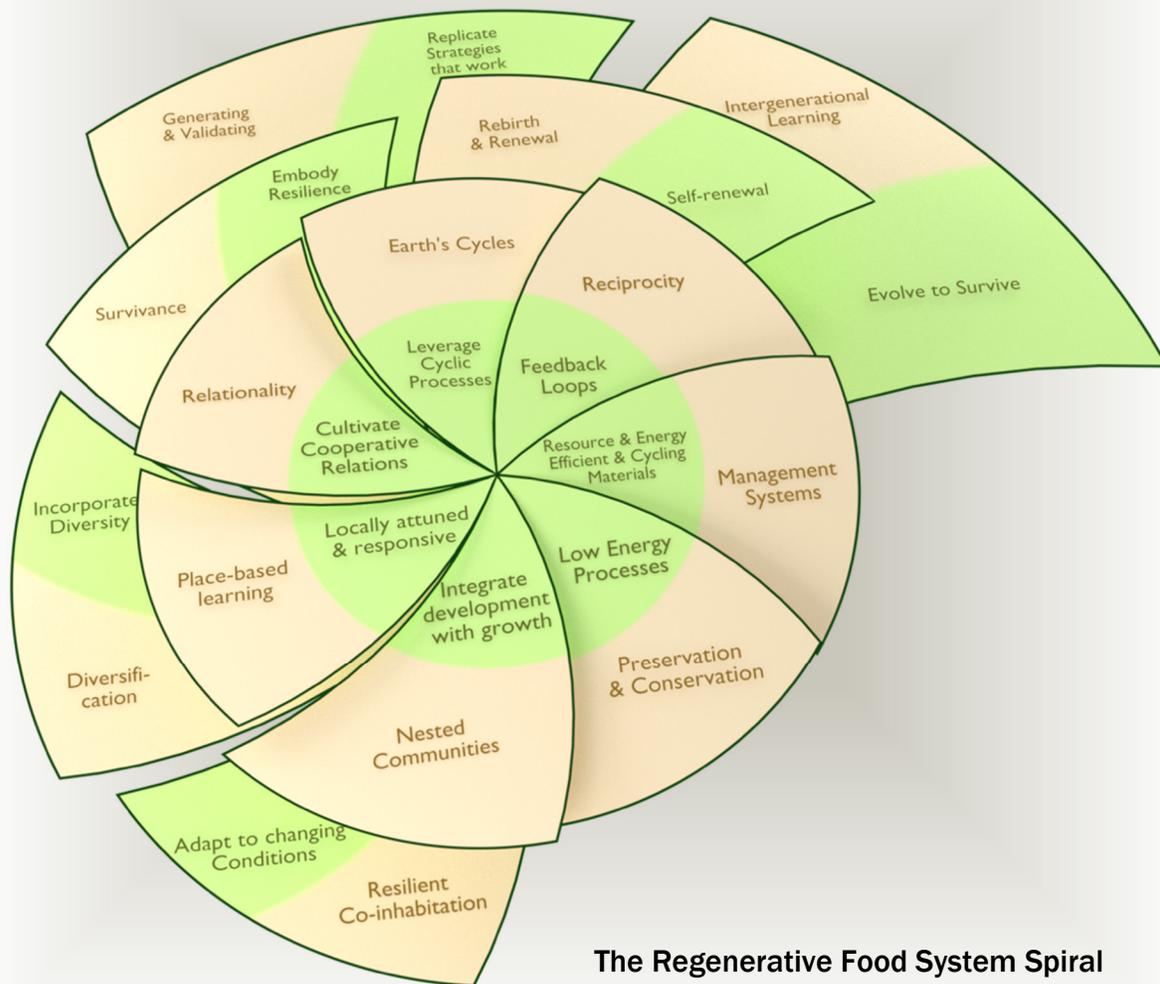


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Winter 2021–2022

Weaving Western and Indigenous Knowledge for Resilience



The Regenerative Food System Spiral



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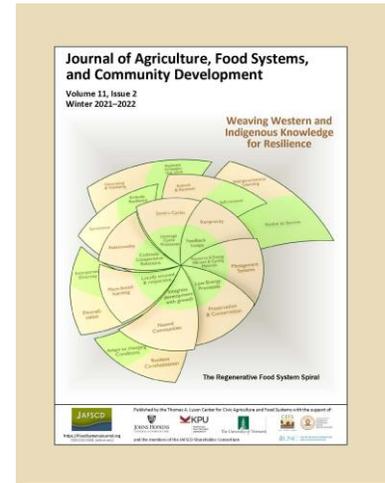
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Graphic designed by Ahmed Barakat



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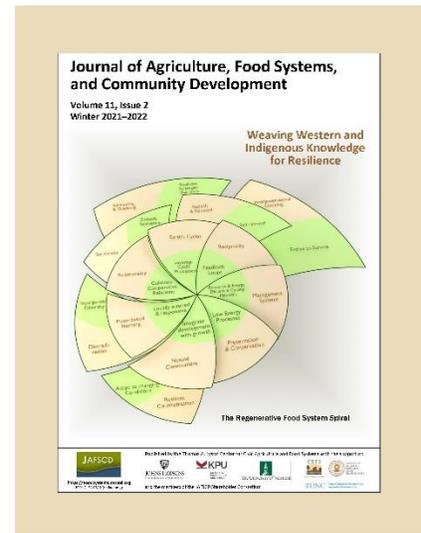
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IN THIS ISSUE
DUNCAN HILCHEY

Weaving Western and Indigenous Knowledge for resilience



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In this issue, our articles explore the often-fragile interaction of scholars, local activists, and practitioners who are blending ideas and philosophies at home and abroad to find a more just and equitable food system that can help save the planet. Or, to put their collaborative efforts more viscerally, to find ways for human beings to save themselves *from* themselves.

An example of the weaving of Western and Indigenous knowledge is on the cover of this issue: the “Regenerative Food System Spiral” represents the intersection between Traditional Ecological Knowledge (TEK) (brown) and Life’s Principles (LPs) (green). The internal spiral is the base of seven principles; the first tier is the expansion over a shorter time frame, and the second tier is the expansion over a longer time frame—many generations. The spiral is a recurring pattern and symbol both in nature and in Indigenous communities, from observation of this optimal growth form. This image is Figure 2 from the article “Weaving disciplines to conceptualize a regenerative food system,” by Sara El-Sayed and Scott Cloutier (both at Arizona State University) who conceptualized this approach, with the graphic designed by Ahmed Barakat.

But before our focus on this issue, The Economic Pamphleteer, **John Ikerd**, launches our winter 2021–2022 issue by asking and addressing the question: *Technology: Good, bad, or neutral?* He suggests that, while the prevailing sentiment is that technology is neutral, its outcomes are often ultimately laid bare as good or bad for the planet. To me, Ikerd’s point begs yet another question: can public policies be required to include ethi-

On our cover: *On our cover:* The “Regenerative Food System Spiral” represents the intersection between Traditional Ecological Knowledge (TEK) (brown) and Life’s Principles (LPs) (green). The internal spiral is the base of seven principles; the first tier is the expansion over time (one to two generations), and the second tier is the expansion over more time (across many generations). The spiral is a recurring pattern and symbol both in nature and in Indigenous communities, showing an optimal growth form. This image is Figure 2 from the article “[Weaving disciplines to conceptualize a regenerative food system](#),” by Sara El-Sayed and Scott Cloutier (both at Arizona State University).

Graphic designed by Ahmed Barakat

cal guardrails to maximize the chances that new technologies will provide holistic benefits to a broad base of citizens, such as promoting equal opportunity, fair competition, scale-appropriate regulation, and benefits for real family farmers, food industry workers, and natural systems? We encourage policy analysts and politicians to figure this one out.

Next, we offer three commentaries, two of which are from JAFSCD Shareholders, the [National Farm to School Network](#) (NFSN), and the [Inter-Institutional Network for Food and Agricultural Sustainability](#) (INFAS). In their JAFSCD Shareholder commentary, entitled *Racial equity in local food incentive programs: Examining gaps in data and evaluation*, NFSN's **Kristen Giombi** and **Lacy Stephens** lament the lack of specific equity-based purchasing policies in state legislative bills that foster local food procurement and make data collection and evaluation recommendations for better informed farm-to-school programs.

This is followed by another JAFSCD Shareholder commentary from INFAS, entitled *Debrief on the United Nations Food Systems Summit (UNFSS)* by **Molly Anderson**, **Lesli Hoey**, **Peter Hurst**, **Michelle Miller**, and **Maywa Montenegro de Wit**. While INFAS found the summit deeply flawed in terms of a structured focus on equity, it was successful in highlighting the potential of global food governance, which is sorely needed.

In our final commentary, *Reflexivity and food systems research* (very apropos to our issue theme), **David V. Fazzino** presents a critical self-reflection that lays out the challenges and contradictions of being a Western scientist studying Indigenous food sovereignty.

Next, we present 14 peer-reviewed papers. Leading off as an introduction to our theme is *Weaving disciplines to conceptualize a regenerative food system* by **Sara El-Sayed** and **Scott Cloutier**, who proffer, and to a limited extent validate, a new regenerative food system that integrates Indigenous and Western approaches.

In her reflective essay *A garden's place in critical food systems education*, **K. Michelle Glowa** shares her rich experience as a college faculty member building a symbiotic relationship with a Hispanic-serving community garden in Santa Cruz, California.

Next, **Leah Joyner**, **Blanca Yagüe**, **Adrienne Cachelin**, and **Jeffrey Rose** explore how farmers and researchers worked together in Salt Lake City to understand how, from a critical geography perspective, food apartheid shapes urban agriculture and informs practical resistance to dominant cultural and economic paradigms in *Farms and gardens everywhere but not a bite to eat? A critical geographic approach to food apartheid in Salt Lake City*.

Similarly, in *Food futuring in Timor-Leste: Recombinance, responsiveness, and relationality*, **David Szanto** provides a reflection of his experience as a “consulting academic” on a decolonized research project that utilized “two-eyed” vision through which researcher and local practitioner create opportunities for shared learning and growth.

In our next article, **Virginia Quick**, **Lauren B. Errickson**, **Gemma E. Bastian**, **Grace Chang**, **Sarah Davis**, **Anthony Capece**, and **Ethan D. Schoolman** demonstrate the increased value of a collaborative researcher/farmer/consumer applied research project in food-insecure areas in *Preserving farm freshness: Consumer preferences for local value-added products at urban farmers markets*.

Ashley Babcock and **Rachael Budowle** present the results of their systematic scan of Western U.S. Indigenous foodway projects, which provide a large reservoir of useful information for scholars and practitioners alike, in *Celebrating Indigenous food sovereignty: An inventory of initiatives within the western U.S.*

Shifting from our theme, the remainder of this issue covers a wide range of topics.

Eiji Toda and **Edward Lowe** take one of the first looks at suburban-based community gardens in *Gardens in a postsuburb: Community garden governance and ethos in Orange County*. Their research suggests the existence of a shift in suburban attitudes, from the traditional consumerist lifestyle to one more focused on quality of life through civic engagement, access to nature, and personal fulfillment.

In *Farmer perceptions of climate, adaptation, and management of farmworker risk in California*, **Gail Wadsworth**, **Heather Riden**, and **Kent Pinkerton** find that the farmers in their sample were proud of their ability to handle weather extremes; however, despite state regulations to the contrary, the farmers also feel that it is mostly farmworkers' individual responsibility to keep themselves safe in the workplace.

This is followed by *Aspects of the sustainability of the camel milk value chain and its regulatory framework in Isiolo County, Northern Kenya*, by **Steve N. Machan, Jones F. Agwata, and Nicholas O. Oguge**, in which the authors present a thorough examination of the existing problematic camel milk supply chain and the potential of a more wholly integrated camel milk value chain.

In *Governance of risk management programs: Learning from Québec's Farm Income Stabilization Insurance program*, **Frédéric Clerson** uses Arnstein's ladder of citizen participation and Glasser's choice theory to examine how and why a popular Canadian farm income program has managed to survive for over four decades.

Meanwhile, in *Appraising the administrative burden of USDA organic certification: A descriptive analysis of Notice of Noncompliance data*, **David P. Carter, Ian T. Adams, Seth Wright, and Tyler A. Scott** find that smaller organic operators (both growers and processors) are at a distinct advantage in the marketplace as they are not as capable as better-resourced operators to absorb the cost of government red tape.

In *Farm-to-hospital programs and public health: Leveraging local food for organizational and behavioral change*, **Phillip W. Warsaw and Alfonso Morales** present two case studies that take an in-depth look at some of the barriers to a more widespread adoption of these programs.

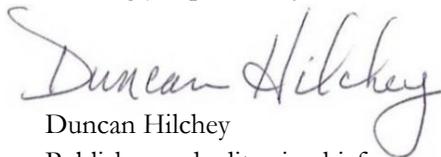
Next, **Marie Asma Ben-Othmen and Jerry H. Kavouras** provide a valuable in-depth case study of the cross-sectoral county-based food policy effort in *Developing a community-based local food system in Will County, Illinois: insights from stakeholders' viewpoints*.

Finally, *"What we raise ourselves": Growing food sovereignty in the Mississippi Delta* by **Emily A. Holmes, Mary F. Campbell, and Ryan Betz** uses the lens provided by the experience of Via Campesina to explore the efforts of a Delta EATS (Edible Agriculture Teaching Students) to build food sovereignty in a majority Black community in the U.S.

We wrap up the issue with two timely book reviews. Just ahead of a special section of articles in response to a JAFSCD call for papers on "Justice and Equity Approaches to College and University Student Food (In)Security," **Mark Lapping** reviews *Food Insecurity on Campus: Action and Intervention*, edited by Clare L. Cady and Katharine M. Broton, and *Experiences of Hunger and Food Insecurity in College*, by Lisa Henry. **Philippe Jeanneaux** reviews *Sustainable Agri-Food Systems: Case Studies in Transitions Towards Sustainability From France and Brazil*, by Claire Lamine, finding the book a strong contribution to the sociological literature on facilitating a transition to a more resilient agroecological future.

We hope the forthcoming spring in the North and fall in the South bring some moderation in not only the extreme weather of our coldest and hottest seasons, but also relief from the ravages of the pandemic and the continuing wars in Africa, the Middle East, and now, Europe. These are unprecedented times we live in, making our work that much the more difficult, but all the more important, in relieving the suffering of our most vulnerable people and the planet. 

Wishing you *peace and justice*.



Duncan Hilchey
Publisher and editor in chief



THE ECONOMIC PAMPHLETEER
JOHN IKERD

Technology: Good, bad, or neutral?

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Is technology good, bad, or neutral? The prevailing sentiment seems to be that technology is neither good nor bad, but is simply a tool that can be used for either. However, once a technology has been developed, its net effects will be one or the other. The consequences will depend on the intention, or perhaps inattention, with which a technology is developed and applied.

The *Encyclopedia Britannica* (n.d.) defines technology as “the application of scientific

knowledge to the practical aims of human life” (para. 1). The basic purpose of technology, whether mechanical, biological, or digital, is to allow people to do things easier, faster, or better. Whether a technology is good, bad, or neutral depends on whose intentions or aims are met and who suffers any unintended consequences. The net effects of a technology, considering both good and bad, is determined not only by whether it contributes to the practical aims of some, but whether it

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*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>*

contributes to the betterment of society or life in general.

Albert Einstein wrote, “I believe that the abominable deterioration of ethical standards stems primarily from the mechanization and depersonalization of our lives—a disastrous byproduct of science and technology. *Nostra culpa!* [We are to blame!]” (AAP FactCheck, 2019, para. 7). I agree. I believe the deterioration of civil society has been a result of inattention to the likely negative consequences of well-intended technologies that depersonalize our relationships with each other and with the earth. The “abominable deterioration” of ethical standards in turn facilitated the degradation of both society and nature, which now threaten the sustainability of human life on earth.

American agriculture provides a prime example of the ecological and social consequences of developing and applying particular kinds of technologies—specifically, industrial technologies. The mechanical and chemical technologies that facilitated agricultural industrialization served the aims of corporate agribusiness investors and a few surviving farmers, but millions of other farmers, farm and food system workers, and consumers have suffered the negative consequences. As I have explained in previous columns, the growing ecological and social threats to agricultural sustainability are the “disastrous byproducts” of using a particular approach to science to develop a particular type of technology: industrial technologies. Even worse, creating cheap industrial agricultural commodities did not accomplish the intended purpose of alleviating malnutrition and instead has fueled an epidemic of obesity, diabetes, heart disease, and a variety of other diet-related illnesses.

The only solutions offered by defenders of industrial agriculture rely on more sophisticated industrial technologies. The technologies idealized by advocates of “sustainable intensification,” for example, might slow the process of degradation, but the productive capacity of earth’s agricultural resources eventually would still be depleted or

permanently damaged (Ikerd, 2021). Regardless of whether future agricultural technologies are mechanical, biological, or digital, if they facilitate the continuation of an industrial agri-food system, the negative consequences will be basically the same.

I believe at least two tests should be used to assess whether the net effect of any new technology is likely to be positive, negative, or neutral. First, the adoption of a new technology by some should not force others to do likewise, but instead allow others to freely choose either to use or not use it. In other words, the benefits of a new technology for some should not be gained at the expense of others. We have seen the disastrous consequences of failing to meet this test in agriculture, as was seen previously in manufacturing. Industrial technologies were developed to make

production easier, faster, and less costly with little regard for their impacts on farmers, farmworkers, or factory workers—or even whether the final products would actually be better for consumers. The consequences for migrant workers in the fields and confinement animal feeding operations today are little different from the consequences for factory workers in the times of Adam Smith.

The primary economic advantages of specialized and mechanized industrial operations arise from the ability to produce more output with smaller, less-skilled and lower-paid workforces. The lower costs of production, made possible by lower labor costs and consolidation of management, force producers to adopt each new cost-saving technology in order to survive economically. Industrial manufacturing resulted in larger corporate organizations and fewer good-paying jobs. Industrial agriculture resulted in fewer and larger factory-like farms and fewer farmers. In agricultural economics, this is called the “technology treadmill” (“Technology treadmill,” 2020). With each new technology farmers were forced to accept, the surviving farms were larger in size and fewer in number. The demise of family farming was another

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And we certainly are to blame!

This leads to the second test for new technologies: A technology should reduce human drudgery but should not replace human thinking. The quality of employment opportunities, and of human life in general, depends on the uniquely human capacities for intentionality and agency. Intentionality is the ability to assess particular situations and develop plans of action to solve particular problems or take advantage of unique opportunities. Agency is the ability to carry through with intention, making any necessary course corrections during implementation. When humans are deprived of the opportunities to exercise these unique capacities, they lose much of their capacity to contribute to either the economy or society. Their quality of life is diminished. Adam Smith acknowledged the deskilling of an industrial workforce as a “dehumanizing” (GoodReads, n.d., para. 1) process and warned of the negative social consequences of industrial production.

Reducing or removing the drudgery from production frees people’s time and energy to focus on the development and use of uniquely human capacities for intentionality and agency. Every hour and calorie spent on non-thinking tasks is an hour and calorie less available for thinking about how to make the essential tasks of life easier, faster, or better. Farming technologies such as large round hay balers and portable electric fencing for livestock producers and paperpot transplanters and lightweight row covers for market gardeners are examples of mechanical technologies that have reduced the drudgery of farming without replacing

the thinking. These technologies allow farmers to perform essential tasks faster and easier so they have the time and energy to think about how to do other things better—or simply to enjoy life.

That being said, technologies should not separate the working from the thinking. Sustainable farmers must be “thinking workers and working thinkers” (paraphrasing the late Richard Thompson, an Iowa farmer and early sustainable agriculture advocate). As Wendell Berry (1990), the farmer/writer/philosopher puts it, “if agriculture is to remain productive, it must preserve the land and the fertility and ecological health of the land; the land, that is, must be used well. A further requirement, therefore, is that if the land is to be used well, the people

who use it must know it well, must be highly motivated to use it well, must know how to use it well, must have time to use it well, and must be able to afford to use it well” (p. 147). Good farming technologies must allow farmers to use the land well, which requires a personal sense of connectedness with their land.

The technological challenges of the future will be to develop new mechanical, biological, and digital technologies that empower, rather than oppress, the people who choose to use them. The developers of these new technologies must also heed Einstein’s warning of the “abominable deterioration of ethical standards” that stems primarily from the mechanization and depersonalization of work and of human life. Technologies of the future should be designed to reduce the inevitable drudgeries of life without depersonalizing our relationships with each other or with the earth. 

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on non-thinking tasks is an
hour and calorie less available
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JAFSCD SHAREHOLDER COMMENTARY



Racial equity in local food incentive programs: Examining gaps in data and evaluation

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Abstract

Since 2002, over 60 local food procurement incentive bills for schools and early care sites have been introduced in state legislatures, and 23 have passed. While these bills promise benefits to children, schools, and producers, limited data collection and evaluation make it difficult to assess the true impacts of these policies' implementation. Data and evaluation focused on the equity impacts of these bills are especially sparse. In this commentary, the authors provide recommendations for improving data collection and evaluation of these local food incentive bills in order to inform and advance more equitable farm-to-school policy and programs.

Keywords

Local Procurement, Procurement Incentive Programs, Equity in Evaluation, Farm-to-School Programs, Early Care

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Introduction

Between 2002 and 2020, 61 state-level local food procurement incentive bills for schools or early care sites were introduced, and 23 passed. Of the 61 bills proposed, just 13 contained any form of program reporting or evaluation. Of those 13, nine were passed (National Farm to School Network & Vermont Law School, 2021). Evaluation is essential to assessing the impact and effectiveness of farm-to-school policy and informing future efforts. Evaluation specifically should include data collection and analysis on the racial equity impacts of farm-to-school policies and programs to identify potential gaps in demographic reach, degree of cultural relevance, and impact on children of color and producers of color. This level of policy analysis is vital to developing future farm-to-school policies and approaches that correct instead of perpetuate racist and oppressive systems. A lack of legislatively mandated data collection makes it difficult to assess the quantitative impacts and outcomes of policies. This commentary discusses the challenges associated with the lack of data and evaluation of local food procurement incentive policies and elevates recommendations to better inform future farm-to-school policy and policy evaluation.

Data Barriers to Farm-to-School and Early Care and Education Evaluation

A major barrier in capturing sufficient information to understand the impacts of incentive policy is that the policy frequently omits evaluation. Although data may be collected by organizations receiving funding for local procurement, the data are not being tracked or reported in a systematic manner. Additionally, if data collection was not planned before policy implementation, important indicators for evaluation may be missed, especially indicators around equity. Even if an outside organization procures funding for evaluation, the available data are often of poor quality, making it difficult to conduct meaningful analyses, particularly around the racial equity impact of the policy. The D.C. Healthy Tots Act is an example of a policy that did not include evaluation (Stephens et al., 2021). The reporting and tracking systems for the D.C. Healthy Tots Act's Local5¹ specific reimbursement numbers, race and ethnicity data, and free and reduced-price meal eligibility rates were incomplete, limiting the analyses of the reach and impact of the program. The Oregon Farm to School Grant Program policy also did not include evaluation. This limited the quality of baseline data because districts were not required to track information on local food purchases before receiving grant funding (Giombi et al., 2018). In the Oregon evaluation, analyses of the impact on farmers and local produce purchases were limited and included no information on producer demographics. Researchers and policymakers would gain a better understanding of the impacts of these policies if organizations required systematic reporting that produces higher quality data from the schools and childcare sites as well as the producers.

While policymakers often tout the economic impacts of farm-to-school programs when trying to pass policy, limited data exist on how these policies affect producers, particularly Black, Indigenous, and other people of color (BIPOC) producers. In our evaluation of the D.C. Healthy Tots Act that examined how farm to early care and education (ECE) policy affects local food intermediaries and local producers, we found that had it not been for a local food aggregator, FRESHFARM, we would have had no producer data because ECE sites and the state agency were not capturing and aggregating the data. In Oregon, data were collected from the school districts, but no data were collected from or about producers. An essential step in furthering equity in farm-to-school policy is tracking sales and disaggregating data by producer race to understand better who is benefitting or being excluded from the policy. Furthermore, it

¹ Local5 provides early care and education centers participating in the Child and Adult Care Food Program with an additional US\$.05 reimbursement for each meal served that contains at least one component that meets the definition of a locally grown, unprocessed food.

is important to consider more nuanced evaluation measures and approaches to understand if and how policies are building business opportunities and supporting access to school markets for producers.

Recommendations

From our work on evaluating farm-to-school and ECE policies, we have three recommendations for making evaluations more robust to better inform future policy. First, establish partnerships with universities and nonprofit partners to support evaluation planning, implementation, and/or data collection, perhaps even during the phase of legislative development. These partners can alleviate the burden on the school districts and bring a level of expertise in data collection and evaluation that can help inform the policy language and implementation. Partners with expertise in evaluation centered in racial equity can also support and inform the prioritization of equity measures and approaches. Furthermore, external partners may have the capacity to capture more than just procurement data. For example, Michigan State University's Center for Regional Food Systems surveyed school foodservice directors on their motivations, barriers, and challenges to purchasing and serving local foods and participating in the incentive program (Mattis et al., 2020).

Having these partners at the table can also set the stage for including the costs of evaluation in policy budgets. For example, Colorado State University was involved in developing the farm-to-school policy in Colorado (School Incentives to Use Colorado Food and Producers, 2019). Though the evaluation portion of the bill was not funded, it provides a model for including evaluation in policy language. In another example, Michigan State University's Center for Regional Food Systems has been involved in data collection for the state's "10 Cents a Meal for Michigan's Kids and Farms" program. In this example, systems were better established to collect data and leverage supplemental resources for analyzing the data collected through state agency partners. Additionally, when it comes to being able to disaggregate data, third parties may have more capacity to layer existing demographic data over incentive participation data.

Our second recommendation is to identify populations of potential impacts and outcome measures prior to implementation to collect the most valuable data for evaluation. Populations of interest may be schoolchildren, school foodservice operations, school decision-makers, parents, and/or producers. Once populations of interest are identified, implementers and evaluators need to engage these groups in informing and developing measures and metrics. What aspects of the program are most important to the community involved? What outcomes do they want to see? What outcomes are needed to continue the policy in the future? These are all important questions that should be considered when developing an evaluation plan.

Outcomes and impacts for producers, specifically BIPOC producers, have been difficult to examine with existing data. By elevating BIPOC producers as key stakeholders of interest and establishing outcomes that are a priority for this population, we can further the exploration and conversation around equity of farm-to-school policy. Furthermore, it is important to ensure that outcome measures are reflective of the population identified and take into account the nuances of the community and culture (e.g., willingness to try culturally relevant foods; equipment or training needs identified by school foodservice staff; and profit or amount of product delivered for producers).

Our third recommendation is to develop easy-to-use reporting templates and systems that are a mandatory part of participation for schools and/or ECE programs receiving funding for local food procurement. These templates should strive to include data on producers. For example, the Michigan Department of Education worked with FarmLogix, a Chicago-based firm that supplies technology solutions, to support an electronic platform for school foodservice directors to track their purchases of local foods used for the program (Mattis et al., 2020). Furthermore, in surveys conducted by the Oregon Department

of Education and Michigan State University's Center for Regional Food Systems, foodservice providers were asked to provide names of producers they had worked with and to share feedback received from food producers, processors, and distributors with whom they had worked to purchase product. This information is a start to understanding equitable access to these programs for producers, but more rigorous data collection is needed.

As part of this recommendation, an option would be to shift most of the burden from school districts and instead have a third party or state agency track data directly from producers. FRESHFARM in Washington, D.C., is a prime example (Stephens, 2021). Another example is New Mexico's Approved Supplier Program (New Mexico Farmers Market Association, 2021). During the 2018–2019 school year, New Mexico's Public Education Department (NMPED) piloted a cooperative that worked with school districts to streamline procurement and vendor requirements needed to sell to schools by establishing a list of approved vendors. The cooperative also supported small producers of color. Distributors are also well positioned to capture producer information and share aggregated purchasing information back to districts or evaluators. Either way, ideally, the policy would include funding to create or expand data collection systems.

Conclusion

Better data collection and use of data can help inform and drive more equitable farm-to-school and farm-to-ECE policy. Equity-centered approaches to evaluation should be explored to capture the experiences and impacts on multiple stakeholders. The ideal would be to build equity into the policy language and priorities, thus paving the way for equity-focused evaluation, such as including support for small farmers and BIPOC producers, and prioritizing reach to communities that have been historically disinvested. Significant work still needs to be done to create foundations to support equitable evaluation. This includes advancing community-driven evaluation that defers to impacted stakeholders and developing consistent and clear policy language that prioritizes BIPOC producers without creating an undue burden on them to obtain "minority certifications." Furthermore, data collection and reporting must always be balanced with the burden on practitioners. Partnerships with academic and community partners, leadership and data collection from state agencies, and transparency in the supply chain can reduce the burden on both nutrition staff and producers. 

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JAFSCD SHAREHOLDER COMMENTARY

Debrief on the United Nations Food Systems Summit (UNFSS)

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Sustainability

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Abstract

What are the roles and responsibilities of U.S. academia in global fora such as the United Nations Food Systems Summit? In an effort to be better global partners, the Inter-institutional Network for Food, Agriculture, and Sustainability (INFAS) accepted an invitation to participate in the UNFSS. INFAS then convened a debriefing for our members to hear from our colleagues about their experiences and any

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outcomes that may have emerged from the Food Systems Summit. The Food Systems Summit process was deeply flawed, resulting in confusion and power inequities, yet it stimulated coalition-building and reflection on how and why to participate in global food governance.

Keywords

United Nations, Food Systems, Equitable Livelihoods, Civil Society, Decent Work, Multilateralism, Multistakeholder Process

The United States is notorious for regressive and obstructionist behavior related to United Nations efforts, while U.S. civil society participation is low. In an effort to be better global partners, the Inter-institutional Network for Food, Agriculture, and Sustainability (INFAS) accepted an invitation to participate in the UNFSS Action Track Four¹ (Equitable Livelihoods) in the lead-up to the first-ever global Food Systems Summit² in September 2021. About six weeks later, INFAS convened a debriefing for our members to hear from our colleagues about their experiences and any outcomes that may have emerged from the Food Systems Summit.

Who should participate in global food systems governance? How is equal footing achieved for civil society, governments, and business? These are concerns that came to the fore in the lead-up to the Food Systems Summit. UN efforts are organized so that governments are the primary participants, and each government has an equal vote to balance the power dynamic (termed a multilateral process). Although multilateralism is deeply flawed in supporting the sovereignty of the nations that participate, some effort was made to balance the dynamic. In a radical step away from multilateralism, the summit took a “multistakeholder” approach. This meant that businesses and civil society were brought into the summit as full partners to governments.

Of course, money equals speech in such an arrangement. INFAS members who participated in the summit directly or by critiquing the process from the outside reported that governance was dictated by a small insider group with close ties to industry and philanthro-capitalists. There was a troublingly uneven distribution of power and lack of transparency from the start of the process. In the lead-up to the formal summit, it appeared that there was a parallel process convened by business interests to shape the meeting outcomes. Every so often, actors in the parallel process would intervene in the official process. For instance, shortly before the summit, a new group appeared on the scene to discuss labor issues, forming the “Decent Work and Living Income and Wages Coalition.” Hundreds of large businesses attended, including many that had yet to participate in other lead-up activities to the summit. In the meantime, the Action Track Four leader, Christine Campeau, notified members two weeks before the summit that the Action Track was dissolved, with no notice or follow-up with those on that committee.

