainable within planetary boundaries for six environmental processes that include climate change, land-system change, freshwater use, biodiversity loss, and interference with the global nitrogen and phosphorus cycles (Willett et al., 2019).

Table 1. Composition of the Planetary Health Diet for an Intake of 2500 kcal/day

Food group	Foods	g/day	kcal/day
Whole grains [a]	rice, wheat, corn, other	232	811
Tubers or starchy vegetables	potatoes, cassava	50	39
Vegetables	dark green vegetables	100	23
	red and orange vegetables	100	30
	other vegetables	100	25
Fruits	all fruit	200	126
Dairy foods	whole milk or equivalents	250	153
Animal source proteins [b]	beef, lamb	7	15
	pork	7	15
	chicken, other poultry	29	62
	eggs	13	19
	seafood [c]	28	40
Plant source proteins [a, d]	dry beans, lentils, peas	50	172
	soy foods	25	112
	peanuts	25	142
	tree nuts	25	149
Added fats	unsaturated oils [e]	40	354
	palm oil	6.8	60
	lard or tallow	5	36
Added sugars	all sweeteners	31	120

[a] Wheat, rice, dry beans, and lentils are dry, raw. [b] Beef and lamb are exchangeable with pork and vice versa. Chicken and other poultry is exchangeable with eggs, fish, or plant protein sources. [c] Seafood consists of fish and shellfish. [d] Legumes, peanuts, tree nuts, seeds, and soy are interchangeable. [e] Unsaturated oils are 20% each of olive, soybean, rapeseed, sunflower, and peanut oil.
Source: Willett et al., 2019.

Description of the Model Program

A program known as *Food That Connects Us All* has served more than 50,000 meals in Baltimore City, Maryland, since the beginning of the COVID-19 pandemic. *Food That Connects Us All* was founded in mid-March 2020 by Alkimiah, a collaboration between the catering business Mera Kitchen Collective and the restaurant Alma Cocina Latina. It was created to address food insecurity in response to the pandemic. Alkimiah has received funding and support from the World Central Kitchen, founded by Chef José Andrés. Fresh fruit and vegetables, dairy products, and chicken are sourced from local organic farms, as much as possible, or received as donations of excess fresh produce from farms in Maryland and Pennsylvania. Fish and meat are obtained from local purveyors. The coordinating chef plans the menu daily with five cooks in the kitchen of Alkimiah. The founding principles of *Food That Connects Us All* include providing healthy, sustainable diets to people in need. The meals generally follow guidelines for the planetary health diet (Table 1) (EAT-Lancet, 2020; Willett et al., 2019). Examples of meals include (1) salmon cakes with mixed seasonal vegetables, Israeli couscous, and creamy pesto sauce; (2) chicken salad with red peppers, green beans, mixed greens, caramelized onions, dried figs, quinoa, and fresh basil; (3) ground turkey chili with red kidney beans, polenta, local sweet corn, Latin coleslaw, and cilantro. The staff prepare approximately 500 meals per day in the early morning, and the meal boxes are distributed in the afternoon by distribution center volunteers. Food workers are paid a minimum of US$16/hour in the project. The food distribution has included over 15 schools, community centers, and senior homes in Baltimore City, Monday through Saturday, 1:00 to 4:00 PM. Some meals are delivered by volunteers directly to families that are unable to come to the distribution centers. Since the distribution of meals is community-based, most recipients walk a short distance to the distribution centers. This program supports primarily low-income Hispanic families in areas of Baltimore City that are high-priority food areas (sometimes known as food deserts) (Franco, Diez Roux, Glass, Caballero, & Brancati, 2008).

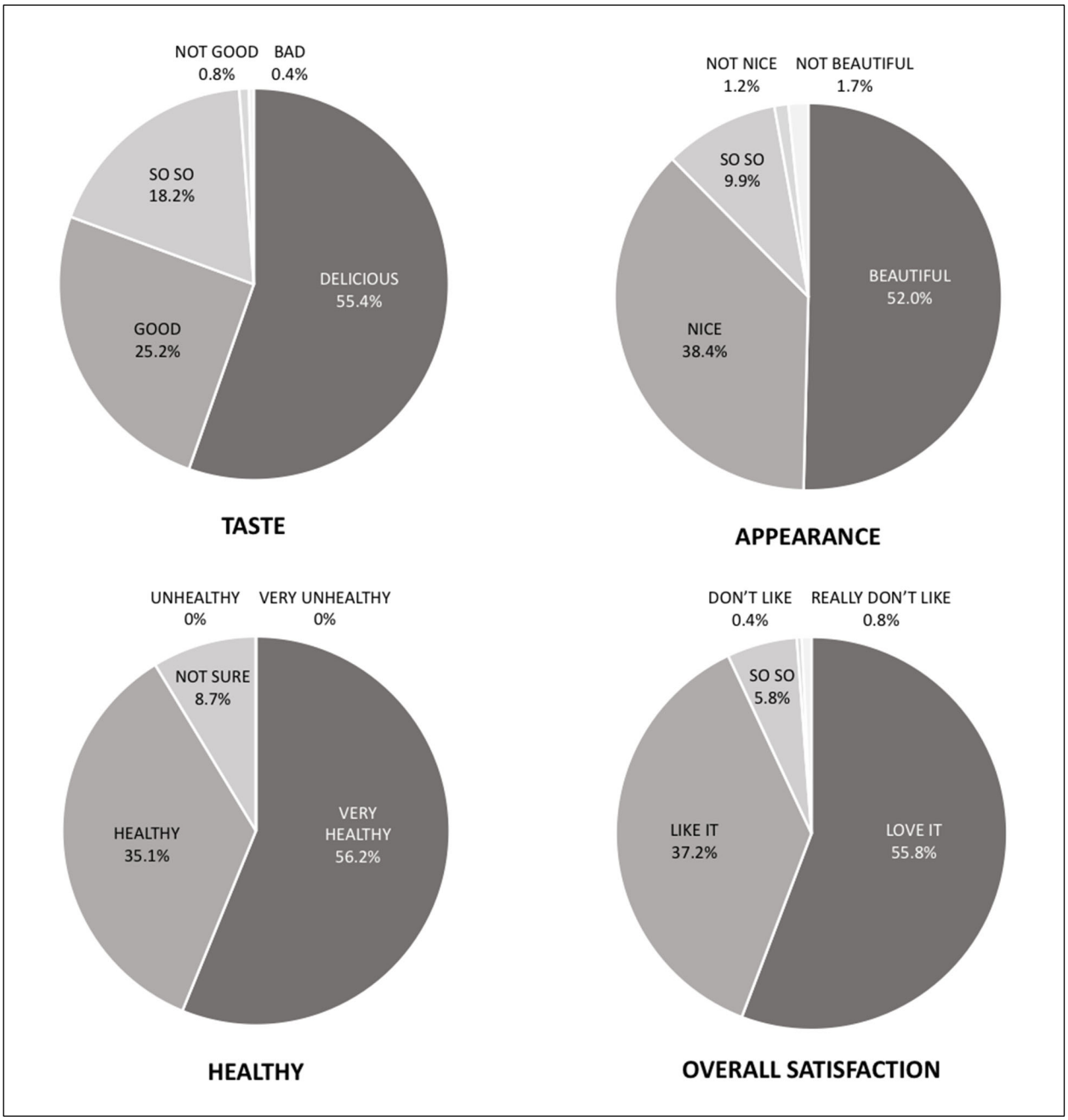
In order to evaluate the recipients' satisfaction with the meals provided by *Food That Connects Us All,* a survey was conducted consisting of six questions: (1) How do you like the taste of the food? Delicious/good/so so/not good/bad; (2) How do like the appearance of the food? Beautiful/nice/so so/not nice/not beautiful; (3) How healthy is the food? Very healthy/healthy/not sure/unhealthy/very unhealthy; (4) What is your overall satisfaction with the food? Love it/like it/so so/don't like/really don't like; (5) Would you recommend this food to a friend? Yes/no; (6) What would you change about the meal? Check any: Nothing/bigger portions/more vegetables/more variety. The survey was given in both English and Spanish. Of the approximately 500 people who regularly receive their meal boxes, 242 completed the survey in the period of August 17–24, for a response rate of 48.4%. The results of the first four questions are shown in Figure 1. The responses were highly positive, such as 55.4% for delicious taste, 52.0% for beautiful appearance, 56.2% for very healthy, and for overall satisfaction, 55.8% love it. When asked "Would you recommend this food to a friend?" 96.2% responded yes and 3.8% responded no. When asked about changing anything about the meal, 36.8% would not change anything, 32.2% wanted bigger portions, 14.4% wanted more vegetables, and 9.0% wanted more variety.

Addressing Food Insecurity

The COVID-19 pandemic may increase health disparities among low-income minority families due to loss of livelihood and exacerbation of food insecurity (Kinsey et al., 2020). To our knowledge, *Food That Connects Us All* is a novel community program providing meals consistent with the planetary health diet to low-income families. This program attempts to overcome some of the limitations of other food assistance programs.

The largest program addressing food insecurity in the U.S. is SNAP, which cost US$60.3 billion in

Figure 1. Responses of 242 Participants in *Food That Connects Us All* to Four Questions in a Food Survey



2019 (Duffin, 2020). Retailers can accept SNAP funds for essentially any food product, including candy, chips, sodas, doughnuts, and other convenience foods; analyses from the National Health and Nutrition Examination Survey show that participants were likely to make food choices that have relatively poor dietary quality (Leung et al., 2012a). Among children 2 to 17 years old, SNAP recipients were more likely to consume sugar-sweetened beverages and to be overweight or obese compared to those who did not receive SNAP benefits (Twarog et al., 2020). SNAP participants have a higher consumption of sugar-sweetened beverages compared to some SNAP-eligible nonparticipants (Nguyen & Powell, 2015). SNAP

has been implicated in increasing both diet and health disparities (Fang Zhang et al., 2018). SNAP participants are at higher risk of hypertension, cardiovascular disease, diabetes, and have higher risk of all cause, cardiovascular, and diabetes mortality compared with other American adults (Conrad, Rehm, Wilde, & Mozaffarian, 2017; Leung, Willett, & Ding, 2012b; Nguyen, Shuval, Bertmann, & Yaroch, 2015). In order to increase access to staple foods in high-priority food areas, SNAP was updated with standards to increase the "depth of stock" of healthier foods. In Baltimore City, however, the barriers to providing better foods in food deserts have included low customer demand and the potential for food spoilage (Ross, Krishnan, Ruggiero, Kerrigan, & Gittelsohn, 2018).

Food banks, which were traditionally established to alleviate hunger, are another source of food for low-income families. Many food banks have difficulties providing fresh fruit and vegetables, and not all leaders of food banks consider their organizations to be agents for change to promote health and reduce chronic disease (Wetherill, White, & Seligman, 2019). Many food banks do not want to turn down food, even though it may not be considered healthy (Wetherill et al., 2019). Other challenges with food banks include limited hours and the availability of mostly poor-quality foods (Bryan et al., 2019; Ginsburg et al., 2019).

A strength of *Food That Connects Us All* is an innovative application of the planetary health diet in a vulnerable population at high risk for obesity (Flórez et al., 2019), diabetes (Aguayo-Mazzucato et al., 2019), and cardiovascular disease (Graham, 2015). The planetary health diet was formulated—based upon the strongest scientific evidence—as the reference diet for promoting health and longevity and staying within planetary boundaries (EAT-Lancet, 2020; Willett et al., 2019). The program in Baltimore shows the feasibility of applying this healthy reference diet in an urban setting. The responses to the survey showed a high rate of satisfaction with the food by the participants. According to one of the program directors, initially the meals were somewhat of a shock to some of the participants, who were accustomed to eating beef, pork, and highly processed foods and snacks (Irena Stein, personal communication, August 21, 2020). However, the participants expressed overall satisfaction with the meals.

The program provides meals on a daily basis, which allows for inclusion of fresh vegetables and fruit that have a limited shelf life. The program offered a reasonable working wage to cooks and personnel and supports locally sourced foods. The planetary health diet is sustainable for the planet; if the diet were adopted worldwide, there would be an estimated 23% reduction in agricultural global greenhouse gas emissions (Semba et al., 2020).

As noted above, meals are provided daily by the program. A more convenient alternative may be to supply a week's worth of food in one pickup; however, prepared fresh salads, fruit, vegetables, and dairy products may lose quality and appeal after storage in a refrigerator beyond a day or two. Nuts are not included in the meals because of concerns about nut allergies among the participants. The meals are relatively expensive, as the total cost of one meal, including food costs, food preparation, transport, and delivery, is US$10.00/meal, compared with US$1.40/meal provided by support from SNAP (Center for Budget and Policy Priorities, 2019). The long-term impact of these healthy meals on recipients' health outcomes is not known because the program was just recently initiated. The formulation of the planetary health diet is based on what is considered to be an ideal healthy reference diet that reduces risk of heart disease, diabetes, obesity, cancer, and mortality (EAT-Lancet, 2020; Willett et al., 2019). There may be long-term benefits in providing healthy food to high-risk, low-income families, such as reducing chronic diseases and the related health care costs (Jardim et al., 2019). *Food That Connects Us All* demonstrates the feasibility of providing an ideal reference diet during the COVID-19 pandemic to vulnerable, low-income families who have a high risk for poor health outcomes.

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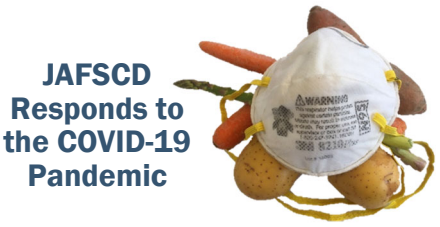
COMMENTARY ON COVID-19 AND THE FOOD SYSTEM



Community-led food resilience: Integrating grassroots food access into municipal emergency planning

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The initial impact of the COVID-19 pandemic was a severely disrupted conventional food system, exacerbating issues of food access for populations previously experiencing food insecurity. Simultaneously, the number of individuals requiring food assistance continued to rise. In Baltimore City, municipal emergency responders who were activated as part of the city's food resilience plan worked overtime to coordinate adequate food access to communities in need. The challenges they faced were compounded by public health guidelines and policy restrictions, leaving common emergency food strategies such as community feeding untenable. However, the reaction to COVID-19 set the stage for new food response efforts outside the established network players. The need for a shift in food access strategies was answered by emergent, community-led partnerships engaging in responsive food recovery and distribution.

Typically, emergency food assistance relies on autonomous organizations, such as food banks and food pantries, and is not explicitly integrated into emergency management operations. Baltimore, however, has emerged as a national leader through the city's efforts to address community-driven

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emergency and long-term food security. Established in the aftermath of the Baltimore Uprisings—protests following the death of Freddie Gray while in custody of the Baltimore police in 2015—the role of the Baltimore Office of Sustainability was essential in the city's coordination of food access actors present in their network.

Abby Cocke, an environmental planner for the Baltimore Office of Sustainability notes,

> Community organizations were on our radar from the beginning because of our work with the Resilience Hubs, a network of major non-profits, faith institutions, and other community-centered organizations that serve their neighbors. We had been equipping these hubs with emergency supplies in case of climate disasters, and when COVID-19 hit, they were on our radar in terms of food because most already ran food pantries or soup kitchens, or else started them up quickly.

Despite the city's progressive emergency plan, the pandemic exposed the difference between those engaged in food access at the institutional and the hyperlocal grassroots level. Those referred to as "grassroots" are entities not previously named in the city of Baltimore's municipal emergency operations. From breweries producing hand sanitizer to restaurants donating meals, local food service businesses appropriately pivoted to fill specific needs within their community.

Among the many grassroots organizations working to address COVID-19–related food insecurity in Baltimore is Mera Kitchen Collective. Prior to COVID-19, Mera Kitchen Collective primarily hosted pop-up events and provided catering services. By utilizing their culinary background and talents, they support refugee and immigrant women through business development and food-based storytelling. Thanks to their pre-established commitment to creating positive change, they were able to form the partnerships needed to fully focus on providing food assistance to the Baltimore community during the pandemic. Through identifying key aspects of Mera Kitchen Collective's post-pandemic actions, the benefits that grassroots organizations bring to emergency responses become apparent.

Shifting Priorities

While the majority of commercial food service businesses were required to limit their person-to-person contact or shut down, Mera Kitchen Collective focused their energy to form a sustainable business model providing meals to those experiencing food insecurity. According to Aisha Alfadhalah, co-founder of Mera Kitchen Collective, their organization was hyper-aware of the importance of food assistance and mindful of how their business fit into the larger food network. This allowed them to showcase an agile shift in priorities to be able to respond to the crisis in real time. She says,

> In March several of our catering events were canceled. We knew many will be hungry and our workers depend on the income they make, so we created a GoFundMe to support our meal program. . . . We hope that by sharing delicious and healthy food, at an accessible price point, we can illustrate the economic, environmental and personal impact that we, as chefs and entrepreneurs, can have on the food system and individual livelihoods.

Building Trust

Typical emergency food procurement and distribution, while having greater access to institutional resources, often relies on generalized data and maps to make decisions about where to send food assistance. In many cases, the lack of direct and interpersonal relationships with community members leads to the people requiring services being overlooked for emergency assistance. Without a nuanced understanding of these needs, a sense of distrust between city institutions and communities is perpetu-

ated, leaving people unsure of accepting assistance. Through intentional relationship-building with the community, Mera Kitchen Collective is a prime example of an organization widely viewed as reliable, rendering their efforts to provide assistance successful. Regarding these efforts, Alfadhalah shares, "Our business has always been about centering our workers and creating community. Many individuals in Baltimore believed in our business and supported us when we started. The response to community meals was reciprocal to the generosity that Baltimore gave us."

As noted in the Baltimore Food System Resilience Advisory Report, "Interviews with community members suggest strong social capital in some, but not all, Baltimore neighborhoods. A lack of trust in formalized city institutions could hinder community-level uptake of City-led resilience and preparedness strategies" (Biehl, Buzogany, Huang, Chodur, & Neff, 2017, p. 3). Grassroots organizations like Mera Kitchen Collective demonstrate that through building rapport, organizations are able to be seen as a trustworthy resource and provide food assistance to more people because of it.

Collaborating

As food distribution was disrupted and service shut down, Alfadhalah mentions that partnerships were immediately formed with organizations "to increase [our] capacity in providing delicious and nutritious meals." Mera Kitchen Collective initially partnered with the restaurant Alma Cocina Latina to develop the Community Meals initiative. This partnership ensured income for workers of both organizations as well as free meals to those in need. Local farmers were also crucial partners in this effort, providing fresh produce while over 35 other groups and organizers distributed the food in their communities. In just the first three months of the initiative, their partnership provided over 54,000 free meals. This initiative would not have been as successful without the efforts of all organizations involved, emphasizing the importance of collaboration.

Conclusion

The characteristics of Mera Kitchen Collective's efforts have highlighted the fact that community-led emergency food initiatives are valuable resources and should be better integrated into emergency planning. Alfadhalah suggests, "City responses can work with local restaurants and small businesses in finding solutions and creating change in our society where quality food and dignifying labor is the center of the response." From Mera Kitchen Collective's perspective, "As food professionals, we dream to see a closer 'co-existence' within the urban communities through food . . . creating a dialogue and building bridges through food."

Partnering with grassroots organizations creates the link between institutions and communities, vital to addressing inequities and building long-term resilience. Food insecurity doesn't begin or end with the COVID-19 pandemic. There is still a long way to go to ensure equitable food security in the face of other food systems hazards, even in times of relative normalcy. As the likelihood of future pandemics and other kinds of disturbances increases, it is imperative to understand the characteristics that allowed these organizations to quickly address the gaps in equitable food access and long-term food system resilience. The work of Mera Kitchen Collective demonstrates how cities can rethink ways of approaching emergency food assistance centered on collaboration and trust.

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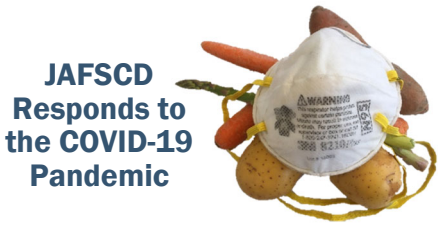
Vulnerabilities of the craft chocolate industry amidst the COVID-19 pandemic



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Introduction

Craft chocolate is a model within the global chocolate industry, promoting accountability, transparency, and ethical practices, while often citing unfair labor or poor agricultural practices recognized in conventional chocolate. However, amidst the COVID-19 pandemic, the craft chocolate industry is particularly vulnerable, and specialty cacao farmers may be asked to pay the price.

Craft chocolate, also known as fine, flavor, specialty, artisan, or premium chocolate, is recognizable by high flavor attributes, quality, and origin specificity of the cacao utilized. Those in the craft chocolate industry often practice direct trade to source high-quality specialty cacao beans (Gallo, Antolin-Lopez, & Montiel, 2018). Specialty cacao beans are generally destined for use in craft chocolate production and traded directly, commanding a significantly higher price per ton compared to commodity cacao (Daniels, Läderach, & Paschall, 2012).

The disruptions caused by the COVID-19 pandemic are now exposing the unique vulnerabilities of craft chocolate, and specialty cacao and industry members may face inequalities exacerbated by the global crisis. Direct-trade strategies and small-business practices are particularly consequential to the viability of the craft chocolate industry.

Materials and Methods

The materials and methods for the following analysis are an example of how connectivity and access to information are critical to raise global awareness of the unique challenges for the specialty cacao industry.

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Craft chocolate and specialty cacao industry surveys reporting the ongoing COVID-19 pandemic were investigated along with industry announcements and bulletins found online. Additionally, specialty cacao farmer and craft chocolate industry interviews in Spanish and English were examined for first-hand accounts on industry vulnerabilities amidst the COVID-19 pandemic. A review of the literature and preliminary analyses of secondary data were aggregated using Google and the Google Scholar database for all publications related to COVID-19, specialty cacao, and craft chocolate as of September 2020 to complement references cited in the primary literature and unpublished studies.

Direct Trade

Many craft chocolate makers source specialty cacao from origin using direct trade agreements with farmers to produce higher-quality beans (McCabe, 2015). The unique standards for quality in craft chocolate production require considerably more diligence in maintaining control throughout the entire value chain, with some chocolate makers rejecting 94% of the beans sampled for craft chocolate production (Chuang, 2020). With international and domestic restrictions disrupting travel to cacao origins, reduced producer interactions have effectively removed a major quality control and communication channel.

Additionally, specialty cacao buyers often operate on private contracts (Giller, 2017) that may be difficult to honor with decreased revenue from the loss of craft chocolate sales. Reduced operations for these businesses would equate to a loss of buyers for farmers who may not be prepared to quickly find and negotiate new contracts with specialty cacao buyers at a comparable price. Producers are already facing uncertainty for export sales in the short term, with buyers asking to renegotiate existing contracts, and in the long term, potentially going out of business or waiting to recoup costs before making additional purchases (Martin & Ganem, 2020). The travel restrictions due to the pandemic affect the ability of craft industry members to sustain in-person trading relationships. An overreliance of specialty cacao producers on few buyers suggests that selling into craft chocolate supply chains is not a sustainable option for farmers, who may be less willing to invest in specialty cacao production due to constraints along the marketing chain, as previously observed in Ecuador (Díaz-Montenegro, Varela, & Gil, 2018).

Logistics and distribution systems were known to be difficult already before the pandemic, and government-mandated road closures and travel restrictions as well as accessibility to affordable petrol have intensified in many cacao-producing countries (Well Tempered, 2020). The specialty cacao industry also interfaces uniquely with less accessible communities, such as indigenous communities in the South American Amazon who have historically experienced disproportionate inequalities that are further revealed and exacerbated by the COVID-19 pandemic and may face greater difficulties delivering on contracts.

Small Business Proprietorship

The upfront investment in labor and capital required to produce craft chocolate is also much higher than that of industrial chocolate, due to craft chocolate makers operating on a much smaller scale, using manual labor to perform tasks that would be automated in industrial systems, with diverse flavor batches and high attention to detail (Giller, 2017). Craft chocolate businesses often partner with hotels and airport shops, which saw a decline in clientele due to reductions in tourism and travel. Small craft chocolate businesses are often reliant on foot traffic and industry events to reach customers and may not be equipped to rapidly transition to e-commerce strategies that allow for no-contact sales amidst the COVID-19 pandemic.

The results of a flash poll, entitled "Coronavirus and its impact on small chocolate businesses," conducted by the Fine Chocolate and Cacao Institute (FCCI, 2020) included data gathered from 125

chocolate companies, primarily from North America (52.8%), with the rest coming from Europe (22.4%), and grouped South America/Caribbean (15.2%) and Asia/Australia regions (9.6%).

Major findings include that nearly 80% of craft chocolate businesses have been affected or expect to be affected at a level of "significant" or "existential threat" due to the global pandemic (FCCI, 2020). About 17% of these businesses experienced over a 90% decrease in sales (FCCI, 2020). Small chocolate businesses experienced a loss of sales due to reduced sales to customers in person (87%) and sales to businesses (79%) (FCCI, 2020). Additionally, 59% of respondents "are or anticipate increasing [their] digital marketing efforts" over the foreseeable future (FCCI, 2020, 15:02). These results do not reflect the fragility of the chocolate industry as a whole, but specifically the small fraction (less than 5%) that encompasses craft chocolate.

Conclusion

Specialty cacao producers are often asked to shoulder the burden of production, maintenance of consistent quality, and reliance on buyers while wielding the least amount of leverage and resources. Specialty cacao buyers have done well to encourage transparency and accountability systems, including publishing annual sourcing reports that describe on-farm production practices, highlight farmer profiles, and divulge prices paid to farmers for specialty cacao. Following in the footsteps of third-wave coffee industry members, offering cacao producers more robust contracts that guarantee sales and allow for more flexibility in accommodating quality issues along the supply chain may mitigate the burden on farmers.

Additionally, programs that support online communication and sales opportunities for craft chocolate industry members, such as the "Stay home With Chocolate" initiative (an online collaborative platform to boost craft chocolate businesses), have been successful in generating online outreach mechanisms for craft chocolate businesses. Online industry panel events featuring specialty cacao producers have also provided a platform for stakeholders to interact and share perspectives on the pandemic. The fragility of the craft chocolate industry has been recognized by industry members for years and the global crisis has further highlighted the need for investments in farmer relief, improved access to technology for business needs, and farmer empowerment for negotiations with buyers to mitigate risks.

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COMMENTARY ON COVID-19 AND THE FOOD SYSTEM

COVID-19 responses: Food policy councils are "stepping in, stepping up, and stepping back"

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Abstract

In the wake of the COVID-19 pandemic, food policy councils (FPCs) have emerged as a critical structure for organizing community-based responses to multiple food system issues. Strong relationships with

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various food system stakeholders have proven essential in inspiring coordinated action. Using the early results of a Johns Hopkins Center for a Livable Future survey of FPCs (2020), we discuss some of the accomplishments and contributions that 118 FPCs have made toward addressing hunger and supporting producers, school food, food chain workers, racial equity, and resilience in the United States and in tribal nations.

Keywords
COVID-19, Pandemic, Food Policy Councils, Emergency Food, Food Insecurity, Hunger, Producers, School Food, Food Chain Workers, Racial Equity, Resilience

> "We are taking care of everyone that has asked for help to the best of our ability."
>
> — *From the Cass County (Iowa) Food Policy Council's survey, 2020*

In these unprecedented times, food policy councils[1] (FPCs) have been thrust into roles beyond anything their members could have imagined. FPC members represent different food system sectors. Prior to COVID-19, they were working together and collaborating with other food system actors (e.g., producers, retailers, emergency food providers, public health practitioners) to educate stakeholders about food system issues, advocate for food and agriculture policies, mobilize residents to influence decision-makers, and advise governments and institutions on policy. As a result of the concurrent pandemic and structural racism crises, the convening role of FPCs has been crucial to their success in responding to the food and agricultural needs of their communities. During this time, FPCs have continued to fulfill the roles above and assumed new ones, all with a heightened urgency and seriousness.

We have witnessed many councils "stepping in, stepping up, and stepping back" because of their established relationships with food system actors in order to determine how they respond to both immediate and long-term needs in their communities. Below, we highlight several illustrative examples from FPCs across the U.S. and Tribal Nations that are transitioning from their pre-pandemic plans to prioritize emergency food assistance, link food producers to new markets, and take on other issues related to the crises. The examples below were collected as part of the Johns Hopkins Center for a Livable Future (CLF)'s annual census of FPCs (CLF, 2020); the latest version includes 20 questions relating to COVID-19. Responding to questions about their role or accomplishments in addressing COVID-19, these examples are either direct quotes or summaries of responses, and are grouped thematically below. This commentary reflects responses from 118 FPCs who completed the survey by July 21, 2020. A more comprehensive and in-depth analysis of responses is currently underway.

Emergency food assistance: The Lake County Food Access Coalition (Colorado) "came together with community members and organizations to create emergency feeding plans, a food pantry, and a food delivery service," open to all community members in this rural county. White Earth Food Sovereignty Initiative (Minnesota) is feeding community members, particularly older residents, while working to start a mobile grocery store that sells traditional native foods. The Dakota County Voices for Food (Nebraska) "raised and solicited over [US]$40,000 in funds to address hunger, coordinated the distribution of 1,200 food boxes, and converted the county's food pantry to a drive-up model."

[1] A food policy council is defined as an organized group of stakeholders from various sectors that may be sanctioned by a government body or may exist independently of government, which works to address food systems issues and needs at the local (city/municipality or county), state/provincial, regional, or Native American/First Nations levels through policy.

Linking food producers to new markets: Lehigh Valley FPC (Pennsylvania) assisted in saving several farms that had lost their commercial accounts by helping them to divert their products to other retail outlets and by connecting producers directly to school and pantry programs to improve healthy food options. The South Coast FPC (Massachusetts) has distributed 30,000 Farmers-to-Families Food Boxes. Frederick County FC (Maryland) set up a secure online marketplace to sell and buy local food. High Desert Food & Farm Alliance (Oregon) acquired funds to reimburse farmers for food donations.

Food security: The Marshall FPC (Indiana) has shared information with the public on Pandemic EBT[2] (P-EBT) cards and helped change SNAP guidelines. The Jefferson County FPC (Colorado) worked with state partners to obtain a SNAP waiver for online ordering and delivery via Amazon and Walmart. The Montgomery County FPC (Maryland) is "coordinating the food assistance response of 100+ emergency food providers, connecting local food producers and farms to the food security response efforts, [and] advocating for enhanced food security measures (expanded SNAP, P-EBT, summer meals, etc.) to support food access." Eat Well Crawford County (Kansas) worked to get permission from funders to utilize current grant funds to address food insecurity resulting from COVID-19, particularly in rural communities.

School food: The Adams County FPC (Pennsylvania) arranged weekly phone calls with public schools to share plans, discuss delivery options, identify gaps and available resources, and use the backpack program to fulfill needs. Syracuse-Onondaga Food Systems Alliance (New York) co-hosted a convening of school food service professionals "to celebrate their work in the face of the crisis and identify opportunities to build connections to ensure students have the food they need even as schools are closed." Chatham Community Food Council (North Carolina) facilitated discussions among emergency summer food providers to streamline needs and fill gaps.

Food chain workers: The Detroit FPC (Michigan) successfully advocated for funds to provide personal protective equipment (PPE) for grocery workers. The Rhode Island FPC called on the governor to designate grocery clerks and stockers, fast food workers, food hub workers, and school meal preparers as Tier 2 emergency workers, which would provide access to free childcare. Western Michigan Food Recovery Council highlighted the disproportionate impacts of COVID-19 faced by Black, Indigenous, People of Color (BIPOC) communities, which led to recommendations to the state for more PPE and protection for front-line food workers.

Racial equity: Philadelphia FPC (Pennsylvania) is hosting monthly gatherings "to explore and initiate COVID-19 responses that address root causes (racism and oppression), foster collaboration across the food system, and work towards a more just Philadelphia where all people have the power to access, own and control their food, land and labor." Greater Nashua Food Council (New Hampshire) is holding conversations on racial equity with 20 to 25 active organizations, government officials, and community members, and will be holding a training about becoming a more culturally effective organization. As data about massive racial disparities in the health and economic impacts of COVID-19 began surfacing, the Greater Kansas City Food Policy Coalition (Kansas and Missouri) sought to engage stakeholders, such as

[2] Pandemic EBT program was authorized in the Families First Coronavirus Response Act. It provides food assistance for non-SNAP households to offset meals costs that children would have received at school, and also provides a supplement for current SNAP households.

meat factory workers, in developing appropriate policy responses. Doing so prompted the Coalition to start exploring immediate and long-term changes to increase BIPOC and low-wage food chain workers' participation and leadership in the Coalition.

Policy: In Jefferson County (Colorado), the FPC meets weekly to share and discuss on-the-ground needs, local and state food policy, and additional updates among partners, city managers, city mayors, county commissioners, and additional decision-makers. Knoxville-Knox County FPC (Tennessee) serves as the primary contact for food-related issues for the city and county Emergency Operations Center. Grow Montana FPC successfully advocated for farmers markets to be considered essential businesses during the state's mandated lockdown. San Diego Food Systems Alliance (California) developed a COVID-19 food policy platform for all levels of governments.

Resiliency: While community needs remain urgent, several groups (Prince George's County Food Equity Council, Maryland; Humboldt FPC, California; Baltimore Food Policy Initiative, Maryland; Hartford Advisory Commission on Food Policy, Connecticut; Montgomery County Food Council, Maryland) are working on resilience strategies to weather future disruptions to their communities and food systems. Austin-Travis County Food Policy Board (Texas) is highlighting how the pandemic underscores the systemic change needed in the local food system.

Key to strengthening and sustaining FPCs' efforts to address the dual COVID-19 and structural racism crises in the U.S. will be learning from and supporting leadership of people from low-income communities and communities of color, who have successfully organized for decades during times of crises. Many councils are heavily represented by professional white women who may struggle to meaningfully engage community members who are most affected by inequities in the food system, who frequently are BIPOC. Recently, as more councils recognize the manifestation of racism throughout every facet of society, they also acknowledge and are acting upon the need to modify their councils' principles and practices to more explicitly reflect core values such as racial equity, food justice, and food sovereignty. In this sense, councils are "stepping back" to examine how they can support low income and BIPOC engagement, participation, and leadership in councils and in their communities more broadly.