The formation of the Decent Work and Living Income and Wages Coalition itself was odd. The coalition addressed only one of six identified aspects of decent work and was organized by a private industry entity, the World Business Council on Sustainable Development. There is a credibility gap here, especially since organized labor was not meaningfully involved in its formation. The International Union of Food and Agricultural Workers participated in the boycott of the UNFSS meetings, in solidarity with the Civil Society and Indigenous Peoples’ Mechanism, known as CSM. The CSM is the official, permanent civil society link with the UN Committee on World Food Security. It provides a means for civil society organizations to formally participate in discussion and meetings of the UN Committee on World Food Security and Nutrition (CFS) and provide other inputs such as reports and recommendations. Guy

¹ <https://www.un.org/en/food-systems-summit/action-tracks>

² <https://www.un.org/en/food-systems-summit/about>

Ryder, the International Labour Organization's (ILO's) director-general, gave a presentation to the UN Food Systems Pre-Summit in which he stated that "many countries explicitly and consciously exclude rural and agricultural workers from the coverage of labor protection" (United Nations, 2021b, 13:34). Agriculture's exemption from basic labor rights for agricultural workers, such as the right to organize, is a major reason why there are poor labor and health and safety conditions in agriculture and why things such as child labor persist, as detailed in a report on ILO this year (Silliman Bhattacharjee et al., 2021).

One participant noted that the overall UN Food Systems Summit process was like trying to sip from a firehose: it was impossible to keep up with the pace. The process kept participants distracted with meaningless activities. As an example, Action Tracks solicited members and their stakeholders to submit "ideas" (sometimes referred to as "propositions" and "solutions") for meeting the Sustainable Development Goals, eventually collecting over 1,200 proposals (United Nations, 2021a). Then, without notice or vetting by anyone on the Action Tracks, consultants hired by the summit's Scientific Group were brought in to "prescreen" and then apply "review criteria" to all Action Track proposals. In another example, another consultant was brought in to lead a collaborative process with members of all Action Tracks to propose a cross-cutting strategy for weaving good principles of food systems governance across all proposed solutions. She later resigned in protest of the unilateral decision-making employed by conference organizers. Across these and numerous other inconsistencies, sudden pivots, and reversed decisions, one could think that the confusion created was intentional.

Efforts emerged within and outside the process to critique and reform governance so that the summit could be a meaningful event. Conference organizers, however, failed to respond to letters and opinion pieces (The BMJ, 2021) suggesting improvements. The summit leadership's failure to respond to pushback on governance further weakened confidence in the process.

There was no explicit mechanism to incorporate findings into the work of UN agencies, particularly the Rome-based agencies and the Committee on World Food Security (CWFS), that have long facilitated discussions on food and agriculture. The committee's chair was appointed to the advisory group for the summit, months after the process began, after initially being invited to join the "Champions Group" along with numerous other self-identified "champions." The CWFS's Civil Society and Indigenous Peoples' Mechanism was bypassed, effectively cherry-picking civil society organizations that were likely to support the tech-friendly "solutions" that came out of the summit.

Participants could not tell who was in charge, what was agreed, and why some voices—such as those of agricultural and food wage workers—were excluded. To further signal the inattention to summit follow-up, the conference leaders' official responsibilities ended on the last day of the summit (although they are still appearing in webinars and other events).

The rhetoric around an inclusive process sounded desirable, until the lack of governance and organization rendered attempts at inclusivity confusing. People of color, youth, and Indigenous people were elevated in a performative way near the end of the process, drawing into question the politics of inclusion at the event. Adding these voices was at best an effort to make amends. The opportunity to participate was meaningless because the investment required to participate was high and the outcomes were uncertain.

Other international processes are better handled. Participating in the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) process (Foundation on Future Farming, n.d.) was a radically different "multistakeholder" experience. All sectors were invited to participate, but the meetings had clear mechanisms for making decisions, bracketing non-consensus, and avoiding a corporate capture of proceedings. The 2009 Committee on World Food Security reforms (CWFS, n.d.) are another example of a more effective international process. The "members vs. observers" categories were augmented by new categories: the Civil Society and Indigenous Peoples'

Mechanism and the Private Sector Mechanism. Both are self-organized spaces, and their members can participate in plenary discussions and negotiations. For the Committee on Food Security to address the summit's illegitimate process requires them to drop the other work they are doing. Is it worth it?

What is the role for scholars in such a process, where participation requires a large upfront investment with little return? Scientists were organized at the summit around the issues in a “Scientific Group.” The Scientific Group consisted mainly of economists and natural scientists, who were often used throughout the process to legitimize narrow technological “solutions” while other approaches were deemed inauthentic. Some on the debriefing call pointed to the surprisingly robust response to the summit by social movements and the opportunity it created to broaden coalitions. What are the longer and more inclusive strategies necessary for food system transformation?

A group of academics organized to support these civil-society positions and published several briefs, opinion pieces, and articles. Several new coalitions emerged, including a transnational agroecology coalition. At the same time, other scholars mobilized to boycott the summit (Agroecology Research Action, 2021). See, for instance, this special issue, *Resetting Power in Global Food Governance*, in the journal *Development* (Montenegro de Wit, Canfield, Iles, Anderson, McKeon, Guttal, & Prato, 2021), which includes an overview framing paper (Montenegro de Wit et al., 2021) and 21 thematic and regional perspectives from contributors from the Global North and the Global South.

The Peoples' Counter Mobilization to Transform Corporate Food Systems (organized around the CSM) made the case that the Food Systems Summit endorsed and promoted the corporate capture of the global food system. Analysis from Special Rapporteur on the Right to Food Michael Fakhri, with Nora McKeon and Philip McMichael, contends that this was a rotten deal from the start, and in the making for decades. Even if one were to start with the assumption that the summit process was indeed well-intentioned and aspirational, it remains problematic because follow-up and accountability are lacking; there is no way to ensure that the pledges made are implemented. There was talk of another UN meeting to report on progress in two years, but it is unclear if this will happen; a new coordinating body of Rome-based agencies seems to be forming to deal with summit outcomes. Coalitions appear to have agency to continue meeting. For instance, the Decent Work and Living Income and Wages (DWLIW) Coalition held an informational event in December 2021.

Others in the debriefing made a case for avoiding the global stage in favor of sticking with our local and national food systems work. This strategy makes sense given that there is no commitment to sustaining the boundary-spanning work necessary to develop productive and just relations at national and global forums. Still others pointed out that more ecologically and social justice-oriented actors from the U.S. are needed on the front lines of global discussions on food systems, given the dominant and regressive role our nation currently plays in food systems. We have a responsibility to participate. If we do not, elites and market-centered actors will continue to dominate U.S.-backed priorities. 

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COMMENTARY

Reflexivity and food systems research

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I went out there, in search of experience, to taste and touch, and to feel as much, as a man can, before he repents.

—“The Wanderer,” U2 featuring Johnny Cash, *Zooropa*, 1993

This commentary is the result of an imperfect fit of much of the content below for a collection on sustainability and food. Ultimately I choose to remove this as it went through the review process, realizing it was a likely a round-(w)hole–square-peg type of situation. It was perhaps a bit tongue in cheek or “obtuse” for a more “scientific” way of considering the issue of food systems sustainability. In one of the disciplines from which I write, anthropology, the reflexive turn—refuting the outright positivism of neutral and objective studies, which make claims to a knowable and absolute truth—has become a part of the intellectual landscape for generations. This has led to more scientific studies wherein anthropologists are generally more honest about the extent and limitations of their research and writing. The ethnographic texts that implied omniscient and omnipresent accounts of the cultural group have generally faded from favor toward more partial accounts that are (1) reflexive in their thorough descriptions of the methods employed, and (2) those which disclose, to a greater or lesser extent, one’s positioning. These lessons have not generally permeated larger-level discussions of global food systems. Below, I take up the idea of positioning, highlighting tensions that don’t quite make the cut of being labeled or disclosed as a potential “conflict of interest” in academic publications, but nevertheless have

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implications in terms of how research is conducted, written up, and ultimately becomes accepted knowledge in particular disciplinary and professional accounts.

As analysts of food systems, we should be clear about our own ideological and professional commitments that may be operating at cross-purposes to what, where, and how we write and report on global and local conditions of sustainability in food systems. Our lived experiences, in some instances, may create contradictions which, rather than being dismissable as one-offs, may offer signs of preferences and patterns with varying impact on how we conduct our research and writing on topics of sustainability. Through the process of writing and publishing, we create a particular context for our readers to imagine the world as it is and as it could be. This process is inherently one of discernment, wherein we choose the lens or lenses by which we define sustainability and the threat to sustainability for ourselves and our interlocutors.

Naturally, our self-reporting and sharing of aspects of our life is contingent upon our personal predilections, social and cultural factors, and those of our interlocutors. This is true not only in the context of writing but also fieldwork and engagement, including the use of interviewing that informs the work. Of course, we don't always toe the line (Figure 1).

Figure 1. The author slugging down an ice-cold Coca-Cola to clear his palette after enjoying a pizza at the celebration of his parents' 50th wedding anniversary. Note the iWatch representing the "future of health" on his wrist.



Photograph by Ashley Meredith.

Most accounts informing food systems give us a short biographical sketch of the author in order to convey a sense of general interests and current professional position. From this we might be able to contact authors or do our own research in order to consider how their professional training, professional roles and responsibilities, and previous works inform their current work. We typically are left to additional internet searches to attempt to fill in the blank or gossip about personal behavior and decision-making—"Did you see so-and-so eat fast food in the airport?" This is not to say that we should thoroughly engage in "navel-gazing" as the key component of our written work, but, rather, call on one another to pause and reflect on how our own considerations are informed by social, cultural, and inter(personal) affiliations which shape our work.

In terms of my own positioning, Figure 1 reveals a number of interrelated points about research on sustainable food systems. It alludes to several factors that inform how I can and am likely to write about food systems: (1) I am drinking Coca-Cola and eating pizza while writing about and researching sustainable food systems in diverse settings; (2) My diet is, in part, shaped by dietary choices and options my parents presented to me as a child; (3) They are eating the same thing, as we are sharing a meal in celebration with one another; there is a

longevity issue here as we mark their 50-year wedding anniversary; (4) The iWatch is present on my wrist, a personal health and fitness monitoring device that indicates potential substantial investment in personal health; (5) I am white, indicating privilege, particularly when coupled with the next point; (6) The surroundings indicate relative class-based affluence in the U.S., indicating that I am likely not currently experiencing food insecurity and probably never have. This disclosure, albeit partial, serves to illustrate the point of intellectual and ideological cross-cutting commitments.

These have real world impacts in terms of how I have conducted research on food systems. For example, I reported the shifting nature of knowledge and perceptions of traditional foods along generational lines in Tohono O'odham Nation (TON) in southern Arizona, using the broad categories of young adult, middle-age adult, and elder (Fazzino, 2008). The importance of locally produced food has entered these discussions of identity and food sovereignty, as they are healthier options that will help turn the tide of the nutritional and social consequences of increased consumption of imported goods (Fazzino, 2008). My research on the TON highlighted many issues with continuity and change in the context of the traditional food system, as young adults (those aged 18–39) were more likely than elders (those aged 60 and above) to name introduced foods as traditional (Fazzino 2008). What I neglected to include in reporting of these accounts was the reported change over time, measured in and through the reflections on dietary change in the context of one person's life. I attempt to remedy this omission below, and in doing so, hope to set the stage for a broader discussion of sustainability perspectives and illustrate the value of incorporating reflexivity into our work in promoting sustainable food systems.

One elder shared the historical shifts that occurred over his lifetime, maintaining that “It seems like that's what made people healthy back then, the foods that they ate off the land.” These foods were not always readily available due to structural shifts, such as a proliferation of wage employment, boarding schools, and World War II enlistment. These made it less likely for Tohono O'odham to grow or eat locally, creating a situation wherein the TON food system relies on imported foods. He eloquently shared, “[In the cotton camps] there's only store-bought food. ... But even going away to boarding school there was a change in your diet because ... you're eating food that's made in the cafeteria. ... Even when we got rations here, [the] food commodities, that made a change in our diet. ... [Also] I think when the people started going off to war, to the cotton fields, jobs came about here in Sells or other places. ... And when you were doing your job you didn't have too much time to work in your field ... and then finally it just stopped.”

He shared that he sometimes lost sight of the importance of traditional ways in his youth. Some of this was due to the structural shifts away from locally produced foods on the TON and subsequent increases in noncommunicable diseases led to a series of initiatives from TON agencies and nonprofit organizations to grow, collect, and promote the consumption of traditional foods (Fazzino, 2008). The Native American Advancement Foundation (2021) has been active in this process through the creation of Ruth's Garden in the TON's GuVo District.

Hence, while I was reporting on the lack of knowledge or even desire to consume locally grown pre-Contact traditional foods in relation to age (Fazzino, 2008), I underestimated the importance of time in transforming individual perspectives. The semi-structured interviews performed were able to explore the nuances of an individual's preferences and knowledge at that discrete moment in time. This data source was inadequate to speculate on a continual shift toward more globalized and less sustainable foods by the population as a whole, as I suggested (Fazzino, 2008). The focus on a generational shift toward less sustainable diets was overestimated in light of the stories of redemption toward greater consumption of locally produced foods that elders shared with me. This example highlights a potential pitfall in reporting and reflecting on sustainable diets, namely a lack of transparency surrounding the ideological commitments of the researchers and authors. In this instance it was a narrative of decline and loss of traditional

foodways to industrial and imported foods that permeated the analysis and writing. In my deployment of this lens of decline, I lost out on the power of redemption, choice, and agency that was being made, and continues to be made, in the TON and in a variety of other contexts today. 

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Weaving disciplines to conceptualize a regenerative food system

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Abstract

Traditional and Indigenous practices worldwide have aimed to create sustainable and regenerative food systems guided by nature and based on reciprocal relationships between humans and nonhumans. Unfortunately, not all sustainable food system approaches, while striving for less harm rather than a net-positive impact, have considered indigenous knowledge or justice for small-scale producers and their communities. This paper contextualizes and conceptualizes a regenerative food system that addresses harm to the planet and people while creating a net positive impact by integrating a different research and practice

framework. First, we offer a positionality statement, followed by our definition and characterization of a regenerative food system; then we compare and contrast conventional and sustainable approaches, making a case for the need to create space for a regenerative food system. Next, we provide a framework of 13 principles for a regenerative food system by weaving the nature-inspired biomimicry framework of Life's Principles (LPs) with Traditional Ecological Knowledge (TEK) principles, while verifying these practices as they are used among small-scale Indigenous producers from selected arid regions, primarily the U.S. Southwest.

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Author Contributions

Conceptualization and draft preparation was by Author One; overall review and editing were by Author Two. Funding acquisition was by El-Sayed. All authors have read and agreed to the published version of the manuscript.

Keywords

Food Systems, Biomimicry, Traditional Ecological Knowledge, Indigenous Knowledge, Arid Regions

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Conflicts of Interest

The authors declare no conflict of interest.

Introduction

If we are looking for models of self-sustaining communities, we need look no further than an old-growth forest. Or the old-growth cultures they raised in symbiosis with them.

— Robin Wall Kimmerer (2013, p. 284),
Potawatomi Nation

I, Sara El-Sayed, am originally from Egypt and have lived in the American Southwest since 2017. My experiences in collaboration with small-scale producers in both these places have stimulated my interest in, and provided me with insight into, identifying common characteristics of regenerative food systems in arid regions. My research is influenced by both Indigenous and intersectional eco-feminist research (Ackerly & True, 2010; Harcourt, 2017; Merchant, 1996; Trauger, 2017) that ensures relational accountability, in which meaning is based on a community's and individual's experience of being respectful and accountable (Wilson, 2008). Human understandings of the environment are socially situated within narratives based on people's lived experiences and socio-political engagements (Harcourt, 2017). Within this paradigm, I have studied producers who are creating innovative and frugal practices which ensure that seeds are adapted to their harsh environments, preserve and ferment foods while collaborating with microbial life, and hold rituals and ceremonies connecting different generations with food, all while safeguarding traditional cultural and spiritual connections (Adamson et al., 2016; Portman, 2018; Wilson, 2008). I, Scott Cloutier, am originally from New Hampshire and have spent countless hours in New England forests and gardens. My intellectual work focuses on practices that simultaneously regenerate ecological systems and human happiness while honoring our spiritual connection and service to the land. I have worked globally with small-scale farmers ranging from dairy farmers to foresters to local mom-and-pop vegetable stands and have found that many of these practitioners have been inspired by regenerative development practices. Together, we are integrating our academic and practical experience with regenerative development theory to propose a theoretical and practical frame-

work while honoring the voices and wisdom of small-scale producers. This paper's eco-feminist approach acknowledges the value of centering one's positionality and bringing narratives into academia (Haraway, 2008; Ilmonen, 2020; Trauger, 2017) through blending storytelling with academic prose.

Because of the lack of attention to regenerative food system frameworks in academic literature, this paper aims to create a conceptual framework that defines a regenerative food system and identifies its characteristics. The paper will (1) contextualize how a regenerative food system fits within the larger context of modern food systems and builds on sustainability concepts, (2) define a regenerative food system by building on Dahlberg's (1993) regenerative food system definition, and (3) delineate a conceptual framework that emerges through an iterative process. The research is inspired by tools in grounded theory methodologies (Charmaz & Belgrave, 2019) that explore practices drawn from nature-inspired design (Baumeister, 2017; Benyus, 1997) and Traditional Ecological Knowledge (TEK) (Berkes, 1993; Kimmerer, 2002; Whyte, 2013). We also draw on findings from a series of interviews and workshops. Specifically, we compare and contrast food-related aspects of biomimicry Life's Principles (LPs) (Baumeister, 2017) with TEK principles (Hoover & Mihesuah, 2019; Shilling, 2018), and compare them with thematic findings from field research conducted in 2019–2020. The field research was conducted in the arid U.S. Southwest and consisted of interviews across the food chain with self-identified regenerative practitioners who are small-scale producers, primarily from rural communities, as well as data collection and experience-gathering from various Indigenous food workshops in 2019–2020. The collected data supports further insight into potential frameworks to support the work of regenerative scholars and academics across the food system.

A food system is the transformation of food across a chain of activities from production, processing, marketing, and consumption to waste management (Ericksen, 2008). We compare three concepts as ways of thinking about food systems: the prevailing *industrial* system, which began in the 1900s; the 1990s *sustainable* food system concept

stemming from the 1980s sustainable agriculture movement, and not yet realized; and, most recently, the *regenerative* food system concept. Of the three food system concepts, the industrial is widely practiced and prevalent, while the sustainable has not been realized on significant scales but has generated a myriad of alternative paths and practices (e.g., organic farming, community supported agriculture [CSA], farmers markets) that have attempted to counter the negative impacts of the industrial food system (Rhodes, 2017). The regenerative food system concept is just beginning to emerge in literature and practice—although it has long roots in traditional cultures—and is what we propose can enhance sustainable food system goals. Specifically, we suggest that concepts of regeneration can be blended with small-scale traditional production drawing on inspiration from nature. Thus, when we refer to a *sustainable* food system, we are speaking of it as a conceptual idea not yet realized; the same is true for the *regenerative* food system concept.

Rural small-scale producers, who number about 2.1 billion worldwide (Steward et al., 2014), provide 60% of global food needs (Patel, 2012; Rhodes, 2017). However, they lack an equal seat at the table in defining what constitutes good farming or good food in the dominant modern food system (Patel, 2012). At the same time, producers in arid regions, known as drylands, face even bigger strains due to climate changes (Blanco, et al., 2017; United Nations, 2010). Some of these producers have developed innovative ideas to adapt to these conditions and can offer valuable lessons in making our food system more diverse and resilient.

Food System Concepts: Shifting from Industrial and Moving Beyond Sustainable to Regenerative

The industrial food system, rooted in capitalism, grew in reaction to a food-insecure population but has become a means of expanding corporate power through cheap and abundant food (Baret, 2018; Patel & Moore, 2017). A handful of scientists, backed by a conglomerate of institutions, innovated systems to increase production. Borlaug, often referred to as the father of the Green Revolution, focused on grain intensification, and Haber

and Bosch invented industrial-scale ammonia production for the production of synthetic fertilizers (Dunn, 2017). This current system's growth is based largely on monocultures, synthetic fertilizers, pesticides, and genetically modified crops, which have led to unintended consequences and a path dependent on ever-growing corporations (Bausch et al., 2015). The industrial food system has resulted in depleted soils, pollutants leaching into water sources, and a commodity-based economy that has left small-scale producers unable to compete in a global market (Carlisle, 2016; Patel, 2012; Portman, 2018; Trauger, 2017). This “food regime” (Glennie & Alkon, 2017; Portman, 2018) is based on a neoliberal economy, consisting of profit-focused entities that hold both resources (e.g., patents by a few large agribusinesses) and decision-making power (Patel & Moore, 2017; Rhodes, 2017).

Consequently, the dominant system overproduces food (Food and Agriculture Organization of the United Nations [FAO], 2015) and simultaneously results in poor nutrition and an obesity epidemic while one billion people are hungry (Birke-land, 2008; Patel, 2012). To address these issues, starting in the 1960s the U.S. organic movement began paving the way for sustainable agriculture, eventually pushing for legislation in the early 1980s that called for alternative and sustainable food system practices (Youngberg & DeMuth, 2013). On the international stage, beginning in the late 1980s, farmers from organizations such as Via Campesina in the food sovereignty movement, supported by academics and international organizations such as the FAO, had a growing public interest in alternative practices for a more sustainable food system (Dahlberg, 1993; Kloppenburg et al., 2000; Rhodes, 2017).

The sustainable food system concept emerged as a critique to counter the industrialized system, by promoting food security under uncertain socio-ecological conditions, and ensuring food for current generations without compromising future generations' ability to provide for their own needs (Eakin et al., 2017; Rhodes, 2017; World Commission on Environment and Development, 1987). A plethora of alternative solutions can be loosely grouped as “sustainable food systems,” although

defining sustainability remains challenging (Kloppenburger et al., 2000). The term has been applied to but is not limited to sustainable agriculture practices that build on organic agricultural production (Kloppenburger et al., 2000; Youngberg & DeMuth, 2013), conservation farming, labeling, land intensification (Eakin et al., 2017), community gardens (DeLind, 2011), market innovations, diversified diets, nutrition assistance programs, and raised awareness of food justice (Eakin et al., 2017). Over time, these definitions have been contested as some of these practices have proven to be unsustainable. For example, some organic products are grown as monocultures, others are using patented seeds, and others use soils that have lost their organic matter content (Leifeld, 2012).

Sustainability, from the Latin *sustener*, “to hold” (Shilling, 2018), aims at causing less harm (Rhodes, 2012), absorbing perturbations, and maintaining function (Thompson & Scoones, 2009). Over time the concept has expanded and integrated three pillars of sustainable development: ecological, social, and economic (World Commission on Environment and Development, 1987). With regard to food systems, however, these pillars have not held equal status. Ecologically based agricultural practices, concerned only with farming practices and not addressing issues of hunger and injustice for small-scale producers, women, and people of color, have been criticized as insufficient (Allen & Sachs, 1991; Dahlberg, 1994; Kloppenburger et al., 2000). Machinery and cheap labor subsidize the industry and eventually replace the small-scale farmers who cannot compete within the economies of scale (Patel & Moore, 2017), so that alternatives still fall short. Labels such as organic and fair trade have become co-opted and greenwashed into the neoliberal pursuit of economic gain (Edelman et al., 2014; Trauger, 2017). Integrated pest management, which avoids synthetic pesticides, still does not consider how to create more closed-loop systems. Sustainable food system approaches are also often developed without small-scale farmers in mind (Rigby & Cáceres, 2001). Moreover, while the various alternative forms fill a vital niche in the sustainable food systems framework, they do not necessarily address the role that small-scale pro-

ducers and their communities and cultures play, nor the importance of cultural food diversity or the physiological differences in what people can eat (Guthman, 2014). Many sustainable alternatives fall short in that they offer solutions that exclude smaller traditional farmers and perpetuate inequalities in food access and control of the food system. Thus, yet another shift has emerged: a movement toward the concept of a regenerative food system, driven by community-based, small-scale, and Indigenous producers and other proponents of ecologically based food systems.

Unlike the reductionist, positivist approach embraced by industrial food systems (Berkes, 2018), the regeneration narrative embraces complexity. The path to regeneration is one of positive and regenerative development (Birkeland, 2008; Gibbons et al., 2018), reciprocity, restoration, and life promotion (Gibbons et al., 2018) with a net-positive impact (Elevitch et al., 2018; Hes & du Plessis, 2015; Mang & Reed, 2015; Rhodes, 2012). The concept of regeneration is used by farmers and communities to define a system that is not just sustainable but bountiful. It is a pathway that is inclusive of small-scale and traditional practices. Frameworks exist for regeneration, such as regenerative development, a process in which human communities and economic activities mutually benefit life-inducing processes (Mang & Reed, 2012) and manifest in the full potential of improved health for the whole system (Gibbons et al., 2018). Another framework for regenerative agriculture or holistic management (Savory & Duncan, 2016) aims to enhance the ecosystem services of the land (du Plessis & Brandon, 2015), with a focus on improving the health and quality of soils, water, and vegetation (Rhodes, 2015; Savory & Duncan, 2016). However, a regenerative food system framework has not been fully developed. Dahlberg (1993) was the first to define a regenerative food system across the value chain. Our research builds and expands on this definition while also providing an integrated framework to support it.

Table 1 illustrates the three food systems (industrial, sustainable, and regenerative) introduced above and some of their associated worldviews and narratives.

Table 1. Selected Industrial, Sustainable, and Regenerative Food System Worldviews and Narratives

	Industrial/Conventional	Sustainable/Alternative	Regenerative
Worldview	<ol style="list-style-type: none"> 1. Man over nature, domination (Patel, 2012), patriarchal 2. Neoliberal economy and capitalism (Patel, 2012; Portman, 2018) 3. Commodity driven, exploitative (Beus & Dunlap, 1990; Carlisle, 2016) 4. Linear approach (Jackson, 2010) 	<ul style="list-style-type: none"> • Stewards of the land • May work in a complementary way with a neoliberal economy (Edelman et al., 2014; Trauger, 2017) • Foods are organic or sustainable, or produced fairly • Cyclical approach 	<ul style="list-style-type: none"> • Reciprocal relations • Eco-feminist and Indigenous • Decentralized small-scale • Spiral approach
Narratives	<ul style="list-style-type: none"> • End hunger. Provide sufficient, cheap food for a growing population (Baret, 2018) • Incentivizing monocultures, chemical fertilizers, and pesticides for efficiency • Standardization for food safety • Increasing profits and sales • Waste does not factor into the system unless it is profitable 	<ul style="list-style-type: none"> • A three-pronged approach with goals of balancing between nature, society, and the economy • Organic farming, although at times grown in monocultures (Rigby & Cáceres, 2001) • Uses alternative labeling, organic, fair trade • Consumer education is critical • Aims at closing the nutrient loop 	<ul style="list-style-type: none"> • Whole-systems approach creating reciprocal relationships • Creating net-positive impact, carbon capturing, increasing biomass, cycling waste, and enhancing ecosystem services (Rhodes, 2017; Soloviev & Landua, 2016) • Creating alternative certifications that are community-based • Restoring cultural heritage and identity

Methods

Our work was completed in four interconnected, nonlinear, approaches: (1) an iterative literature review to establish a baseline of regenerative food systems definitions and conceptualizations; (2) the integration of two relevant regenerative concepts that emerged from the literature: Life's Principles (LPs) and Traditional Ecological Knowledge (TEK); (3) a series of interviews and workshop participation to validate the integration; and (4) data analysis and coding of the results from steps 1–3. Our methods are grounded in qualitative techniques and also loosely guided by elements of grounded theory (Charmaz & Belgrave, 2019). This includes data analysis aimed at developing theory through an iterative process, with data acquisition guiding where to find the next using theoretical sampling and literature review. For example, a paper might have led to the development of a new regenerative theory. Or one interview might have led to an interview with a new producer or following the origination of a native seed/regenerative practice. Whether reviewing literature, interview transcripts, workshop content, or mapping con-

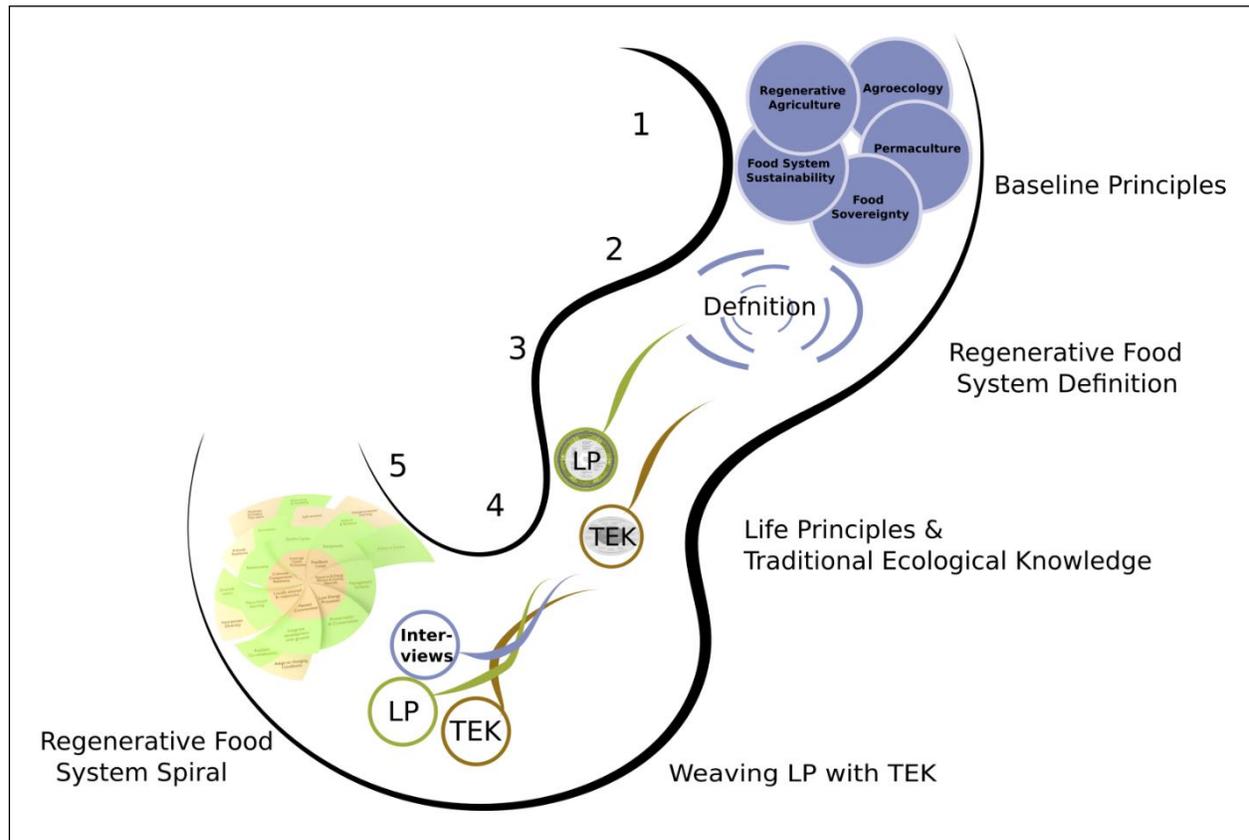
cepts into LPs and TEK, a process of memoing, taking notes, and analyzing the data, from which emergent themes arose (Charmaz & Belgrave, 2019; Tie et al., 2019) was completed.

(1) *Literature Review and Definition Generation.* The literature review was an iterative process seeking regenerative food system theories using Google Scholar, Web of Science, and Scopus. Initial keywords included 'regenerative agriculture,' 'regenerative development,' 'agroecology,' 'permaculture,' and 'food system sustainability.' Literature was drawn from peer-reviewed articles as well as online publications from various institutions (e.g., the Land Institute and Savory Institute) (see Table A1 in Appendix A). Any literature mentioning regenerative approaches to food production or those with similar principles and definitions were included in our study. Content was cross-compared, collated, and clustered, resulting in some baseline principles (Figure 1). Our initial findings were also organized into related themes, which were then used to further define a regenerative food system.