What was presumed to be a few months of uncertainty and disruption as COVID-19 first took hold in the U.S. is evolving into a reorganization of our country's social and economic systems—systems that have been failing many communities for years, as has been seen in the heightened exposure of structural racism. Building new systems from the ground up means lifting up what is working, attending to the trauma that was already present, and preparing for the long-term transformation that is needed to address structural racism, classism, and other -isms in this country. FPCs across the country are doing their best to build on their core strength of acting as conveners of entities across the food system to build partnerships, coordinate resources, and inform decision-makers about the policy needs of their communities. In order to sustain and strengthen their responses to COVID-19, councils need platforms for sharing strategies that work; fast, reliable local data to understand community needs; and resources to support the people and initiatives that make FPCs effective.

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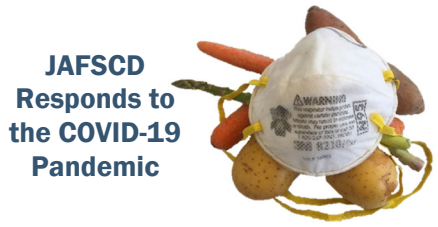
COMMENTARY ON COVID-19 AND THE FOOD SYSTEM

Interventions and compliance: How the response to COVID-19 reflects decades of retail food protection efforts



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Abstract

Preventing the spread of infectious disease relies heavily upon the development and implementation of public health interventions. The requisite debate over the effectiveness of these interventions is accompanied by discussions about which, if any, should be made mandatory. We contend that efforts to mandate interventions in the fight to prevent the spread of COVID-19 have clear similarities to the long-standing efforts to establish and promote retail food safety interventions. Specific similarities are that science is rarely the sole driver in deciding public health mandates and individuals' responses to them, compliance is key but can be difficult to achieve, and the concurrent incorporation of two or more interventions is a barrier against poor compliance. As these factors have a direct effect on the success of public health mandates, understanding the role and relationships among them can aid government and public health officials in ongoing efforts to prevent foodborne illness and slow the spread of COVID-19.

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The conclusions in this article are those of the author(s) and do not necessarily represent the views of the FDA, Baltimore City Health Department, or Johns Hopkins University.

Keywords
Retail Food Safety, COVID-19, Pandemic, Interventions, Compliance, Decision-making, Hurdle Approach, FDA Food Code, Face Coverings, Handwashing, Policy Debate

The ongoing pandemic of SARS-CoV-2, the virus that causes COVID-19, has demanded the full attention, resources, and coordinated response of government agencies throughout the United States. From just a few confirmed cases in January 2020, the number of confirmed cases in the U.S. reached nearly 800,000 by the end of April 2020 (Schuchat, 2020). Government officials worked quickly to inform the public that the virus was predominantly spread from person to person via respiratory droplets and that there was no evidence of food being associated with the transmission of COVID-19 (Rizou, Galanakis, Aldawoud, & Galanakis, 2020). However, despite guidance and recommendations for mitigation being issued in early March, confirmed cases of COVID-19 had reached some three million by July 1 and some five million, with over 180,000 deaths, by August 27, 2020 (Johns Hopkins University [JHU], 2020; Schuchat, 2020).

While a compendium and critique of the many factors that have contributed to the acceleration and prevalence of COVID-19 are beyond the scope of this article, key community mitigation strategies have included quarantine, business closures, physical distancing, and use of facial coverings, as well as frequent handwashing and surface disinfection (Burris et al., 2020; Krishnamachari et al., 2020). Individuals as well as state, local, tribal, and territorial governments have varied in their support for implementing, mandating, and abiding by mitigation strategies recommended by public health officials. These variations in the acceptance and application of, and compliance with, mitigation strategies have undoubtedly had an impact on the spread of COVID-19 and is reminiscent of challenges encountered during decades of work to prevent foodborne illness associated with retail and foodservice establishments. Efforts to establish and promote food safety practices consistently encounter three factors that are also impacting the current COVID-19 response. These are (1) science is rarely the sole driver in deciding public health mandates and individuals' response to them, (2) compliance is key but can be difficult to achieve, and (3) the hurdle approach—incorporating two or more interventions—is a firewall against poor compliance.

Science has played a key role in understanding and addressing food safety issues in retail food establishments. By identifying and investigating the impact of food safety interventions, research evidence has allowed regulators and the industry to make critical improvements in the control of foodborne illness risk factors. What is often overlooked, however, is that science and research evidence, while instrumental in identifying effective food safety interventions, are rarely the only determinants of whether food safety interventions are made mandatory (Liggans, Carrington, & Otto, 2020). Decisions about what interventions should be made mandatory, through public or organizational policy, are often the outgrowth of a scientific foundation upon which a myriad of nonscientific considerations are discussed and weighed. Considerations such as politics, societal norms, economics, logistics, and even moral values interplay with the science and research evidence to inform decision-making.

The strife over mandating interventions to combat the current spread of COVID-19 is a great example of the interaction between science and nonscientific considerations. Prevailing evidence from the growing amount of scientific data published regarding SARS-CoV-2 (Zuber & Brüssow, 2020) has led many researchers and public health officials to assert handwashing, surface disinfection, physical distancing, and use of face coverings as viable public health interventions. While scientific disagreements and misinformation persists, and irrespective of debate over the effectiveness of each intervention, support for voluntary implementation and compliance has been widespread (Fisher et al., 2020; Pennycook, McPhetres, Zhang, Lu, & Rand, 2020). However, in various parts of the country, pushback, public back-

lash, and variation in compliance has accompanied the efforts to make such interventions mandatory. Countries including the U.S. have witnessed protests, political debates, lawsuits, criticism, and even threats of bodily harm to business owners and government officials over mandatory measures (Alund, 2020; Briscese, Lacetera, Macis, & Tonin, 2020; Burris et al., 2020; Gallion, 2020; Gharib, 2020).

The effectiveness of any intervention or mitigation strategy, be it voluntary or mandatory, is dependent to a large extent on the ability and willingness of individuals, communities, and organizations to comply. However, decades of work to prevent foodborne illness have shown that compliance is essential but often difficult to obtain (Harris, DiPietro, Line, & Murphy, 2019; U.S Food and Drug Administration [FDA], 2018). For instance, handwashing and the longstanding effort to prevent food employees from touching ready-to-eat food with their bare hands are well established food safety practices, but are not always complied with. Although known to be effective at preventing contamination of food and food contact surfaces, not all regulatory agencies or individuals have agreed with or supported requiring that there be no bare-hand contact with exposed, ready-to-eat food (Zuraw, 2014). Even where mandated and enforced, 100% compliance with proper handwashing and no bare-hand contact has been elusive. Ironically, although COVID-19 is a respiratory illness, the emphasis placed on more frequent handwashing to combat its spread may have both an immediate and lasting impact on improving food employee hand-washing practices.

The refusal of some individuals to comply with mandated and voluntary interventions during this global COVID-19 pandemic illustrates the complexity of compliance. Take the issue of face coverings. Even with public health officials promoting the use of face coverings to reduce the incidence of transmission (Brooks, Butler, & Redfield, 2020), moving from merely a voluntary recommendation to mandatory use sparked heated debate (Lyu & Wehby, 2020). Moreover, in both cases, as in previous pandemics, compliance has varied (Abbott, Greenhalgh, St. Clair, & Bush, 2020; Fisher et al., 2020). The common denominator is the human element. Individuals weigh a myriad of scientific and nonscientific considerations to help shape their behaviors and determine their willingness to comply. In fact, research suggests that sanctions, norms, moral values, and legitimacy are four key factors that drive compliance (Tyler, 2017). For some time now, behavior theories have been used in the development and implementation of public health interventions (Glanz & Bishop, 2010). Increasingly, enforcement strategies and outreach efforts are using insights from behavioral science to encourage compliance with established food safety interventions (Green, 2008; Lin & Roberts, 2020). Organizations have recognized the need for taking a similar approach to drive compliance with interventions designed to limit the spread of COVID-19 (Van Bavel et al., 2020; West, Michie, Rubin, & Amlôt, 2020).

In addition to the fact that individual compliance with interventions will vary, a single intervention may not completely control or eliminate a food safety hazard. For this reason, food safety regulators have long promoted the hurdle approach—incorporating two or more interventions—to reduce or eliminate food safety risks (Mogren et al., 2018). By layering interventions, with each receiving different degrees of compliance, we hope to more fully control risks. The hurdle approach can thus serve as a firewall against poor compliance with any single intervention.

Use of the hurdle approach in mandating the concurrent use of restricting or excluding ill food employees from working with food, proper handwashing procedures, and eliminating bare-hand contact with exposed, ready-to-eat food (as outlined in the U.S. Food and Drug Administration Food Code, 2017), has been a success in food safety. Together, these three interventions have been described as a three-legged stool. Each leg is needed to be completely effective at reducing the transmission of foodborne pathogens to food. If any leg is removed, the stool will fall. Similarly, in the fight against COVID-19, handwashing, surface disinfection, physical distancing, and the use of face coverings are not completely effective alone, which makes their concurrent use a means of more fully controlling risk. The

ongoing difficulties in implementation and variation in compliance with any one intervention supports the need for continuous application of the hurdle approach during the global coronavirus pandemic and in the ongoing fight against foodborne illness.

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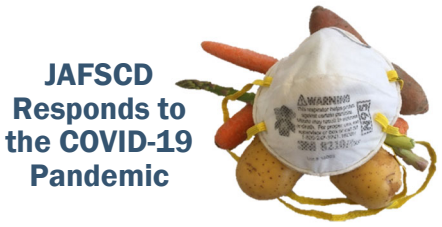
COMMENTARY ON COVID-19 AND THE FOOD SYSTEM

Iteration, innovation, and collaboration: Supporting farmers markets' response to COVID-19



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The value proposition of farmers markets has been altered by the COVID-19 pandemic. The festival-like features of markets put on hold, the in-person social interactions reduced, the physical flow of walk-up markets changed. Just as previous crises[1] called upon markets to shift their operations to serve their community, the 2020 story highlights how once again, these low-capacity/high-functioning entities have been forced to reinvent themselves. This time, alternative models involving online pre-orders, drive-thru, and curbside product pick-up scenarios have been rapidly put in place by individual vendors and market operators. Open-air and shed market vendor placements have been redesigned to allow for social distancing among both vendors and customers. Sanitation and public safety measures including gloves, hand sanitizer, and hand-washing facilities are now essential considerations.

The specific challenges faced by market organizations to implement those changes that have been reported to Farmers Market Coalition (FMC) and to its state and network-level partners[2] include:

- Market-day operational restrictions due to public agency mandates that change regularly, ignoring the realities of outdoor retail venues and forcing significant redesign.

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[1] https://www.youtube.com/watch?v=cxIbm-EyATs&feature=youtu.be
[2] https://farmersmarketcoalition.z2systems.com/np/clients/farmersmarketcoalition/publicaccess/membershipDirectory.do?md=2

- A sharp decline in organizational revenue stemming from decreased vendor participation and funder disruptions.
- Increased expenses related to new safety measures, including additional staff needs and equipment purchases such as PPE and handwashing stations.
- Individual vendors' needs around evolving technology and marketing.
- The need to integrate online ordering, delivery, prepacked box programs, and other shopping and purchasing options.
- The expansion of the U.S. Department of Agriculture (USDA)'s SNAP online purchasing pilot[3] in the spring and summer of 2020 (an important response to COVID, bringing online SNAP benefits to thousands of new households) is still only available when purchasing SNAP-eligible goods through larger retailers such as Amazon and Walmart. This pilot has yet to be extended to smaller retailers, including farmers markets and other direct-to-consumer outlets, once again leaving regional food economies largely out of the conversation around nutrition assistance.

These reports also indicate that the increased consumer interest in healthy options has buoyed local food systems, but not without added pressures: 93% of the market operators who responded to FMC's May 2020 survey reported an increase in expenses associated with COVID-19 mitigation, and 74% reported a loss in income frequently ascribed to the loss of sponsors or a reduction in the income via vendor fees. For example, at some markets vendor participation has dropped by one-third or more in 2020 over the same period in 2019 (Burger & Benz, 2020). In a survey conducted by the California Alliance of Farmers Markets, nearly 20% of market operators expressed concern that they may not be able to sustain the economic impacts of COVID-19 over the long term (Feldman & Creps, 2020).

Resources and Networking

In early March, the Farmers Market Coalition began to organize resources and advice collected from market operators developing COVID-mitigation strategies, including detail as to what was working and what was not. During this time, the state-level association leaders[4] that FMC regularly convenes were doing the same with issues specific to their states, working with public health leaders[5] to establish sensible guidelines for their markets. These documents and communications were organized into blog posts on FMC's website and included tips for staying informed at the municipal and state levels; guidance regarding market operations; examples of communications with vendors, customers, media, and the public; and policy changes and declarations. These posts also included policy documents, practical toolkits designed by markets and market organizations, news articles and op-eds, webinars, instructional photographs and videos, and planning materials. Market operators shared what they were learning in a series of FMC webinars, including *Farmers Market Physical Redesign, Market-Tested Sales Platforms for Shopper Pre-Orders,* and *Thinking Inside the Box—Making Healthy Food Accessible with Curbside/Drive-Thru (Contactless) Models.* Those tools and data are now housed in FMC's Resource Library to serve as permanent emergency response resources. Information continues to be added to this library as the pandemic and public health measures evolve.

The pandemic has also intensified the need for communities of practice and clarified FMC's role in providing a platform for innovation and collaboration. As part of this work, FMC is participating in a project managed by the USDA Agricultural Marketing Service and the University of Kentucky. The

[3] https://www.fns.usda.gov/snap/online-purchasing-pilot
[4] https://www.mfma.org/COVID-19/
[5] https://extension.psu.edu/covid-19-vendor-tests-positive-or-exposed-to-someone-who-has

Local Food Systems Response to COVID[6] project is drawing on the expertise of national agriculture and economic researchers working collaboratively with 17 local food marketing partners in assessing the overall impact of COVID-19 on local and regional food systems. In the summer of 2020, FMC shared an initial impact assessment of the sector with project collaborators detailing how the pandemic has affected market organizations, both socially and economically. That assessment will assist stakeholders in better understanding where to offer support and will also become the roadmap for FMC's resource development for market operators. Those resources include one or more innovation briefs highlighting alternative market models, led by the University of Kentucky, as well as a case study exploring the budgetary impacts of COVID-19 on flagship farmers markets.[7] In addition, in September 2020, FMC conducted another national survey to solicit updated COVID impact data from market organizations, including the challenges posed and adaptations implemented during the summer 2020 market season. FMC will share the results of this survey with researchers from the Local Food Systems Response to COVID project and collaborate on analysis of the data. These initiatives are proving timely in the effort to collect valuable information and apply useful solutions to operational barriers for farmers markets, both in the near and long term. Cultivating relationships with other local and regional food systems leaders will be essential in navigating future crises, particularly those situations where supply chains are disrupted and vulnerable populations face further threats to food security.

Advocacy

In coordination with partners such as the National Sustainable Agriculture Coalition, National Young Farmers Coalition, Carolina Farm Stewardship Association, National Farmers Union, and the National Association of State Departments of Agriculture, FMC undertook significant advocacy efforts beginning early in the pandemic. The mid-March press release *Family Farms and Farmers Markets Are Essential*[8] outlined the need to:

- explicitly include these businesses in any federal stimulus relief package to ensure that farmers markets are able to continue to operate while implementing best practices to minimize the spread of COVID-19;
- proposed adding flexibility to federal programs (including the Farmers Market and Local Food Promotion Program [FMLFPP], Value Added Producer Grants, and the Gus Schumacher Nutrition Incentive Program) affecting these outlets; and
- emphasized the importance of state and local government support in keeping farmers markets operational.

In an op-ed for Civil Eats titled *We Must Save Farmers' Markets,*[9] which FMC co-authored with Heart of the City Farmers' Market,[10] and a call to action[11] delivered by FMC to urge senators to include support for farmers market operators in their consideration of the HEROES Act relief legislation, many issues were presented and potential solutions offered in an effort to gain the same support for the community

[6] https://lfscovid.localfoodeconomics.com/

[7] The development of market types was first begun by the nonprofit Market Umbrella in its 2010 trans•act research, and has been continued by FMC in analyses such as the 2019 report for the city of Pittsburgh, *Strengthening Pittsburgh's Farmers Markets* (https://farmersmarketcoalition.org/resource/understanding-and-improving-pittsburghs-farmers-markets/).

[8] https://farmersmarketcoalition.org/wp-content/uploads/2020/03/Stimulus-Bill-COVID19-RELEASE-2020-FINAL.pdf

[9] https://civileats.com/2020/05/29/op-ed-we-must-save-farmers-markets/

[10] https://heartofthecity-farmersmar.squarespace.com/

[11] https://farmersmarketcoalition.org/ask-the-senate-to-provide-relief-to-farmers-market-operators/

food system as the global industrial system. For example, the CARES Act, signed into law on March 27, 2020, provided Paycheck Protection Program (PPP) benefits to 501(c)(3) organizations and designated US$300 million in additional funding for the Supplemental Nutrition Assistance Program (SNAP). However, these funds did not specifically target farmers markets or those entities managing incentive programs.[12] As for farmers, the Coronavirus Food Assistance Program (CFAP) provides much-needed assistance to agricultural commodity producers facing supply chain interruptions and other significant costs associated with COVID, but does much less to help small farmers, including young and BIPOC farmers who may already face additional barriers in accessing capital, land, and markets (Figueroa & Penniman, 2020).