(2) *Weaving LPs and TEK.* Regardless of the principle or themes, the initial literature review

Figure 1. Five-step Flow Process for the Conceptual Framework of a Regenerative Food System

The five steps are: (1) Establishing baseline principles by drawing on extant literature (Table 1); (2) Extrapolating an overarching regenerative food system definition; (3) Focusing on Life's Principles circular diagram of 26 principles (Biomimicry 3.8 framework), and a circular diagram representing the Traditional Ecological Knowledge diagram developed in 2000 by Turner et al. (Appendix C, Figure C1); (4) Comparing emergent themes with literature and weaving LPs with TEK; and (5) Developing a spiral framework for a regenerative food system.



revealed that regenerative approaches often emulate natural systems and/or draw on traditional practices. Exploring these findings led us to two existing frameworks: Life's Principles from Biomimicry (accounting for nature emulation) and Traditional Ecological Knowledge (accounting for traditional practices). We decided to integrate the two to make a more comprehensive regenerative food systems research and practice-based framework. The process involved a weaving process (integration) through several iterations of matching principles from both LPs and TEK, eliminating others, and aligning the frameworks to define and characterize a regenerative food system. The process was achieved by revisiting literature, and the framework was validated by discussing it with food

systems experts and practitioners in interviews and as part of attending a series of workshops.

3. Interviews and Workshops. In total, 24 semi-structured interviews were conducted through purposive sampling, along with eight workshops attended (by El-Sayed) on Indigenous foodways, to integrate the findings more deeply from the methods above (see Table 2 and Table D1 in Appendix D for details on the workshops). Given that TEK is relatively new to academia, especially as it relates to food, the workshops provided more in-depth context and intense engagement (Ahmed & Asraf, 2018; Ørngreen & Levinsen, 2017). The workshops were led by expert panelists working in regenerative and sustainable food production, including both scholars and practitioners. Rich workshops

Table 2. Interviews Conducted and Workshops Attended in the Course of the Research

Jobs (interviews fit several categories)	Farmer/Gardener	11
	Processing	4
	Chef/Cook	8
	Educator	17
Race	Native American	8
	White American	8
	Other	8
Gender	Female	18
	Male	6
Location	Northern Arizona	7
	Southern Arizona	11
	Southwest (not Arizona)	3
	North Africa	2
Themes	Indigenous food systems	4
	Traditional processing practices	2
	Rights of Nature	2
Number of days/time	1 hour	3
	1 day	2
	2 days	2
	10 days	1
Format of workshop	Online	3
	Lecture	3
	Interactive workshops	2
Author engagement	Listener	5
	Active-Participant	1
	Volunteer	2

notes (memos, notes, photos, video, and conversations) were also taken by El-Sayed to assess the validity of the topic (Lincoln et al., 1985). Artisanal and Indigenous producers working across the food system were interviewed via a snowball sampling process whereby they and the themes that emerged suggested the next interviews. Recorded interviews included open-ended questions and field observations, infused with arts-based games (e.g., visualization exercises and walk and talk) (Lerman, 2018). Subsequent workshops attended were a mix of in-person and online and were based on recommendations from interviewees; notes and photos were taken at each one. The longest workshop was an

in-person 10-day Indigenous Sustainable Communities Design Course (ISCDC) run by Indigenous educators Clayton Brascoupe and Louie Hena.

4. *Analysis to Finalize the Regenerative Food Systems Framework.* To further enhance the inclusion or elimination of the principles from the integration of LPs and TEK, interview transcripts, workshop notes and transcripts, field notes, and pictures were imported into the data analysis tool MAXQDA (Version 3, VERBI Software, 2020). Here, *in vivo* coding and principles-based coding were completed. The concepts extrapolated from the interviews and workshops revealed many themes, which were classified into smaller categories and then compared to the principles identified from the literature in step 1. The wealth of information and practices found across the interviews and workshops suggest that the principles in the literature and those from the integration of LPs and TEK are supported by current examples and practices (Figure 2; Table 3). All findings

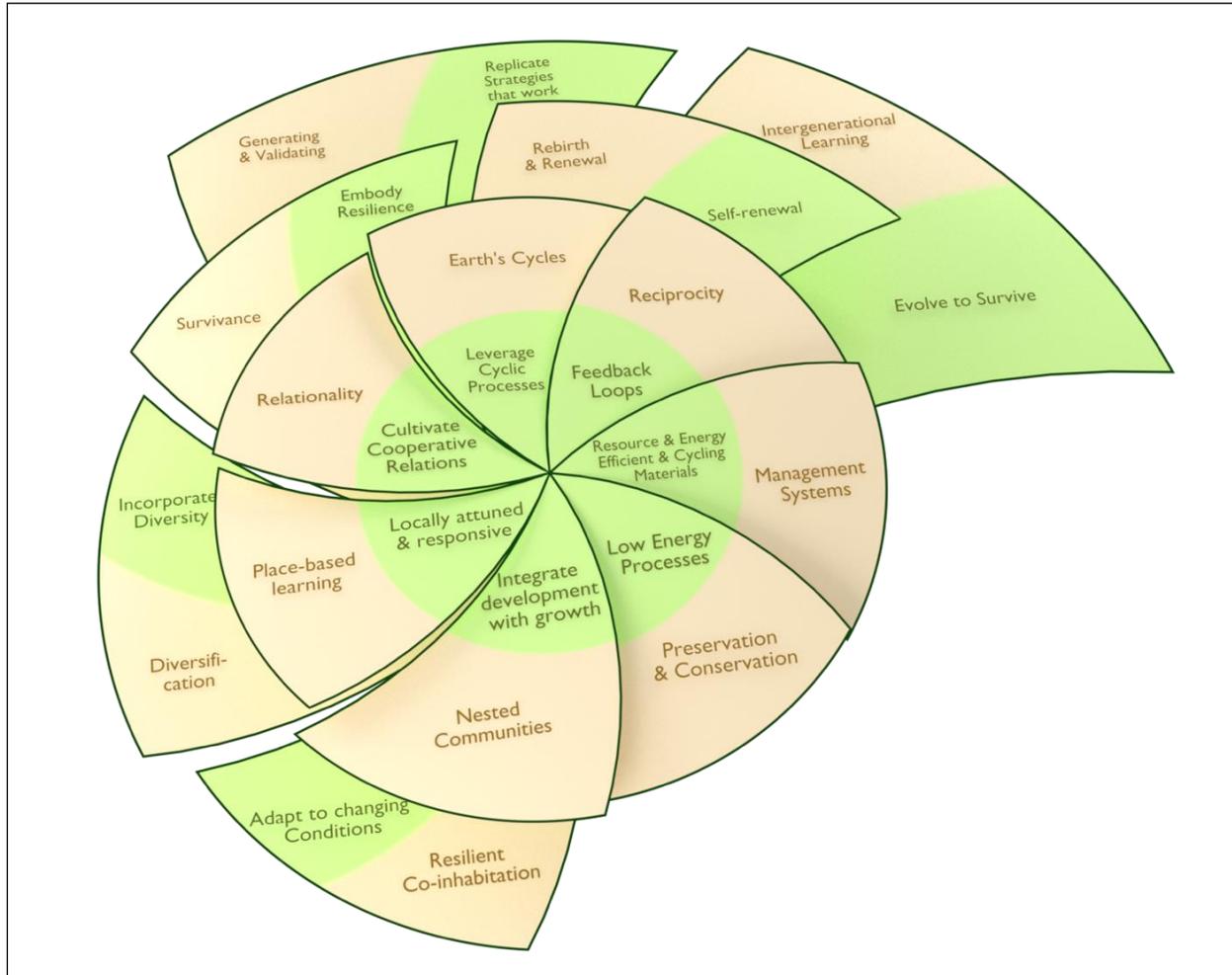
were integrated to create the regenerative food systems framework, shared below.

Results

Our results (Figure 1) are shared in five steps: (1) the findings from the literature review and the initial emergence of related themes (nature-inspired and traditional knowledge) and principles; (2) an enhanced definition for a regenerative food system; (3) the process of weaving together LPs and TEK; and (4) the development of a conceptual framework, based on comparing LPs and TEK principles with transcripts from interviews and workshops. The framework is illustrated in the

Figure 2. Regenerative Food System Spiral

This represents the intersection between Traditional Ecological Knowledge (TEK) (brown) and Life's Principles (LPs) (green). The internal spiral is the base of 7 principles, the first tier is the expansion over time (one to two generations), and the second tier is the expansion over more time (across many generations). The spiral is a recurring pattern and symbol both in nature and in Indigenous communities, showing an optimal growth form.



form of a spiral highlighting the most significant characteristics of a regenerative food system (Figure 2).

Establishing Baseline Regeneration Principles

The baseline principles were extrapolated from the literature, as described in the methods above, and mainly involved two themes: nature-inspired solutions (e.g., nutrient cycling, incorporating diversity, cooperation) and traditional practices (e.g., social justice for small-scale producers, place-based education, and a whole-system approach).

Defining a Regenerative Food System

Our definition of a regenerative food system is adapted from Dahlberg (1993). We propose an enhanced definition that builds on research based on both Indigenous knowledge and nature-inspired design. In addition, it included some of the aspects learned from our interviews and the workshops attended by El Sayed.

We define a regenerative food system as a whole-system approach to food that uses place-based education (Coté, 2019; Jackson & Jensen, 2018; Kimmerer, 2002; Mang & Reed, 2012),

Table 3. LPs and TEK Definitions in Relation to Food Systems and Corresponding Examples

Numbers correspond to numbers in the discussion section.

Biomimicry LP	TEK Principles	Definition in relation to food system	Practice or Example
1. Locally attuned and responsive	Place-based knowledge	Food production that fits the immediate environment, through generational experience based on place.	<ul style="list-style-type: none"> • Being a native and connecting to ancestral foods • Building a local food economy
2. Cultivating cooperative relationships	Relationality	Symbiotic mutualisms that strengthen relations among humans, nonhumans, spiritual entities, and landscapes.	<ul style="list-style-type: none"> • Introducing oneself and one's ancestry (Wilson, 2008) • Facilitating the growth of other organisms, including pollinators, microbes, and fungi
3. Leverage cyclic processes	Cycles of the Earth	Taking advantage of phenomena that repeat themselves, food practices based on seasons, ceremonies, and festivals.	<ul style="list-style-type: none"> • Periodic Zuni bowls and dykes to divert seasonal waters • Cosmology-related rituals, including fasts • Biodynamic farming practices
4. Feedback loops	Reciprocity	Food production that embed self-regulating systems and tight feedbacks, including reciprocity through gifts.	<ul style="list-style-type: none"> • Honorable harvest (Kimmerer, 2002) • Gift economy • Hopi grow corn protected deep in the ground and corn reciprocates by producing food
5. Readily available materials/energy and recycle all materials	Management systems	Systems based on a deep understanding of both local and readily available resources, and how to recycle energy and resources.	<ul style="list-style-type: none"> • Hopi dryland farming relies on rain, hard work, and prayer (Wall & Masayesva, 2019). • Nahuatl '<i>quauhtalli</i>,' rotten wood turned into rich, soft soil (Peña, 2019).
6. Low-energy processes	Preservation and conservation	Techniques that use low and available energy sources, including strategies of food storage and preservation for times of stress.	<ul style="list-style-type: none"> • Fermentation of foods such as pickles, kombucha, and <i>kishk</i>. • Using passive energy such as gravity, net, and pan farming
7. Integrate development with growth	Nested communities	Investing optimally to promote both development and growth based on nested elements that are built from the bottom up.	<ul style="list-style-type: none"> • Small bands organize into intricate structures • O'odham people built on Hohokom canals, and stabilized rivers by growing agave and century plants (Nabhan, 2013)
8. Adapt to changing conditions	Resilient co-habitation	Responding to dynamic contexts over time, and producing foods adaptable to changes in climate; the biosphere provides the rules and humans use trial and error to adapt to the socio-ecological system.	<ul style="list-style-type: none"> • Maintaining living seed banks • Drought-tolerant crops • California tribes managing forests via controlled ceremonial fires based on trial and error
9. Incorporate diversity	Diversification	Incorporating multiple forms, processes, and systems, such as diverse species, multiple rotations, successions, and guilds, and creating a diverse diet.	<ul style="list-style-type: none"> • Growing polycultures (Three Sisters) • Encouraging perennials • Seasonal and ceremonial foods

10. Self-renewal	Rebirth/renewal	Maintaining integrity through self-renewal, increasing hybrid vigor of plants and animals, as well as through rituals such as spiritual ceremonies.	<ul style="list-style-type: none"> • Smoke ceremonies for cleansing and detoxification • Succession management, holistic grazing, and herd rotations (the Sahel)
11. Resilience through variation, redundancy, and decentralization	Survivance	Resilient food systems and survivance, withstanding environmental and/or economic disturbances by incorporating variation, decentralization, and an active sense of presence by keeping stories alive.	<ul style="list-style-type: none"> • The Gileños/Pimas use double and triple cropping, harvest wild crops, and fish and hunt (Rea, 1997) • The Jebilya of the South Sinai have fruit forests, raise sheep, and tell stories through poetry
12. Replicate strategies that work	Generating, validating, and interpreting	Repeating successful food production strategies and traditions observed from patterns in nature, interpreted and replicated.	<ul style="list-style-type: none"> • Telling food stories and songs marking pivotal moments or teaching lessons • Selecting and passing down drought-tolerant seeds
13. Evolve to survive	Intergenerational learning	Intergenerational learning from ancestors to posterity, by telling stories and poetry, songs, and dreams, embodying information that allows for the endurance of food practices.	<ul style="list-style-type: none"> • Maintaining knowledge for seven generations: three generations back, the present, and three generations forward, such as through apprenticeship • Transitioning from annual staples to perennial crops (Jackson & Jensen, 2018)

integrates traditional agroecological knowledge with modern practices (Altieri et al., 2011), and adopts nature-inspired solutions (Rhodes, 2017), while being engaged civically and economically (Hintz, 2015; Trauger, 2017). It is a system that produces both flavorful and culturally appropriate food (Fontefrancesco, 2018), which is ecologically net positive (Hes & du Plessis, 2015; Zari, 2018), and which aims at intergenerational (Hoover & Mihesuah, 2019; Whyte, 2018) and interspecies justice (Dahlberg, 2009; Paxson, 2008).

This definition acknowledges that food systems should be approached holistically while being attuned to the nuances and circumstances of a place and its community. Solutions to food challenges should be derived by in situ producers and developed in the name of regeneration as inspired by nature's adaptation to place. Thus, Native people who have observed local adaptations and created agroecological systems should not only be included and consulted but also their know-how should be protected. Moreover, for a regenerative food system to grow and develop properly, it should involve its people civically and economically (with respect to food sovereignty and local food choices) while being embedded in cultural traditions that value culturally distinctive flavors, rituals, and ceremonies. A regenerative

food system should not be resource-exhaustive or even carbon-neutral; rather, it should have a net positive and regenerative impact, with the aim of achieving justice, of addressing the disproportionate burdens of environmental harm and lack of access to natural resources due to systemic injustices related to race, class, and gender (Guthman, 2014) for present and future generations of human and nonhuman species. Through the generation of this definition and the emergent baseline principles from literature, our work called for the integration of Life's Principles (LPs) and Traditional Ecological Knowledge (TEK) into a more comprehensive regenerative food systems framework.

Life's Principles and Traditional Ecological Knowledge

The emergent themes in the literature indicated the importance of nature's patterns to regeneration, meaning that food systems can take inspiration from nature's strategies such as multifunctional designs or circular systems with no waste. Thus, we turned to biomimicry's overarching characteristics, "Life's Principles" (LPs) (Baumeister, 2017). Small-scale producers whom we interviewed revealed that much of their knowledge about production, processing, and

managing food derived from traditional wisdom, which constitutes knowledge meshed with practice and belief systems (Berkes et al., 2000). Traditional wisdom has different names but is commonly referred to as Traditional Ecological Knowledge (TEK). Subsequently, we describe and synthesize LPs and TEK and then contextualize and integrate them in relation to food systems.

Biomimicry's Life's Principles

As used in this paper, biomimicry refers to the strong form of biomimicry, which is conducive to ecological health, rather than the weak form that is mechanistic, and based on emulating form (Blok & Gremmen, 2016). It is a design that is emulated from nature to enhance sustainability (Benyus, 1997). The nascent discipline looks to nature as inspiration to recreate strategies that are most adapted to life on planet Earth. Like TEK, biomimicry is an ancient practice. Humans have typically looked to nature for inspiration to design their world; Alaskan hunters will stalk seals emulating polar bears. Although borrowing from nature for inspiration has roots in Indigenous traditions, we refer here to the growing Western-based field of biomimicry, which has three main elements: *emulate*, *ethos*, and *reconnect*. *Emulate* is the process of learning from nature's strategies and adopting them to help solve sustainability challenges. Examples include self-cleaning paints that mimic the nanostructure of lotus leaves and the "Living Machine" that mimics a wetland to purify greywater (Laylin, 2010). *Ethos* is the philosophy that humans are part of nature and therefore should steward it. *Reconnect* is an invitation to be in nature and learn from it by nurturing our own relationship with the Earth (Baumeister, 2017). Learning from nature offers the potential for a different worldview of sustainability, based on understanding that nature is a "supra-system" of organizations and elements intersecting in complex relations, as well as a model, measure, and mentor (Benyus, 1997; Olaizola et al., 2020).

Biomimicry 3.8¹ has developed the LPs framework over 20 years and several iterations. It

consists of 26 guiding principles of patterns ubiquitous to and extrapolated from the natural world (see the diagram of 26 LPs in Figure B1, Appendix B). The principles serve as a valuable tool to establish sustainability baselines and move beyond them into regeneration, with the goal of supporting conditions conducive to life (Baumeister, 2017).

What is Traditional Ecological Knowledge?

I, El-Sayed, am still navigating the world of TEK, having not been raised in an Indigenous family. I have been drawn to Indigenous ways of knowing and the many storytellers in my life that have explained the world around us using science and spirituality. As an Egyptian/Italian, I felt compelled at a young age to connect with Indigenous elders in the Sinai, where I interned with Jabaliya elders, and unbeknownst to me was learning TEK through rituals and observing nature. I, Cloutier, have long felt drawn to TEK, learning about Indigenous farming practices like the Three Sisters, an Indigenous polyculture of corn, beans, and squash, as a young boy. I later connected with practices of TEK through Western perspectives like permaculture and natural building, followed by experiences with Celtic shamanism and ceremonial practices of connecting with and honoring the land and the intuitive wisdom Indigenous to all beings.

The term TEK became popularized in the 1980s and is currently finding its way in academia, especially in relation to environmental issues such as adapting to climate change (Hosen et al., 2020). However, TEK refers to ancient practices (Berkes, 2018). TEKs are forms of knowledge that reflect diverse worldviews of traditional and Indigenous people. Different scholars have referred to them as "Indigenous knowledge" (I.K.), "traditional knowledge" (T.K.), and "Native science" (Berkes, 2018; Cajete, 2018; Whyte, 2013). TEK stems from Indigenous ways of knowing passed down by the oral tradition of elders and the cultural expression of arts, crafts, and ceremonies (Tsosie, 2017). It is a blend of science, spirituality, and ethics (McGregor, 2018), and includes the diversity of interactions among plants and animals, landforms, water-

¹ Biomimicry 3.8 is a B corporation founded in 1998 by Benyus and Baumeister that has pioneered the research, education, and application of biomimicry topics.

courses, and other traits of the biophysical environment (Berkes, 1993; Frank, 2011). TEK has been called by Nelson and Shilling (2018) the “soul” of sustainability, highlighting Indigenous ethics long before Western science defined sustainability. It believes in reciprocity, nature-centering, valuing the dynamic relation of being attuned to the senses, and being responsive to the elements, as well as responsibility to future generations (Shilling, 2018). TEK shares similarities with the eco-feminist belief that humans are not separate from nature, that life is not about the domination of human over nature, or man over woman, but rather a co-existence based on caretaking, love, and reciprocity between species (Kimmerer, 2013; McGregor, 2018; Plumwood, 1993; Trauger, 2017; Whyte et al., 2016). It is a knowledge-practice-belief complex (Whyte, 2013; Berkes, 2000) with an emphasis on care and stewardship (Kimmerer, 2002), spanning generations (Nelson, 2017). (See the framework diagram of TEK in Appendix C, Figure C1.)

Unlike the industrialized relationship of food as a commodity, the TEK food relationship is sacred and founded on profound ethics of respect and gratitude for culture-land resources (Huambachano, 2018). Because of the sacredness of the relationship, many Indigenous communities, including many that were interviewed, have traditions of giving prayer at meals and sites visited. Food has not only sustenance value but is a reconnection to culture that can be expressed more accurately through food sovereignty and regenerative processes, rather than just a matter of sufficiency (Hoover & Mihesuah, 2019). Such views of food are complicated, due to the impact that colonialism had on severing Indigenous communities from their culture and place and their sovereignty over their food. An example is the disenfranchisement by Native American boarding schools of Indigenous children from their foodways, which were supplanted by Western diets high in sugar and starch (Hoover & Mihesuah, 2019). This paper will not explicitly address two key elements of TEK and food: food sovereignty and the importance of spirituality in Native cultures (Houde, 2007; Wilson, 2008). This paper focuses on areas of intersection with another ancient but reformulated discipline of nature inspiration.

Synthesis of LPs and TEK

LPs and TEK are strongly linked, given their emphasis on learning from nature’s strategies and being attuned to the natural world, but we suggest that weaving them together would strengthen both. Many Indigenous communities describe how nature works as core to their understanding, which is the essence of biomimicry, and biomimicry describes understanding traditional knowledge as a form of connecting to and being inspired by nature. Kimmerer (2002) describes how both TEK and scientific ecological knowledge (SEK) rely on a systematic observation of nature, but that nature is subject in TEK and is object in SEK. Nelson describes how Native women have continued to be holders of ecological knowledge through their experience with plants and medicines, emphasizing their eco-feminist approach (Nelson, 2017). The Indian food sovereignty activist and scholar Vandana Shiva (2019) endorses care for plant diversity; Benyus (1997) discusses learning from Native insights, which often mimic nature, indicating that the discipline of biomimicry has roots in Indigenous knowledge systems. As the relationship is not explicitly correlated, this paper weaves them together, beginning with LPs and overlaying equivalent TEK principles gathered from publications, Indigenous scholarship, interviews, and workshops.

This paper focuses on the food system of arid regions. Because arid regions are so fragile, successful strategies and practices in these ecosystems may serve as models to emulate in a future when temperatures are rising and rainfall regimes shift. Although there are many similarities between the two disciplines, differences remain. Biomimicry, as defined in this paper, stems from Western epistemology, focusing on sustainability, while TEK is based on Indigenous sovereignty, justice, and the relationality of humans and nonhumans (Peña, 2019). Indigenous agroecological traditions existed before the arrival of more Western practices, some of which, such as permaculture, have even been influenced by indigenous knowledge but have not acknowledged it (Peña, 2019). This paper values each system but mainly highlights how the similarities between TEK and LPs can allow us to create a more regenerative food system.

Weaving LPs with TEK

We began with 47 themes, coded in MAXQDA from both *in vivo* research and LPs and TEK principles. Themes were matched to the literature as well as interviews and workshop transcripts. The 47 themes included, for example, low technology, fermentation, microclimate, relationality, and taboo foods. We distilled themes into the LPs' "buckets" and matched them with equivalent TEK themes, and removed themes that were infrequent and thus insignificant. This enabled us to distill 13 LPs and their equivalent TEK principles. The principles were mapped onto a framework in the form of a spiral, showcasing the relationship between LPs and TEK and the equivalent practices related to arid regions. The principles lay out the LPs and their equivalent TEK principles, supplemented by examples of each within Indigenous food system practices.

Regeneration Spiral

The result of this iterative process was a regenerative food system spiral (Figure 2). It illustrates the parallels between LPs and TEK, beginning with the central circle and spiraling out in time—from one to two generations in the first tier and multiple generations in the second tier—and in complexity to the two outer layers. Each matching principle represents an LP (coded in green), and its equivalent TEK (coded in brown) based on the recurring themes that emerged most frequently from the data.

Discussion

A spiral, as explained by Louie Hena, a member of the Tesuque and Zuni Pueblos, shows how we are all related, as a pattern that is often repeated in nature—in galaxies, the eye of a hurricane, fingerprints, and seashells; among the traditional Pueblos the community started at the center of the circle and expanded in a spiral form (Hena, 2014). In nature many organisms take the spiral form and follow the golden angle, enabling growth without changing shape. Table 3 provides more details and descriptions for each principle, along with related practices. The spiral does not value one principle over another; rather, the principles occur over time. (The italicized words or phrases represent the

LPs and TEK principles.) The first seven principles form a system's foundation, ending this inner circle with the *integrate development with growth/nested communities* principle. The process leads to *adaptations* in the second spiral and the principle *evolves over time* through generations, as the system matures in the outer spiral.

Below is a detailed description of the principles. Each section contains (a) an explanation for each LP and the equivalent TEK principle; (b) an example to explain the LPs, using the saguaro cactus because of its cosmological tie to the Tohono O'odham Tribe, one of the tribes inhabiting the Sonoran desert where saguaros are found (Rea, 1997; Yetman et al., 2020) and association with survival strategies of arid regions; (c) one or more traditional food system practices stemming from community knowledge based on literature and observations and interviews involving producers and workshops in the arid Southwest (Figure 2 and Table 3).

More amazing perhaps than any aspect of its biology is Man's emotional involvement with the saguaro—the saguaro is a "hero" among plants.

—S. Steenberg and C. Low, *Ecology of the Saguaro II* (quoted in Yetman et al., 2020)

[Inner Spiral] Locally Attuned and Responsive/Place-Based Knowledge

Being locally attuned and responsive (Baumeister, 2017) is the ability of living things to fit and integrate into the surrounding environment. Indigenous Knowledge is grounded in *place-based knowledge*, understanding the cycles specific to a place and eating what is adapted to the land and about the cycles specific to a place (Kealiikanakaoleohaililani & Giardina, 2016).

An example of a highly adapted organism is the saguaro cactus, attuned to the desert by storing water in its pleated, expandable reservoir, protected from evaporation with thick waxy skin, and with spines that help it avoid predation as well cool it (Gibson & Nobel, 1986). In arid regions, local attunement requires adapting to hot and dry summers, monsoonal summer periods, sparse rains in winter, and significant temperature differences

from hot days to cold nights. Similarly, the Tohono O’odham of the Sonoran Desert have mastered local attunement and place-based knowledge by using multiple growing seasons for wheat, greens, and agave, diversifying and foraging for food, such as saguaro and velvet mesquite, and rabbit hunting and fishing (Rea, 1997). A Salt River Pima Indian community member stated that in the past they managed ridges near the Verde river with agave groves, both stabilizing the soil and providing food.

[Inner Spiral] Cultivate Cooperative Relationships/Relationality

Nature thrives on *cooperative relations*; it nurtures mutualisms and symbiotic relationships (Baumeister, 2017). To nurture place, Indigenous communities strive to build strong bonds with both the place and among their people, creating strong *relations* (LaDuke, 2016). Indigenous people will often introduce themselves by their name and their clan name, giving respect to both the ancestors as well as the land they have come from. A regenerative food system also is based on a nurturing relationship whose result is not limited to feeding humans but may provide a habitat for pollinators or create favorable soil biology by fostering beneficial soil microbes and fungi. In TEK, everything is *relational*, relations with people, with the cosmos, plants, and animals: it is a responsibility to the earth (Twila Cassadore, Wisdom of Indigenous Foodways workshop; see Appendix D). An interview with a Tohono O’odham woman featured traditional songs about freshly harvested saguaro fruit she knew as a little girl; plants and even seeds are seen as related. A Mohawk/Anishinabek instructor began each session with a prayer thanking the elements, the plants, animals, the food, and ourselves for our presence at each activity, as giving thanks also honors relationships (ISCDC Workshop, 2019: Appendix D).

[Inner Spiral] Leveraging Cyclic Processes/Cycles of the Earth

Nature *leverages cyclic processes* such as day and night, tides, and seasons (Benyus, 1997). Understanding place is about understanding its physical conditions and the *natural cycles of Earth* that form a place, and

how to leverage them. Indigenous communities have historically leveraged cycles via rituals, ceremonies, and festivals (Whyte et al., 2016). The saguaro leverages the seasonal monsoonal rains that enable it to survive its arid climate. The *Tekna* herders, members of an Arab-Berber tribe in southern Morocco, leverage the seasonal ephemeral plants found after rains by moving several hundred kilometers to where the plants are, since they provide a good diet for animals; but they also diversify by buying forage in other periods, therefore leveraging cycles over a year to ensure a diverse diet for their herds (Blanco et al., 2017). The Zuni of New Mexico traditionally managed water before the monsoonal seasons by creating check dams, small dykes, and Zuni bowls to slow water as it came down valleys (Lancaster, 2013; Nabhan, 2013). In the past, work parties would be organized and gather annually to manage the mountains and valleys, preparing them for the next period of rains to ensure that the cycles had been leveraged to optimize water retention (ISCDC Workshop, 2019: Appendix D).

[Inner Spiral] Feedback Loops/Reciprocity

Leveraging cycles are dependent upon a larger *feedback* system in nature, with negative and positive feedback allowing for self-regulation (Benyus, 1997), creating a form of *reciprocity*. During the summer, the saguaro’s white flower blooms at night and sends a signal to migrating lesser long-nosed bats, which creates positive feedback. The bats are invited to eat nectar, pollen, and fruit, aiding the cactus in pollination (Yetman et al., 2020). Indigenous communities also have cycles of regulation in the form of *reciprocal* caretaking (Kimmerer, 2013). Reciprocity is also referred to as “all our relations” to living things, when prayers are whispered across generations to all “our relatives” (LaDuke, 2016), stressing the importance of caretaking. Honorable harvest is another instance of reciprocity (Kimmerer, 2018). At the beginning of harvest, permission is asked to take, and take only what is needed is taken, praise is given, and a gift reciprocated, such as burning tobacco (Kimmerer, 2018). A Pueblo artist and permaculture designer in New Mexico emphasizes the importance of creating micro-environments in her home to feed

herself and her family and to create opportunities for other life to thrive in the harsh desert environment, such as creating a rock habitat that enables small pockets of shelter and life to exist (Interviewee F13, 2019).

[Inner Spiral] Resource and Energy Efficiency and Cycling/Management Systems

A tight feedback loop also includes *resource efficiency*, the ability to manage resources and energy conservatively and efficiently (Baumeister, 2017). This is also known as *resource management systems* in Indigenous communities (Berkes, 2018). The structure of a saguaro has evolved systematically to cool the plant by creating microconvections around each spine, as well as to expand and contract to store water (Phillips & Wentworth, 1999). Dryland farming is an example of the management systems practiced by the Hopi of Arizona. Dryland farming uses minimal water, mostly what falls during monsoons, to grow highly adapted corn seeds cultivated up to a foot beneath the soil (Michael Johnson, Wisdom of Indigenous Foodways workshop, Appendix D). Other resource-efficient farming practices include using compost and mulch to retain moisture and nutrients in the soil. The Western Apache of White River grow crops needed on the reservation by managing the cycling of nutrients and enriching the soil with mycelia as well as compost mixtures at different intervals in the growing season. While these are not traditional practices, the Western Apache recognize that cycling nutrients from local resources is important to enable the soil to regenerate and enable crop diversity (Interviewee F2, 2019).

[Inner Spiral] Low Energy Processes/ Preservation and Conservation

Another level of resource efficiency in the natural world is the principle of *low-energy processes* (Baumeister, 2017), which are expressed as preservation and conservation practices by Indigenous communities. An example from nature is photosynthesis, where the process requires sunlight as a source of energy to produce sugars and enable a plant to produce sugars. The saguaro cactus has a large surface area to facilitate the process and leverages capillary action to move water up the plant, and is

composed of a tough composite waxy cuticle to reduce water loss. Emulating from this strategy would mean using passive energy sources such as the sun to power food systems. In Indigenous arid communities, or where food harvest is limited, preservation and conservation practices are crucial at certain periods of the year. Drying and fermenting foods are especially important. In Egypt, vegetables such as okra and tomatoes are sun-dried, while dairy and grains are fermented and dried to be used throughout the year. In the summer, the Tohono O’odham of the Sonoran Desert organize foraging parties to gather saguaro fruit, which is processed into a thick syrup, a jam, and a fermented ceremonial rain-making wine to preserve it due to its short fruiting season.

[Inner Spiral] Integrate Development with Growth/Nested Communities

A food system needs time to develop and, in the natural world, *development is integrated with growth*; similarly, traditional *communities* have *nested* structures (Baumeister, 2017). For instance, saguaro needs many years to grow its columnar structure to 3–4 meters, before any branch is formed. The cells then differentiate to begin a branch by creating a small bud (Pierson et al., 2012). Life does not happen from the top down, but rather from the bottom up in small nested units, such as cells that make tissues that make organs. Many Indigenous communities developed in modular nested units of small bands that then organized into larger, more *complex units*. The Navajo or Diné people organized themselves in complex food systems that came together around important food activities, forming nested communities. They organized matrilineal clans that often organized around food-related activities; some clans even named themselves based on foods, such as the Naadaa Diné, or Corn People Clan. They came together to plow, plant, weed, and harvest, as well as prepare certain foods collectively, such as making ground-baked corn cake (Eldridge et al., 2014). Native Southern Californians such as the Cahuilla also established complex clans and families, creating nested communities around pruning oaks for acorn production, sowing, weeding, and burning meadowlands to produce grassy pastures that in turn supported wild

animals (Hoover & Mihesuah, 2019). This sustainable management of lands maintained a balance to control wildfires, in comparison to today's lack of effective management (Hoover & Mihesuah, 2019). The Indigenous Siwans of Egypt have created complex agroforestry systems, developed from small units of grove gardens with polycultures of palm trees, figs, and apricots with an understory of vegetables in a very arid environment.

[Second Spiral] Adapt to Changing Conditions/ Resilient Co-inhabitation

The principle *adapted to changing conditions* is the ability to continually respond to changes in the local conditions. Indigenous communities have embodied this as *resilient co-inhabitation*. The saguaro cactus has adapted to the Sonoran Desert and the harsh climatic conditions, using small seeds that are drought resistant and multiple strategies to capture and store water, self-cool, and defend itself from predators. However, to ensure successful growth, a juvenile saguaro can only be established after two consecutive years of summer monsoonal rains (Pierson et al., 2012). This *resilient co-habitation* has allowed traditional communities to adapt to environmental demands (Peña, 2019). Through trial and error, Native communities have selected the most drought-tolerant crops, creating living seed banks (Linda Black Elk, Intertribal Food Summit, Appendix D; Interviewee F13, 2019), and acquired practices such as allowing certain areas of a forest to burn.

[Second Spiral] Incorporate Diversity/Diversification

For effective adaptation, it is important to *incorporate diversity*. Genetic diversity ensures that organisms can withstand disturbance. In food systems, diversity is supported through the cultivation of perennial crops and diverse cover crops with intercropping rotation (Crews & Rumsey, 2017). The saguaro's diverse strategies for dealing with aridity have enabled its survival. Indigenous communities value *diversification* in various aspects of food production, from growing polycultures to growing different crops in different seasons, as well as tending wild plants (Nabhan, 1997). Traditional communities in the Americas have grown the Three

Sisters of corn, beans, and squash, maintaining the diverse varieties within these three groups (Melissa Nelson, Intertribal Food Summit, Appendix D; Interviewee F4, 2019). In the Sinai, the Jabaliya Bedouins grow orchards with apples, apricots, almonds, quince, figs, pomegranate, and mulberries (Gilbert, 2011). Jabaliya maintain desert-adapted orchards of olives, apricots, almonds, and other fruits, while growing hardy grains and raising herds of goats and sheep that feed on wild shrubs, thus ensuring they are diversifying their sources of food.

[Second Spiral] Self-Renewal/Rebirth and Renewal

Within this diversification is *self-renewal* or *rebirth* or replenishment, which can be in the form of new cells or new tissues of an organism (Baumeister, 2017), or a ceremonial rebirth. For example, when the Gila woodpecker punctures the trunk of a saguaro, the plant quickly heals itself and creates a hard, watertight scab that can even become a habitat for other organisms (Phillips & Wentworth, 1999). Many Indigenous communities are highly attuned to renewal; for example, herders often move from one grassland to another to ensure that grasses have sufficient time to self-renew. Indigenous communities often conduct rituals such as smoke ceremonies to create an experience of rebirth (Sunny Dole, Indigenous Innovation Workshop, Appendix D; Frank, 2011; Peña, 2019). A Kiowa Chief shared that Hopi rituals of rain and fertility are songs to the spirit of the Corn Mother; the Diné perform Sun Dances as a form of summer purification, with the hope that these prayers and songs will invite new life (Interviewee C1, 2019; Frank, 2011).

[Second Spiral] Embody Resilience/Survivance

Such strategies lead to resilience to disturbances; variation, redundancy, and decentralization are mechanisms that ensure *resilience* in living things (Baumeister, 2017). Part of the saguaro's resilience strategy is its defenses against predation with its many spikes, diverse water capture mechanisms, and self-cooling strategy. In TEK, the ability to provide resilience in communities and their endurance despite domination has been described by Vizenor (1994) as *survivance*, a sense of active

presence and continuance through living and recounting Native stories (Whyte, 2017). Essentially, that despite concerted efforts to eradicate Indigenous communities throughout history, they continue to survive and refashion their culture through their oral traditions. For example, it is customary among the Tohono O’odham for children to follow the grandmothers on nature walks, to collect wild plants or catch rabbits, and during these walks many songs and stories are told. In some cases, these walks are refashioned as workshops where unrelated children might follow a grandmother, thus actively continuing the passing on and presence of their traditions to adapt to a modern age (Interviewee F13, 2019).

[Outer Spiral] Replicate Strategies that Work/Generating, Validating and Interpreting

The genetic makeup of organisms is constantly replicated, where successful strategies that work and enable the organism to survive are passed to the next generation (Baumeister, 2017). Communities *generate, validate, and interpret* information that they have observed in their surroundings. As an example, agro-biomimicry is the TEK generation of agricultural systems that mimic the environment, including wild plants, to create ecosystems. This is what has enabled the saguaro species to persist: gene mutations that enabled the species to adapt and evolve through millennia despite dramatic changes in climate (Yetman et al., 2020). *Generating, validating, and interpreting* knowledge enables the passing on of persistent strategies such as the growing of perennial trees that complement each other, utilizing annual polycultures, growing soils that are not tilled, and integrating animals in the rotation to fertilize the soil and cut through it with their hooves (Elevitch et al., 2018; Peña, 2019). These strategies have persisted, especially as place-based knowledge, with the continual understanding of rain patterns, soils, irrigation, growing perennials, and maintaining foods through preservation techniques (Ford & Swentzell, 2015).

[Outer Spiral] Evolve to Survive/ Intergenerational Learning

For a regenerative system to persist, it needs to evolve over generations, continually embodying

information to enable it to *evolve to survive*; it also needs to pass on the knowledge *intergenerationally* in communities. Adaptation through natural selection has enabled the Cacti family to evolve into many niches. The saguaro evolved its mechanism of obtaining carbon dioxide from the typical photosynthesis process to the specialized crassulacean acid metabolism (CAM) mechanism, enabling the plant to gather sunlight by day without losing water, and then use water to produce its sugars by night (Gibson & Nobel, 1986; Yetman et al., 2020). The *intergenerational learning* of Indigenous people takes place through songs and poetry passed down across generations. Native activist Winona LaDuke asserts that a viable Indigenous paradigm for intergenerational learning is to think and act in terms of seven generations: three in the past, the present, and three in the future (LaDuke, 2016). Intergenerational learning is exemplified by the work of a Tohono O’odham Gila River farmer and her daughters, who take the lead in educating the next generation about the tepary beans they grow today that originated with her parents (Interviewee F5, 2019). An Indigenous permaculture course led by the Traditional Native American Farmers Association (TNAFA) is a modern way of passing the knowledge of the elders to the younger generations.

Conclusion

In conceptualizing a regenerative food system, biomimicry’s ubiquitous LPs were woven with TEK principles, and 13 principles were identified (numbered below) and contextualized to arid regions. The principles highlight the importance of (1) place-based knowledge and a local attunement that is established through strong (2) cooperative relations, not just with people, but with all of creation, that in turn supports our foods. Therefore, relations must be reciprocal with nonhumans (Kimmerer, 2013) and the cosmos (Wilson, 2008). Reciprocity involves creating a (3) feedback loop, a cycle of care (Kealiikanakaoleohaililani & Giardina, 2016) and gratitude, which could come in the form of a gift or an offering. Such local attunement is achieved by understanding (4) nature’s cycles and leveraging them by knowing when to grow in tune with the seasons and cycles. With this stewardship

toward the earth, there is also a sense of (5) frugal and resourceful management, and establishing how to utilize resources and energy effectively and (6) use low-energy processes that preserve and conserve foods.

In this conceptual framework, once a regenerative food system is established, (7) growth happens slowly from the bottom up, as complex communities are nested within and benefit one another while developing together to create a complex and interdependent society. In turn, communities grow to become well-adapted ecosystems, known in TEK as (8) resilient co-habitation because they have (9) diversified their diet, their growth patterns, and their crops, and incorporate patterns of (10) self-renewal through ritual and ceremony. This ultimately enables a system to be resilient due to community (11) survivance, the ability to persist, with food traditions passed through stories, songs and rituals. As a community persists, it evolves and passes this knowledge across generations, adapted to present situations with a forward outlook. In Indigenous traditions, learning and (12) replicating strategies that work and validating them ultimately (13) evolves across seven generations (Kealiikanakaoleohaililani & Giardina, 2016; Whyte et al., 2016). A regenerative food system thus honors small-scale and traditional practices while being grounded in teachings of the past, realities of the present, and ways to be more in tune for the future.

We have provided a path demonstrating how TEK and LPs can weave together and create a definition and a conceptual framework for a regenerative food system, guided by community practices from food systems in arid regions, in the spirit of Albert Marshall's Two-Eyed Seeing: learning "to see from one eye with the best in our Indigenous ways of knowing, and from the other eye with the best in the Western (or mainstream) ways of knowing ... and learn to use both these eyes together, for the benefit of all" (Marshall & Bartlett, 2010, slide 12). It is imperative to move beyond both the industrial food system and the narratives of sustainable solutions, which claim merely to improve some of the unintended consequences of the industrial food system. These two systems have not taken into consideration small-

scale producers and their traditional and Indigenous processes. However, neither sustainable nor regenerative food systems have been realized on a larger scale. The need remains to create a more equitable system across generations and species to ensure a positive impact of food production on our environment and our communities, which the regenerative food system is beginning to fill.

Limitations of this study include using a feminist lens that acknowledges positionality; it is not common practice in academia since this narrative is viewed as subjective. It is, however, an attempt at being more transparent. Haraway (1988) states that knowledge in feminist scholarship is situated, and thus it is important to consider the account's embeddedness (Gottschlich et al., 2017). For us (El-Sayed and Cloutier), our human journey, thus far, and subjectivity of the experience(s) are inherent within and to the narrative. Another limitation has been using emergent grounded theory methods, and we acknowledge having not reached saturation (Tie et al., 2019). Our sample was relatively small, as we were trying to interview people across the food chain, making the research a work in progress. As with most research, it needs further validation; we look for insights from Indigenous communities, as well as possible new principles that may arise.

In weaving together these two disciplines, we aim to bridge the gap between them, due to their strong correlations. However, many questions remain unanswered, such as, How can non-Indigenous communities embody such principles, and what would the benefits be? How do these principles translate into strategies and policies? Can we create truly regenerative systems that have a net positive impact on nature and their communities? In the meantime, we, the authors, believe that it is possible to weave together these two disciplines, and offer this research as a seed for future efforts to explore. 

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Appendix A.

Table A1. Comparing Regenerative Agriculture, Agroecology, Permaculture, Food System Sustainability and Food Sovereignty

	Regenerative Agriculture	Agroecology (Altieri, 2002; Gliessman, 2007)	Permaculture (Mollison, 1990; Holmgren, 2007)	Food System Sustainability (Eakin et al., 2017)	Food Sovereignty—Radical Collectivism (Trauger, 2017)
Definition	To embrace regenerative development, by adopting measures that drive the regeneration of soils, forests, watercourses, and the atmosphere (Rhodes, 2017).	The holistic study of agro-ecosystems, which includes environmental and human elements, with a focus on form, dynamics and functions of their interrelationships and the processes in which they are involved (Altieri, 2002).	Derived from permanent agriculture or culture and describes a low-impact method that uses perennial cultivation methods to produce food crops, working via principles that are in harmony with nature.	Achieves and maintains food security under uncertain and dynamic social-ecological conditions, through respecting and supporting the context-specific cultural values and decision-processes that give food social meaning, and the integrity of the social-ecological processes necessary for food provisioning today and for future generations.	Food sovereignty is the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems (Nyéléni Declaration, 2007).
Goal	To increase soil quality and biodiversity in farmland while producing nourishing farm products profitably (LaCanne, Lundgren, 2018).	Provide basic ecological principles for how to study, design, and manage agro-ecosystems that are both productive and natural-resource conserving, and that are also culturally sensitive, socially just, and economically viable (Altieri, 1995).	To develop sustainable human settlements and self-maintained agricultural systems modelled from natural ecosystems (Rhodes, 2017).	To ensure food security as well as social justice.	To put the aspirations and needs of those who produce, distribute, and consume food at the heart of food systems rather than at the demands of corporations. Prioritize local economies and markets and empower peasant and family farmer-driven agriculture, and artisanal food production, distribution, and consumption based on environmental, social and economic sustainability (Nyéléni Declaration, 2007).

Continued

Principles	<ol style="list-style-type: none"> 1. Actively build soil fertility and avoid tillage. 2. Foster plant diversity on the farm. 3. Integrating livestock and cropping operations on the land. 4. Integrate diversity in terms of polycultures and perennials. 	<ol style="list-style-type: none"> 1. Resilient systems that cope with disturbances. 2. Species and genetic diversification in space and time. 3. Enhance soil biotic activity for plant growth. 4. Sociocultural relations of collective forms of organization. 5. Increased soil cover. 6. Balancing nutrient cycle and recycling of biomass. 7. Optimization of the whole farm, not one crop. 	<ol style="list-style-type: none"> 1. Use and value diversity. 2. Obtain a yield. 3. Creatively use and respond to change. 4. Apply self-regulation and accept feedback. 5. Use and value renewable resources and services. 6. Use edges and value the marginal. 7. Design from patterns to detail. 8. Integrate rather than segregate. 9. Use small and slow solutions. 10. Catch and store energy. 11. Produce no waste. 	<ol style="list-style-type: none"> 1. Innovation. 2. Diversity in terms of crops, diet, and practices. 3. Congruence is about fit. 4. Transparency. 5. Modularity. 	<ol style="list-style-type: none"> 1. The right of people to self-governance and democracy. 2. Local production, food coops, solidarity economies, local processing. 3. Mutualisms and alternative economic models. 4. Based on agroecological principles. 5. Access to local and communal resources, seeds varieties, water, land. 6. Social justice and self-governance.
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Appendix B.

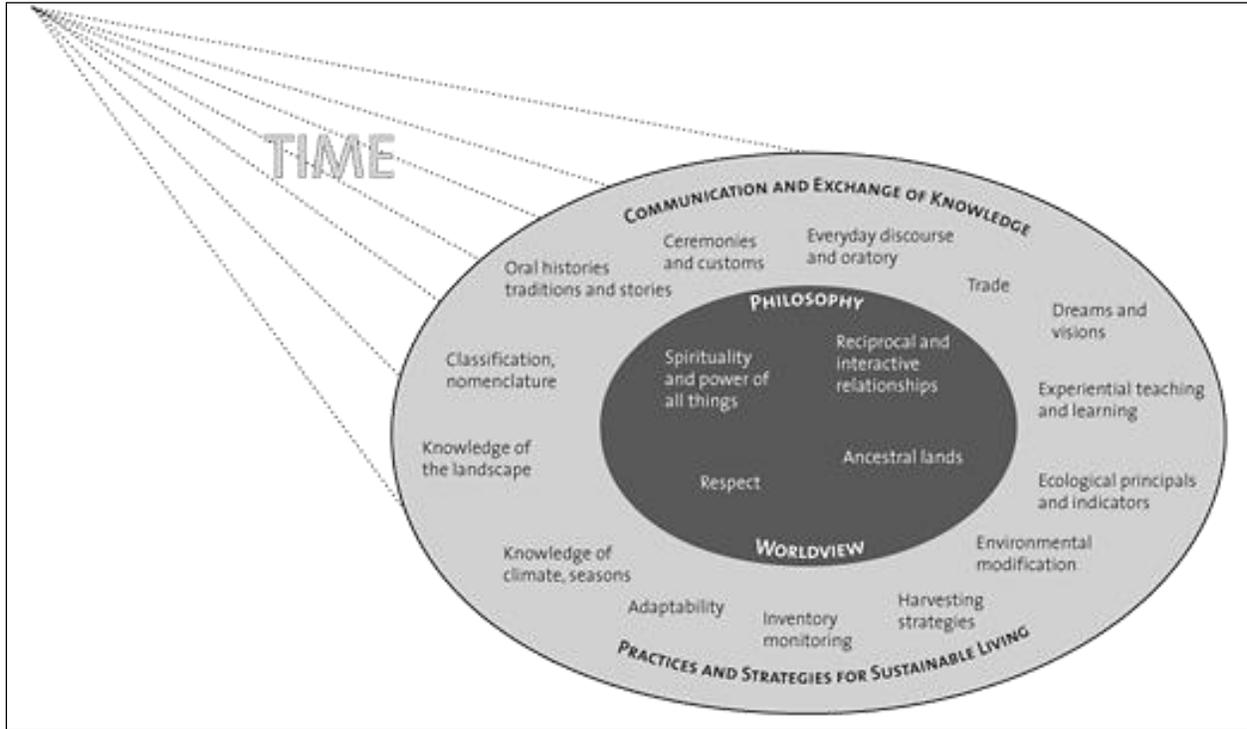
Figure B1. Life's Principles Diagram



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Appendix C.

Figure C1. Framework for Traditional Ecological Knowledge and Wisdom of Native People



Source: Turner, Ignace, & Ignace, 2000; reprinted with permission from John Wiley & Sons.

Appendix D.

Table D1. Titles, Dates and Organizers of Various Workshops Attended

Title of Workshops	Dates	Organizers/Presenters
Reclaiming Native Truths, Slow Food Nations	July 19, 2019	Michael Roberts, Ian McFaul, Denisa Livingston, Roy Kady
The Art of Fermentation, Slow Food Nations	July 20, 2019	Sandor Katz, Mara King
Indigenous Sustainable Communities Design Course (ISDC)	July 21–30, 2019	Clayton Brascoupe, Louie Hena, Roxanne Swentzl, Lillian Hill
Wisdom of Indigenous Foodways	January 22, 2020	Janie Hipp, Melissa Nelson, Sean Sherman, Twila Cassadore, Terrol Dew Johnson, Michael Johnson
Rights of Nature and the Food system	January 23, 2020	Janie Hipp Paula Daniels, Denisse Córdoba Montes, Shannon Biggs
Intertribal Food Summit	June 20, 2020	Melissa Nelson, Linda Black Elk
Indigenous Innovation Workshop	June 15–19 2020	Sunny Dole, Diné, Karletta Chief
Indigenous Governance	July 20–26, 2020	Lyla June

A garden's place in critical food systems education

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Abstract

For several years, hundreds of students have been tour guests and interns at a community garden, the Beach Flats Garden, run by Mexican and Salvadorian farmers in Santa Cruz, California. This paper reflects upon engagement between the gardeners and local educational institutions and opportunities through three major themes: connection between practices of solidarity, urgency of action, and pedagogy; possibilities in engaging with the frameworks of critical food system pedagogy alongside the lessons of autonomy and activist ethnography; and the importance of teaching the history of agroecology and more broadly of social research in connection with resistance to capitalist-colonial domination. The article discusses what place the garden holds in expanding and deepening the scope of food system education through providing examples

of noncapitalist exchanges and practices, a space of resistance to gentrification in a highly competitive land market, and decolonial foodways that emphasize gardeners' traditional agroecological knowledge.

Keywords

Urban Gardens, Agroecology, Critical Food System Education, Activist Ethnography, Gentrification

Introduction

From the October 2, 2015, *Santa Cruz Sentinel*: “Unlike many of the quiet, laid-back mornings at the Beach Flats Community Garden, the vernal Raymond Street lot was buzzing with young people Friday. Coming in three waves throughout the morning, the approximately 170 Branciforte Middle School seventh-graders saw their textbook lessons come to life, right in the home neighborhood of many” (York, 2015, para. 1–2). This was one of many school trips I helped organize that fall with Beach Flats gardeners Don Emilio and Don

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Federico, leading tours and patiently answering questions from students from all over Santa Cruz.

During the summer of 2015, news spread that the Santa Cruz Seaside Company, the Beach Flats Garden landowners, would end their agreement with the city of Santa Cruz Parks and Recreation Department, thus forcing out about 25 families who for two and a half decades had developed the lush foodscape of corn, beans, nopales, fruit trees and much more. Brian, a youth from the neighborhood, expressed concern about the proposed change: “It’s wrong to put something else here. That’s practically some people’s homes, and place to get food, so they won’t go to the store and waste that much” (York, 2015, para. 10).

Brian’s reaction was typical of many of the young people who visited the garden that fall. Shortly after the middle schooler visit, a small after-school program from the local elementary school brought their students to tour, interview gardener Don Emilio, and take photographs in the garden. Through this photovoice project, students developed comic strip–style persuasive letters that focused on themes of gardeners deserving to stay on the land, the contributions the gardeners make to the community, and how the decision about the future of the garden should not simply be in the company’s hands. After another set of field trips and dozens of letters from students to the city council and the Seaside Company, we suddenly had teachers backing out of requests to come visit. We heard through a parent that the teachers had received notice from the school districts that the visits needed to stop, that the issue was too politically charged. We still do not know how that decision was made, but it was clear that these visits were having an impact.

Over the last seven years of engagement with the Beach Flats Community Garden, I have partnered in many educational projects with the gardeners and other community partners. Many of these projects continue to this day as we contemplate and refine their orientations. In this reflective essay, I will consider three areas of the opportunities and limitations of these endeavors with the objective of sharing what lessons we have gathered. The first is the connection between practices of solidarity, urgency of action, and pedagogy. The

second area focuses on the possibilities in engaging with the frameworks of critical food system pedagogy alongside the lessons of *autonomia* (indigenous autonomy) and activist ethnography. The third is the importance of teaching the history of agroecology and, more broadly, social research in connection with resistance to capitalist-colonial domination. This reflective essay is intended to continue the conversation many food system educators and advocates have initiated on the purposes and potentialities of garden-based education. In particular, I build on the concept of critical food system education (CFSE) presented by Meek and Tarlau (2015, 2016). This paper draws on lessons and critical reflections about broader conceptual framings which connect liberatory change with the everyday work of gardening and preservation of the Beach Flats Community Garden. This work of bridging the theoretical and the embodied is, as many scholars have noted, just as relevant in the practices of garden education as in the reflections of educators themselves on those practices.

Gardens, Education, and Political Subjectivities

Gardens have long held a place in U.S. educational institutions and teaching. As early as the late 1800s, school gardening became a popular avenue to promote agrarian ethics, entrepreneurial skills and work ethic, and opportunities for developing connections to nature (Burt, 2016; Lawson, 2005). Although gardens were frequently initiated through the work of women’s clubs, mother’s associations, and horticultural clubs, school garden advocates advanced the idea that gardens should hold a permanent place in public education (Burt, 2016). University extension offices became advocates for urban gardening as an integral feature of public schooling. In 1911 the University of California developed a project in which 200 students were allocated plots in a one-acre site on the Berkeley campus and worked individually to produce and sell vegetables and flowers (Lawson, 2005). Communal plots were used to demonstrate agricultural technologies and best practices, as well as to support team building activities. This combination of individual and communal gardening became a common strategy both to encourage individual

ownership and an agrarian work ethic while engaging students in collective learning (Lawson, 2005).

Pudup (2008) and others have noted that this emphasis on the cultivation of particular political subjectivities through gardening continues to this day. Urban school gardening projects frequently focus on developing entrepreneurial opportunities or alternative agriculture-focused consumer subjects (Melcarek, 2009; Pudup, 2008). School garden projects that emphasize personal responsibility and the use of market tools for social change can intentionally or inadvertently promote neoliberal subjectivities. Thus, it becomes necessary to reflect on what kinds of relationships to land politics are possible through garden education projects and, from this standpoint, what forms of anti-neoliberal political subjectivities can be cultivated.

Method

Writing this article is part of my process of reflection, which has given me the time to sit with students and collaborators, including gardener Don Emilio, and discuss their reflections and mine on our work together, sometimes asking uncomfortable questions. The reflections in this essay have been developed collectively. They are not mine alone, and although I do not claim to represent the views or words of my collaborators, it is through their insights and years of conversation and joint analysis with gardeners and student volunteers that I came to write this essay. Activist ethnographers write about collective reflexivity practices such as action debriefs, informal conversations, trainings, and events and games with reflection conversations and shared meals. Collective reflexivity emphasizes how members of research communities produce collective meaning (Davies, 1999, Hardy et al., 2001, Maton, 2003). Feminist scholar Rachel Wasserfall (1999) has taken this further, to suggest that accountability provides a more active engagement with praxis than reflexivity, shifting the questions towards always being responsible to self and the broader community.

I began working with the Beach Flats Community Garden in 2011 after returning to the U.S. from working in urban gardens in Mexico. I worked as a gardener with my toddler in tow, continuing to learn about Mexican and now Salvado-

rian, indigenous and campesino foodways and agroecologies until the pressures of graduate school and parenting led me to give up my plot in 2012. In 2015, ecological researchers working in the garden reached out to me about the threatened closure of the space. A subsequent visit to the garden led to gardeners requesting support in talking to city officials and advocating for the garden's protection. My subsequent work with the gardeners included supporting and coordinating coalition-based advocacy, doing oral history interviews with nine of the gardeners, conducting neighborhood opinion surveys, and long hours spent with gardeners in their plots, the garden common area, and their homes discussing everything from strategy to everyday life. Working with the coalition and students, I have also asked collaborators to sit and reflect with me on our work, how we might understand particular challenges and dynamics, and what might be changed moving forward.

This paper reflects upon engagement with the Beach Flats gardeners over the last seven years in facilitating relationships with local educational institutions. Specifically, I have worked in three primary fronts: at the request of Emilio in particular, I have brought school field trips to the Garden for tours and educational events; I have supervised over a dozen undergraduate interns who have worked as activist-advocates, curriculum developers for community youth days, and research assistants in the garden; and I have partnered with graduate students to conduct oral histories and collect archive material in partnership with our local Museum of Art and History as part of a project to bring living history and community empowerment into the work of the institution.

A key partner in all of this work has been "Don Emilio," Emilio Martinez Casteñeda, a long-time gardener who first became involved a year or so after the garden was started. Emilio grew up in rural Durango, Mexico, and farming was his education from an early age. He frequently tells students he can not read or write, but he knows the milpa, which are cropping systems primarily focused around corn, beans, and sometimes squash and other vegetables that were developed by Indigenous farmers over millennia, formed a cornerstone of many Mesoamerican Indigenous and campesino

cultures, and are still planted today. Emilio explains he knows how to grow the food we eat. He has become an important educator and spokesperson for the garden, presenting at schools and events across the city. He explains how he spends every day in the garden tending to the plants who are part of his family, saying, “they need to be tended to like my children so they can grow in a healthy way.”

Practices of Solidarity and Learning

As my introductory vignette indicates, much of the focus of my work with the gardeners has engaged their struggle and our community’s struggle to maintain access to this land for the gardeners. The educational links that we have created tie together the themes of agroecology, the gardeners’ farming histories in Mexico and El Salvador, and the politics of immigration, race, gentrification, and land rights. During the fall, winter and spring of 2015–16, I was part of and sometimes a significant figure in forming a coalition of gardeners, food justice advocates, and community activists who waged an effort to save the garden. We met in the garden and held bilingual meetings on a weekly and sometimes more frequent basis, where new folks were always welcome. The strategy of the coalition and its governance, which included the relationship between it and attempts at a gardener-only committee, were areas of debate, much of which was worked out through the mere fact of who showed up at any given meeting. As a part of the effort, many of us actively built or strengthened relationships with the neighbors of the garden in the predominantly Latino neighborhood, which involved community organizing as well as negotiation with community officials.

An issue that came up in side conversations but never directly in the garden meetings was the racial composition of the coalition—there was a concern that many involved, like me, were from outside the neighborhood and were white. Several of us who were white and from outside the neighborhood had previous relationships with the gardeners and garden, but not everyone did. This has continued to be an area of tension, which I hope to continue to explore with those who want to talk about it. Many of the interns and student organizer

volunteers were from out of town; several were from the L.A. area and were Latinx. One Latina intern told me that she knew my race was a concern for some students and coalition members involved. It is complicated to see a white, Ph.D.-educated woman facilitating and guiding relationships with the garden and gardeners. She indicated that for her it was important to see an approach from coalition members such as myself that emphasized asking questions about how gardeners want to lead, what they want from supporters, and then developing deep conversation about ways to work together to achieve joint goals. For her, seeing this approach was key to teaching other students and youth how to engage with the garden. She emphasized that the internships should serve for folks to use their social position as students with access to at least some university resources to create and amplify forums for gardeners to share their knowledge and histories. Santa Cruz is the home of the Center for Agroecology and Sustainable Food Systems and thus of decades of training and education focused on models of non-industrial agriculture from the perspective of the sustainable food movement. The question of who gets to be a teacher in this movement is important. The garden provides learners an opportunity to hear from and interact with gardeners as teachers as they cultivate the garden using both traditional and newly learned sustainable techniques, demonstrating indigenous and campesino agroecologies. Interns helped connect outside audiences with the gardeners as teachers by bringing a local youth club into relationship with the garden, connecting many classes at the university to the space, soliciting press attention, and in other ways.

In my reflective conversation with this former intern, she also expressed she had learned much from the style and format of the garden organizing meetings. She expressed that she thought, the gardeners and other coalition members were teaching by example processes of social struggle that prioritized decision-making by those most impacted—the gardeners and neighbors—in the struggle to maintain tenure security over land in this gentrifying Californian context. Specifically, she noted that she observed an emphasis on gardener voice and leadership within meetings, focusing on facilitation

practices of asking gardeners to offer their ideas for action and asking for their response to coalition members ideas. She indicated that it was confusing to come in to the garden meetings and see myself or other coalition members facilitating. This was clearly not just an example of a community self-organizing and fighting for the preservation of their garden. It was a group of gardeners and neighbors working with a coalition of outside community members with different backgrounds, organizing orientations, and goals. Participating in the meetings, provided her an opportunity to reflect on solidarity and how non-gardeners could play an active role in advocating for the garden while emphasizing (or not) asking questions about how gardeners want to lead and what they want from supporters. The garden meetings, created a space to negotiate out how deep conversations or practices would unfold outlining ways to work together to achieve joint goals. Two practices of note include that meetings were largely held in Spanish, sometimes with translation for non-Spanish-speaking coalition members, and that meetings happened frequently, which limited decision-making outside the gatherings of gardeners.