Conclusion

Farmers Market Coalition regularly celebrates the role of local food systems—and farmers market organizations specifically—in creating positive change. Yet, more stakeholders are needed to assist FMC and its state partners to ensure that markets remain welcoming and inclusive spaces for all who wish to participate, while also ensuring they receive sustained funding and policy support. The impact of COVID-19 created rapid change, adaptation, and innovation in the farmers market sector and demonstrated its capacity for flexibility and resilience. FMC continues to amplify those successes while encouraging operators to seek site-specific data collection partnerships and foster collaborative learning both in and around their markets. For an increasing number of Americans, COVID-19 has highlighted the vulnerability of our food system and the value of having access to locally sourced, nutritious food. How and to what end markets and their partners apply what has been learned will assist entities like the Farmers Market Coalition in discerning how best to deploy their expertise and partnerships to develop positive sectorwide growth from this unprecedented challenge.

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[12] The bills did not offer aid to other 501(c) and nonprofit incorporation types, under which many markets and other food assistance programs fall.

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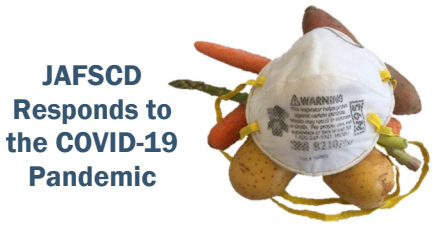
ICT solutions to support local food supply chains during the COVID-19 pandemic



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Abstract
The COVID-19 pandemic has disrupted food supply chains operations across the globe. Due to health safety practices like social distancing, local food supply chains such as farmers markets and food hubs are unable to conduct normal operations. This paper describes two low-cost information and communication technology (ICT) solutions developed for a farmers market and a food hub in Iowa to enable them to continue their operations during the pandemic while ensuring the safety of vulnerable consumers and essential workers. Other benefits of ICT for the long-term sustainability of local food systems are also discussed.

Keywords
Local Food, Farmers Market, COVID-19, Pandemic, Food Hub, Information and Communication Technology, ICT

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Introduction

The COVID-19 pandemic saw increased grocery store shopping due to consumers' fears of visiting a restaurant or even of food shortages. This panic buying situation resulted in empty grocery shelves at the supermarkets, and so consumers turned toward local food alternatives. However, the operations of market channels for local food such as farmers markets and food hubs were also disrupted due to social distancing measures and crowd size restrictions. Many farmers markets across the U.S. had to scale down or intermittently shut their operations due to a decline in the number of vendors as well as the number of customers visiting (Williams, 2020).

Adoption of information and communication technology (ICT) offers a potential solution to mitigate the disruption in local food supply chains, especially during times of crisis, such as the pandemic. This paper discusses two case studies where low-cost ICT solutions were developed for regional food supply chains in Iowa, which enabled them to continue their operations uninterrupted during the pandemic and improved their overall efficiency as well. We close by discussing future research directions and providing a brief description of the ongoing work to develop new ICT solutions for local food systems.

Case Studies

Virtual Marketplace for Riceville Farmers Market

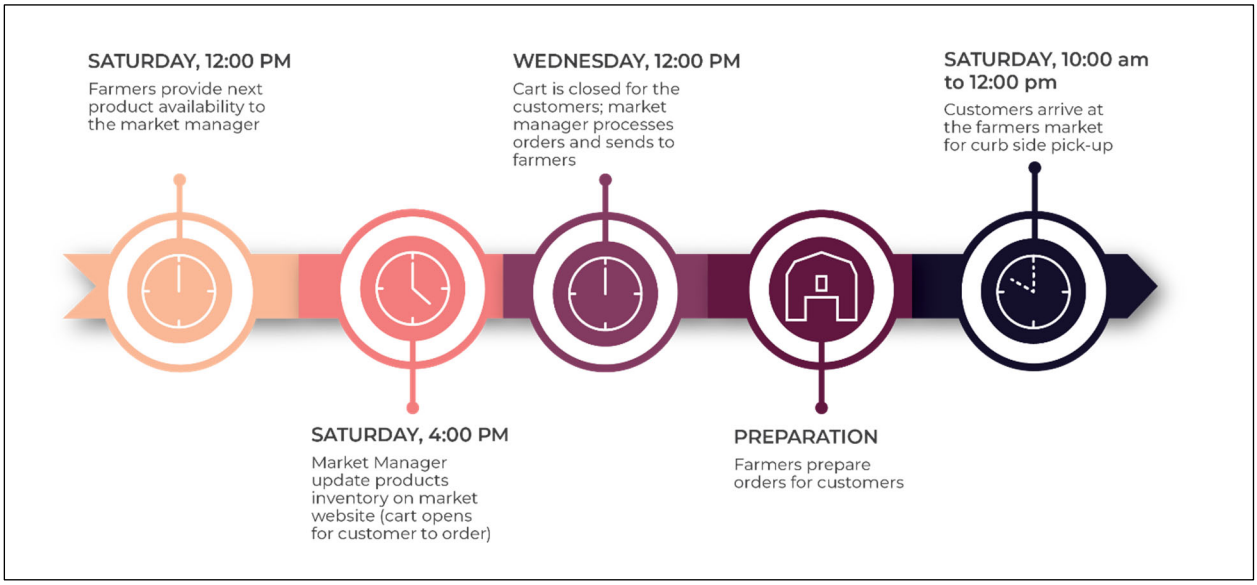
Riceville, a small city in northeastern Iowa with a total population of 827, consists primarily of an elderly population; the median age is 41.6 years (Data USA, 2020). The local farmers market is the primary source of fresh produce and bakery items for the people of Riceville, as there are no stores or supermarkets offering these items in the city. The farmers market in Riceville is operated by a nonprofit organization and is run primarily with the help of unpaid volunteers.

The farmers market starts its operations every year in May. However, with the onset of the pandemic and due to the vulnerable population in the city, it could not conduct normal operations by having customers visit farm stands at a physical location. Therefore, a virtual solution was required such that customers could visit a vendor's shop online and see the products that are available, purchase what they like, and get the products in a contactless manner, thus avoiding any potential exposure.

A virtual marketplace, developed using WordPress, was established to ensure that the continuity of the farmers market was maintained. The virtual market works on a weekly cycle, in which the farmers provide information on product availability to the market manager by Saturday. The online shopping cart opens every Saturday and customers can add products to their carts until the following Wednesday. Upon receiving the customer orders, market managers send the list of products that farmers need to bring to the farmers market on Saturday morning. The customers pick up their orders on Saturday morning via the curbside delivery option in a contactless manner. The customers are asked to bring individual checks and/or exact amounts in cash for each farmer based on their order. The exact amount owed to each farmer is displayed to the customer when they place their online order through the website. The timeline for these activities is shown in Figure 1.

The virtual platform is operated solely by the market manager, as many vendors selling through the farmers market are Amish, who abstain from using the internet. Therefore, additional automated solutions using Microsoft Excel and Visual Basic for Applications were developed for the market manager to quickly upload weekly inventory on the platform and develop order lists for all the vendors after the customers' orders. The platform has been developed with a very low initial and no running cost, as any incremental cost could be a burden on farmers and, thus, customers. While many web-based programs exist to help with this type of aggregation and distribution of products for farmers markets, most of them have monthly or yearly subscription fees, which puts additional financial burden on small

Figure 1. Timeline of the Activities in the Virtual Farmers Market at Riceville, Iowa



farmers. The initial advertisement of the online platform was done through the local newspaper as well as at the location where the physical market used to be held (Figure 2). The virtual platform enabled seamless operations of the farmers market and helped the people of Riceville get access to local and fresh food amid the pandemic.

Contactless Curbside Pickup for Iowa Food Hub

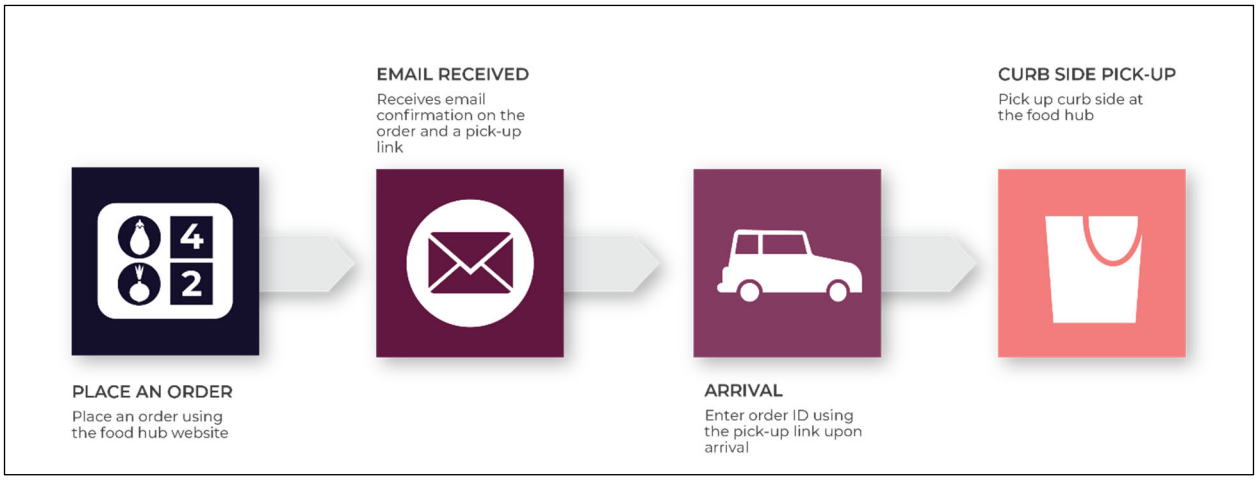
Iowa Food Hub (IFH), located in Decorah, Iowa, is a direct-to-consumer food hub that purchases food from local farmers and sells it to both institutional and retail customers on a weekly basis. Before the pandemic, IFH offered retail customers an option to pick up orders at their aggregation facility, in addition to fee-based home delivery. However, due to the social distancing guidelines imposed during the pandemic, IFH switched to having customers do curbside pick-ups. During the pick-up time window of two hours every Saturday, at least one food hub employee had to be at the curb. Whenever a

Figure 2. Signage Makes Customers Aware of the Move of the Riceville, Iowa, Farmers Market to a Virtual Platform

customer arrived to pick up their orders, a food hub employee requested the order ID from the customer, came back into the aggregation facility to retrieve the order, and finally went back to hand the order to the customer. This became a time-consuming process and increased confusion, especially when multiple customers arrived at the same time. In addition, it led to greater risk for the food hub employees and customers due to increased exposure during the pandemic.

An ICT solution was developed to facilitate contactless deliveries and enable effective and efficient communication between the food hub employees and customers. The solution allows the customers to indicate their arrival at the curb side by clicking on a unique link they receive in their order confirmation email. Upon clicking the link and entering their car details and order ID number, the food hub employee gets a notification over text and email along with the customer details. This allows the food hub employees to retrieve the customer's order from the warehouse and deliver it in a contactless manner. This whole process is easy for the participants to use, involves little to no cost as it is developed using Google Forms and Google Apps Script, minimizes the physical effort by the food hub employees, and avoids any confusion. The process of curbside delivery using the ICT solution that was developed is shown in Figure 3. A similar solution was developed for Alaska Food Hub, located in Homer, Alaska, and North Iowa Fresh located in Clear Lake, Iowa.

Figure 3. Flowchart of the Contactless Curbside Pick-up Method at Iowa Food Hub



Discussion and Ongoing Work

Small-scale agricultural enterprises need to use ICT solutions not only to survive during the pandemic but also to become more efficient in their operations. For example, using the virtual farmers market platform, vendors can track sales and product performance. This allows vendors to better plan future production and adjust pricing, as necessary. The solution developed for Riceville Farmers Market provides data that many of the vendors either would not track or would be labor-intensive to track manually.

Farmers often learn about new tools and technology platforms through their peers or through winter conferences and expositions. However, most of these solutions are geared toward larger farm businesses and include features that are not affordable or not needed by small and medium-scale producers (Burke, 2010). ICT solutions for these small and medium-scale farms are often ignored by industry, due to their small budgets. As of 2015, small-scale farms accounted for 90% of U.S. farms, based on income from farm operations (MacDonald & Hoppe, 2017). In addition, there is growing consumer demand for local food, which in turn supports the growth of small and medium-scale farms. The above two case studies

demonstrate the need to look deeper into the needs of small-scale agricultural enterprises and develop ICT solutions that cater to their specific requirements. These solutions need to be low-cost, easy to use and understand, and customized to meet specific needs (Mittal, Krejci, & Craven, 2018; Mittal, White, & Krejci, 2017).

Collaboration between academic institutions, nonprofits, and the local agricultural community could provide an effective way to cater to these requirements. Universities, through research and project collaborations, can provide the much-needed, low-cost technological skills and solutions and offer continued support as operations evolve. The collaboration specifically on this front can help bring students involved in the project much closer to their community and provide an understanding of the challenges faced by small-scale farmers on the ground while addressing their specific needs.

Ongoing work includes developing an online database, "FreshConnect," that allows farmers in Iowa to post listings of their excess product inventories (Grimm & Mittal, 2020). The pandemic has disrupted the marketing channels of farmers. For example, producers who depend on sales to institutional customers have been left with a huge pile of unsold products due to restaurant and office closures, while on the other hand several CSA programs had to close registrations due to the huge spike in demand (Burger & Benz, 2020). Therefore, many farmers need to find alternative markets to be able to sell their food. As farmers list their products in the database, buyers (e.g., food hubs and school districts) will be able to access the available inventory and make purchasing decisions accordingly. Products will be removed from the list after a month from when they are listed. Other information collected from the farmers are their shipping needs, which may allow them to collaborate on transportation needs.

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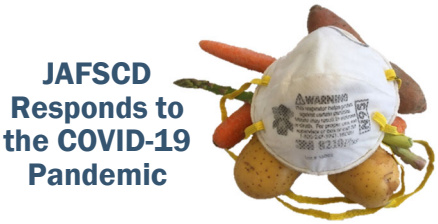

An initiative to develop 21st century regional food systems (Jump-started by a US$10 billion federal stimulus COVID package)

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The design and development of a rejuvenated and re-created regional food system for the USA are necessary now. COVID-19 has effectively unmasked the fragility of the global industrial food system. The ensuing crisis has provided us with a rare opportunity to pause, reflect, and imagine a more resilient and sustainable food system—one that is more balanced and just, one that is capable of withstanding shocks and disruptions, and one that better provides for people's health and community economic security as well as the planet's well-being.

A nationwide network of regional food systems is not only possible; its development needs to be stimulated and accelerated, as inspired by the 2010 report "The 25% Shift" (Masi, Schaller, & Shuman, 2010). This report analyzed the 16-county Northeast Ohio region around Cleveland and the impact of meeting a quarter (25%) of all demand for its food from the region itself.

The report showed that a 25% shift to local food production and downstream processing, distribution, and marketing within the region would (per the executive summary):

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- Create 27,664 new jobs, providing work for about one in eight unemployed residents.
- Increase annual regional output by US$4.2 billion and expand state and local tax collections by US$126 million.
- Increase the food security of hundreds of thousands of people and reduce near-epidemic levels of obesity and Type II diabetes.
- Significantly improve air and water quality, lower the region's carbon footprint, attract tourists, boost local entrepreneurship, and enhance civic pride.

How could such a system be designed? What would it look like?

Ecological and regenerative science provide key principles of a more resilient system. These principles need to be embedded into the organizational structure and social culture of the system to establish patterns that will endure for the long term.

Eight essential principles are:

1. *Community Wealth Creation:* The health and economic well-being of every community is dependent on the ample and equitable generation, retention, and circulation of capital.
2. *Local Ownership:* Community ownership is encouraged and optimized by developing new financial mechanisms.
3. *Just and Equitable:* Across the entire value chain, all participant needs—from farmers and food business owners to agricultural and retail workers—are met in a balanced, equitable, and just way. Throughout the system, the value of human labor is fairly recognized and appreciated.
4. *Integrated and Networked:* By vertically integrating and networking the components of food value chains, greater efficiency, transparency and fairness are achieved.
5. *Diversity:* Diversity and biodiversity in all aspects of the system are respected and recognized, from the biome to people, businesses, community, and culture.
6. *Stewardship:* In all aspects of food production and distribution, stewardship of our land and marine ecosystems is required to ensure that succeeding generations will have an equal or better opportunity to flourish from its resources. Our soil, water and air need restoring and improving.
7. *Right to Food:* All people have the right to high-quality, healthy food.
8. *Representation:* Complex systems require decision-making where the equitable participation of stakeholders is present at all levels of system governance. Decisions and deliberations must be made that fairly represent the diversity of affected views, and interests and are not dominated by any single view or interest.

A New Operating System

We believe that to create an operational model that could be adequately scaled to achieve something like a 25% shift, these principles would need to be integrated into three interlocking structural components.

1. **A Commons Trust:** A nonprofit, quasipublic entity to acquire and steward critical foodshed assets (such as land) in perpetuity.
2. **A Commons Community Fund:** A community-owned financial institution that provides capital and financial services to foodshed enterprises.
3. **A Commons Community Corporation:** A for-profit business entity that provides the umbrella for all the system functions, from production to distribution and wholesale, to retail and food service. Both community- and employee-owned, it provides scale economies, business services, technical assistance, training, and other services deemed necessary and beneficial.