When I have asked gardeners about the complexities of having both nonwhite and white, non-neighborhood residents involved in the coalition, the response was resoundingly that they want solidarity and support from the whole community. The gardeners did not seem to want to take the conversation further, at least with me, demonstrating potentially a limit of what conversation I can have at this moment in our relationships given my social position. One gardener commented that the coalition members and students' experiences in their communities, whether a predominantly white community or a Latinx community, can sometimes be very different from a recent immigrant's experience. It was clear many coalition members had an outlook on city politics that assumed greater access to power and influence than the assumptions sometimes shared by gardeners. From early in the process of trying to save the garden I heard comments along the lines of "why would city officials listen to us, we are poor immigrants who they don't even acknowledge." Some gardeners highlighted the marginalization and precarity they felt

about their ability to access the ear and favor of local decision-makers. For the group of gardeners overall, the mood at meetings frequently fluctuated between this sense of marginalization and a potent anger that the city officials were not providing for the needs of community members but rather the needs of one of the most powerful companies in town. Several very active garden leaders emphasized the need for more solidarity and action within the broader Latino community and within Beach Flats specifically in order to make the city see how they were neglecting this responsibility.

Rodríguez (2017) explores how white academics may frequently write about issues of marginalization and resistance, while personally not knowing the experiences that limit and challenge POC scholars' access and security in academic positions (2017). She critiques a current notion of solidarity that sees allyship as within the academy:

The hallways in the institution where I currently work embodies this faux-solidarity in posters about conferences, colloquiums, and trips in the Global South or about the Global South that cost an arm and a leg. As long as you have money to pay for your airfare, hotel, meals and transportation, you too could add two lines in the CV and speak about the new social movement and their radical strategies to dismantle the system. You too can participate in academic dialogues about poverty and labor rights as you pass by an undocumented cleaner who will make your bed while you go to the main conference room to talk about her struggles. (2017, para. 14)

A main critique Rodríguez makes is that "today, anything and everything is allowed if a postcolonial/decolonizing seal of approval accompanies it, even if it is devoid of any political urgency" (2017, para. 13). She challenges us: "we can't keep criticizing the neoliberal system while continuing to retain superficial visions of solidarity without striving for a more in-depth understanding," (2017, para. 13). I continue to ask myself and others involved in this work, what do we see as constituting superficial versions of solidarity? A crucial intervention I understand from Rodríguez is

the need for urgency in taking political action outside academic spaces. In the case of the work with the gardeners, I see this as both the urgency of an immediate struggle, as there was a timeline for eviction, *and* an urgency to address the deeper issues within the community. Continued commitment from the Coalition to Save the Garden has brought about new solidarity efforts, including rapid response solidarity during immigration raids and the development of a movement for housing justice in the city. These more organizing-oriented efforts are not always a primary focus of the educational efforts described before, but always keep our education work with the garden grounded in the broader needs of communities involved with the garden. Similar to the effort to maintain tenure access for food growing, gardeners and allies worked in the housing and immigration rights efforts to articulate their rights to space, dignity, and decision-making power.

For student visitors to the garden, we also encourage a visit to a recently repainted community mural just down the block from the garden, as a lesson in connection between the garden and questions of gentrification. Community members painted the original murals in 1992. Young community artist Victor Cervantes, with help from many community residents, directed the effort. In 2013 the City decided that restoration of the largest of the three murals was too expensive and hired an artist to paint a new mural. Subsequently, City staff came and painted over the old mural, literally whitewashing it. Community residents asked what was happening, objected, and finally stood in the way of the painters. After intense community backlash and a lawsuit against the City, Cervantes and the community were offered a formal apology and US\$30,000. Not long after this decision, in late summer 2015, vandals painted over the remaining two smaller murals, several Spanish language signs, and a work of art depicting an indigenous farmer in the Beach Flats Garden. The main sign near the entrance of the neighborhood was vandalized, with “Flats” taken out of “Beach Flats Community.” The vandals were not found, but the clear racism in these attacks upset many inside and outside the neighborhood. While participating in the repainting of one of the murals, a representation of the Virgin

Guadalupe, I encountered another side to the issue. A middle-aged white appearing woman who had bought a house in the neighborhood several years before came and demanded we stop repainting, claiming the mural was offensive to her because of its religious content and not being in keeping with the new direction the community should go in, presumably one which encouraged development, investment, and displacement of the low-income, Latino residents. Gardeners and Coalition members have worried that the downsizing of the garden is the beginning of an intensified process of gentrification.

In 2016, Santa Cruz was named the nation’s seventh most competitive housing market. An extensive local housing survey noted high levels of housing burden and eviction (McKay & Greenberg, 2017). A few gardeners say that they have had to move out of Beach Flats because of rising rents. In meetings with City officials in the garden, Beach Flats residents have brought up their concerns about the availability of affordable housing. These conversations were part of what led to a housing justice campaign to try to obtain just cause eviction and rent control in the city, protecting tenants from excessive rent hikes and evictions for no reason. Today, conversations about the garden are almost always accompanied with discussion of gentrification, skyrocketing rents, and the future of the Beach Flats community. The urgency of solidarity with the struggle for the garden’s land tenure security opened a constellation of intersecting issues with which many local community members are now more active. Urgency, I suggest, is a critical lesson from the garden education work. While academic and professional constraints may lead food system educators and advocates to stay narrowly focused on particular framings or themes, ultimately this will limit how solidarity can be enacted. If we only focused on agriculture and the tenure security of the garden, then it could easily be imagined that a garden would continue to be there but without the Beach Flats residents. To engage with the urgency of less shallow forms of solidarity will mean blurring the professionalized boundaries of our projects and commitments in order to see the roots of racism and capitalist exploitation that connect food

system struggles with other struggles of everyday contemporary life.

Critical Food Systems Education and a Garden's Place

Meek and Tarlau (2015, 2016) synthesize approaches that “build on a long history of social movements incorporating education into their larger struggle against classism, racism, and sexism” to present the critical food systems education (CFSE) framework (2015, p. 134). CFSE is grounded in critical pedagogy, which sees education as an intrinsically political project that can either “facilitate integration of the younger generation into the logic of the present system and bring about conformity or it becomes the practice of freedom, the means by which men and women deal critically and creatively with reality and discover how to participate in the transformation of their world” (Freire, 2002, in Meek & Tarlau, 2015, p. 34). I agree with the authors that CFSE is a necessary intervention to continue to make in food system education. Through engaging students in local tours at the garden, Emilio, myself, and sometimes other collaborators attempt to follow the “dialectical process of analyzing the reality of the local food system, linking this local reality to national and international structures that have coproduced this local reality, and helping students come up with creative solutions to transform these realities: Freire’s famous concept of praxis” (Meek & Tarlau, 2015, p. 134). Students on these tours have frequently been the most vocal and creative in thinking about alternative politics of land that emphasize the gardeners’ rights to continue to cultivate. This perspective emphasized in the garden tours may provide a counter example to the model of garden-based learning educators that Meek and Tarlau discuss in their work. Pudup and many others have questioned how school gardens and other garden education projects can produce subjectivities that problematically envision food system democracy through voting with your fork—or consumption politics—and promote depoliticized, white-dominated agrarian ideologies. However, through our work with the Beach Flats Community Garden we seek with students to draw out another set of histories, knowledges, and

struggles of the gardeners, challenging them to think through the connections of agroecological food production, displacement, and the struggles for land justice for this community of Latino farmers and residents.

Our work draws on the important contributions of activist scholars like Peña et al. (2017), who introduce a decolonial approach to critical food studies that “envisions the recovery and resurgence of Indigenous knowledge, belief, and practice as these are related to food, foodways and cuisines,” (2017, p. xvii). They state that “decoloniality explores hidden alternative histories of relationships between plants, animals, soil, water, and humans,” (2017, p. xvii). The knowledges and practices entangled with these histories can be seen as embodied in what the authors call *decolonial comida*, or deep foods and foodways as social relations that are connected to “a normative infrastructure constitutive of ways of being in the world predating white settler societies by thousands of years” (2017, p. xx). Through engaging with deep foods and foodways, opportunities for healing and transformation are opened. These are openings of escape from the subjugated space of the dominant neoliberal capitalist agri-food system. However, “these escapes are not universal, and major challenges are posed by the decimation and erasure of heritage cuisines,” (2017, p. xx). Yet, as in the work of Holloway (2010) on cracks within capitalism and of many food scholars in critical geography who have emphasized the interstitial spaces of alternative food systems, their use of *decolonial comidas* emphasizes the potentialities of practices of resistance to the colonial-capitalist food system through connecting micro-actions in gardens to international food movements.

In addition to the commitment to popular education and the use of education as a tool in liberation, CFSE draws from three other areas: the lessons from food justice struggles in understanding race and class in the food system, the political nature of agroecology as a project in contestation to the industrial agribusiness model (Meek & Tarlau, 2016), and the importance of food systems educators thinking about their work in relationship to the development of the international food sovereignty movement which unites many groups and

peoples fighting for more just food systems (Meek & Tarlau, 2016).

Much of the work of Peña (2017) concurs with this formulation. However, one key difference is his critique of the framework of food sovereignty as proposed in the La Via Campesina declarations emphasizing *autonomia*. Indigenous *autonomia* for Peña can reorient food movements toward a political project grounded in understanding the “nuanced coupling of ecological systems with Indigenous models of human rights, property, and the individual” (2017, p. xxii). Peña argues that this critique reorients food movements away from some of the limitations of “‘dominionist’ and ‘exceptionalist’ subject positions that limit and perhaps even rule out the possibility of a politics of *coevalness* [emphasis in original] among humans, other organisms, and ecosystems” (2017, p. 5). Peña refocuses attention on the actually existing spaces of autonomy and the formal and informal networks of mutual aid and cooperative labor in Indigenous ancestral and diaspora-adopted territories. This is a practical *autonomia*, a place-based autonomy that supports culturally grounded practices of self-governance, maintenance of agroecological knowledges, and connection between broader political aims and the acts of saving seeds, cooking traditional meals, or managing soil health. These can draw from indigenous conceptions of property that are relational and frequently embrace “earth-care” obligations. For example, in this analysis the urban diasporic communities’ use of gardens becomes spaces resisting state and capitalist dominance of foodways—gardens create everyday ways to enact “earth-care” largely outside industrial and capitalist food systems. This contributes to what Peña describes as practical autonomy:

We see multiple signs of emerging alternatives to anthropocentrism and the rejection of the acquiescence to a neoliberal global order who’s biopolitics seek the commodification of everything related to food and foodways. . . . At the heart of these alternatives are organizational forms involving cooperativism inspired by Indigenous general assemblies and a consensus approach to participatory democracy. (2017, p. 24)

In our work with education in the garden, we focused clearly on these emerging alternatives and lessons in the forms of cooperativisms at play. Interns learn about and participated in the meetings of gardeners that were held sometimes multiple times a week to make decisions and discuss strategy and action for how to try to save the garden from development. Students visitors discuss the difference between a garden where each person has an individual plot and this garden, where many spaces are tended collectively and gardeners share in both labor and produce with each other and broader community. They plant bean seeds, pull weeds, make tortillas and cornhusk dolls, and physically connect to work of the milpa. They learn about the nonmonetized means of food distribution, how neighbors can come as ask for *epazote*, *boja santa*, and corn husks for their soups or tamales, and how the garden is a space for birthday parties, movie nights, community healing clinics, and free food distribution days every other week. Visitors see this and learn the history of the Seaside Company wanting to convert the garden into a space for storage, and the broader issues of conversion of land into space for commercial development in the neighborhood. This provides a concrete example of juxtaposing expressions of *autonomia* and the use of space for community good, with a different set of priorities: what may be considered a more profitable use of the land. The lesson goes beyond the claim that another world is possible, to show how in practical everyday ways multiple worlds exist through actions of commoning. I find this action essential for the development of liberatory food systems education and radical education, and for research more broadly. Food system educators, while acknowledging the limits of gardens, can recognize these places as important sites of teaching practical autonomy through the *decolonial comida* perspective.

This work is supported by the approach and commitments of my department, Anthropology and Social Change, at the California Institute of Integral Studies. As a graduate program, our faculty and students focus on militant, activist and social change-oriented ethnography. We pull together three threads of recent work in ethnography: activist research as described by Charles Hale, Shannon

Speed, and their colleagues at the University of Texas at Austin; public anthropology and the call for “barefoot” or “militant” anthropology within this subfield from scholars such as Nancey Scheper Hughes and Laura Nader; and recent work on militant ethnography and movement-engaged scholarship by authors such as Jeff Juris and Chris Dixon. These approaches, without going deeply into their distinguishing elements, emphasize a role for anthropologists that challenges them to engage as a participant, ally, and multisided subject engaged with and part of the community of struggle. This may mean engaging more deeply with the concept of anthropologist as witness, which for Lynn Stephen (2002) means “trying to be an attentive listener, recognizing the situatedness of one’s intellectual work, and affirming one’s own connections to the ideas, processes, and people one is studying” (p. 22). I think that we can look at the last point in more detail—what does it mean to affirm our connections to the ideas, processes and people we are studying? For Juris, Dixon and others, this means locating our motivation in and demonstrating a commitment to political solidarity with research collaborators, at the same time that we consistently work to incorporate concern for how the outputs or products of research benefit and represent our collaborators and collaborations, as well as, when appropriate, invite wider audiences to participate in these collaborations.

These three approaches pull from diverse threads of engaged research, including Latin American collaborative ethnographic projects such as participatory action research (PAR), liberation anthropology, and decolonial anthropology (Fals-Borda & Rahman, 1991), as well as worker’s inquiry research in Italy in the 1970s and earlier Marxist interventions (Wright, 2002). The three approaches promote an ethos of emancipation through the research process that blurs distinctions between the researcher and the researched and the roles of investigator and activist. In so doing, the research process itself contains within it a commitment to hope, the politics of possibility, and an emphasis on drawing out the alternative histories, narratives, and practices that have co-existed alongside systems of exploitation and domination. As a teacher and researcher, I ask how as an inherent

responsibility of my work I can show how communities have developed and struggled for concrete alternatives. This brings me back to the question of solidarity. For Peña, practical autonomy is linked to solidarity: “The autonomy perspectives in this chapter are guided by awareness that our movements do not seek permission from the state or corporate acquiescence in order for us to act in solidarity. Relational accountability/solidarity is really praxis not theory; it is a method of resistance. We must act everywhere possible in a radical manner by refusing to submit to sovereign power as we rebuild local deep-food systems for ourselves based on relational knowledge of our place-based cultures and convivial economies” (Peña, 2017, p. 26). Through our actions as food system educators, we can open space to see the worlds of possibility that have existed and continue to be built through the practical autonomy of communities in resistance through cooperative survival strategies.

Agroecology as Social Movement

In addition to the histories of participatory and movement-focused research described above, I want to present how our discussions and the teaching of agricultural practices—the agroecology of the garden—draw out the history as well.

Agroecology, for Gliessman (2016) and many others, is not just a science that applies ecology to agriculture. It is understanding the complex interplay between science, practices, and social movements that shape sustainability in food systems. Rosset and Martinez-Torres (2012) have written about contestation over the term and attempts to co-opt the terminology in order to put it to capitalist use in the dominant industrial model of agriculture.

Gliessman (2016) notes that one of the first uses of the term agroecology was in response to the indiscriminate use of external inputs—fertilizers, pesticides, and other technological innovations. In 1930, Basil Bensin, a Russian agronomist, called attention to the need for respecting and engaging farmer knowledge, citing the disappointment of farmers who had been caught up in advertising without knowing if the seeds, machinery, etc. were actually appropriate for their local conditions. Gliessman quotes Bensin arguing for the “need to

regulate the purchase of fertilizers, machines and seeds so as to reduce the risk to the farmer” (Gliessman, 2016, p. 24), which can be interpreted as calling for some forms of resistance to pressure from corporations, a need that has only grown greater as the industrial model of agriculture more and more dominates our food system. Following the lead of Mexican scholars such as Efraim Herbabdez Xolocotzi and Alba Gonzales Jacome, Gliessman traces the roots of agroecological resistance to experiences of the green revolution in Mexico. In particular, he highlights three roots.

First, in 1976–1977 ethnobotanist Hernandez Xolocotzi documented the immense agrobiodiversity in the fields of Mexican farmers and the practices and crops developed in the fields through thousands of years of coevolutionary processes. He argued that the green revolution ignored the ecological, socioeconomic, and technological axis of agroecology and emphasized practices aimed at increasing yields to respond to market pressures and the dominant development thinking of the time. The socioeconomic axis was reduced to a purely economic one, and an entire culture of agriculture was being lost. In 1976 he called for a national seminar titled “Analysis of Agroecosystems of Mexico.”

Second, agrobiología was developing at this time, with ecologist and botanist Arturo Gomez-Pompa as its chief proponent. He established the National Institute for Research on Biotic Resources (INIREB) in Xalapa, Veracruz, where researchers have developed alternatives to industrial farming grounded in biological and ecological knowledge linked with the traditional knowledge of local farmers. Gliessman says, “This effort was a form of resistance to the large-scale removal of tropical forests to install large internationally funded development projects using Green Revolution technology” (2016, p. 27).

The third root is the work of students and teachers at the Colegio Superior de Agricultura Tropical (CSAT) in Tabasco. The school was started in 1974 and was affiliated with the Chontalpa Development Plan, the first phase of which involved clearing 90,000 hectares of tropical forest and wetlands and displacing residents in order to establish large monoculture production. Students

arriving to study ecology pushed for studying ecology in relation to agriculture, in connection to their lives. Ecology morphed into agroecology. In studying the monoculture project, researchers determined it to be unsustainable both ecologically and in social, economic, and cultural dimensions. The injustices that the development project imposed were too many (Barkin & Zavala, 1978). The teachers began looking to the margins, to traditional Mayan farmers, to understand alternatives to the dominant model.

The three moments represent roots of agroecology which originated as resistance to green revolution development projects, looking to small farmers to develop alternatives to the dominant model. The seeds were planted for the growth of agroecology as an anti-capitalist science and movement. Since then many agroecological researchers, teachers, and promoters have emphasized methodologies that connect with commitments with agricultural alternatives, including participatory action research (PAR) (Méndez et al., 2016), methods of communication and learning such as campesino a campesino networks (Holt-Giménez, 2006), movement-run learning institutions like La Via Campesina’s Paulo Freire Latin American University Institute of Agroecology (IALA-PF), a peasant-run school (McCune et al., 2014), and approaches such as *diálogos de saberes* of La Via Campesina, where connective space is created for dialog between different knowledges, experiences, and ways of both knowing and practicing (Rosset & Martínez-Torres, 2012).

The political history of agroecology is woven throughout our work with the garden in several ways. Our oral histories with the gardeners show that displacement has played a large role in the agroecological formation of the gardeners, and the practices they use to resist current forms of displacement and injustice. My colleagues and I have engaged with the Beach Flats Garden as a case study to theorize an “agroecologies of displacement” (Glowa et al., 2018), arguing that farmers are increasingly less singularly place-based through forced displacement, and that displacement and dispossession shapes agricultural practices—and social practices, broadly—in farming communities. We follow Kerssen and Brent (2017) and others in

calling for bringing a historically focused analysis of displacement, dispossession, and the dynamics of land ownership under capitalist systems to our understanding of the articulations of food movements, in particular political and transformative agroecologies. This analysis points to a form of praxis that emphasizes teaching and acting within a historical lineage of history that interweaves the social and ecological, and forces us to ask as food system educators how to teach our students that food and agriculture are never apolitical.

Caminando Preguntamos

In fall 2017, we were able to conduct our first larger class field trips again at the garden; after two years, the ban on visits apparently has passed. Over one hundred 2nd–5th graders came to visit over two days. As we began the visits, the first questions were about the struggle to save the garden: Why did they (the company) want the land? Will they try again? Can we see the part they took? The students lined up to step up onto a chair and peer over the newly constructed fence separating off the third of the garden that was lost. I explained that only another year and a half of the lease is left and the future of the garden is unknown. The students filed back down the narrow pathway to continue learning about the work that has continued on the two-thirds that has been saved. Attention shifted to the bright orange flowers dotted across the garden. A student asked, “What are those for, can you eat them?” A shy student in the back raised her hand to answer. “No, those are the day of the dead flowers, *compasuchitl*.” Emilio explained how they grow these flowers for community members to use on their altars at home. Through these types of experiences, I hope that we create room for inspiration, beauty, and the seeds of visions for a fundamentally different kind of economy and society, while at the same time we question more broadly: How do we make this happen together? What are the roles and mechanisms of solidarity we may need moving forward?

Much of the work of the gardeners and garden coalition focused on the effort to maintain tenure security and access to the land. The educational projects tied to the garden similarly have emphasized land rights and property dynamics as crucial

to understanding the potential and the challenges facing liberatory food projects. These dynamics have been explored in relationship to agroecological practices, farming histories, patterns of immigration, and politics of race and displacement. Agroecology, as it has been taught in the garden, is deeply tied to the social dynamics of farmer movements and the impacts of capitalist world food systems. The necessity and urgency of solidarity with struggle for the garden’s land tenure security opened to a constellation of intersecting issues around housing, immigration, and gentrification, with which many community members are now more active. While the constraints of academic educational efforts can sometimes lead food system educators and advocates to remain more narrowly focused on singular issues or framings, that ultimately is a disservice to our students. It limits both how students understand the interconnections of food, ecological, and social issues and how solidarity can be enacted. One could imagine that if a coalition were to focus only on the continued existence of the garden as a space for agroecological cultivation that the garden could survive, but the current Mexican and Salvadorian Beach Flats residents would no longer tend it due to gentrification and displacement. Through this case, we see how food systems educators can emphasize drawing the connections between agroecology and broader social questions around gentrification, discrimination, and housing justice.

In the Garden, residents and non-residents alike can reflect together on how land use decisions are made and what role each person, whether a gardener, a visiting student, or an educator, might play in land use futures. Gardeners make explicit requests to supporting tenure security of the garden and visitors have the opportunity to think about how they will respond to that request. In that moment of relationship, learning goes beyond individuals receiving information and the learner actively sees acting in solidarity as part of their learning. In so doing, the micro-actions of writing a letter or contributing to public comments at a city council meeting connect to broader action for food sovereignty. For educators who may connect with communities in struggle, either through field trips, as guest speakers, or through being having projects

based in a community in struggle, I believe this case can help us reflect on how we build on the connection between local action and more global goals, with an emphasis on the enacting of solidarity in which learners participate.

In addition to contributing to critical food system praxis through demonstrating the complexity of what could be considered relevant to food systems and agroecology and asking students and educators to engage with the urgency of solidarity action, this case also helps to open a post-capitalist lens to the everyday actions of the gardeners, for which Peña's framework of practical autonomy is apt. He describes the place-based food work of Mexican and Mesoamerican diaspora communities that ground practices of self-governance and cooperativism. In the garden, we see how nonmonetary exchanges, networks of support through labor and food, and orientations toward communal or shared land tending are observed by students and thus provide teaching examples of practical autonomies. Through these cooperativisms at play we see post-capitalist everyday practices, what I believe to be a necessary component for critical food systems education. While it is important to acknowledge the limits and contradictions of garden-based learning, as educators we can do more to highlight these sites of practical autonomy through a decolonial *comida* perspective. And this can contribute to realizing Peña's assessment of solidarity as action, praxis based in the relationality of how self-governance and participatory democracy are practiced and

actively chosen without permission or guidance from state or corporate authority. As food system educators, we have a great opportunity and responsibility to ask students what worlds of possibility they see that have and continue to be nurtured by communities in resistance, and how as potential collaborators they wish to act in solidarity with the cultivation of these worlds.

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Farms and gardens everywhere but not a bite to eat? A critical geographic approach to food apartheid in Salt Lake City

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Abstract

Through community-engaged research, we investigate how political and economic practices have created food apartheid and the ways in which this legacy complicates efforts toward equitable urban agriculture in Salt Lake City (SLC). The study takes place in SLC's Westside, where an ample number of farms and gardens exist, yet food insecurity is a

persistent issue. We partner with a small urban CSA farm operating in a USDA-designated food desert in SLC's Westside to explore the farmers' own questions about whom their farm is serving and the farms' potential to contribute to food justice in their community. Specifically, we examine (1) the member distribution of this urban CSA farm and (2) the underlying socio-political, economic, and geographic factors, such as inequitable access to land, housing, urban agriculture, food, and transportation, that contribute to this distribution. GIS analyses, developed with community partners, reveal spatial patterns between contemporary food insecurity and ongoing socioeconomic disparities matching 1930s residential redlining maps. These data resonate with a critical geo-

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graphic approach to food apartheid and inform a need for deeper and more holistic strategies for food sovereignty through urban agriculture in SLC. While resource constraints may prevent some small farmers from attending to these issues, partnerships in praxis can build capacity and engender opportunities to investigate and disrupt the racial hierarchies enmeshed in federal agricultural policy, municipal zoning, and residential homeownership programs that perpetuate food apartheid.

Keywords

Food Apartheid, Urban Agriculture, Redlining, Food Justice, Critical Geographies of Food, Food Deserts, Community-Based Praxis

Introduction

In Salt Lake City (SLC), food insecurity is a persistent issue, despite a multitude of food access advocacy programs and a vibrant tradition of urban agriculture (UA). This paradox is evident in SLC's Westside, home to much of the city's immigrant and refugee community, including 75% of SLC's Latinx population (University Neighborhood Partners, 2019). In the Westside, spatial clusters of food insecurity have been designated by the USDA as 'food deserts' (Food Access Research Atlas, 2021a), a label that does not capture the myriad political and economic factors that undergird structural food inequity or the particularities of place (Holt-Giménez & Harper, 2016).

A great deal of food is grown in local backyard and community gardens and small urban farms in SLC's Westside (Yagüe et al., 2020). Urban farmers cite more affordable land prices and larger residential tracts as primary reasons for living in and growing food in this part of the city. This is particularly salient in the Glendale neighborhood, where there are multiple small farms in operation, a large co-housing development with residential gardens, and numerous residents who cultivate gardens and manage animal husbandry systems. Additionally, food culture is strong in this community, where many residents identify foodways and practices connected to traditional foods, cultural identity, and community building (Cachelin et al., 2019). This complexity demonstrates some of the reasons that so-called food deserts may be better under-

stood as products of food apartheid. A food apartheid framework accounts for the idea that food inequity is not a natural occurrence based in ecological limits, but rather an explicit outcome of political economy based in structural racism and unequal geographies of access (Reese, 2019; Brones, 2018). The political and economic factors that underly food apartheid may also provide context for the prevalence of food insecurity in the face of abundant local urban agriculture.

One farm in SLC's Glendale neighborhood operates from a self-described progressive and radical-leaning food paradigm that drives their goal of practicing food justice through UA. This community supported agriculture (CSA) farm has a unique land access model, growing food in neighbors' backyards and, in exchange, providing landowners with a weekly share of produce during the growing season. The farm name, Backyard Urban Gardens (B.U.G. Farms), reflects this approach. This structure allows the farmers to operate the CSA despite not owning the land, which alleviates a significant barrier for localized agricultural operations.

The researchers initially visited B.U.G. Farms in 2017 as a part of a more extensive collaborative effort to understand food access and justice in SLC. During this initial field visit, the farmers expressed concern about the possibility that they may be exporting produce from the Westside to predominately white, affluent neighborhoods elsewhere in the city. In further conversations with our team, the farmers expressed a desire to understand their own positionality within their neighborhood and the patterns of food inequity they have noticed across SLC.

This article describes our resulting community-engaged research partnership and details our collective exploration into the underlying political and economic factors that contribute to food apartheid in SLC and complicate B.U.G. Farms' aims to practice food justice. First, we seek to answer the farmers' own questions regarding the actual demographic and geographic composition of this urban CSA operating in a U.S. Department of Agriculture (USDA)-designated food desert in SLC's Westside, and to what extent the CSA might be exporting produce to other communities and thus undermin-

ing its own goals of food justice. Subsequently, we employ a critical geographic lens to examine political and economic factors, such as racially inequitable access to land ownership, food, and transportation that might account for these distributions. We draw on a variety of data, including CSA owner and member surveys, community interviews, historic geographic data, and contemporary census data to spatially contextualize the structural processes that undergird food apartheid in SLC. We then consider the complex role of collaborative research praxis towards informing deep and holistic approaches to food sovereignty through UA.

Context and Community-Based Praxis

Over the past four years, we have engaged in community-based praxis with our partners at B.U.G. Farms toward understanding how the sociopolitical context of the food system shapes the farm and its potential and actual relationship to the community. At the time of our initial site visit, one member of the research team resided at a home where B.U.G. Farms grows food, which uniquely positioned our team to launch a collaborative partnership and support B.U.G. Farms' aims to explore options to better connect with and positively affect their community. In our earliest conversations with B.U.G. Farms, the farmers situated their concerns about whom their CSA was serving within their broader feelings of hopelessness about the potential impact of one small farm in the face of a global corporate, industrial, foodscape and locally inequitable urban foodscape. These conversations launched our resulting partnership rooted in community-based praxis. For our team, community-based praxis means that work occurs as a partnership with a lateral exchange of benefits, is driven by the aims of the researchers and the community, and carries the commitment to ensure that data collected are used to inform actionable outcomes (Community Research Collaborative, 2021; Torre et al., 2018). Community-based praxis guides our aims to avoid extractive, ahistorical, and nonpolitical approaches that have traditionally characterized social science and ecological research (Tuck, 2009). Our praxis has taken shape through a blend of critical conversation, action, and outreach as we have joined B.U.G. famers in harvesting and sharing produce,

distributing seedlings at community events, and engaging with Westside residents to understand their visions for the farm's role in the neighborhood foodscape.

The subsequent literature review contextualizes these conversations and what we have learned through our collaborative community outreach by exploring the complex factors that B.U.G. farmers, CSA members, and Westside residents have pointed to from their own perspectives as underlying the local foodscape. Specifically, we examine how myriad global conditions inherent to the industrialized food system (1) set the stage for widespread food insecurity; (2) intersect with municipal factors such as housing inequality, food access programs, land-use policies, and gentrification to produce racially inequitable access to food; and (3) complicate the possibilities for urban farmers who seek to play a role in food justice.

Big Food and the Foundations of Food Insecurity

Small and urban farms operate as spaces of contestation and possibility within the complex setting of the industrialized food system, which we refer to here as Big Food. Big Food is characterized by mechanized large-scale and monoculture production, overreliance on extractive petrochemical inputs, intensive water usage, genetically modified seeds, and heavily subsidized immigrant labor (Alkon & Agyeman, 2011; Neff et al., 2009; Hoffpauir, 2009; Manning, 2004). The propulsion of Big Food necessitates global dependency on commodity crops, which is facilitated by corporate interests embedded in the state who influence governmental subsidies and global markets (Friedman, 1993; McMichael, 2009). Proponents of Big Food employ the rhetoric of scarcity and famine to contend that industrialization is the only way to feed an ever-growing population. However, research indicates that small farms can produce higher quality and quantities of food on smaller, more intensively managed parcels of land, foster greater levels of biodiversity than industrial counterparts, and support increased food systems resilience (Altieri, 2008; Manyise & Dentoni, 2021; Ricciardi et al., 2021; Shiva, 2005).

Big Food is buoyed by governmental policies that both hide and externalize the true costs of

food such that small farmers are unable to compete in the marketplace (Windham, 2007). For example, international neoliberal policy and labor programs such as the North American Free Trade Agreement (NAFTA), Central America Free Trade Agreement (CAFTA), and the U.S.'s H-2A immigration program enable Big Food to generate an underpaid and precarious agricultural workforce with limited access to organized labor rights advocacy (Sbicca et al., 2020). These types of trade policies, also referred to as immigrant subsidies, enable commercial growers to hire 'guest workers' to enter the U.S. for agricultural work, and have been widely criticized for labor rights abuses of immigrant workers akin to modern-day slavery (Bauer & Steward, 2013; Coalition of Immokalee Workers, 2020). In the U.S., small farms, defined by the USDA as farms with under US\$350,000 in annual sales, do not receive proportionate rates of federal subsidies compared to larger, industrial operations (Bekkerman et al., 2019; USDA Economic Research Service [USDA ERS], 2020). The distribution of labor subsidies exacerbates a situation in which small farmers who do not participate in exploitive governmental labor programs, and are not otherwise supported by subsidies, must charge higher prices than their commercial counterparts to offset the resource constraints of small-scale, labor-intensive food production (Bekkerman et al., 2019; Cross, 2020).