Together, these represent a new economic paradigm and functional model for local and regional food. This type of organizational structure seeks the efficiencies of vertical integration with the goal of sharing the benefits across the value chain and within the community, rather than extracting and exporting wealth.

Central to the model is the recognition that farmland must be held as a long-term public good. Moreover, it offers the choice of an alternative system for the multitude of independent food system actors across the nation seeking a viable path for the future.

Stimulus Money for Regional Food—A US$10 Billion Investment

We propose an immediate US$10 billion federal stimulus investment to significantly and swiftly scale a nationwide system of regional food enterprises during and after the COVID pandemic.

The US$10 billion could be allocated simply and directly. If the country were to be divided into 50 regional foodsheds largely located around urban centers, each would receive US$200 million to be awarded for regional food system infrastructure development. Also, the investment could be structured to create a revolving capital fund supported by the community so that the original stimulus money would be retained locally indefinitely.

A major investment in a system of regional enterprises would jump-start the transition away from the structural and economic dependence on food and farm subsidies and "too big to fail" consolidated and centralized food enterprises.

Conclusion

Most of what is being proposed here is not new. All the pieces of a robust, integrated system for regional food exist. It is time to bring many of the pieces together and develop a more cohesive, coherent, and consistent whole. What we have proposed are the foundational underpinnings of a new systems model.

What is new is the demand for a federal government stimulus package to jump-start the initiative and a call to action to fund the building of infrastructure in regions around the country that would inspire a much improved and more balanced food system.

Resources

For materials on developing a Food Commons regional food system model, email the authors: Larry Yee at lkyee@ucdavis.edu or Jamie Harvie at harvie@isfusa.org.

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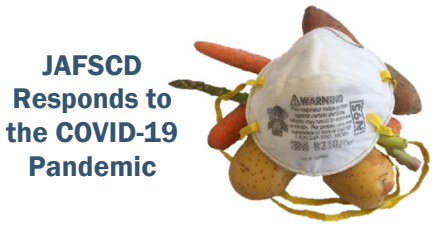

Community Capitals Policing merges food economy and public safety, repairing decades of harm

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A local, circular food economy like the one we are building in Alameda County, California, will not only alleviate food insecurity, create jobs, and improve the environment, it is also a centerpiece of our 15-year-long effort to strengthen social cohesion, repair trust, and improve public safety through a revolutionary new approach to policing.

More than 15 years ago, the Alameda County Sheriff's Office launched a new brand of public safety, called Community Capitals Policing,[1] in Ashland and Cherryland, two unincorporated communities just south of Oakland, California. These communities have experienced disproportionate levels of crime, poverty, disinvestment, disease, unemployment, and blight since the late 1970s.

Our work, based on the community capitals framework (Fey, Bregendahl, & Flora, 2006), is taking a systems-level approach to repair the harm done to the community over decades of systemic racism and neglect. The work is informed by a seven-year project called Food Dignity, funded by a US$5 million grant from the U.S. Department of Agriculture. Through the Food Dignity project, leaders of five community-based food justice organizations and academics from three universities sought to strengthen local food systems and enable more people to not only choose what they eat, but also how their food is produced and processed and what role they wanted to play in the food system. More than three dozen researchers and activists from diverse backgrounds and communities worked on the project, including sworn and civilian employees of the Alameda County Sheriff's Office. In 2018, the project collaborators

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[1] See more about Community Capitals Policing at https://drive.google.com/file/d/1Q06HRbTTloOkztzVZfwBXIlFIbyT-Ccx/view

published a full special issue of the *Journal of Agriculture, Food Systems, and Community Development.*[2]

We carry out our work through a seamless partnership with the nonprofit Deputy Sheriffs' Activities League,[3] and our effort is fueled by direct community input. We also receive support from dozens of county agencies, nonprofit organizations, and foundations.

Our successes—which are many—include launching a social enterprise, called Dig Deep Farms, with more than 8 acres (3.2 hectares) of productive urban farmland spread across four farms where urban farmers use permaculture design to grow no-pesticide fruits and vegetables, making healthy food available in neighborhoods where fast food and liquor stores predominate. Dig Deep Farms works with people reentering the community from incarceration, offering them permaculture certification, work experience, and paid internships.

Dig Deep Farms features a 3,300-square-foot (307-square-meter) Food Hub, a community-based food packaging and distribution center with a commercial kitchen where local food entrepreneurs can incubate and grow their businesses. The Food Hub opened in January 2020 and represents a US$3 million renovation of an existing structure on county-owned land funded by the Deputy Sheriffs' Activities League through a US$1.2 million loan and US$1.8 million in grant support.

Together, these efforts have formed the basis of an emerging circular food economy that is replacing unhealthy, industrially grown food with fresh, regeneratively grown fruits and vegetables, while also eliminating waste, reducing greenhouse gasses, and repairing the soil and the environment.

The circular food economy we envision redefines growth by focusing on society-wide benefits instead of corporate profits; eliminates waste and pollution; works to regenerate natural systems, like soil, water, and air; and creates good jobs for local residents, while also supporting small farms and local food businesses.

Hunger, Public Safety, and the COVID-19 Pandemic

An estimated 12.2% of Alameda County's population—about 200,000 people--do not have enough food. These numbers are skyrocketing during the COVID-19 crisis as more and more breadwinners lose their jobs and families scramble to make ends meet. Simply put, we are in the midst of a full-scale hunger crisis.

When COVID-19 struck, the Deputy Sheriff's Activities League and Dig Deep Farms sprang into action and began distributing free groceries and fresh produce to food-insecure families. With support from a local foundation, we were able to provide US$15,000 grants to local food businesses to prepare healthy meals for seniors and vulnerable populations. Hundreds of cars line up on Fridays to pick up free groceries, and 18 local food businesses received grants that helped them keep their doors open and keep their workers on the job. We also expanded our partnership with the county office of probation to arrange for the delivery of groceries to seniors and vulnerable populations as part of our effort to provide career pathways for those coming through periods of incarceration to prevent recidivism and further social cohesion.

As of late August 2020, we had distributed nearly 40,000 bags of groceries and delivered more than 20,000 prepared meals to those in need.

Despite these challenging times, we have continued to push forward on a comprehensive solution to building a new local food economy—one that focuses on equity, sustainability, and health. Our approach is documented in a new report, "Alameda County Circular Economy for Food" (Priebe, 2020), which provides an analysis of our current food system, a detailed financial model, and recommendations to

[2] See the special issue (summer 2018) at https://www.foodsystemsjournal.org/index.php/fsj/issue/view/food-dignity-issue
[3] https://www.acdsal.org/

guide the development of a new, regenerative, local food economy.

The good news is that many elements of the circular food economy have already been built as part of our Community Capitals Policing initiative. The challenge, however, is that no part of the circular food economy can be understood in isolation. The circular food economy will require systems-level change, but systems-level change is difficult because it requires people to get out of their silos and work together on a shared vision. The "Alameda County Circular Economy for Food" report provides a precise vision along with a step-by-step plan to bring that vision to fruition.

When you line up the work we are doing to grow a local, circular food economy, along with the accomplishments we have achieved through Community Capitals Policing (providing free recreational activities for kids, hosting community events that enliven public spaces, building soccer parks and gyms where there were none, creating a municipal advisory council to give local community members a voice, supporting public art, providing behavioral health services, and much more), and then incorporate the sense of collective efficacy and engagement we have engendered with the sworn elements of the sheriff's office, you begin to see a brighter future not only for the community, but also for the institution of policing.

Viewing these systems through the lens of policing—and having the sheriff's office spearhead the effort to drive systems change—is leading to fresh, productive solutions that are producing tangible results for the individuals, families, and communities who have suffered most from the racist policies of the past.

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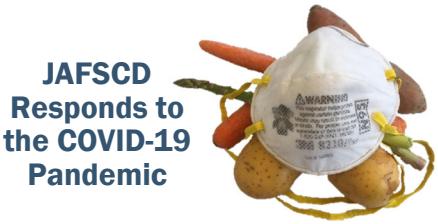

Fostering food equity in an immigrant neighborhood of New York City during COVID-19

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Abstract

Food equity includes the right to food that is culturally appropriate. Immigrant neighborhoods can be sites of contestation over who participates in the production, distribution, and consumption of food. Manhattan's Chinatown is a good example of a neighborhood where food is central to its commerce, cultural heritage, and reputation as a tourist destination. The coronavirus' origin in China caused immediate material impact on Chinese restaurants and food purveyors in New York City as well as in other cities with major populations of Chinese people. Chinatown suffered disproportionate closures of its grocery stores, restaurants, and produce vendors due to COVID-19 as compared to other neighborhoods in NYC. The grassroots response to this crisis is a reminder that people have the power to use food to assert the society that they desire, to shape a highly contested urban space, and to claim their right to the city.

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Acknowledgments

I have several project partners who have facilitated my engagement with community organizations in Chinatown and people who care about its food system. I thank Stephan Fan for initiating our collaboration with City as Living Laboratory (CALL) and introducing me to Yin Kong, director of Think!Chinatown. Olivia Georgia and Liza Cucco at CALL have organized walks and virtual forums to foster dialogue about food, gentrification, cultural heritage, and the environment in Chinatown that have shaped my perspective. I am grateful for the assistance of Binghamton University undergraduates Raymond Peng and Stella Huang. Finally, I thank Yin and her research assistant Alexandra Smith, and my colleague Stella Yi at New York University, for commenting on this manuscript before submission.

Keywords
Urban Food Systems, Food Equity, COVID-19, Pandemic, Community Engagement, Resilience, Chinatown, New York City

Seven months before the unpredictable lockdown of New York State due to COVID-19, New York City Council released an agenda to improve food equity across the city. The report opens with the assertation that "Food has the power to connect us to cultures of past and present, to our neighbors, our communities and our Earth. . . . Every neighborhood should have food businesses that reflect the community's cultures and diversity" (Johnson, 2019, p. 4). This is a powerful vision that recognizes the centrality of food to the fabric of multicultural, global cities like New York. It also evokes the well-established idea that who we are as individuals and as a society is reflected by what we eat (Gabaccia, 1998; Ginanneschi, 2020; Mintz, 1996).

A less celebrated idea is that we are what *we won't eat.* Foods of minority peoples that were once embraced by majority culture can revert to being considered disgusting or otherwise unconsumable as political and economic tensions rise between nation states (King, Fu, Brown, & Santacaterina, 2020). The coronavirus' origin in China caused immediate material impact on Chinese restaurants and food purveyors in NYC as well as other cities with major populations of Chinese. These businesses experienced an economic downturn even before cities went into lockdown, sending a ripple effect through the supply chain. An Asian vegetable farmer, whose family farm has supplied Chinatown for three generations, saw a swift decline of more than half of their usual sales, a pattern that cascaded out across their Florida growing region (S. Chen, personal communication, April 1, 2020; Campbell & McAvoy, 2020). Tourists, a mainstay of the food economy in Chinatown, simply stopped coming, and residents were afraid to go out in the face of overt discrimination (Barron, 2020; Sietsema, 2020).

Eating and enjoying the food of others is not enough to surmount the structural inequities that separate people by class, race, ethnicity, and citizenship (Garcia, DuPuis, & Mitchell, 2017; Ku, Manalansan, & Mannur, 2013; Ray, 2016). This is why government plans to enable equal access to fresh, healthy and culturally appropriate foods are critical. Such plans, however, often frame minority communities as those in need of food rather than as producers of culturally specific practices. Acknowledging this difference can lead to programs that support and uplift ethnic entrepreneurs and civil society organizations, which are critical to just and sustainable food systems.

Manhattan's Chinatown is a good example of a low-income, immigrant neighborhood where food is central to its commerce, cultural heritage, and reputation as a tourist destination. Chinese-American entrepreneurs developed their own food system to deliver culturally specific foods since Chinatown's inception as a racialized ghetto. The food sector is a common place of work for new immigrants (Ray, 2017). Today, NYC has multiple Chinatowns across its five boroughs that are not solely ethnic enclaves, but are interconnected global hubs composed of small independent operators rather than the national and international franchises that have come to dominate food distribution and service elsewhere (Hum, 2014; Imbruce, 2016). The food sector represents the largest proportion of Manhattan Chinatown's businesses. Twenty-six percent of commercial and up to 91% of industrial use supports restaurants, grocery distribution, and food manufacturing (Li, 2011). This uniquely fosters interdependence between businesses and among residents. A grocery store owner of 25 years in Manhattan's Chinatown says she is in this business, "Because by doing this, we can help people. By helping others, we also help ourselves" (A. Yee, personal communication, July 20, 2020).

Compared to other neighborhoods in NYC, Chinatown has suffered disproportionate closures of its grocery stores, restaurants, and produce vendors due to Covid-19 (Yi et al., 2020). The neighborhood has lost over 20% of these businesses, including cornerstone restaurants that are cultural institutions.

Over half the street vendors selling fruits and vegetables had already been on decline over the last decade (Imbruce, personal observation). The specter of gentrification looms large behind these closures. Many people fear that this is accelerating the processes of displacement of Chinese-American residents, decline in households with children, and loss of mom-and-pop businesses already underway (Li, 2011; Young, 2020).

The grassroots response to this crisis is a reminder that people have the power to use food to assert the society that they desire, to shape a highly contested urban space, and to claim their right to the city (Zukin, 2010). There have been many initiatives beyond the length of this commentary, but I will highlight several of the activists, artists, and entrepreneurs that I am inspired by. Grace Young, a James Beard award winning cookbook author and video maker, has collaborated with the online museum Poster House on the video series *Coronavirus: Chinatown Stories*. These stories humanize and give heart to the struggles of Chinese restaurant owners as they face decisions to close. Think!Chinatown, a small nonprofit that uses storytelling and the arts to build community, connected local stakeholders with city leadership to support the declining wholesale produce industry in Chinatown. They have found that the tools needed to support practical solutions are present within the community and that intergenerational adaptation has been critical for resiliency. They began "Assembly for Chinatown," a collaboration with the woman-led design collective A+A+A Studio, to design Department of Transportation–compliant and attractive outdoor dining solutions (see Figures 1 and 2). Joe Boo, the son of an Asian produce wholesaler, started an e-commerce site, asian-veggies.com, simply to help his father move produce that otherwise would have rotted in his warehouse. He also partnered with Welcome to Chinatown, a philanthropic organization that sprang up in response to the pandemic, to donate produce bags of Asian fruits and veggies for homebound seniors (Greens for Good). Now Joe, a software salesman, is finding connection with the food of his Malaysian-Chinese upbringing. He has found a niche in online Asian grocery sales, so he is now working above and beyond his full-time job to build this business.

Figure 1. Think!Chinatown and women-led design studio A+A+A build new outdoor dining to support Sweet House Drinks & Desserts on 67 Bayard Street in their program Assembly for Chinatown. Photo by Think!Chinatown.

There are many more grassroots initiatives of note, from Send Chinatown Love, to Heart of Dinner and Stir Fry Meals on Wheels. I have had a unique view of this moment in large part due to the sustained engagement I have had with City as Living Laboratory (CALL) to bridge art and science for the public education of sustainability challenges. Together, we developed a story map to uncover the connections between Chinatown's vibrant marketplace and the farms that support it. The story map showcases the forward-looking urban design ideas of Stephen Fan that address the antagonistic

goals of street-level micro-entrepreneurship and orderliness on sidewalk space (CALL, 2020).

There is no shortage of vision for a just and equitable society. And there is incredible talent, energy, and in some cases, resources to devote to food sovereignty and people's right to Manhattan's Chinatown. Ethnic food became a category in American consciousness as a tidy way to position the foodways of the dominant first immigrant groups to America against other newcomers (Ray, 2016). We are a nation of multi-ethnics, curious to eat the food of others, taking pleasure in new culinary experiences and mixing culinary traditions and flavors in single dishes to make something new, but also easily revert to fear when threatened (Gabaccia, 1998). The irony of Chinatown is that its food system arose from the codified discrimination of the early 1900s. Now that it is no longer solely an immigrant ghetto, competition for the right to its urban space and pressures on the farmland that supplies it has started to disrupt its structure. If we do not recognize the multiple cultures and peoples that our ethnic, immigrant neighborhoods support, service, and appeal to, and the structures and processes that make them successful, we lose the chance to grow food equity in our cities.

Figure 2. People enjoy outdoor dining on a warm Saturday in late September 2020 thanks to Assembly for Chinatown. Photo by author.

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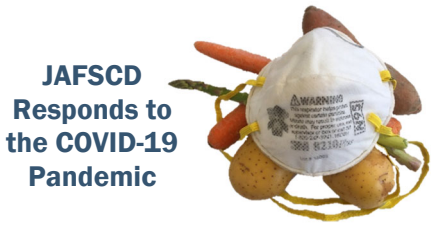

Providing menu and shopping toolkits to improve food access and security during a pandemic

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Abstract

In response to COVID-19 stay-safe-at-home orders, the University of Minnesota Extension created and disseminated menu and shopping list toolkits for use by consumers and emergency food supply organizations. The menus were developed to use items commonly available from food pantries and small rural grocery stores. The menu and shopping toolkits have been useful to provide to consumers who are sheltering in place during the pandemic and may be useful to consumers and emergency food providers during other emergencies such as natural and human-made disasters that may limit access to food.

Keywords

COVID-19, Pandemic, Food Access, Food Insecurity, Menu, Toolkit, Grocery Shopping, Cooking, Emergency Food, Food Pantries

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Introduction

With every day of the pandemic, vulnerable populations were put at greater risk for food insecurity due to loss of employment and supply chain disruptions resulting in rising food costs or lack of food availability. The federal government's response included providing waivers for school meal programs, changing and expanding eligibility criteria for Supplemental Nutrition Assistance Program (SNAP) benefits, and establishing the Farmers to Families Food Box. Individual states also authorized a variety of programs and funding. The governor of Minnesota allocated special dollars to food recovery programs and created a food security task force that reported directly to the governor's office.

Vulnerable populations, such as children and the elderly, are most affected by food insecurity. Chang and Hickman (2017) found that low-income older adults with functional limitations who lived alone faced three times higher odds of having a perceived poor-quality diet. Data from the Early Childhood Longitudinal Study—Kindergarten Cohort indicated that children experiencing any signs of food insecurity will learn less (Winicki & Jemison, 2008). The short-term effects of food insecurity are obvious: reduced dietary quality and food variety, disrupted eating patterns, and reduced food intake (Wright et al., 2018). However, the long-term effects are less obvious, and include obesity, diabetes, hypertension, and slower growth and development in children.

Food insecurity, while endemic across the United States, was exacerbated by pandemic-related societal changes. The U.S. Census Household Pulse Survey reveals that in August 2020, 20% of American households with children at home reported an inability to afford enough food, an increase from 17% in June 2020 (Callen, 2020). One COVID-related study from a community health center in Texas reported food insecurity well above the usual 20%–25% rate expected among high-risk families with children, and almost four times that of U.S. households (Abrams, Avalos, Gray, & Hawthorne, 2020). In response to the mid-March shutdown to slow the spread of COVID-19 and relieve the burden of food insecurity in already vulnerable populations, University of Minnesota Extension created a series of food access resources for consumers, rural grocery stores, and emergency food providers.

Identified Need

On March 15, 2020, Minnesota's governor ordered a temporary shutdown of the state's K-12 schools, quickly followed by an order for all nonessential businesses in the spring and fall of 2020. This abrupt shutdown forced an immediate change in daily habits, such as grocery shopping and meal preparation. In addition, fear and natural instinct resulted in a reaction of hoarding for those with the means to stock up on food and supplies. Another result was a mass loss of jobs in companies and organizations deemed nonessential. The combination of empty store shelves and more people without a paycheck created an immense strain on emergency food sources such as food pantries (also called food shelves) and soup kitchens.

Rural communities, already stretched for resources and supplies, were at risk of losing their local grocery stores as residents traveled to large communities to stock up at big-box stores. Rural food pantries experienced the loss of volunteers—typically older community members who were at increased risk of contracting the virus. Within the first week of the stay-safe-at-home order, it was clear that our community infrastructure partners needed help.

Response

Our first response, released on March 19, was a 14-day grocery list for rural grocery stores (Draeger, Gold, & Olive, 2020). Developed and deployed by University of Minnesota Extension's Regional Sustainable Development Partnerships (RSDP), the list included a consumer menu and list of shelf-stable foods to help a grocery store to prepare 20 kits. In addition, the RSDP released a tip sheet for

rural grocery stores to safely distribute kits curbside.

To expand the useability of a 14-day grocery list, University of Minnesota's Extension for Family Development, Health & Nutrition program created a menu and recipe toolkit that could be used by consumers and food pantries (Gold, 2020). This menu was designed for nutritional content with an emphasis on nutrients of special interest to older adults—those most at risk for the double threat of COVID-19 and poor nutrition. The meals and recipes were designed to use foods readily available at stores and food pantries. The kit included a shopping list to help guide consumers and food shelf volunteers to choose only the foods needed. Recipes were created or selected to accommodate inexperienced cooks and incomplete kitchens (for essential workers or others who lived in hotels or facilities without kitchens). Videos were developed that demonstrated how to prepare the recipes. The 2-week menu toolkit was distributed to rural and metropolitan food pantries and community partners who work with Extension's SNAP-Ed program.

Community partners quickly responded with requests for additional resources. Several of the resources were translated into Spanish and one resource into Somali. In response to the increased need for resources, Extension Health & Nutrition educators created several additional resources:

1. A 14-day menu toolkit for using The Emergency Food Assistance Program (TEFAP) foods (University of Minnesota Extension, 2020d). This enhanced the efficiency of food pantries to provide food kits for families.
2. Feeding your Family with a Food Support Box (University of Minnesota Extension, 2020a) with ideas for using foods commonly found in food shelf boxes.
3. A COVID-19 hotel menu and shopping list (One Week Hotel Menu and Shopping List, [University of Minnesota Extension, 2020c] designed for health care and other essential workers who were quarantined or for individuals and families who would otherwise stay in shelters. Recipes were designed for use in a room equipped with a refrigerator, microwave, and coffee pot for preparing hot water.
4. The Cooking Without a Kitchen Guide (Erdahl & Johnson, 2020) provides food lists and recipe suggestions for three scenarios: (1) No cooking equipment available, (2) hot water available, and (3) refrigerator and microwave available.
5. Help Keep your Grocery Store Safe (University of Minnesota Extension, 2020b) was designed specifically for Somali grocery stores (the resource is in Somali).

Findings

Between mid-March and the end of August, use of the guides and toolkits grew with the extension of stay-safe-at-home orders. As people return to work and businesses settle into a new normal, the guides and toolkits have become embedded in the routines of food pantries and community partners of our SNAP-Ed program. Since the menu kits were released in April and through mid-September, they have generated a great deal of interest. Social media reach for the menu toolkits (excluding the grocery store kit) total 31,851 for Facebook and 3,014 for Twitter (as of September 29, 2020).

Conclusion and Application

The food access resources created by Minnesota Extension in response to the COVID-19 stay-safe-at-home governor's order proved useful for food access organizations and consumers to plan and prepare for healthier eating during extended periods between shopping trips. These guides and toolkits are applicable to any emergency where individuals and families must shelter at home. In Minnesota, blizzards and deep-freeze situations may prevent travel; throughout the U.S., storms and electric outages

frequently prevent travel and access to food. The menu kits can be used to prepare and stock up prior to storm season, and the Cooking Without a Kitchen Guide can be used for meal preparation when there are no cooking facilities. All the resources are easily adapted to suit individual tastes and food availability.

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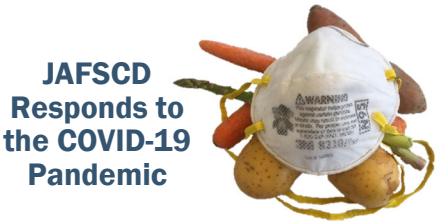
COMMENTARY ON COVID-19 AND THE FOOD SYSTEM

The impact of the COVID-19 pandemic on food insecurity



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Abstract

This research commentary reviews the current impact of the COVID-19 pandemic on food insecurity. We explore the impact of the pandemic on existing programs and evaluate how these programs adapted under these unprecedented circumstances. Moreover, we explore currently undertaken, favorable strategies for successfully addressing food insecurity during the pandemic. These initiatives include a nonprofit-retail industry partnership and programmatic strategies implemented by the U.S. Department of Agriculture (USDA). In an effort to bring awareness to addressing this important public health issue, we note the need to document these strategies and determine the most effective solutions to combat food insecurity in a vulnerable population.

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Conflict of Interest Statement

Dr. Sharma is on the board of directors of the nonprofit Brighter Bites, which works to improve access to fresh fruits and vegetables and nutrition education among underserved communities. This is an unpaid, advisory board position. The other authors have no conflicts of interest relevant to this article to disclose.

Keywords
Review, Food Insecurity, Food System, Nonprofit, COVID-19, Pandemic, Public Health

Introduction

Food insecurity is defined as "the limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways" (USDA ERS, 2020, September). Food insecurity is a growing concern during the 2020 pandemic, caused by limited food resources that may lead to poor nutritional intake and diet-related chronic disease (Aiyer et al., 2019). Those who are food insecure often experience inadequate food supplies due to budget shortages, resulting in the consumption of unhealthy foods, including increased consumption of energy-dense foods with added sugars and saturated and/or trans fats that have low nutritional quality (Seligman, Laraia, & Kushel, 2010). These dietary patterns resulting from food insecurity can lead to poor nutritional status and poor health outcomes such as diabetes, hyperlipidemia, hypertension, and other chronic disease (Laraia, 2013; Seligman, Smith, Rosenmoss, Marshall, & Waxman, 2018).

As food insecurity rates increase in the United States, there is simultaneously a vast amount of consumable food wasted. In 2010, the U.S. wasted 30–40% of the edible food supply in retail, an estimated monetary loss of US$161 billion (U.S. Department of Agriculture, n.d.). As a resolution, the U.S. Department of Agriculture (USDA) joined with the U.S. Environmental Protection Agency (EPA) to cut the nation's food waste by 50% in 2030 (USDA, n.d.).

Furthermore, the COVID-19 pandemic has threatened the health of individuals and disrupted social welfare and the economy throughout the world. In September 2020, the number of infections in the U.S. passed 6 million cases and nearly 200,000 deaths (CDC, 2020). In 2019, prior to COVID-19, 10.5% or 13.7 million U.S. households were food insecure at one point (USDA Economic Research Service, 2020a, 2020b). As a result of the pandemic, the number of food-insecure individuals increased to approximately 54 million people (Feeding America, 2020). The pandemic continues to impact many, with reports indicating that food insecurity rates tripled among families with children in April 2020 (Schanzenbach & Pitts, 2020). Given the health impacts of food insecurity, it is urgent that sustained and scalable solutions be developed to mitigate food waste and address food insecurity among the most vulnerable.

Call to Action: Partnership Strategies to Mitigate Food Insecurity during COVID-19

Several innovative and promising solutions are currently being implemented to mitigate food insecurity among the most vulnerable. One method is avoiding food loss by donating excess food supplies to hunger-relief organizations targeting food-insecure individuals (USDA, n.d.). More recently, at the national level, the USDA followed its model by connecting suppliers directly to vulnerable consumers by distributing more than 90 million food boxes through the Farmers to Families Food Box Program to support American farmers and families affected by the COVID-19 pandemic (USDA, 2020). This is one example of a strategy that links food systems by allowing for the procurement of more produce from farmers and providing it to families most in need.

From a policy perspective, Supplemental Nutrition Assistance Program (SNAP) and Medicaid set in new actions to implement federal flexibilities in response to the pandemic, such as allowing participants to purchase food online from Amazon and Walmart with a delivery option and allowing recipients to obtain the maximum amount for their household size (Texas Health and Human Services, n.d.-a.). During the 2019-2020 school year, the USDA approved Texas for Pandemic Electronic Benefit Transfer (P-EBT) with more than US$1 billion to provide one-time payment benefits for families who lost access to free or reduced-price meals (Texas Health and Human Services, n.d.-b.). In fact, several food policies are being tested at the local level to specifically address low-income, vulnerable communities during the

COVID-19 period that could be sustained and scaled. For example, El Paso County opened an application process for US$1 million in healthy food financing initiative funds to develop the infrastructure to increase access to healthy and affordable food by offering grants and low-interest loans in high-need areas (Paso Del Norte Health Foundation, 2020). These strategies allow more food-insecure families to enroll in SNAP and access services and government assistance to meet their needs.

At the programmatic level, several community-based organizations are implementing innovative solutions that could be rapidly scaled. For example, due to COVID-19 related school closures, a nonprofit/retail industry partnership was forged through a program called Brighter Bites (Sharma, Markham, Chow, Ranjit, Pomeroy, & Raber, 2016; Sharma et al., 2019). This nonprofit pivoted to partner with the for-profit grocery retail stores to distribute biweekly produce vouchers to their participating families with children, combining this with its comprehensive health literacy framework to continue to provide fruits and vegetables and nutrition education on their website (Brighter Bites, 2020). Other programmatic strategies include SNAP Double Up programs where every SNAP dollar spent would be matched in free double up food bucks to spend on local produce at participating farmers markets (USDA SNAP-Ed Connection, 2009). Another successful farmers market incentive program is the Utah Double Up Food Bucks (DUFB) program, established to allow locally grown fruits and vegetables to be more affordable and accessible for low-income people (Durward et al., 2019). These partnerships between for-profit, nonprofit, and government agencies can create healthy, food-secure ecosystems by connecting systems to build new networks.

Conclusion

Faced with the current challenges of COVID-19 and overstraining health systems, it is crucial to understand and document initiatives creating structural improvement among these food-insecure, vulnerable populations by achieving long-term nutritional impact and behavioral changes. We call for scaling and sustaining these policy, partnership, and programmatic strategies among new and existing programs to help mitigate food insecurity during COVID-19. Furthermore, a systematic evaluation of existing programs is needed to analyze the current efforts undertaken to produce scientifically sound, evidence-based organizational and community approaches necessary to achieve structural changes for an equitable, sustainable food system.

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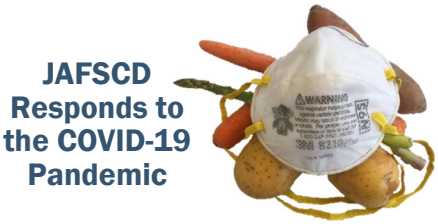

Food systems resilience through dialogue: Localizing a food systems approach in pandemic response

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Abstract
Community and international development practitioners are increasingly adopting a food systems approach to research, planning, and intervention. This paper examines such an approach as part of the COVID-19 response of the Food Systems Dialogues (FSDs), a global effort facilitating multistakeholder interchange to build support for food systems transformations. The FSDs' pandemic response involved redesigning the in-person global dialogue process for online delivery in localized settings. This paper documents how the online FSDs in New York's Hudson Valley allowed local systems actors to share their experience mid-shock, as the system responded to the pandemic, and revealed FSDs' ability to quickly adopt a systems orientation and thus take the first steps toward transforming food systems. It also highlights where new research is needed in food systems approaches to development.

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Keywords
Asset-Based, Food Governance, Food Systems Approach, Food Systems Resilience, Food Systems Transformation, Planning, COVID-19, Pandemic

A Food Systems Approach

The COVID-19 pandemic exacerbated the challenges facing food systems, including persistent food insecurity and malnutrition (HLPE, 2020). The pandemic shock necessitated both immediate interventions to combat food insecurity and long-term research and planning to build more resilient food systems for the future.

A food systems approach focuses on activities and outcomes and how they are shaped by socioeconomic drivers and environmental change (Ingram, 2011). This approach considers the elements in our food systems and the relationships between them (van Berkum, Dengerink, & Ruben, 2018). Proponents of a food systems approach recognize that current global frameworks fail to conceptualize food systems as a unified whole and call for them to be urgently re-cast as such so that shared visions of transformation can be realized (Rosenzweig et al., 2020). Corporate shareholders and stakeholders may increasingly expect food businesses to adopt this approach as well (Hansen, Ingram, & Midgley, 2020).

While the food systems *approach* has enjoyed widening acceptance, food systems *analysis,* which tends to involve the decomposition of systems into functions of interest, has had more limited relevance. However, a meta-analysis suggests potentially useful archetypes of inquiry (Brouwer, McDermott, & Ruben, 2020). Brouwer et al. posit that an archetype of 'systems-oriented' inquiry demonstrates the use of dialogue to encourage the gradual evolution of norms and values (2020, p. 7). The Food System Dialogues share characteristics of this archetype, aiming to generate global consensus regarding food systems transformation in line with the 2030 Sustainable Development Agenda (Lawrence, Baker, Pulker, & Pollard, 2019). At the local level, such dialogue can build relationships and weave together previously divergent discussions. This, in turn, can fuel food systems transformation by creating conditions for the convergence of local and global priorities (Caron et al., 2018). This was the ultimate intention of the online FSDs event series in the Hudson Valley.

Application to Hudson Valley Food Systems

New York's Hudson Valley is a vibrant agricultural region with links to both New York City and the state's capital city of Albany. Twenty-two hundred farms cover approximately 10% of the valley, which leads the state in the production of vegetables, poultry, and eggs. In addition, there is a strong local food system, evidenced by over 100 community supported agriculture farms (CSAs) that connect primary producers to consumers for direct advance sales (Hudson Valley CSA Coalition, n.d.). Despite this bounty, food insecurity was an issue in Hudson Valley prior to the pandemic, when household food assistance was utilized at levels in line with the national average of 10% (Hudson Valley Pattern for Progress [Pattern], 2020; U.S. Department of Agriculture, Food and Nutrition Service, n.d.). Following the onset of COVID-19, food banks across the region experienced demand increases ranging from 40% to 400%, while unemployment applications increased by between 200% and 400% (Pattern, 2020). Simultaneously, disrupted supply chains forced farmers to destroy or dump surplus crops and milk (Yaffe-Bellany & Corkery, 2020). This faltering ability to move supply and meet demand raised concerns and sparked interest in generating solutions.

The Food Bank of the Hudson Valley (FBHV) partnered with Food Systems Foresight (FSF), an advisory firm, to host an online FSDs event with a broad scope in June 2020. This event was followed by a second, more focused event in August 2020. Both events were designed using existing FSDs approaches as well as asset-based approaches used in nearby settings prior to the pandemic (Weissman &

Potteiger, 2018). The June event encouraged participants to use their collective knowledge as an asset to generate potential solutions in group settings. The August event encouraged participants to reflect individually on how they might leverage a broad range of existing assets, including technology, human resources, institutions, infrastructure, and collaboration capabilities to build a better future rather than fixate on current challenges. Participation from government and civil society organizations was ample, and while the business community had less fulsome representation, overall stakeholder diversity allowed for a holistic review of available assets.