The skewed distribution of agricultural subsidies not only serves to maintain inequity in labor relations but also presents serious implications for food access. The prevalent undervaluation of agricultural labor in the U.S. is connected to the staggering rates of people who work growing food in this country who also experience food insecurity, a state of unreliable access to safe and nutritious food (Brown & Getz, 2011; Reno, 2020). Concerns relating to the distribution of federal funding through agricultural subsidies and food access programs were raised in our conversations with B.U.G. farmers and neighboring farmers, many of whom noted that the struggle that small farmers face to feed themselves can also preclude their participation in local initiatives to alleviate food insecurity.

Food insecurity is so widespread in the U.S.

that 1 in 7 people regularly uses food banks, and 14.3 million households are food insecure (Feeding America, 2020). Food insecurity also disproportionately affects Black, Indigenous, and people of color and LGBTQ+ people (Holt-Giménez, & Harper, 2016; Lemke & Delormier, 2018; Leslie, Wypler, & Bell, 2019; Reese 2019). Federally funded response to U.S. food insecurity is largely based on the Supplemental Nutrition Access Program (SNAP), formerly referred to as food stamps, in which 11.3% of total U.S. households are enrolled (U.S. Census Bureau, 2020). SNAP participants redeem 83% of total benefits at superstores, 6% at grocery retailers, and 5% at corner stores (Center on Budget and Policy Priorities, 2019). While SNAP is the primary mechanism through which the government responds to food insecurity, the majority of benefits ultimately goes back to the corporate beneficiaries of Big Food via sales and subsidized food access for those corporate conglomerates' own underpaid employees (Ayazi & Elsheikh, 2016). The structure of the SNAP program creates a feedback loop in which the corporations that contribute to food insecurity in the first place benefit from the governmental programs purportedly designed to alleviate hunger.

One of the primary avenues for small and urban farms who, like B.U.G. Farms, are seeking to respond to food insecurity is through joining the growing number of farmers markets accepting SNAP benefits. However, even when markets successfully navigate the cumbersome process of obtaining the necessary approval and technology for SNAP, high costs, lack of transportation, and an overrepresentation of whiteness in the cultural organization of market spaces remain barriers for low-income and marginalized customers (Alkon & McCullen, 2010; Hoover, 2013; Kellegrew et al., 2018; Larimore, 2018). The amount of funding spent at farmers markets through SNAP remains a very small portion of overall expenditures (Farmers Market Coalition, 2020). In order to increase urban accessibility to local food, we must first reckon with the impact of U.S. governmental response to food security from the root causes, such as systemic disparity in income, access to land, transportation, and purchasing power among food-insecure individuals.

Food Apartheid: Racialized Food Insecurity

Small and urban farms, such as B.U.G. Farms, who seek to understand issues of food access are confronted with the task of first understanding the shape of food insecurity in their own communities. In efforts to conceptualize widespread food insecurity, the USDA categorizes some areas as ‘food deserts,’ which denotes inadequate and inequitable food access (USDA ERS, 2021a; Olson, 2018). Food deserts are defined as census tracts wherein “at least 500 people or 33 percent of the population [is] located more than 1 mile (urban) or 10 miles (rural) from the nearest supermarket or large grocery store” (Dutko et al., 2012, p. 6) The food desert designation is a highly contested, deficit-oriented framework, which devalues existing community foodways such as small, independently owned corner stores, backyard gardens, and food-sharing networks, and does not adequately account for the socio-geographic factors that influence food availability (De Master & Daniels, 2019; Penniman, 2018; Raja et al., 2008; Reese, 2019; Taylor & Ard, 2017; Brones, 2018). ‘Food swamp’ is another designation for areas where fresh food availability is scant but where fast food and highly processed foods are widely available (Cooksey-Stowers et al., 2020; Fielding & Simon, 2011; Rose et al., 2009). The food desert and food swamp designations can result in the framing of marginalized communities, especially communities of color, as hostile environments, superimposing narratives of damage and concealing the processes of capitalism and colonialism that create clustered food (Lewis, 2015; McClintock, 2018; Shannon et al., 2013). Food swamp and desert designations also conjure imagery of naturally occurring landscapes rather than the reality that food inequity is actively produced and maintained by systems and processes (Reese, 2019).

The food desert and swamp designations presuppose supermarket access as the most appropriate remedy for food insecurity given that, in the Food Access Research Atlas (USDA ERS, 2021b), “low access to healthy food is defined as being far from a supermarket, supercenter, or large grocery store (para. 2). The USDA approach to defining supermarkets as the solution for food insecurity is especially troubling when considered in conjunc-

tion with the history of supermarket redlining. Supermarket redlining is a phenomenon in which major chain supermarkets relocate stores from inner cities or low-income neighborhoods to suburbs, citing lower profit margins and higher operating expenses (Eisenhauer, 2001; Zhang & Ghosh, 2016).

Supermarket redlining stems from the more widely recognized practice of residential redlining through which federal lending programs incentivized white homeowners’ disinvestment in urban centers while simultaneously preventing ethnic minorities from obtaining homeownership. This practice of residential segregation through redlining was implemented in 1933 by the Homeowners Loan Corporation (HOLC) under the oversight of the Federal Home Loan Bank Board. The HOLC generated a series of residential security maps that segmented cities into sections ranked in terms of viability for home loans. Sections designated “A” were considered to be the “best” areas for investment in home loans, “B” areas were “still desirable,” and “C” areas were “definitely declining.” African American neighborhoods, or areas that were home to “low-class foreign-born laborers,” were assigned a “D” grade, which denoted “hazardous” areas not viable for home loans (McClintock, 2011; Nelson & Ayers., 2020). Redlining resulted in geographically concentrated clusters of racialized poverty. Consequently, many food retailers intentionally pulled stores out of low-income inner-city neighborhoods (Eisenhauer, 2001; Zhang & Ghosh, 2016), setting the stage for geographically based, racialized food access issues. While white, middle-class Americans amassed intergenerational wealth through equity in their owned homes, African Americans and people of color were actively prevented from accessing home loans in all sectors of the HOLC maps and the suburbs (Rothstein, 2017). Redlining was not prohibited until 1968, and its impacts continue to contribute to racially inequitable housing insecurity and food availability in major cities across the U.S. (Eisenhauer, 2001; McClintock, 2011; Nelson & Ayers, 2020; Rothstein, 2017).

Contemporary census data reflect that USDA-designated food desert tracts are more likely to be located in communities of color and in areas with

higher rates of poverty than nonfood desert-designated tracts in the same cities (Dutko et al., 2012). In a systematic review of food desert literature, Walker et al. (2010) cite multiple findings indicating that predominately Black and Latinx communities have less access to supermarkets and healthy food options than predominately white neighborhoods. This arrangement is not only due to a lack of supermarket access but also transportation, which is often scarce in USDA-designated food deserts and is a primary barrier to procuring fresh, healthy, and affordable foods (Dutko et al., 2012; MacNeill et al., 2017; Strome et al., 2016).

People who are affected by food insecurity also more frequently experience a lack of access to housing, healthcare, and fair wages (Gaines-Turner et al., 2019; Kirkpatrick & Tarasuk, 2011; Raskind, 2020; Wolf-Powers, 2017). An Urban Research Institute study found that renters struggle with food insecurity at much higher rates than homeowners and are often forced to choose between paying for rent or food (Karpman et al., 2018). Renting can also prevent other forms of adaptation to food insecurity, such as home gardening (Mee et al., 2014). The structural foundations of food insecurity stem from political and economic legacies of racially inequitable access to housing, transportation, fair wages, and other socioeconomic determinants of health.

A growing number of food scholars and activists assert that food apartheid is a more appropriate label for this systematic production of food inequity, as it calls into question the ways in which socio-political factors related to race and class shape communities' relationships with food (Holt-Giménez & Harper, 2016; Penniman, 2018; Reese, 2019; Sbicca, 2012; Brones, 2018). Conceptually, food apartheid is a term that "forces us to question ... the ways non-profits, advocates, researchers, and policymakers frame residents' lack of knowledge or will to access or eat healthier foods, rather than locating the deficiencies in the ways white supremacy has shaped neighborhood food spaces" (Reese, 2019, p. 46). Food desert and food swamp labeling naturalize and thus normalize, whereas food apartheid describes the many factors that created and continue to shape inequity and

maintain racial hierarchies throughout the food system (Holt-Giménez & Harper, 2016).

Food Justice, Sovereignty, and Urban Agriculture

Urban agriculture is rooted in a rich history of food justice advocacy led by farmers and people of color and can serve as an essential component of movements toward the disruption of food apartheid (Agyeman & McEntee, 2014; Alkon & Norgaard, 2009; Corcoran, 2021; Gripper, 2020; Heynen, 2009; Penniman, 2018; Whyte, 2017). Food justice can be defined as "the right of communities everywhere to produce, process, distribute, access, and eat good food regardless of race, class, gender, ethnicity, citizenship, ability, religion, or community" (Institute for Agriculture and Trade Policy, 2012, p. 1). Urban farms, such as B.U.G. Farms, who seek to practice justice-oriented UA may also consider themselves participants in, or supporters of, the food sovereignty movement.

Food sovereignty offers an oppositional strategy to food apartheid, which includes the commitments of food justice advocacy as part of a strategy broader in scope that advances the democratization of the food system by situating the right to democratic control of the entire food system, from production to consumption, with people rather than corporations (Holt-Giménez, 2009; Martínez-Torres & Rosset, 2010). Food sovereignty has been defined as "the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems" (Nyéleni, 2007, p. 7). Food sovereignty is both a paradigm and process, predicated on a radical approach to the active dismantling of the larger racialized system in which small-scale and urban agriculture are made inaccessible from both producer and consumer ends of the value chain (Holt-Giménez & Shattuck, 2011).

The history of racism embedded in U.S. agricultural policies has culminated in an overwhelming disenfranchisement and displacement of Indigenous, Black, and people of color throughout the agricultural sector and especially as farmers (Ayazi & Elsheikh, 2016; Elsheikh, 2016; Fagundes et al., 2020; Penniman, 2018; Tyler & Moore, 2013). The preventative nature of land ownership

is a persistent barrier that renders UA largely inaccessible to low-income and other disadvantaged community members in the U.S. (Horst et al., 2017; Siegner et al., 2018; Wekerle & Classens, 2015). The necessity to procure affordable and stable land access often leads urban farmers to seek out low-cost tracts of land, which tend to be more available in marginalized areas that are already vulnerable to gentrification (Sbicca, 2020). The repercussions of redlining underly this cycle, as property values are frequently lower in USDA-designated food deserts compared to non-food redlined urban neighborhoods (McClintock, 2011; Reese, 2019). This dynamic can exacerbate food apartheid when UA attracts renewed interest in development and inadvertently drives up property values in marginalized communities or USDA-designated food deserts (Jettner, 2017; McClintock, 2018; Pride, 2016; Reynolds & Cohen, 2016; Sbicca, 2019). The resulting cycle of eco-gentrification presents a negative feedback loop, in which UA is a critical tool for food sovereignty and yet may amplify persistent barriers to food security, land access, and agricultural resources for Black, Indigenous, and people of color who are the most affected by food apartheid (Sbicca, 2020). Negative impacts of UA, such as eco-gentrification, may be linked to the prevalence of inequality and barriers to financial security, leaving many producers struggling to pay themselves a living wage and with little time to also attend to issues of food justice in their own communities.

The perpetuation of food apartheid in urban environments is related to a number of structural factors such as colonization, whiteness, and privilege embedded in the food system, which predicate barriers to addressing food security through alternative food provision and can complicate the relationship between small farms, food justice, and food sovereignty (Anguelovski, 2015; Guthman 2008a, 2008b; Hoover, 2013; Slocum, 2007). Such is the case with B.U.G. farmers, who seek to support food justice in their community while also attaining financial viability and living wages in a marketplace dominated by Big Food. Recognizing these complexities drives the intentions of our community partners and informs our collaborative critical geographic approach to understanding the

actual construction of food apartheid and associated relationships with UA in SLC.

Study Site

The development of Salt Lake City's food justice movement has not been as widely studied as in other U.S. cities that have become well known for locally driven food movements, such as Denver, Oakland, Philadelphia, Baltimore, New York, and Chicago. In many of these cities, scholars have identified connections between urban agriculture projects and negative outcomes such as eco-gentrification and the perpetuation of overt whiteness in local food movements (Alkon et al., 2019; Alkon et al., 2020; Hoover, 2013; Jettner, 2017; Kellner, 2016; McClintock, 2018; Pride, 2016; Sbicca, 2019). As the local food movement in SLC continues to grow, it is well poised to incorporate lessons learned in similar contexts by incorporating food justice and sovereignty in urban agriculture development at an earlier stage in order to avoid replicating cycles of food apartheid and displacement via UA.

This study takes place in SLC's Westside, where political and economic legacies of inequality are prevalent, including clusters of extractive industries and associated point-source pollution, the construction of railway and highway systems that separate the neighborhood from the rest of the city and impede food access, and increasing development-driven displacement (Carothers, 2018; McKellar, 2015; Mullen et al., 2020; SLC Planning Commission, 2014; Tucker, 2019). We focus specifically on the Glendale neighborhood, which shares characteristics with many marginalized urban communities in the United States. It has an ethnic minority rate of 89% and the largest refugee population in the state of Utah (Salt Lake City Schools, n.d.). In this community, 90% of schoolchildren qualify for free or reduced lunch, which indicates widespread food insecurity in a setting where food-related disease disproportionately affects Black, Hispanic, and American Indian and Alaska Native populations in SLC (Salt Lake County Health Department, 2017).

Preliminary fieldwork in Glendale, a USDA-designated food desert, indicates that many food access organizations operating here have not suffi-

ciently aligned their programs with the needs of residents. Many SLC organizations have employed charity-based frameworks in food access programs. Charity-based programs attend to the surface-level symptom of hunger by relying on donation-driven food distribution, which can perpetuate inequality in the food system and normalize charity rather than societal change as a response to poverty-driven food insecurity (Fisher, 2017; Poppendieck, 1999). In SLC, charity-based approaches to food insecurity alleviate the immediate issue of food insecurity for some residents, yet may also be precluding authentic connections between local food producers and community members (Yagiie et al., 2020). Racially inequitable access to food remains a persistent issue here, and political-economic factors of inequality impede the relationship between UA and food justice.

Methods: A Critical Geographic Approach to Food Apartheid

Critical geographic methods are particularly well suited to the analysis of political economic factors that undergird food apartheid. Critical geographies of food embrace dynamic understandings of spatial processes, allowing for the production of rich descriptive accounts through which we understand a sense of place as the coalescence of multiple “spatially diffused social networks” (Bosco & Joassart-Marcelli, 2018, p. 541). Understanding localized political economy factors can help establish mechanisms for restructuring food systems and support efforts for justice in local and far-reaching contexts (Reynolds & Cohen, 2016; Trauger, 2017). For example, interviews and surveys with residents can center the lived experiences of racially minoritized populations, including the use of archival information such as historic redlining maps to document systemic forces of racism that create food apartheid (Reese, 2019). Additionally, critical geographies of food can employ participatory and archival methodologies, including interviews, review of policy documents and reports, and participation in food system activism and policymaking (Reynolds & Cohen, 2016). These dynamic and engaged methodologies enable researchers to describe structural oppressions relevant to UA accurately and ground their analysis in community-based experi-

ence. Critical geographies of food can also reveal connections between land tenure, food regimes, and municipal planning systems to expose food injustice and offer the potential for justice-oriented foodways (Tornaghi, 2014).

Following this tradition, we employed a critical geographic approach to better understand how underlying socio-political, economic, and geographic factors are a backdrop for B.U.G. Farms’ export of food from a USDA-designated food desert in SLC’s Westside. Considering that historic redlining and an enduring lack of access to housing, transportation, and fair wages have all been linked to ongoing structural food inequity (De Master & Daniels, 2019; Gaines-Turner et al., 2019; Raskind, 2020; Wolf-Powers, 2017), this study draws on various forms of socio-political, economic, and geographic data.

First, to understand the extent of B.U.G. Farms’ food export from a USDA-designated food desert, we developed surveys to document the distribution and demographics of B.U.G. Farms’ stakeholders. CSA member data were collected in partnership with B.U.G. Farms through an anonymous online survey sent to all CSA members (~130) through the farm’s newsletter in fall 2017. The newsletter has a high readership, as it is circulated to all members via email each week to describe the contents of the CSA boxes, provide recipe suggestions and farm updates, and share reminders about delivery and pick-up logistics. The survey was promoted three times in this weekly newsletter and through a printed note that was included in all CSA boxes for one delivery. The survey was designed together by the research team and the farmers, and several questions were adapted from a previous survey of CSAs in the Mid-Atlantic region (Oberholtzer & Project, 2004). There were 20 total questions, including seven demographic questions: neighborhood and/or zip code of residence, age, gender, racial and/or ethnic identity, place of origin, estimated annual income, and highest level of formal education. The survey also included questions proposed by the farm’s operators to gather feedback on the CSA’s quality, quantity, and member satisfaction, as well as several additional open-ended questions designed to provide a more qualitative understanding of CSA

members' motivations and involvement with food movements. As incentive for survey participation, the farm offered one extra box of winter produce through a random drawing for participants. CSA members' locations were mapped in a series of figures that depict members' geographic distribution across SLC and respond to farmers' questions regarding their potential export of food from the Westside.

Secondly, to further explore underlying political and economic factors in the urban foodscape in SLC, we utilized ARC GIS (version 10.8.1) to contextualize how historic redlining spatially overlaps with contemporary inequities in land access, housing, transportation, and food. We generated a series of maps to provide spatial context for understanding our farmer partners' perspectives of how underlying inequities complicate their aims of practicing food justice in SLC. These maps use data from HOLC redlining maps of SLC (Cooley 2018; Nelson & Ayers, 2020), U.S. Census tract racial-ethnic and socioeconomic data (U.S. Census Bureau, 2018), public transit information (Utah Transit Authority, 2020), and USDA food desert maps (Food Access Research Atlas, 2021a). Using ArcGIS, historic HOLC redlining districts were mapped onto current SLC census tracts, and data from the U.S. Census Bureau American Community Survey (2018) were used to demonstrate racial and ethnic distributions. Shapefiles from the USDA Food Access Research Atlas were included to represent the location of USDA-designated food deserts within SLC boundaries; these data were also used to represent areas categorized as low income. UTA TRAX (light rail), Frontrunner (commuter rail), and bus routes were also imported and displayed through ArcGIS. The resulting figures depict CSA food distribution in the context of contemporary access to food, transportation, and housing, along with historic residential redlining maps, in order to visually demonstrate how these spatial relationships change over time.

Trustworthiness

Triangulation, or the cross-examination of data at multiple points, supports the trustworthiness of a study's findings and the overall quality of the research process (Denzin, 1978; Rose & Johnson,

2020; Savin-Baden & Major, 2013). We triangulated through the inclusion of various types of historic, social, and empirical data guides our critical geographic approach to understanding factors that underlie food apartheid and associated relationships with UA in SLC. Spatial data points are represented through the mapping of CSA member demographic and geographic distributions. Temporal data range from the 1930s, when redlining was established, to 2018, where contemporary socioeconomic data is juxtaposed against historic redline zones. The persistent nature of unequal geographies of access is depicted through the inclusion of USDA food desert data and SLC transportation maps.

Findings

A total of 35 shareholders responded to the CSA member survey, or about 27% of the 130 total shareholders. B.U.G farmers reported that this was the highest response rate ever received in any of their previous CSA satisfaction and feedback surveys. The large majority of respondents ($n=33$) did not reside in Westside neighborhoods. Of the two shareholders who did, one is a landowner who received a share in exchange for leasing their land to the farm, and the other is a farmworker who receives a workshare. Previous fieldwork and insights from B.U.G. Farms indicate that the two shares that stayed in the Westside via landowner and worker exchanges represent relatively recent transplants to the area who relocated to and recently purchased land in the neighborhood for the potential to participate in UA and are likely not experiencing food insecurity.

As predicted by the farmers, the majority of CSA shareholders self-identify as white ($n=31$). One shareholder self-identified as Hispanic. Four participants did not respond to this open-ended question. The CSA farm's owners, landowner partners, and workers all self-identified as white. B.U.G. farmers indicated that these results are consistent with their own understanding of the demographics of CSA members, based on their personal interactions with members through recruitment and distribution processes.

Figure 1 demonstrates that CSA shareholders are located primarily in neighborhoods that are not

USDA-designated food deserts. This figure depicts the export of locally grown food from food-insecure Westside neighborhoods to more affluent and food-secure areas of the city and is related to the tension between the small farmers' desires to support equitable access to food and the conditions in which they must charge a higher price in order to afford land and a living wage.

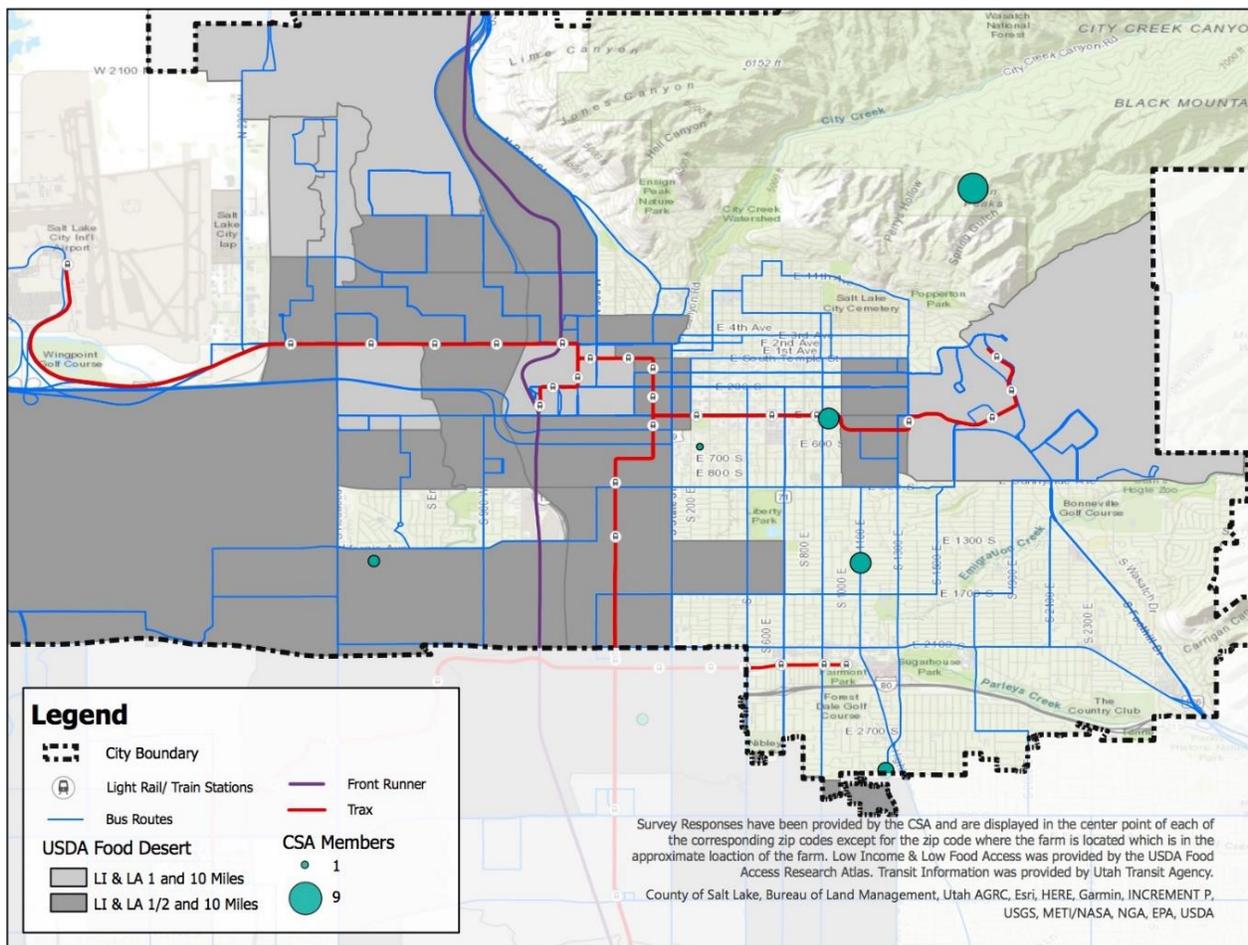
Figure 2 demonstrates that CSA shareholders are more commonly located in areas that were designated "A" and "B" by the HOLC. This figure visually represents how the legacies of discrimination, such as racially driven policies that prevent homeownership, may be related to contemporary food access and purchasing power.

Figure 3 demonstrates that areas that are USDA-designated food deserts are more commonly located in HOLC tracts designed "C" and

"D" grades. This figure illustrates how contemporary USDA-designated food deserts—which indicate a prevalence of low-income residents—are spatially linked to historic redlining policies that prevented the accumulation of wealth through homeownership.

Figures 4 and 5 use U.S. Census data to indicate that "A" and "B" tracts remain primarily populated by white residents with higher per-capita income per household. These figures use a visual clustering of contemporary racial/ethnic populations to demonstrate how current residential patterns echo the intentional segregation of redlining policies. This stark visualization of contemporary segregation contributes to an understanding of how the racialized foundations of food apartheid continue to affect intergenerational wealth accumulation and thus food security.

Figure 1. USDA Food Deserts and B.U.G. Farms Community Supported Agriculture Food Distribution

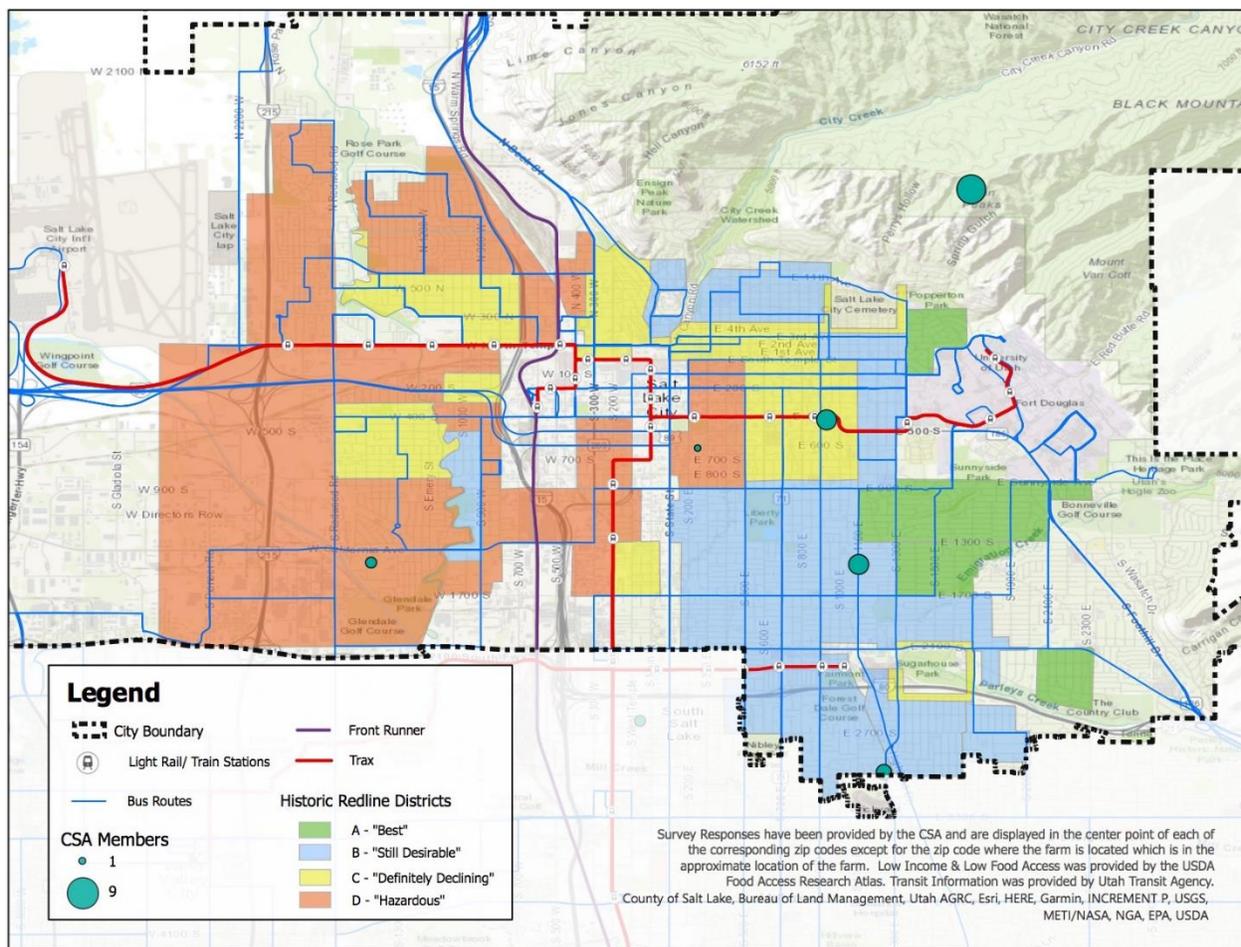


SLC public transportation data included in these figures also indicate a lack of public transportation available in formerly redlined census tracts, which overlaps with contemporary USDA-designated food desert census tracts. Considered together, this collection of figures demonstrates how the ongoing impacts of redlining intertwine with contemporary socioeconomic inequality and food apartheid in SLC. HOLC redline maps of SLC demonstrate that “D” grade areas, or communities of color, were primarily located in what is contemporarily referred to as the Westside. This is connected to the findings of Cooley (2018), who found that residents in SLC’s Westside neighborhoods were less likely to be approved for homeownership loans, contributing to systemic barriers to housing

and intergenerational wealth accumulation and has led to continued racial segregation across the city. In an analysis of 2010 ACS data, Cooley (2018) also found that census tracts associated with HOLC “D” or “hazardous” ratings were linked to higher proportions of renter-occupied and vacant units, whereas areas designated “A” and “B” continued to reflect higher proportions of owner-occupied housing units.

These figures align with previous research that also suggests that residents of the Westside continue to experience disproportionate impacts to various socioeconomic determinants of health, such as access to health care, transportation, affordable housing, food, and air quality (Mullen et al., 2020; SLC Planning Commission, 2014; Wood et al., 2013).