Results and Discussion

The Hudson Valley Online FSDs highlighted systemic issues and key needs, including transdisciplinary communication and collaboration, food policy councils and alliances, and local food systems infrastructure (FSF & FBHV, 2020). Assembling stakeholders from across systems disrupted the local norm of organizing into industry verticals, while connecting actors and prompting identification of common cross-sector issues. The participants quickly adapted to a systems mindset and were able to identify problems and solutions that were broad and systemic in nature.

The results indicated a keen awareness of barriers to working across industries and spotlighted needs relating to coordination and inclusive food governance. This echoed the findings of similar community-focused food systems studies (Brouwer et al., 2020; FSF & FBHV, 2020; Weismann & Potteiger, 2018). Common themes also emerged within the global FSDs, such as the need for broad stakeholder involvement and inclusive innovation (FSF & FBHV, 2020; Nabarro & Alexander, 2019). The consistency between the global and local scale is encouraging and speaks to a degree of convergence of food systems priorities.

Looking Forward

The act of dialogue in Hudson Valley food systems will continue under the stewardship of a local community foundation that had identified food systems as a strategic investment area prior to the pandemic. The Hudson Valley Online FSDs documented here provide fodder for its future work, having served as an emergency reporting mechanism for the impact of COVID-19 on local food systems.

The use of dialogue as part of a food systems approach thus has demonstrated potential at the local level; however, it is not yet clear from this early-stage example how the insights and approaches generated will be operationalized. Additional research is required to understand the practical implications and attributable results of dialogue relating to food systems at the global level as well. Finally, future research is called for in the arena of food business engagement in these processes, which could have an outsized impact if done effectively.

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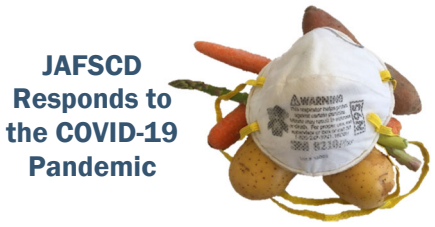
COMMENTARY ON COVID-19 AND THE FOOD SYSTEM

"Let us be small": A case study on the necessity for intentionally small producers



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Abstract
Ran-Lew Dairy quickly adapted during the COVID-19 pandemic, a time when many grocers suddenly faced shortages due to disruptions in their supply chains. Ran-Lew expanded into the direct retail market and increased its in-store sales to stay viable. Due to its small scale, vertical integration, and community connections, it was able to pivot models and react rapidly to the changing needs of its community. This case study highlights the importance of small-scale producers in developing food system resilience.

Keywords
Local Producers, Food System Resilience, Small-Scale Farm, COVID-19, Pandemic, Dairy

As was the case throughout much of the country, the impact of COVID-19 was felt immediately at Ran-Lew Dairy, a small farm in Alamance County, North Carolina. The farm lost half its business when restaurants closed, and yet it also saw an increased demand for milk from individual consumers as people focused on stocking their pantries. In response, it quickly created a socially distanced on-farm

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I would like to acknowledge and thank Taylor Hayes, manager of Ran-Lew's Bottling Plant, for allowing me to share the company's story. She worked closely with me throughout the project.

pick-up system to provide milk to people in the area, expanding into the direct retail market, which it had not previously served (see Figure 1).

In addition to individuals calling to come pick up their milk, larger companies that the farm often provided small quantities of milk to prior to the pandemic also called. Ran-Lew has regularly supplied a small number of bottles to several large grocers in the area. But after the pandemic began and the normal supply chains to these larger grocers faced new strains and needed to adjust quickly, these stores struggled to keep their shelves stocked. Ran-Lew was ready to fill that void. It was able to quickly increase their normal orders to those stores and help make up for losses from the grocers' normal suppliers.

Figure 1. Ran-Lew's Socially Distanced On-farm Pick-up System

While larger producers and processors were struggling to adjust quickly, causing milk shelves to remain empty across the country, Ran-Lew was able to rapidly adapt its operation and respond, much like many other small-scale producers were able to do. Why?

Figure 2. On Ran-Lew Dairy Farm

The size of the farm is partially the reason. With a herd of 50, it is considered a small dairy farm (Figure 2). Randy, the farm owner-operator, remembers growing up during a time when there were around 80 dairy farms in Alamance County. Now, there are only four. The same trend is being seen across the country. The average herd size grew from 50 in 1987 to 175 in 2017 (MacDonald, Law, & Mosheim, 2020). Herds of 5,000, even up to 10,000, cows are becoming increasingly common (MacDonald et al., 2020). These trends in farm growth and consolidation are the result of a large push throughout the agricultural system, starting in the 1970s with then-Secretary of Agriculture Earl Butz's often quoted phrase to farmers, "get big or get out."

Despite those trends, smaller productions—with their smaller staffs and operations—can be trained more rapidly and can adapt to market changes more fluidly than industrial-scale farms. They are able to pilot novel programs without too large a financial investment and gradually expand those efforts.

Ran-Lew is well positioned for another unique reason: it is vertically integrated. That is, it is fully in charge of its entire supply chain. The company raises its own cows, processes its cows' milk, and

Figure 3. Pawpaw Gelato from Ran-Lew Dairy

Figure 4. Honeysuckle Ice Cream from Ran-Lew Dairy

advertises and sells its own products. This gives the staff greater flexibility to meet larger orders and create new on-farm pick-up systems, as they do not have to rely on large processers as many other dairies do. While this has been critical to Ran-Lew's success, vertical integration alone does not equal resilient, local agriculture. Taylor Hayes, Ran-Lew's bottling plant manager, is quick to point out that Smithfield is an early example of vertical integration that is not resilient, local agriculture (T. Hayes, personal communication, September 2020).

The reliance of small farms on large processors is not unique to dairies. There has been an increased demand for small- and midscale meat processors as well. Larger processors need large amounts of product in order to be cost-effective, and so they source from a greater number of producers compared to a small or midscale processor. In such cases, producers are often at the mercy of the processor, which can choose which farms to purchase products from. The vulnerability of these farms is only exacerbated by unexpected catastrophes, such as a pandemic.

While larger entities have been able to readjust over the course of months, the COVID-19 pandemic has made the resilience of and need for small producers abundantly clear. When immediate need strikes, these are the operations most readily prepared to respond.

Once retail sales began to return to normal, Ran-Lew was again able to pivot its model to stay afloat in these economically difficult times. Sourcing local, seasonal ingredients, it was able to sell a wide variety of limited-time ice cream, with flavors including honeysuckle, strawberry, and pawpaw (Figures 3 and 4).

Figure 5. On Ran-Lew Dairy Farm

The farm has been heavily engaged with its community for decades, so customers, both companies and individuals, were quick to turn to it when they needed milk during this crisis. To those thankful customers, Randy always responds, "You can't support small businesses *only* when you need them—you have to support them all the time or they won't be there when you need them" (T. Hayes, personal communication, September 2020).

The resilience of the local food

economy is crucial to the longevity of our food system. Ran-Lew Dairy exemplifies that resilience, along with other benefits of small-scale production. It is a part of a strong local community with many organizations that are willing to step up and support small and midsize family farms. That support is highly valuable and necessary for the dairy's continued survival. When asked what the largest challenges are for Ran-Lew Dairy Farm in the current agricultural system, Taylor had one request: "Just let us be small" (T. Hayes, personal communication, September 2020).

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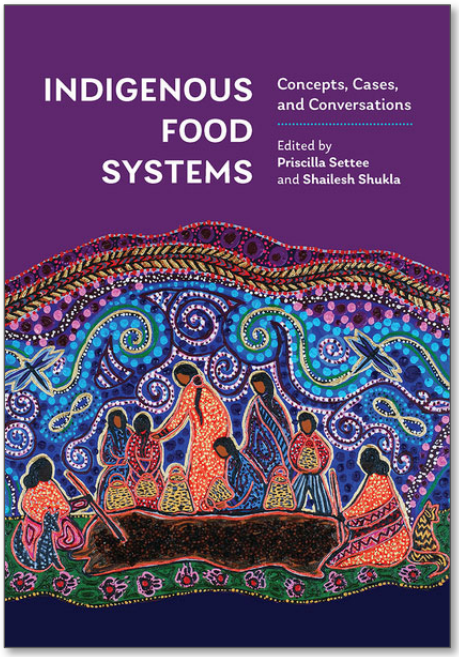
Indigenizing food sovereignty

Review by David W. Everson, University of Southern Maine*



Review of *Indigenous Food Systems: Concepts, Cases, and Conversations,* edited by Priscilla Settee and Shailesh Shukla. (2020). Canadian Scholars. Available as paperback and eBook; 292 pages. Publisher's book page: https://www.canadianscholars.ca/subjects/indigenous-studies/books/indigenous-food-systems

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It has been nearly 25 years since the international peasants' movement *La Via Campesina* outlined a "food sovereignty" framework at the 1996 World Food Summit. Since that time, the broader food sovereignty movement continues to accelerate, drawing renewed attention as the escalating climate crisis and global pandemic lay bare the corporate food system's production of environmental and racial injustices. Despite its institutionalization in a growing number of academic food studies programs, however, food sovereignty's theorization and praxis continue to be shaped in contexts typically absent of Indigenous voices. This is a starkly ironic reality considering that corporate food systems in settler-colonial societies like Canada and the United States are enabled by the ongoing hoarding of Indigenous ecological resources.

Such reasons underscore the importance and timeliness of *Indigenous Food Systems: Concepts, Cases, and Conversations.* In assembling a diverse collection of scholar-practitioners, Priscilla Settee and Shailesh Shukla have produced an edited volume notable in both form and content. Bracketed by Settee and Shukla's decades of research and activism on the subject, the book's 15 chapters provide an accessible overview of the complexities of Indigenous food sovereignty in Canada. Beyond its

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theoretical and empirical insights, the inclusion of within-chapter pedagogical tools, including critical thinking questions, concept glossaries, and suggested readings, make the text an invaluable resource for instructors.

Section I of *Indigenous Food Systems* (Chapters 2–5) foregrounds the distinctiveness of *Indigenous* food sovereignty by contrasting dominant cultural understandings of food sovereignty and food security. In regards to the former's focus on the localized control over food production and distribution, Morrison (Chapter 2) sets out four principles of Indigenous food sovereignty: (1) the sacredness of food, (2) active participation in traditional land and water-based foodways, (3) self-determination, and (4) sovereignty over public policy. Indigenous food sovereignty, in short, attempts to reconnect the social, cultural, spiritual, and ecological relationships that were severed by settler colonialism in order to achieve Indigenous *well-being,* an outcome attainable only if Canada's Indigenous communities have unimpeded access to their traditional lands and waters. Dawson (Chapter 5) distinguishes the idea of Indigenous well-being from the Eurocentric conceptualization of health focused on individual "nutrition," as evinced by Canada's official Food Guide. The broader social and cultural connections of food systems to individual and collective Indigenous well-being is also emphasized by Levi (Chapter 3) and Pawlowska-Mainville (Chapter 4). Levi documents how interviews with members of the Elsipogtog First Nation in New Brunswick yielded holistic understandings of food security, ultimately leading to a range of ongoing initiatives that include community gardens and the community sharing of traditionally harvested foods. In contrast, Pawlowska-Mainville utilizes collaborative research with the Poplar River First Nation in northern Manitoba to emphasize both the diversity of Indigenous food systems (also see Chapter 13) and how the foodways of the Canadian boreal forest deviate from the agrocentric focus of dominant food sovereignty discourse.

Although community-based initiatives are invoked throughout the book, section II (Chapters 6–10) devotes five chapters to case studies of applied research with Indigenous peoples, including those living in urban spaces. In Chapter 10, Kouri, Engler-Stringer, Thomson, and Wood detail the social and kinship-based networks that facilitate Indigenous foodways in inner-city Saskatoon. By consuming both market-based and traditional foods (the latter often procured through an "alternative food network" rooted in cultural principles of sharing), urban-based Indigenous peoples resist food insecurity while concurrently maintaining a connection to land-based practices. The notion of Indigenous food sovereignty being "grounded in the land and rooted in an epistemology of relationships" (p. 144) is similarly emphasized by Martens and Cidro's (Chapter 8) community-based research in inner-city Winnipeg. By participating in year-long food workshops that incorporated a range of traditional harvesting practices (e.g., gardening, ice fishing), Indigenous youth in the city's North End neighborhood gained practical skills while "demonstrat[ing] the power and potential of working together as part of a cultural experience to strengthen Indigenous cultures" (p. 146).

The final section (Chapters 11–15) highlights contemporary challenges to Indigenous food systems, further contextualizing settler colonialism's ongoing threats to First Nation and Métis livelihoods in Canada. Thompson and Pritty (Chapter 11) document how a lack of running water, inadequate sewage systems, and food price inflation contribute to food insecurity in the O-Pipon-Na-Piwin Cree Nation (OPCN) in northern Manitoba. Severed from their land base by the provincial Churchill River Diversion hydroelectric project in 1976, the OPCN represents a common case of how colonial development produces Indigenous food insecurity. OPCN resistance has included community-based collaborations such as the Ithinto Mechisowin Program (IMP), which mobilizes the knowledge and practices of Elders to harvest and distribute traditional food (Chapter 7 also discusses IMP). Programs such as the IMP have shown promise in reducing food insecurity over the last decade. In contrast to the ongoing displacements resulting from development projects and climate change (see Chapter 12), Neufeld (Chapter 14) focuses on the cultural destruction resulting from Canada's residential school system. Through interviews with First Nation female elders in southwestern Ontario, the author documents

how residential schools severed the ecological, social, and cultural ties of Indigenous women, including the silencing of the intergenerational transmission of land-based food practices.

By tying together historical context, conceptualizations of Indigenous food sovereignty, and applied community-based case studies, *Indigenous Food Systems* accomplishes a great deal in the span of a single edited volume. As such, it is recommended for scholars and practitioners across a range of subjects, such as food studies, public health, applied sociology, and Indigenous studies. Its lessons on the interconnection of human-ecological rootedness and well-being should resound with both Indigenous and non-Indigenous communities alike.

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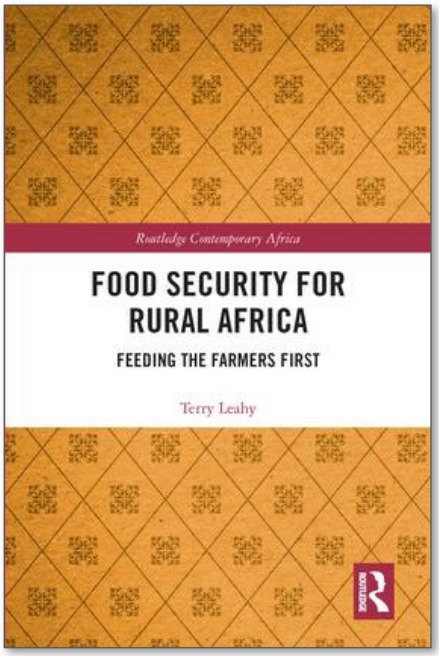
Rethinking "food security" in Africa

Review by Joeva Rock, University of California, Berkeley*



Review of *Food Security for Rural Africa: Feeding the Farmers First,* by Terry Leahy. (2018). Routledge. Available as paperback, hardcover, and eBook; 246 pages. Publisher's book page: https://www.taylorfrancis.com/books/e/9781351134156; permanent link: https://doi.org/10.4324/9781351134156

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In *Food Security for Rural Africa: Feeding the Farmers First,* Terry Leahy makes what he knows is an unpopular argument: that subsistence—not commercial—agriculture is the surest path to food security. Since the colonial era, government officials—and, later, development agencies—have sought to convert African smallholder farmers into industrial producers. Today, certain proponents of a "new" Green Revolution for Africa are guided by the theory of the *agricultural exit,* the idea that agricultural consolidation is essential for economic growth, and that such consolidation requires a majority of farmers to find off-farm employment.

It is in this context that Leahy intervenes and warns that a hypothetical agricultural exit would lead to a population of landless peasants. As an alternative, Leahy argues for reinvestment into subsistence agriculture, what he defines as when "food being produced is distributed without money changing hands" (2019, p. xii). This definition is purposely broad, as it allows Leahy to consider a variety of strategies to strengthen food production at the household level first and to plan for the market second. Such a model, Leahy argues, is not "a traditional relic of past practices," as some

* Joeva Rock is an anthropologist and lecturer at the University of California, Berkeley. Her research explores how international development shapes African foodways, political institutions, and environmental governance. She is currently completing a book manuscript based on six years of ethnographic research with Ghanaian activists, farmers, scientists, and officials who are embroiled in intense debates over agricultural futures, political sovereignty, and biotechnology. She can be contacted at joevarock@berkeley.edu

detractors of the phrase "subsistence" often suggest, but rather, "a response to current problems" embedded in the current capitalist moment (2019, p. 132).

Leahy builds his argument over nine chapters and eight vignettes. In the first half of the book (Chapters 1 to 5), he provides examples of past projects and policies that he considers failed. Leahy rightfully argues that markets are risky end-goals, as they are not only difficult to tap into (especially for small producers at the global scale), but also are constantly in flux. In response to these risks, Leahy argues that donors have over-relied on requiring farmers to organize into cooperatives to farm collectively, establish savings groups, or jointly market their product. Leahy asks why these sorts of models—along with entrepreneurial-styled projects centered around the notion of "teaching a man to fish"—continue to hold such prominence in development thinking when there is little proof they actually work.