Figure 2. Homeowners Loan Corporation (HOLC) 1930s Redlining Zones and Distribution of B.U.G. Farms Community Supported Agriculture Members

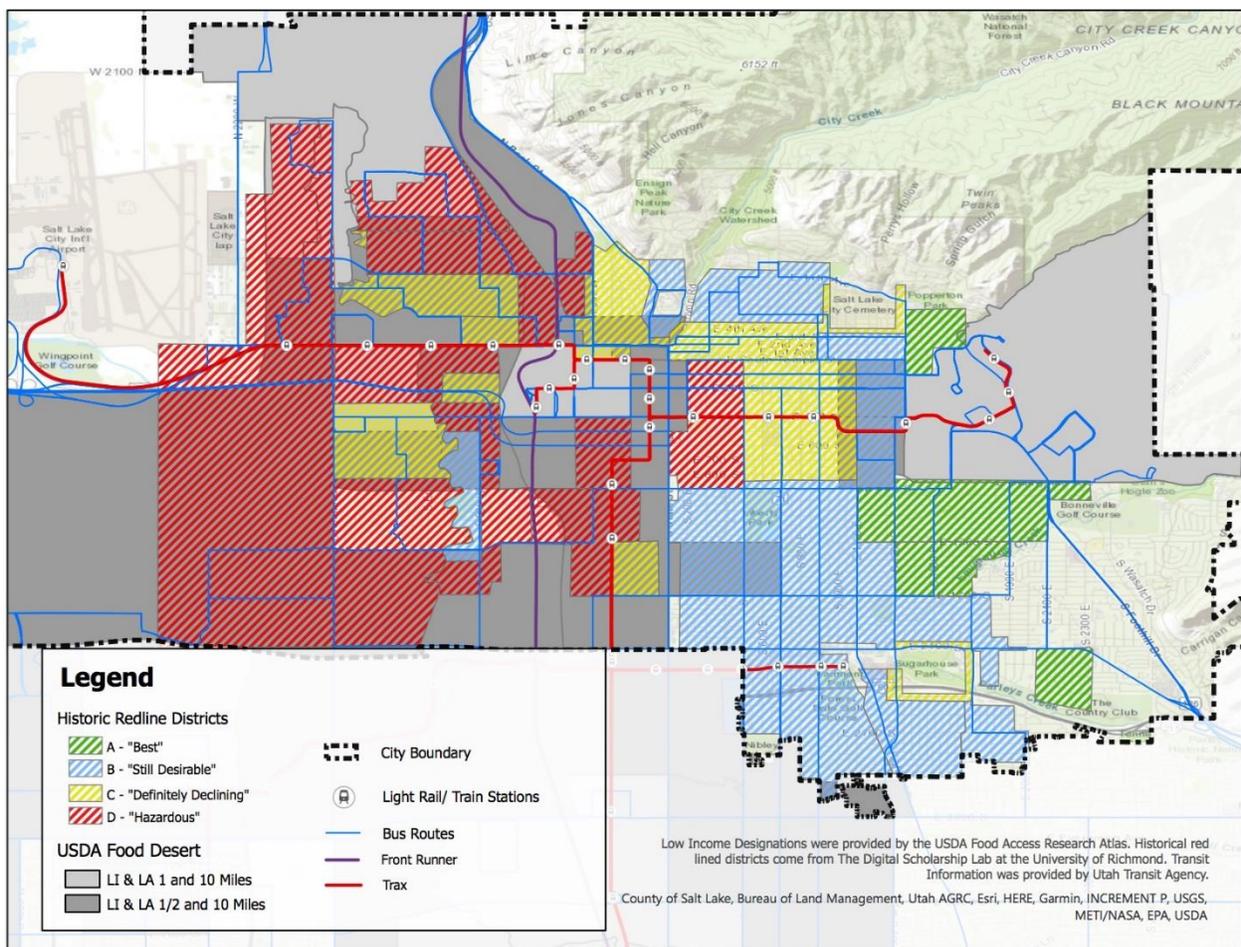


Discussion and Implications

This study illustrates how the sociopolitical history of SLC and the larger political and economic structures at work throughout the food system complicate the justice-oriented aims of B.U.G. Farms. Geographies of inequity form the backdrop for food apartheid in the Westside and complicate the aims of many UA practitioners who seek to practice food justice. Considered collectively, these figures provide insights into how the impacts of food apartheid also shape the broader relationships between UA and food sovereignty in SLC. Our previous fieldwork indicates that B.U.G. farmers are among several UA practitioners who have been drawn to the Westside to access land affordably. In the case of B.U.G. Farms, the necessity to charge nonsubsidized higher prices to offset the costs of

labor-intensive food production likely set the stage for its export of produce from the Westside to CSA members who reside in other, primarily white and more affluent areas of the city with greater access to food. Through interviews with additional UA practitioners in Glendale, we have learned that other farms and gardens experience a similar need to export produce, as the most financially viable markets are located in other areas of the city (Yagüe et al., 2020). These findings offer important considerations for various types of UA operators in SLC’s Westside and across the city interested in attending to food justice. This study indicates that racially inequitable access to food across SLC is spatially connected to the effect of residential redlining, which also predicates disparate access to housing and transportation. These findings reso-

Figure 3. U.S. Department of Agriculture (USDA) Food Deserts and Homeowners Loan Corporation (HOLC) Redlining Zones

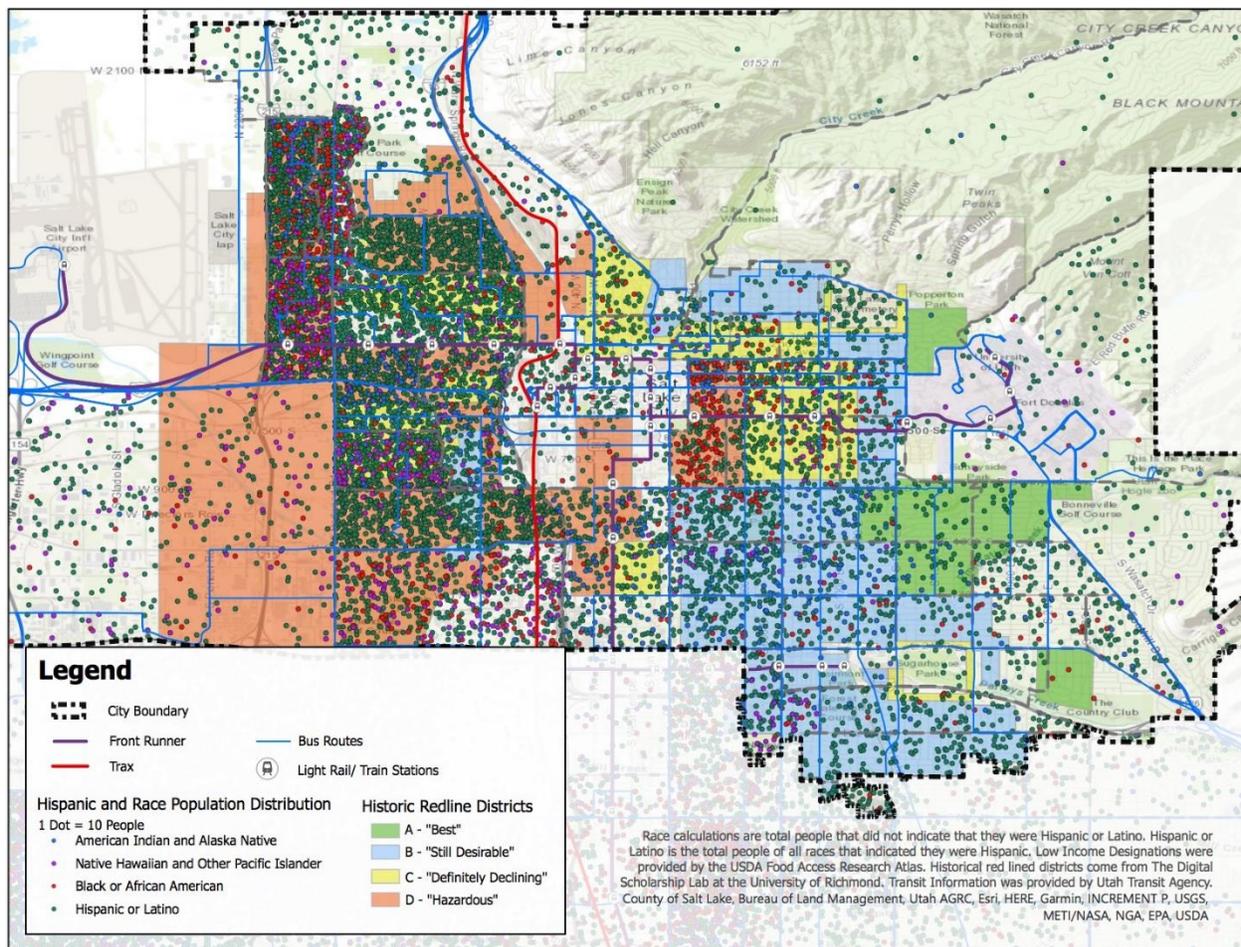


nate with previous research that suggests that populations who qualified for homeownership in non-redlined census tracts continue to hold more access to intergenerational wealth through the accumulation of home equity (McClintock, 2011; Rothstein, 2017). This accumulation of wealth may contribute to an ability to pay the higher costs associated with nonsubsidized, locally produced food such as a CSA membership.

The underlying factors for food security, such as housing and income inequality, cannot be addressed comprehensively through charitable approaches to food security (food banks, soup kitchens, and emergency food assistance) (Gaines-Turner et al., 2019; Kirkpatrick & Tarasuk, 2011; Raskind, 2020; Wolf-Powers, 2017). Charity-based emergency food access programs have become a normalized and necessary, yet insufficient, solution

to hunger and food-related illness (Fisher, 2017; Poppendieck, 1999). Enduring income inequality in formerly redlined and food apartheid-impacted neighborhoods indicates a need for more comprehensive policies, from raising the minimum wage to housing-first models with robust commitments to food security (Hainstock & Mesuda, 2019; Housing First Charlotte Mecklenburg, 2020). These justice-focused structural adjustments represent systemic approaches to improving the lives of people at the lower ends of the socioeconomic spectrum. Pertaining particularly to concerns associated with food apartheid, emergency food aid delivered through food banks and federal food assistance programs such as SNAP attend to the immediate symptoms of food injustice. However, in order to increase the feasibility for UA to alleviate food insecurity, a more holistic approach is

Figure 4. Hispanic and Racialized Population Distributions and Redlining



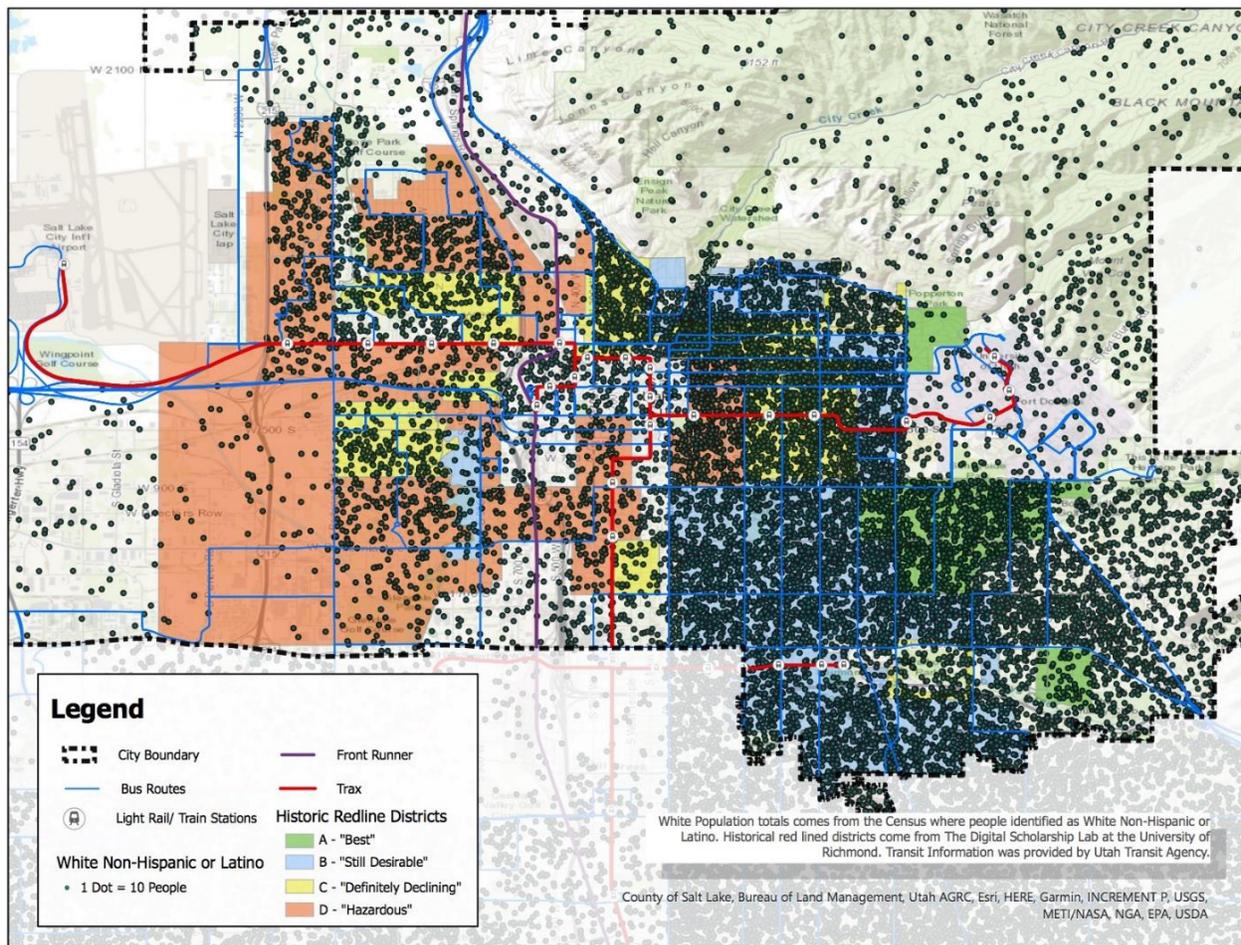
needed to confront the root causes of food apartheid and introduce opportunities to replace emergency food access programs with financially viable and sustainable, community-driven food access and UA initiatives.

The findings of this study are likely connected to the ways in which federally subsidized commodities and labor programs buoy corporate interests in the food system (Windham, 2007). Federally subsidized commodities and labor programs could be adapted to better serve small farms and increase accessibility to marginalized people as consumers and potential producers. Previous research indicates that the redirection of federal subsidies away from corporate interests and toward small farms, UA, and community-controlled food provision programs may offer a promising pathway toward food sovereignty

through UA at a broad scope (Bruckner, 2016; Fisher, 2017; Graddy-Lovelace & Diamond, 2017; Holt-Giménez, 2019; Patel, 2012).

Because USDA food desert census tracts are calculated based on access to supermarkets, the correspondence of food desert polygons with HOLC redlined tracts indicates enduring relationships between residential and supermarket redlining, as formerly redlined areas continue to experience less access to supermarkets. However, considering research that indicates the introduction of big-box supermarkets may prime neighborhoods for gentrification and the displacement of independent and community-oriented food outlets (Anguelovski, 2015), we suggest that future food access initiatives in the Westside should focus on investing in currently existing and community-controlled food outlets such as regional and family-

Figure 5. White Population Distributions and Redlining



owned businesses, ethnic grocers, small farms or gardens, and local markets.

Our findings also illuminate a lack of access to public transportation in formerly redlined Westside neighborhoods and current USDA-designated food deserts. Strategies that increase equitable public transportation in low-income areas can also increase access to fresh, healthy, and affordable foods (Dutko et al., 2012; MacNell et al., 2017; Strome et al., 2016). Consequently, municipal investment in better public transportation may serve as a tool for increased food access and overall health and well-being in the Westside. One promising step toward this goal is the newly launched Transportation Equity for Salt Lake City's Westside Study, which explores possibilities for increased access to transportation infrastructure throughout the Westside (SLC Transportation, 2021).

Throughout our analysis and discussion, we position food sovereignty as a framework through which to understand food apartheid and identify the need for equity and justice-focused food policies and programs. As a form of decolonization itself, food sovereignty discourse has long been led by Indigenous scholars and activists and is incomplete without a commitment to Indigenous autonomy and reparations (Grey & Patel, 2014; Whyte, 2017). We acknowledge that a major limitation of this study lies in the inherent relationship between food apartheid and settler colonialism. The localized manifestations of food apartheid that we examine in this manuscript occur on stolen Indigenous land that has been cultivated within the U.S. agricultural system rooted in chattel slavery and displacement of Black, Indigenous, and people of color (Ayazi & Elsheikh, 2016; Elsheikh, 2016; Fagundes et al., 2020; Penniman, 2018; Tyler & Moore, 2013). In order to connect UA with the aims of the food sovereignty movement and to alleviate the impacts of food apartheid, we argue that justice-oriented approaches to food system reform must include reparations to displaced and disenfranchised African American and Indigenous peoples, and federal investment in agricultural land preservation and subsidized land access programs for small farmers, especially BIPOC farmers. A promising example of this reparative act has

recently been introduced into the U.S. legislature via the Justice for Black Farmers Act (2020), which we identify as an important step toward redressing food apartheid, albeit one that is incomplete without land reparations to Indigenous peoples. The American Rescue Plan is another example of advancement toward equity in national food policy, as it contains a directive for the USDA to establish an equity committee to “address historical discrimination and disparities in the agriculture sector” (USDA, 2021).

This investigation into food apartheid in SLC could not have occurred without the introspection and partnership of the farmers themselves, which provides an example of how food itself can serve as a window into the structural processes that produce food apartheid and spark change toward much needed policy reforms. In this case, the use of critical geographic methods illustrates how food apartheid complicates UA in SLC. The implications of this study are also related to the socio-ecological legacies of inequality that remain prevalent in the Westside and draw attention to the need for future research and programs that apply an environmental justice approach to the interrelated nature of food apartheid amidst social disparities that compound as imminent threats to overall health and well-being. Salt Lake City has taken significant steps toward these goals by establishing a Resident Equity Food Advisors program (RFEA), consisting of a group of residents from marginalized backgrounds who provide counsel to the city on issues relating to food access and equity. The first cohort of the RFEA program has called for two key actions related to the findings of this study: (1) The launch of a community food assessment update that centers equity in its scope, process, and outcomes; and (2) a resolution from the mayor and city council declaring Salt Lake City's commitment to advancing food equity and increasing access to healthy food for all residents (SLC Department of Sustainability, 2021).

One of the ongoing outcomes of this praxis is our collaboration with the SLC Food Policy Council to share the findings of this study, which may be relevant to the proposed community food assessment. Our research team continues to support B.U.G. Farms' goals of making food more readily

available in the Westside. The farm remains committed to increasing community engagement through local hiring practices, knowledge-sharing with nearby community garden projects, donating produce and creating sales agreements with local food pantries and community kitchens. B.U.G. farmers are pursuing the option to accept EBT payments for CSA shares by 2022, and, along with their plans to continue working with other farms on food justice and security issues, are exploring the option to implement a mobile bike farmstand that would enable the sale of produce beyond CSA shares.

Our future research will explore how farms and food-access organizations can employ collaborative praxis in order to avoid introducing outsider or top-down approaches to food access. This study also provides a framework for our ongoing partnerships with Westside community groups as we seek to collaboratively forge educational pathways through UA and food sovereignty praxis. However, the greater pursuit of food sovereignty in SLC's Westside and elsewhere must include broad-scale work to establish equitable housing policies that create pathways to homeownership specifically for BIPOC, increase public transportation, and increase minimum wages (Gaines-Turner et al., 2019; Karpman et al., 2018, Kirkpatrick & Tarasuk, 2011; Mee et al., 2014, Raskind, 2020; Wolf-Powers, 2017). Herein lies the power of praxis, given that “educational institutions are often community hubs with considerable political and social capital, [where] institution-wide measures that enable students to participate [in collective action] hold great promise in higher education institutions overall” (Verlie et al., 2021, p. 144).

Ultimately, this work arises out of an imperative for food systems activists, scholars, and advocates, including farmers, to interrogate the racially uneven geographies of access in our communities. We recognize that the fundamental political econ-

omy of the broader food system can, by design, prevent small farmers from attending to much more than the already daunting task of growing food in a system that is stacked against alternative food provision. Yet, partnerships in praxis can build capacity to overcome these constraints and create opportunities to investigate, and thus disrupt, the racial hierarchies enmeshed in federal agricultural policy, municipal zoning, and residential homeownership programs that perpetuate food apartheid. 

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Food futuring in Timor-Leste: Recombinance, responsiveness, and relationality

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Abstract

The pluralistic nature of food culture and food systems produces complex and blended realities for research, often prompting approaches that embrace mixed methods and cross-sector partnerships. In parallel, calls for the decolonization of research methods have brought attention to the importance of relationality when working with local communities and traditional knowledge holders. This article presents the process and outcomes of the Timor-Leste Food Innovators Exchange (TLFIX), a multifaceted initiative centered on the contemporary and historic foodways of Timor-Leste, including current challenges to individual health, cultural identity, and economic-ecological sustainability brought about by centuries of colonial and transnational influence. Conceived within an international development context, TLFIX

aimed at building local empowerment, economic development, and social change. Methods included quantitative, qualitative, and material-based approaches, including surveys, storytelling, and culinary innovation. As a “consulting academic” on the project, I contributed to the research design, coached team members on storytelling-as-method, and participated in a portion of the work. For the current text, I use the notions of *recombinance*, *responsiveness*, and *relationality* to interpret our collective experience and to frame an example of carrying out

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mixed-method and mixed-participant work in complex food contexts. As a whole, this example illustrates ways in which to leave space for improvisation and emergence within food practice and scholarship.

Keywords

Timor-Leste, Foodways, Relationality, Localness, Improvisation, Decolonization, Culinary Innovation

Introduction

Food scholarship that involves material practice—growing, processing, cooking, serving, eating, disposing—presents a range of challenges to positivist academic conventions (Atkins, 2010; de Solier, 2013; D. Miller, 2005; Szanto, 2016). While *food systems* are often studied through disciplinary frameworks such as sociology, economics, biology, and geography, the material nature of *food* itself tends to blur disciplinary lines while implicating pluralistic, sensory, and embodied forms of knowledge, including those that resist textual description. In response, some food scholars have adopted hybrid models that bridge sectors, enable partnerships with on-the-ground practitioners, and highlight transdisciplinarity (de Marchi, 1999; Levkoe et al., 2016; Strand et al., 2003). Adding to such hybridity, fields such as sensory studies, ecofeminism, and Indigenous studies have contributed paradigms to food studies that support a “performative turn” (Conquergood, 1989; Szerszynski et al., 2003). In this sense, food systems can be understood as complex and adaptive, often comprising non-causal relationships between action and outcomes, intent and effect (Law, 2004; Mingers, 1994). Research involving food systems transformation thus implicates “non-linear, long-term, multi-actor processes ... that are not very amenable to planning and control” (Leeuwis et al., 2021, p. 770).

In parallel, increasing calls for the decolonization of research methods have brought attention to the risks posed by work involving local and Indige-

nous communities, including the often extractive nature of “outsider” collection of traditional knowledge (Levkoe et al., 2019; Smith, 2013; Steeves, 2018). This is of particular relevance for food scholarship, in which ecologically sensitive practices and embodied ways of knowing often intersect with Western methodological conventions (Bradley & Herrera, 2016; J. T. Johnson, 2012; Ritenburg et al., 2014). Imposing such frameworks can reinforce historically problematic power relationships and privilege academic objectives over community needs and, more generally, the greater social good (Bortolin, 2011; Flicker, 2008; Kepkiewicz et al., 2019). Furthermore, questions of accuracy and relevancy may arise, given that disciplinary methods do not always account for sensory or affective experience (Montuori & Donnelly, 2016; Todd, 2018), nor for systems that “do not hold still for their portraits” (Clifford, 1986, p. 10). In the case of food systems research, using methods that are blended and improvisational can be an effective response.

This paper presents outcomes from the Timor-Leste Food Innovators Exchange project (TLFIX), a multifaceted futuring¹ initiative centered on the food and foodways of Timor-Leste, including challenges to individual and collective health, as well as cultural and economic sustainability. A sovereign nation since 2002, Timor-Leste has a centuries-long history of colonial and transnational influences, which have combined to produce a complex array of effects. These include severe undernutrition and the tendency toward the “double burden of malnutrition” (undernutrition coupled with overweight) common to many industrializing and post-conflict countries (Provo et al., 2017). As well, through ongoing waves of migration and mixing, the sense of cultural identity in Timor-Leste is highly blended (Arthur, 2019), making fixed understandings of national heritage, Indigeneity, sovereignty, tradition, and language elusive. Within this context, TLFIX brought together local and outsider collaborators, worked toward diverse objectives, bridged the development, tourism, and aca-

¹ Futuring can be understood as the intentional “identification, creation and dissemination of images of the future, shaping the possibility space for action, thus enacting relationships between past, present, and future” (Oomen et al., 2021, pp. 2–3). In this sense, futuring acknowledges and engages with extant realities while imagining and attempting to realize better alternatives.

demographic sectors, and engaged with diverse knowledge paradigms. Moreover, by remaining open to emergent opportunities, the project team produced and encountered a range of outcomes both anticipated and serendipitous.

In what follows, I provide one account of this hybrid initiative, reflecting on its effects in the short and longer term. My aim is to show that a non-linear, open, and “messy” research project can be highly productive for a diverse array of stakeholders, and that outcomes from such projects may be both quantifiable and demonstrable as well as embodied and speculative. To address this range of potentialities, I take inspiration from Gibson-Graham’s (2014) call for “thick description and weak theory” when interpreting or imagining future possibilities, an approach relying less on “proving” established models and more on observation and interpretation that “yields to emerging knowledge” (p. S149), leaving space for reflection on potential implications. My “weak theory” includes the broad notions of *recombinance*, *responsiveness*, and *relationality*, which are meaningful in the context of collaborative work on and with the performativity of food systems, and which offer a way to deploy methods and paradigms that productively embrace improvisation and innovation.

Recombinance, Responsiveness, and Relationality in Food Research

In imagining sustainable food futures, Belasco (2006) proposes *recombinance* as an approach that eschews the “take-it-or-leave-it homogeneity” (p. 219) of technocratic “solutions” to systemic challenges, as well as fantasy efforts to return to a “simpler” pre-industrial food system. Instead, recombinance blends practices—some technoscientific, some ecological-relational—to find effective paths forward. Practical examples include urban and vertical farming, small-scale digital agriculture, and alternative protein production (Broad, 2020; Florey et al., 2020; Haberman et al., 2014). In a complementary sense drawn from genetics, recombinance also suggests that by making key changes to actors and their behaviors in the here and now, we can produce long-term ecosystem transformation in the future (Glick & Patten, 2017). In other words, by exchanging diverse food

knowledges, practices, and motivations among individuals and groups today—i.e., the “DNA” of our food systems—new traits and interactions might be produced in generations to come.

Like recombinance, the notion of *responsiveness* invokes grounded and improvisational methods that can lead to unexpected outcomes and “alternative social spaces of engagement and resistance” (Fischlin & Heble, 2004, p. 2). Responsiveness is particularly valuable in food systems work that addresses both longitudinal issues and material practice, given that such contexts are performative (Callon, 1984; Mansfield, 2003; Santich, 1996; Szanto, 2018). This means putting aside conventional expectations regarding cause-and-effect relationships and adopting a non-linear—i.e., complex and adaptive—understanding (Lien & Law, 2011; Stefanovic, et al., 2020). Dynamic subjects in food systems work demand dynamic research frameworks that are able to adapt in real time to the opportunities and outcomes that emerge.

In dialogue with and extending the concepts of recombinance and responsiveness, *relational* paradigms reveal the value of ecological and embodied ways of knowing, as well as alternative interactions in both time and space (Cole, 2017; Hart et al., 2017; Johnston et al., 2018; Ritenburg et al., 2014; Romm, 2020). Relationality undergirds Indigenous research methods (Wilson, 2009), while also easing frictions between local perspectives and the efforts of outsiders to understand them. In this sense, it foregrounds that knowledge is “situated” (Haraway, 1999); that is, an effect of the knowledge-creator/holder’s unique positionality in the world. Acknowledging and engaging with situatedness is critical to enabling pluralistic understandings of food and food systems, particularly when such work involves people from diverse traditions of knowing and doing. Relationality necessitates engaging with the surrounding environment (ecological knowing) as well as the sensory-corporeal memories of lived experience (embodied knowing), rather than relying on pre-determined systems of measurement and validation. In the context of Western researchers working with Indigenous communities, “Two-Eyed Seeing” (Bartlett et al., 2012) has been proposed as a way to relationally navigate historic dualities and power imbalances;

supporting collaboration among local participants and outsider researchers, “Two-Eyed Seeing” can be understood as a methodological form of recombination, one that “facilitate[s] the ‘talking and walking together’” (p. 334) of different paradigms. Such an approach is crucial for cross-community food research, whether or not it falls within the patterns of Indigenous/non-Indigenous collaboration.

A valuable means of activating relationality in research is to interleave storytelling and reflection with other methods. A millennia-old practice of knowledge translation, storytelling concomitantly builds connections among documented information, embodied knowledge, research participants, and research outcomes (Boje, 2011; Dolejšová et al., 2017; L. Miller et al., 2011). It is also an effective means of redistributing power within knowledge relationships (Conquergood, 2002; Doonan, 2015). Michel de Certeau’s assertion, “what the map cuts up, the story cuts across” (1984, p. 129), implicates the boundary-blurring nature of oral narrative and its capacity to link concepts, places, and times that have been otherwise divided by political forces. In the same vein, reflection and exchange, as practices that complement disciplinary methodologies, can identify points of articulation among disparately gathered data. In this text, I describe storytelling and reflection as methods deployed in TLFIX, as well as modes through which the project team came to a new understanding about the varied ontologies of storytelling itself. Storytelling and reflection also structure my own writing, inviting readers to relate to my interpretation of these events in their own way—with acceptance, reticence, curiosity, or other responses.

Together, these threads begin to outline the characteristics of TLFIX, leaving space for the project to be understood in diverse ways and paralleling the diverse outcomes that it helped create. Recombinance, responsiveness, and relationality may also provide an alternative framework in which to understand Timor-Leste itself, a place that tends to resist conventions and prevailing definitions.

Project Context

The Democratic Republic of Timor-Leste, also known as East Timor,² became a sovereign nation in 2002, following a multi-century history of colonization, revolt, independence efforts, occupation, invasion, civil war, and ongoing violent unrest (Molnar, 2010; Siapno, 2013). Today, a range of governmental bodies are engaged in myriad nation-building efforts, aimed at educational, health, trade, and political goals (Leach, 2016). In parallel, many community initiatives are underway to address the multigenerational trauma that has taken place, and which has led to complex societal relationships both within Timor and with external nations (Borgerhoff, 2006). Complementing locally driven efforts, multiple international influences are also at play within Timor, including non-governmental development agencies, commercial and corporate organizations, and cultural and scholarly actors (Dunphy, 2013; C. M. Johnson, 2015; McGregor, 2007; Murta & Willetts, 2014). While this article does not directly address the gamut of influences on the people of Timor and their movement toward political, economic, and social stability, they nonetheless inflect the ways in which TLFIX unfurled.

The Timor-Leste Food Innovators Exchange was conceived in 2017 with the aim to “reinvigorate the production and utilisation of healthy Timorese foods (both wild harvested and locally grown) to improve food security and address malnutrition” (TLFIX, 2018). Despite having exceptional biodiversity (Denis, 2014; Guillaud et al., 2013), Timor was historically less subjected to agricultural exploitation than some other colonized regions (Borgerhoff, 2006; Molnar, 2010), in part because of its mountainous terrain and minimal transportation infrastructure. Nonetheless, ongoing waves of outside influence have displaced traditional and local foods with more highly processed, transnational imports, which is correlated with the rise of several food-related health challenges (Guttal, 2009; Howe, 2013).

Recent data demonstrate that these challenges and others affect large percentages of the Timorese

² For the purposes of this text, and in keeping with the local naming habits I observed, I refer to the country either as “Timor” or “Timor-Leste,” using “Timorese” as the adjectival form.

population, including almost half of children experiencing chronic undernutrition and stunted physical development, and a quarter of children suffering from acute malnutrition, leading to physical wasting. Iron deficiency anemia is extensive among both children and women of reproductive age (General Directorate of Statistics, 2018; Timor-Leste Ministry of Health, 2014). These realities are in part due to the fact that over forty percent of the Timor-Leste population lives below the national poverty line, but also to shifting food-consumption habits and the limited availability of nutritious, culturally appropriate food products (Andersen et al., 2013; Bonis-Profumo et al., 2019). In parallel to these health challenges, and due to both affinities for and antipathies toward food associated with Timor's historic oppressors and colonizers, there are widely varying attitudes toward traditional Timorese foods (Castro, 2013). Indeed, the notion of *traditional* is extremely heterogeneous in Timor, depending on the scale of history one takes.