In Chapters 6 to 9, Leahy details a number of initiatives that he believes offer promising strategies. One example is a permaculture project in eastern Zimbabwe, which Leahy argues has been successful for a number of reasons, including that residents both participate and manage the project, giving them ownership in the project. Leahy uses lessons learned from Zimbabwe and other case studies to build a set of criteria for his "winning formula" for projects to follow. These include requiring few inputs, having individuals or households (not collectives) as beneficiaries, and ensuring that the project's funder and managers are engaged in the communities they serve (2019, p. 199).

The book concludes on a much-welcomed positive note, and one is left with a feeling that alternatives to commercial agriculture might very well be possible. However, while Leahy offers findings from his studies throughout southern Africa, largely missing from the book is an insight into how African farmers themselves are organizing for political and agricultural change. This omission is apparent in the manuscript's introduction, where Leahy explains that the phrase featured in the book's subtitle, "feeding the farmers first," comes from a Filipino farmers organization. While this point no doubt could provide a rich pathway for a discussion on south-south solidarity, the author does not do so, leaving the reader to wonder whether there are equivalent farming organizations on the African continent (there are).

I found myself coming back to this point throughout the book, especially in the chapters that build a case for low-input agriculture. Though he does not name it as such, the ways in which Leahy describes "subsistence" are closely aligned with that of agroecology, a movement and agricultural framework gaining traction worldwide. Agroecology is not mentioned in the book, and perhaps Leahy is not a proponent of the framework—I do not know. Regardless, Leahy's argument would have been strengthened had he integrated any of the ample evidence from agroecological studies on the viability of low-input, biodiverse farms. This is also a missed opportunity to provide insight into how African farming organizations are already doing the hard work of advocating frameworks similar to that which Leahy proposes. For instance, the Alliance for Food Sovereignty in Africa, an umbrella group of 30 organizations across the continent, has released a number of field studies, policy recommendations, and research notes on the possibilities of agroecology across the continent.

Relatedly, a more focused historical analysis would have also strengthened the book's contributions. Throughout the book's case studies in Zimbabwe, South Africa, Uganda, and Zambia, the impacts of colonial and apartheid rule on agriculture, foodways, and food availability are mostly absent. Without this context, the reader is left with an incomplete picture of how and why certain communities face challenges related to food and farming. Leahy, no doubt, writes from a place of deep interest and commitment to improving food security in the countries in which he works. However, the absence of historical context and insight into farmer organizing, coupled with certain author descriptions (Leahy describes the goal of the manuscript as presenting "approaches to . . . problems . . . firmly rooted in the particularities of the African situation" [2019, p. 19]), reinforce the pernicious idea that agricultural practice on the African continent is homogenous, somehow unique, and in need of solving. As scholars such as

Kojo Amanor, activists like Bridget Mugambe, and civil society groups such as the Alliance for Food Sovereignty in Africa remind us, this sort of narrative obscures political-economic contexts as well as the agency, creativity, and diversity of African farmers and agricultural practice.

With that said, professionals working in the fields of rural development and agricultural policy may well benefit from Leahy's analysis of project design. Indeed, one of the book's strongest contributions comes in its concluding chapter. Leahy flips the gaze and calls on practitioners and academics in the Global North to consider the possibilities subsistence farming has to offer. He calls for a "cultural change" in how food security is framed in the Global North and for a reclamation of the term "subsistence" not as something outdated, but rather, "as the latest scientific advance" (2019, p. 212). I am sure his counterparts in the agroecology movement would agree.

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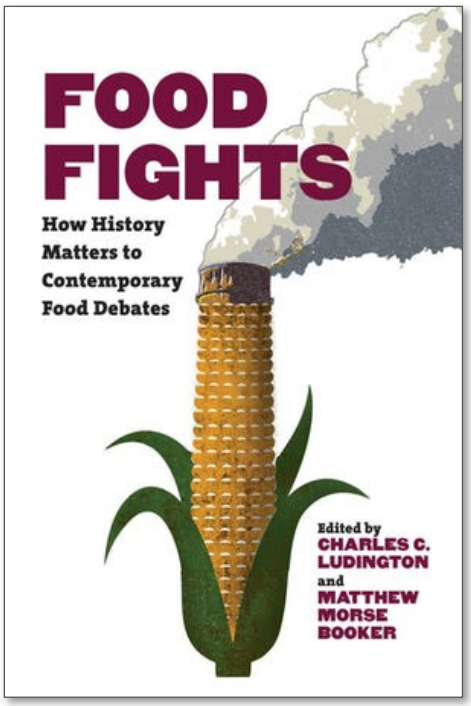
Framing the fight: Food, history, and meaning in the mess

Review by Jess Gerrior, University of Southern Maine and Antioch University New England *



Review of *Food Fights: How History Matters to Contemporary Food Debates,* edited by Charles C. Ludington & Matthew Morse Booker. (2019). The University of North Carolina Press. Available as paperback, hardcover, and eBook; 304 pages. Publisher's book page: https://uncpress.org/book/9781469652894/food-fights/

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Issues of food systems can be cast in a glaring light that obscures nuance and polarizes dialogue. We get closer to the truth when we pull back from our present constructions of the issues and allow ourselves to experience the dynamic, marvelously complicated stories of how they have formed, what forces drove them, and how those forces affect us still. Such histories entail tension and convergence, missed opportunities, best-laid plans, and unintended consequences. The understandable impulse may be to avoid difficult and even painful realizations of how entangled food has become with larger issues of class, identity, and political economy. The authors of *Food Fights* do not let us off the hook. They invite us instead to walk back through these issues more deeply, more critically, using a historical frame that allows us to see the issues, if not more clearly, at least more honestly.

The book's attempt to "bring a critical histori-

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cal eye to food studies" (p. 3) matters because it recognizes the limitations as well as the contributions that the natural sciences, social sciences, and humanities have brought to the table thus far. In many respects, the book achieves that aim. Its section on "Choosing Food" does an excellent job of helping the reader see how issues of class play in who eats what foods and why, and the implications of food choice for socially constructed measures of health. Here, too, is where the book could have looked more closely at certain historical moves that have shaped food insecurity today, specifically why programs like the Supplemental Nutrition Assistance Program (SNAP) and Women, Infants, and Children (WIC) may not deliver the benefits they intended. This gap is addressed in Andrew Fisher's discussion of the "hunger-industrial complex" in *Big Hunger: The Unholy Alliance Between Corporate America and Anti-Hunger Groups* (2017). Additionally, some chapters characterize farming as a singular entity and farmers as a homogenous group, seeming not to recognize the vast differences in the impacts of food policy on large, industrial, and conventional farms and small, independent, and organic farms, as well as which farmers' voices (mainly the former) are heard at the policy table.

Food Fights does a good job of portraying the various forms of food activism and explaining the motivations and limitations of "alternative" food movements in the context of American, capitalist food systems. However, while it offers valuable perspectives on class and gender as they relate to food, the book glosses over the issue of race. For example, Chapter 3, where Steve Striffler rightly describes American agriculture as a "profoundly unequal system defined by powerful companies and an exploited labor force" (p. 66), would have been the place to name structural racism. Whether our nation's legal enslavement of African people and subsequent discrimination against Black Americans, the cultural assimilation of Native Americans, reliance on the cheap labor of Latin and Asian immigrants, or disproportionate exposure of migrant workers to toxic agricultural chemicals, the book missed opportunities to confront structural racism by naming its role in our modern food system.

The book would pair well with Timothy Wise's *Eating Tomorrow: Agribusiness, Family Farmers, and the Battle for the Future of Food*, which dedicates a section to "The Roots of Our Problems." Both books offer lessons about food actors landing on the wrong side of history. Both books' conclusions propose the importance of balance. In *Eating Tomorrow*, it is about restoring balance in our agricultural ecosystems by achieving "a reasonable balance between family farmers and agribusiness" (p. 276), a statement that shows care for the distinction between these very different operations of food production. In *Food Fights,* it is about a "twin program" of continuing to use what is working and daring to name what has since become maladaptive, so that that food can become more equitable, enjoyable, and environmentally sound.

As they trace the multiple threads in America's history, the authors of each chapter "enter the fray" by problematizing assumptions of both "those would romanticize the past" (p. 7) and those who find no problems with the current food system. As they articulate their positions, the authors show how people can look at the same set of facts and come to different conclusions based on their frameworks. This makes the text well-suited to critical food studies. The book does a particularly impressive job of letting the reader experience the chapters "speaking" to one another. It reads cohesively, like being in a conference with colleagues who may fundamentally disagree, but lend one another an attuned and respectful ear and welcome the reader into the conversation.

Academics should consider *Food Fights* for an intermediate seminar in food studies or any course dealing with social problems where food might present a case study for larger sociopolitical issues to support critical discourse and develop critical research questions. Chapters could be integrated into an introductory food studies course, so long as students are familiar with (or the instructor provides background on) topics like the farm bill, nutrition policy, and economics. Readers may benefit by first reading Dan Barber's *The Third Plate: Field Notes on the Future of Food* (2014) for a sense of the landscape of issues that *Food Fights* seeks to illuminate.

By partaking in more nuanced debate framed and informed by history, readers may find them-

selves less inclined to accept an oversimplified version of our current food reality and instead embrace a more meaningful, messy one. The authors' appreciation for social context imparts a respect for food studies as a history in progress. It highlights the importance of understanding the impact of precedent on contemporary food problems because overlooking the past narrows our scope of future solutions. Revealing historical underpinnings in food studies also offers hope that more food scholars, activists, and other change agents may find history alive and even alluring.

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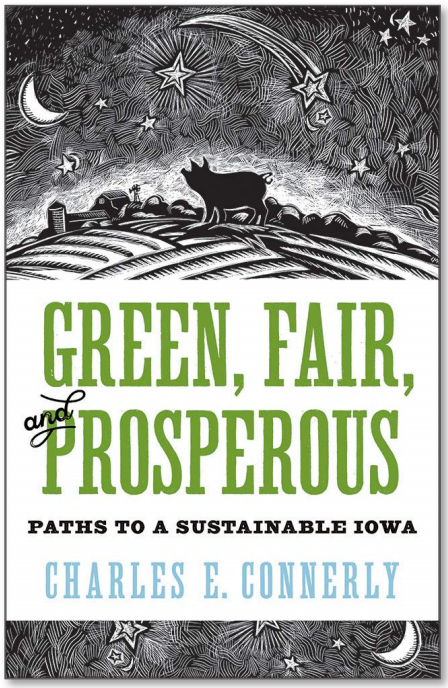
The promise of sustainability for Iowa

Review by Paul Lasley, Iowa State University *



Review of *Green, Fair, and Prosperous: Paths to a Sustainable Iowa,* by Charles F. Connerly. (2020). University of Iowa Press. Available as paperback and eBook; 228 pages. Publisher's book page: https://www.uipress.uiowa.edu/books/9781609387204/green-fair-and-prosperous

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I was first attracted to graduate school in sociology in part to help me understand the nagging question of why some people work hard and yet remain poor. When extrapolated to the community level, I was puzzled by why some communities seem to grow and thrive and yet others decline and stagnate. I wish this book had been available during my graduate training.

* * Paul Lasley is an Iowa State University professor of sociology, where he has taught several courses, conducted research on rural and agriculture change, and led a nationally recognized Extension program for nearly 40 years. Lasley has been on the cutting edge of documenting many of the changes in Iowa agriculture and rural life for four decades. He can be contacted at Department of Sociology, 312 East Hall, Iowa State University, Ames, IA 50011 USA; +1- 515-294-0937; plasley@iastate.edu

Two essential dimensions of community economic development are the natural resource base of the community and the qualities of the workforce, what is often referred to as the human capital of local residents. Jeopardizing either the resource base or failing to invest in people generally diminishes the opportunities for economic development. Likewise, spoil the environment and it becomes less attractive to live in and those who can migrate elsewhere. Failing to invest in education and skill training often results in a marginalized population that cannot fully engage in the growth and development of the community.

This book's underpinning is that sustainable development can be represented as a three-legged stool: economic development, environment protection, and social justice. Each of the legs must be

the same length for the stool be stable. To achieve long term sustainability, economic development must be held in check by ensuring that everyone benefits, otherwise the resulting drift toward greater inequality will hamper future growth. On the other hand, if environment protection is carried to excess, it will thwart economic development, leading to stagnation. Lack of attention to social justice—ensuring that everyone shares in the abundance of growth and development—will lead to an underclass that will eventually undermine political stability. It is in stagnate economies, mired by high levels of stratification and environmental abuse, where the greatest social disparities exist. Wherever environmental abuse exists, one generally finds high levels of economic and social inequalities.

As a backdrop for the need for sustainable development, Connerly asks the daunting question, "what kind of state does Iowa want to be?" Based on his research and historical analyses, Connerly writes, "Iowans are at the crossroads when it comes to answering this question. Put bluntly, neither the state's environmental nor its social justice record is exemplary, and Iowa appears to be on the path in which environmental degradation is made justifiable by the health of the economy—or at least the agricultural portion of the economy" (p. 20).

Implementing change starts with awareness of and interest in the need for new approaches and acceptance of new ideas. The book provides awareness of the urgency to address the forces restructuring the state and provides an excellent historical review of the trends that have shaped the tall grass prairie states (principally Illinois and Iowa, with some portions of Indiana, Minnesota, Missouri, Kansas, the Dakotas, and Wisconsin). The primary focus is on trends in Iowa, which Connerly uses as a microcosm of the major features of the tall prairie states. While one might quibble with the forces that he identifies or that other forces should have been included, the book presents a historical analysis of how national and state policies have shaped the economy and culture of the state and suggests that unless new directions are taken, these historical forces will limit the prospects for the future.

Chapter one provides historical analysis of the dominant forces that were responsible for the settlement of the tall grass prairie states, including discussions of the role of transportation (especially the railroads), slaughter plants, and manufacturing of farm equipment, and how these forces coalesce around growing dependency on major urban areas. Through markets, the processing and distribution of farm outputs, and the acquisition of purchased inputs, the economy of Iowa is closely tied to the major Midwest cities of Chicago, Minneapolis, St. Louis, and Kansas City.

Chapter two opens with a discussion of the great expansion of establishing farms and breaking of the prairies (1860–1900). In 1860, only about 2.7 million acres (about 7%) of Iowa's total land was devoted to farming; however, 40 years later, 34.6 million acres, or about 96% of the land in the state, were being farmed. This pioneering settlement era was extended through improved farm equipment and the engineering of drainage systems, along with discoveries of improved plant and animal genetics and commercial fertilizers, culminating in an industrial approach to farming. Sadly, the emphasis on increased production and efficiencies has not always translated into farm profits or robust rural communities, as evidenced by the farm crisis during the 1980s. More recently, this contradiction has been illuminated by the fact that 67 of Iowa's 99 counties lost population between 2000 and 2017, and nearly two-thirds of Iowa's communities lost population.

Chapter three presents the numerous challenges facing Iowa agriculture, with considerable attention paid to the environmental and climatic changes underway. Exploring Iowa's contribution to the hypoxia problem, or what is commonly referred to as the Dead Zone in the Gulf of Mexico, the difficulties presented by challenging the authority to regulate point-source pollution from agricultural drainage districts, and the creation of the Iowa Nutrient Reduction Strategy illustrate growing awareness among many in the state that new approaches to environmental stewardship are needed.

Chapter four provides an understanding to the question, "why is Iowa so white?" Iowa is the nation's sixth "whitest" state, and even though the state boasts of progressive court decisions on race relations, there are other policy actions designed to

discourage African American settlement in the state. Reflecting on the historical treatment of Native Americans, African Americans, Hispanics, and Asian Americans, Connerly challenges the complicity of the dominant white populations in not doing more to welcome diversity throughout the state.

Chapter five provides a set of twelve general principles and recommendations to achieve sustainability by addressing economic development, environmental protection, and social justice. Each of the principles identified by Connerly is "doable" and would likely position the state for a more sustainable future, but they are still lacking the impetus to motivate state and community leaders to consider these new challenges as opportunities.

It is my opinion that the book would have been strengthened by more attention to the role of leadership in motivating Iowans to consider the challenges the author identifies. Many of the actions that Connerly suggests will require group action through strong local and state leadership. The book provides a greater understanding of the forces that have shaped the state and region. The first step in bringing about social change is recognition of the issue and a willingness to explore new approaches. This book contributes to a better understanding of the historical forces that have shaped Iowa and the need for new approaches to its long-term challenges.

In reading the book, I kept recalling the three questions posed by C. Wright Mills in *The Sociological Imagination* (1959):

1. What is the present structure of society and how does it differ from previous ones?
2. What are the dominant forces responsible for these changes?
3. What are the consequences of these changes?

As a sociologist, I appreciate Connerly's historical analysis and how this book is implicitly guided by a social-historical analysis. The book would be excellent required reading for an upper-level undergraduate or graduate course in the social and environmental sciences, as well as in community and regional planning. It would be a valuable addition to the library of those interested in understanding the challenges of midwestern states. I highly recommend it.

Reference

Mills, C. W. (1959). *The sociological imagination.* Oxford: Oxford University Press.