TLFIX was an initiative of the Timor-Leste Food Lab (TLFL), a social enterprise owned and operated by Alva Lim and Mark Notaras, Australian nationals who had been working in Timor since 2011. TLFIX was funded by innovationXchange,³ a development program emerging from LAUNCH Food,⁴ which itself is supported by USAID and Australia's Department of Foreign Affairs and Trade (DFAT). Agora Food Studio,⁵ a café-restaurant headquartered in the capital city of Dili, provided a revenue stream for TLFL, while also working to regenerate local interest in and consumption of traditional Timorese food products. TLFIX, TLFL, and Agora all operate under a common strategy that merges taste and the pleasure of eating, pride and empowerment generated through

commercial food provisioning and communications, and the role of diversity within nutrition and well-being.

Following several preparatory efforts in Dili, TLFIX established a multiphase pilot project, initially scoped for a duration of six months. The pilot was eventually conducted over the nine months from July 2018 to March 2019, and took place in both Dili and Ataúro, an island some 35 km to the north of the capital. Ataúro falls within the municipal district of Dili, and comprises six villages and a population of about 6,000 residents (Figure 1). The choice of research sites was based on the infrastructure and community provided by Agora, as well as the project instigators' existing relationships with homestay⁶ operators on Ataúro.

Project Scope

TLFIX was conceived within an international development framework as a pilot for a potentially more extensive effort toward achieving local empowerment, knowledge making, economic development, and social change. It brought together community and academic researchers as well as policy and development advisors. The research plan and governance model were designed to be contextually responsive; that is, as new themes and relationships emerged over the course of the initial timeline, the project team was able to modify its objectives and methods, and pursue emergent avenues for knowledge translation and dissemination.

To mitigate risks regarding the potentially extractive nature of food systems research, the TLFIX objectives were identified by Timorese advisors and community food practitioners, with the development and academic collaborators serving as "consultants" to these local "clients." The

³ See <https://ixc.dfat.gov.au/>

⁴ See <https://www.launch.org/food/foodchallenge/>

⁵ Lim and Notaras founded Agora in 2016 with the objective of training Timorese youth in food tasting, cooking, and service, as well as communication skills and peer training. Following a model of youth empowerment, the organization has built a sustainable "pipeline" of young leaders engaged in peer-to-peer education, while simultaneously valorizing the Timorese cultural practices of gastronomy and oral narrative. In early 2020, due to the COVID pandemic, Lim and Notaras returned to Australia and the Agora and TLFIX efforts were temporarily suspended. The TLFL team later re-opened Agora, however, with plans to apply the TLFIX approach toward future projects that support COVID recovery efforts. Lim and Notaras also transitioned Agora to a staff-ownership structure, retaining a mentorship role in the organization while stepping back from day-to-day operations.

⁶ Homestays are similar to bed-and-breakfast operations, allowing private residents to offer food and accommodation to visitors to Ataúro, which otherwise has a limited range of tourism services.

project budget came from a development-based initiative, itself funded by international aid organizations. My own role in the project (described below) was thus in service to the project team—a “consulting academic,” rather than a scholar with his own agenda, research objectives, and funding. Together, these foundational elements helped decentralize power within the project team, facilitate negotiated decision-making processes once the project was underway, and support greater equitability in the methods deployed and outcomes realized.

Three broad efforts were brought together, following quantitative, qualitative, and material-based approaches. Research included eater surveys, designed to uncover attitudes regarding Timorese ingredients and dishes, while also providing occasions for informal observation of local food markets and behaviors. Intergenerational storytelling brought forward memories and practices related to historic and contemporary foods and the associated habits of consumption. It also created a key moment for project team members to reflect on their own situated understandings of how storytelling itself operates. Food product development capped the process, providing opportunities for further relational exchange while creating tangible outputs that could be market tested and potentially commercialized. Together, these modalities were aimed at fulfilling the TLFIX goals of understanding, valorizing, and promoting healthful and nutritious local food, as well as helping partner communities adapt to and innovate within Timor-Leste’s current food realities.

The work was carried out by a team of collaborators who themselves represent a range of localness, Indigeneity, non-Indigeneity, and outsider status. They included Timorese food and tourism practitioners, Timorese Hakka (Chinese) and

Figure 1. Timor-Leste, at the Eastern Tip of the Archipelago Including Java, Bali, and Lombok, Represents an Important Intersection of Biospheres and Historic Species Migration



Source: Google Maps, n.d.

Timorese administrators and advisors, Australian social entrepreneurs, an Australian development worker, and a Canadian food scholar. It is important to note that while the two key instigators of TLFIX are not native to Timor, they have extensive development experience in the country, as well as strong ties to the community and a deliberate focus on serving local needs.

As the Canadian food scholar in question, I acknowledge that even as I advocate for pluralistic knowledge and mixed-models of knowledge making, I am the sole author of this paper. This was a decision made in consultation with the other team members. In producing the current text, I also consulted with them on the format and framing, and received extensive support in the form of notes, images, reflections, and data syntheses. Although not named as co-authors, their voices and experi-

ences are represented here as faithfully as I know how. Together, we recognize our contributions as collectively and differently meaningful, whether in the context of making academic texts, non-academic words and images, or the more tangible benefits of social change that have been generated locally in Timor.

Project Objectives and Methods

At the outset of the project, the TLFIX objectives were to improve perceptions of local food and address malnutrition in Timor-Leste through the participative development of innovative, commercialized food products. A corollary goal was to build community and policy relationships that could allow the pilot project to evolve into a longer-term effort. At the same time, it was necessary to acknowledge the intense complexity that characterizes food systems as well as the equally complex nature of Timor's socio-political history and contemporary foodways. Therefore, a mixed approach was taken, engaging both a development framework and a research framework. Figure 2 portrays the former, including the broader, action-research goal of improved sustainability and nutrition as critical components of a future Timorese food system.

The research framework that was established then drew on the identified development goals, setting specific research phases, intended interim outcomes, and the potential for emergent outcomes. (Table 1.) Broadly, the work entailed (a) two baseline surveys, one targeted at participants within the TLFIX project (members of the Ataúro and Agora communities) and one at visitors to Ataúro homestay facilities; (b) two endline surveys, targeted at the same participants; (c) qualitative observation of food species and products available at the Beloi village market and elsewhere on Ataúro; (d) inter-generational storytelling workshops with Ataúro residents, to surface and document historic and heritage foods; (e) recipe innovation and product development, based on the preceding work and followed by market testing and feedback; (f) research team reflection and debriefing, to glean

additional details and observations.

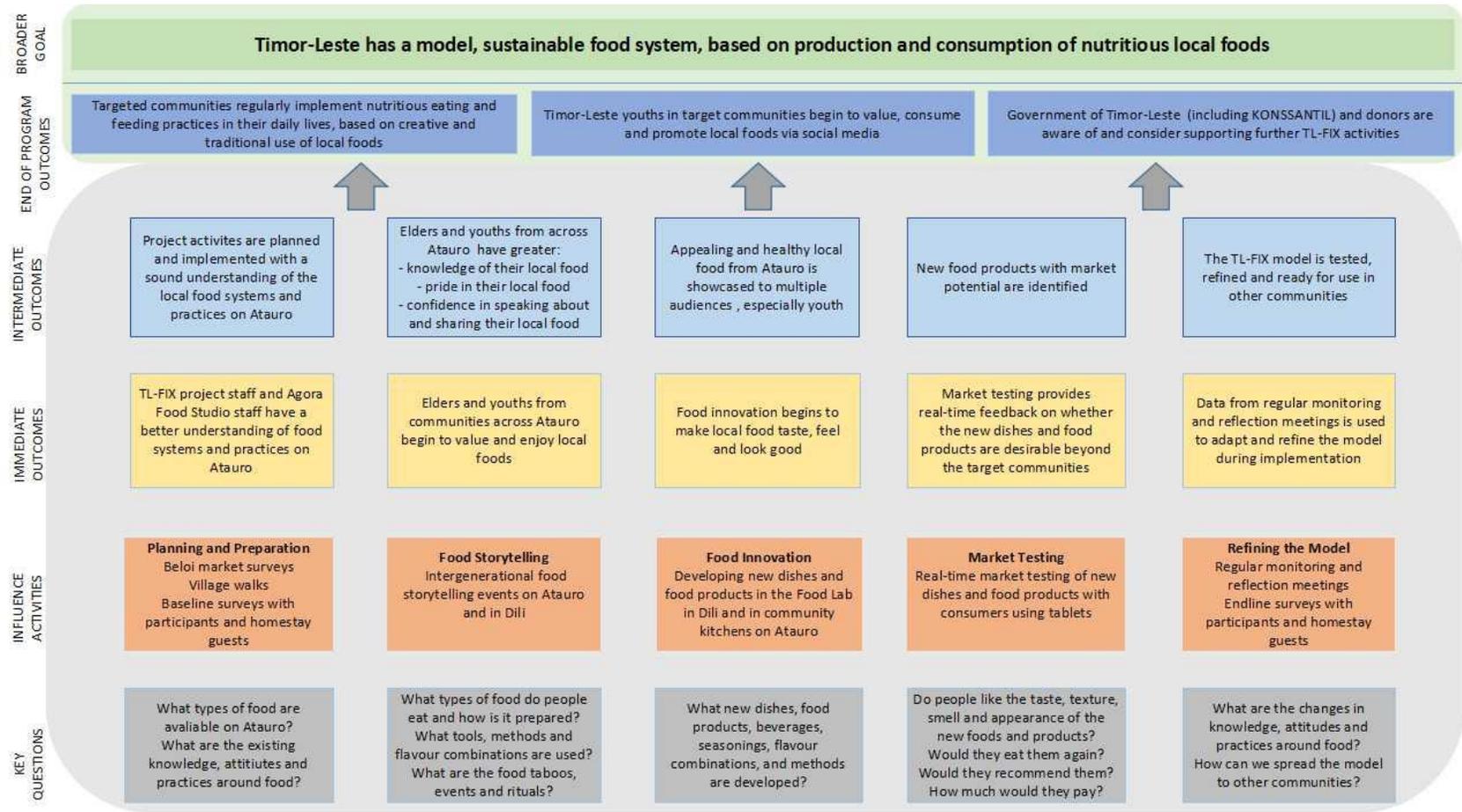
The instigators of TLFIX explicitly sought to engage their Timorese collaborators in project leadership, relationally adopting local models of cultural knowledge and practice. In this respect, while the project deployed two relatively conventional frameworks, it also made space for methods, theorizations, and objectives to adapt responsively over time. This included moments when the needs and perspectives of the participants showed that a new direction should be taken.

Because one desired outcome of the pilot was to bring about long-term change at the institutional and governmental level, the team also included a policy advisor familiar with the Timor-Leste federal government. Having played a number of roles in such circles, Filipe da Costa helped align the TLFIX design—and its eventual outcomes—with the country's long-term policy planning and food strategy development. As an advisor to the prime minister and to the National Council for Food Security, Sovereignty and Nutrition in Timor-Leste (KONSSANTIL), da Costa was also well-positioned to disseminate outcomes from the project within government and civil society circles.⁷

Consistent with its community focus, TLFIX also involved several homestay operators from the Ataúro Homestay Association (AHA). Members of AHA had approached Agora in February 2018, requesting assistance with developing foods for their guests that would be more appealing to an international clientele. Specifically, the operators wanted to incorporate higher-quality ingredients into dishes that visitors would find both palatable and representative of the locale. Embedded in this request were several issues, including the availability of food products on Ataúro, the culinary skills of the operators, the perceived tastes and preferences of homestay visitors, as well as an underlying tension between pride and shame in Timorese cuisine. This last derives from the country's complex colonial and conflict-laden history, leading to a very diverse spectrum of affinity for international cuisines, including those of neighboring Indonesia and Malaysia.

⁷ In October 2019, da Costa was named to the position of Special Representative for the Timor-Leste Food Security and Nutrition Program, reporting to the prime ministerial cabinet (Pereira, 2019).

Figure 2. The Development Framework of the TLFIX Pilot Project, Including Questions, Activities, Outcomes, and Top-Level Goal



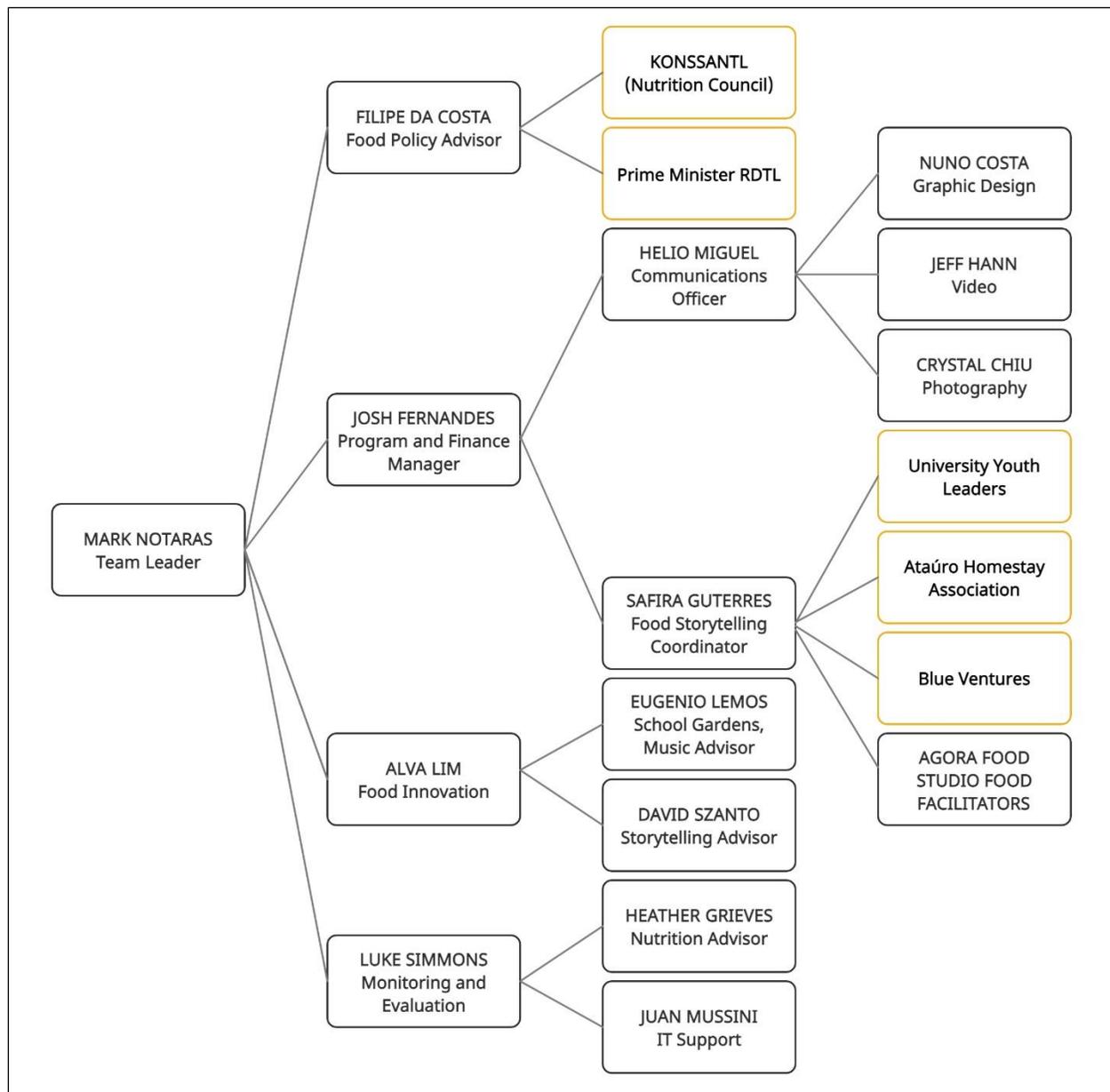
Source: Graphic developed by Luke Simmons.

Continuous special attention was paid to interpersonal dynamics, through both project-focused discussions and more casual social interaction. This involved one-on-one conversations between team leads and other participants, focused on research methods, project management, and communications techniques, and implicated the nurturing of relationships across the team, including participation by the community members in the storytelling and food innovation phases. It is apt that many of

these exchanges involved the making and sharing of meals, which foregrounded generosity and commonality, while grounding the project team in the diversity and sensory pleasure of local food. Along with our insider/outsider “talking and walking together,” we spent a lot of time talking and *eating* together, bringing reasoned understanding of the project into relation with more ecological and embodied knowing.

Figure 3 depicts the formal relationships within

Figure 3. The TLFIX Organigram



the TLFIX team, including community members, civil and governmental organizations, development actors, policy insiders, and researchers. The informal relationships are far less easily represented in graphic form.

The team's diversity was enhanced by fluidity within our designated roles, enabling each of us to respond to new opportunities as they arose. For example, through my own exposure to Indigenous-driven research in Canada, my role broadened to include coaching the team on relational methods and non-Western frameworks of knowledge. My interest in translation informed the ways in which language was used in the project—in storytelling, surveys, and various reports—and my access to academic journals prompted the writing of this article.

A notable example of our fluid role-shifting involved the negotiated process of creating the eater surveys. Four members of the team participated in this process. We translated questions into Tetun, one of Timor's two official languages, then retranslated them back into English, in order to check potential variations in meaning and reflect on more locally relevant phrasings as needed. The sociology background of our monitoring and evaluation advisor (Luke Simmons) thus encountered my food-and-communications framework and the multilingualism and local knowledge of our operations manager (Josh Fernandes). TLFIX instigator Mark Notaras brought his development-world perspective into play, as well as an outsider-insider curiosity about Timorese food and traditions. This back-and-forth process served as a model for later phases of the project, while also providing the primary interviewer (Josh) with greater capacity to probe for detail, pose questions differently, and interpret respondents' non-verbal responses. Other challenges arose regarding the meaning of some of our translated terms, including "food," in the senses of edible matter, culture, and systems, and "storytelling," which in Tetun translates to *konta istoria*, a term laden with both sadness and superstition. (See "Storytelling as Empowerment?" below.)

Ultimately, TLFIX became a nine-month pilot project conducted with and within several spheres of Timorese society, providing numerous occasions for such relational exchange. Other occasions arose

as well, in which logistics, local politics, and participant availability created resistances that demanded responsiveness within the research process. Our approach allowed us to shift the timing of some phases, while adding or removing others. It also meant that we were able to let go of preconceived notions about what "success" should look like within the project, freeing us to accept emergence within both our methods *and* outcomes.

Outcomes and Discussion

As shown in Table 1, some of the project outcomes were generated by pre-planned forms of data collection and processing. But it also became clear that some aspects of the project—not formally conceived as research methods—had also generated important outcomes, particularly in the form of embodied knowledge and individual transformation. These included negotiation during project management and survey design, exchange during sensory experiences (e.g., cooking, eating, market walks), and ongoing group reflection. In what follows, I present some of the outcomes from our more formal efforts, as well as two other phases of work, during which we collectively synthesized what was taking place. These constituted a key role in re-centering community-actionable outcomes as a primary objective.

Shifting Research, Shifting Objectives

Initially, the baseline and endline surveys were aimed at understanding local and outsider attitudes toward Timorese ingredients and cuisine, including their perceived nutritional content and pleasure quotient. These surveys generated minimal results on the part of homestay guests, largely due to a lack of tourism during this period. For the homestay operators (and to a lesser extent the TLFIX team members), the survey results were more robust. They point to a shift in attitudes toward Timorese food, as well as signs of longer-term transformation among those cooking and serving local food to homestay guests. Overall, nearly all of the ten respondents reported a high regard for Timorese food, ranking it as "good" or "very good" (the top two indicators of quality).

Moreover, following the hands-on food innovation workshops, participants reported increased

confidence in talking about Timorese food (and food in general), pride in local food, and culinary skills and knowledge. One participant, Meriam Soares, stated, “After participating in TLFIX I am cooking with *nu’u tein* [shredded, lightly caramelized coconut] and starting to eat corn again. We’re also

eating a lot more bitter foods at home again, [as well as] tamarind seed powder with honey, and millet with wild beans. In the future, I plan to run a mini local food innovation restaurant in Ataúro.”

Of key importance was the dominant attitude among homestay operators that Timorese food was

Table 1. The Research Framework Initially Established for TLFIX Pilot Project (Columns 1, 2, and 3), and Some of the Unanticipated Effects that Emerged (Column 4)

Research Phase	Participants	Format	Emergent Effects
Baseline survey of TLFIX participants	Ataúro community members; Agora Food Studio staff	Structured qualitative interviews with participants at the start of the project to gauge their knowledge, attitudes, and practices around healthful local food	<ul style="list-style-type: none"> Negotiated and shared understanding of linguistic translation (English to Tetun and Tetun to English)
Baseline survey of Ataúro homestay guests	Short-term and long-term homestay guests	Online survey completed independently by participants, addressing the foods eaten, and the context of eating, during their homestay visit	<ul style="list-style-type: none"> Increased capacity and confidence of interviewer; development of technical skills (use of tablet for interview process)
Beloi village market survey	TLFIX team	Qualitative and quantitative data on foods available for sale, including seasonal variability and apparent provenance (local or from Dili/elsewhere)	<ul style="list-style-type: none"> Development of relationships with local market sellers and village elders, supporting eventual storytelling and culinary workshop with youth
Ataúro village walks	TLFIX team and Ataúro community members	Qualitative data on plant foods and animals raised in Ataúro villages, as well as wild/foraged foods gathered by villagers	<ul style="list-style-type: none"> Observation of local cooking infrastructure and village layout, leading to increased understanding of mealtime habits and commensality
Intergenerational food storytelling	Meriam Soares, Rogerio Soares, Eu Branco, Dina Martins, Felizada David de Araujo, Francisca Martins	Audio documentation of storyteller narratives; photographic documentation of food products and names; textual documentation of food names and usages; group reflection and documentation of key points	<ul style="list-style-type: none"> Identification of translation problems inherent to the term <i>konta istoria</i> Empowerment of youth research team member toward deeper project involvement
Timor-Leste Food Lab and Community Kitchens	Kelo Gomes, Safira Guterres, Alva Lim, Lucia Fernandes, Meriam Soares, Dina Martins	Culinary innovation, tasting, discussion, reflection, and documentation of preparations	<ul style="list-style-type: none"> Grounding of the necessity of pleasure for supporting increased food security and improved nutrition
Real-time market testing of new preparations and ideas	Timorese government officials; DFAT representatives	Digital survey completed using tablet-based app, facilitated by research team members	<ul style="list-style-type: none"> Replacement of market testing with other opportunities (collaborative dinner for prime minister and other officials; media appearances)
Team reflection meetings	TLFIX team	Monthly debriefing and documentation sessions held among TLFIX team members, with notes distributed to all members by email	<ul style="list-style-type: none"> Sharing of power; valorization of the mixed perspectives of Indigenous and non-Indigenous team members
Endline survey of TLFIX participants	Ataúro community members; Agora Food Studio staff	Structured qualitative interviews with participants at the end of the project to gauge changes in their knowledge, attitudes, and practices around healthful local food	<ul style="list-style-type: none"> Engagement of entire Agora team in TLFIX and exposure to the methods and outcomes, leading to future spin-off projects
Endline survey of homestay guests	Short-term and long-term homestay guests	Online survey completed by participants, following same structure as baseline survey, to gauge change over the course of the project	<ul style="list-style-type: none"> Increased understanding of Ataúro community dynamics, including relationships among homestay association members and other tourism operators
Communications and outreach	Core team	Development of video channel (Facebook and YouTube); endline report to funders, in support of future, longer-term project; blog posts and scholarly articles; photo library; Facebook food innovation challenge	<ul style="list-style-type: none"> Media appearances (TV, online) by project director and policy advisor Engagement of 200 University of Dili students in TLFIX objectives

good, nutritious, and distinctive, and that they would embrace being advocates for it in the future. Several operators, who are exclusively women, also noted that their children and their husbands had become more interested in cooking, and were now participating in that aspect of the homestay businesses. Initially involved for primarily administrative reasons, the Biqueli village chief, Daniel Martins, also became engaged with the importance of these outcomes for the longer-term physical and cultural health of his community: “I like the idea of rediscovering the abandoned nutritious foods, and bringing together community from different villages to exchange knowledge and experience regarding local foods. It reminds the youth of our healthy, heritage ingredients, which have nourished our ancestors.”

In addition to the reduction in scope of the survey data, the team did not ultimately carry out the post-workshop market testing of commercializable products. Although the development of new foods would eventually take place, three new foci had emerged as more pressing project objectives: (a) increasing pride and confidence among homestay operators (as described above); (b) empowering youth participants, through research skills acquisition and gastronomic entrepreneurialism (see below); (c) disseminating project outcomes within media and political spheres (see below).

Rather than resisting the shifting nature of our research context by attempting to remediate the lack of survey data with follow-up efforts or forge on with market testing of products, the team recognized the need to respond to what was emerging before us. Following the model that improvisation theory puts forward—accept, agree to, and build on dynamic change—we chose to follow the emergent opportunities that arose. These shifts illustrate the real-time, responsive character of the project design. Moreover, because of the outcomes that were eventually realized, the value of being responsive to non-linear food system relationships was underscored.

Storytelling as Empowerment?

Initially, the storytelling workshops on Ataúro (at the Manukoko Rek homestay in Vila, and later in

Biqueli village) aimed at two primary outcomes. The first was to surface examples of local foods through the recollection of past ingredients and dishes. For the Vila workshop, participants brought numerous food items with them, serving as both illustrations and tasting samples. The project team also provided food (coffee, roasted *kumbili*, pickled *bilimbi*, and several types of fruit), both as a gesture of hospitality and as examples of what we ourselves found delectable within Timorese food. The mutual exchange of edibles supported our relational research paradigm and was intended to demonstrate our own embodied pleasure and understanding.

Team members who were more fluent in Tetun documented the food items in words and images, as well as the stories to which they were attached. These included narratives about cultivation, processing, cooking, and eating. In combination with the results of the market observations, this generated an extensive summary of food items that historically had been eaten and either abandoned or maintained within the local diet. The narratives were rich in detail, demonstrating a mixed set of attitudes toward local food, ranging from pride to dubiousness, as well as confusion about why one food might have fallen out of favor despite its former appreciation. Table 2 depicts some of these foods, including their Tetun names and English meaning. I consider the details summarized to be both true and subjective, meaningful and non-exhaustive—a compendium of highly relational, situated knowledge.

The second aim of the storytelling process was to engender pride and confidence in local food, both through the enactment of memory and the potential for futuring that oral narrative can produce. This framing drew on my long-held interpretation of storytelling as an empowering process, one that can rearrange the “truth” of historical records, which are often produced by those in dominant positions of power and privilege. By recalling and expressing multiple, individual accounts of the past, the official account may be challenged and, in some cases, refigured so as to allow alternate understandings of history to emerge.

Those recounting stories in Vila were all native Timorese, speaking Tetun and the dialects of their

Table 2. Some of the Foods Shared During the Oral Narrative Event at Manukoko Rek in Vila, on Ataúro

<i>koto moruk</i>	<p>wild bitter beans</p> <ul style="list-style-type: none"> • Processing to remove toxins requires up to twelve cycles of boiling and/or soaking and boiling; each Timorese community has their own method, specific to the microclimate and bean composition. • Once processed, the beans are called <i>koto tisi</i>, indicating that they are ready to be eaten plain or seasoned (e.g., stir-fried with chili and garlic) and eaten as a snack. 	
<i>lehe</i>	<p>velvet beans</p> <ul style="list-style-type: none"> • Also known as monkey tamarind or cowage, processing <i>lehe</i> includes soaking and boiling to first remove the outer pod and then more boiling and water replenishment to remove the bitter compounds that are naturally present. • Once the taste becomes “sweet,” <i>lehe</i> are traditionally eaten with coffee. 	
<i>nu'u tein</i>	<p>shredded and lightly caramelized coconut flesh</p> <ul style="list-style-type: none"> • A by-product of making coconut oil, <i>nu'u tein</i> is sold at low-cost in baggies, or in bulk as shown here. • It is somewhat comparable in taste and texture to crumbled brownie. 	
<i>budu tasi kripik</i>	<p>seaweed-and-sago (palm starch) crackers</p> <ul style="list-style-type: none"> • Similar to prawn crackers, <i>budu tasi kripik</i> are made without animal products. • Deep-fried in coconut oil, the crackers puff up and take on a pleasant, somewhat fishy taste. 	
<i>marungi</i>	<p>moringa</p> <ul style="list-style-type: none"> • Named as a “superfood” globally, moringa contains significant protein and vitamin content. • A foraged food widely available on Ataúro, it is considered a staple of almost all meals. • A simple soup made of moringa and <i>fatuk masin</i> (black sea rocks, see below) is considered both sustaining and restorative of health. 	

continued

fatuk masin black sea rocks

- Rich in mineral salts, the rocks are used as a flavoring agent and nutritional additive to a simple soup made with moringa.
- The rocks can be boiled and reused many times.

*batar no tunis* corn and pigeon peas

- Corn kernels are soaked before pounding, which allows them to be softened and reduced to consistent sizes that are neither powdery nor chunky, improving the mouthfeel when cooked.
- Pigeon peas are cooked together with parboiled, pounded corn, to which moringa, pumpkin leaves, and *bilimbi* pickle (see below) may be added for a traditional, typical Timorese stew.

*sukaer musan u'ut* tamarind seed powder

- Once the tamarind pulp is removed from its pod, the seeds are sun-dried and then dry-fried until crisp, after which they are pounded to remove the skin of the seed.
- Processed seeds are then soaked in water and eaten as is, or pounded into a powder that may be eaten with honey.

*kumbili* giant lesser yam

- A foraged tuber that is pit-roasted onsite, in the hills where it is found, *kumbili* has a fluffy, striated texture and a toasty, slightly sweet, bread-like taste.
- The roasting process reduces the yam's water weight and thereby the labor necessary to transport it to village markets.

*bilimbi* bilimbi

- Also known as cucumber tree or tree sorrel, *bilimbi* is similar to star fruit and contains high concentrations of oxalates, which can be beneficial in small doses and potentially harmful when consumed excessively.
- *Bilimbi* forms the base of one of many forms of *budu*, a generic Tetun term for highly flavored, fermented condiments.



Photos by Crystal Chiu

own communities, but not English. Over the course of this session, some participants expressed hesitation or discomfort about what they were being asked to do. While the narratives eventually unfurled in generous and informative detail, we came to understand that the initial resistance was related to our well-intentioned but partially uninformed understanding of *konta istoria*, the Tetun term we were using to mean “storytelling.” Through later debriefing and reflection sessions, we came to realize that a more nuanced interpretation of *konta istoria* is “to correctly recall facts from the past.” Rather than being understood as a mode of imagining an empowering future, *konta istoria* carries a different weight of responsibility in Timor. Those who practice it are considered record keepers, community members who embody the knowledge of family relationships, historic events, and financial debt. Moreover, many Timorese believe that to recount past events may enable them to be reproduced in the future. For a country whose past decades are characterized by extreme violence, oppression, and loss, *konta istoria* can be fraught—a painful and risky process, rather than one that is celebrational or creatively empowering.

In translating *storytelling* into *konta istoria*, we neglected to recognize the ways in which the Tetun term carries an emotional and historically laden meaning. However, as our reflection sessions continued, we arrived at the notion of “weaving” as a more apt motif for what we wanted to communicate. Timorese culture, like that of other nations in the region, places high value on woven textiles, both from artistic and economic perspectives. *Tais* are handwoven cloths that serve a number of purposes in Timorese society. Both functional and decorative, *tais* are often meticulously detailed, using traditional techniques such as hand-dyeing. They are worn for ceremonial and special occasions, and the patterns and images woven into them signify important events in family histories. Notably, because they are so time- and skill-intensive, they also represent *wealth*, and are seen as an investment in the family’s future (Barrkman, 2014). The making and sharing of *tais* thus embodies more directly the empowerment and futuring that we had intended to invoke with “storytelling.” As we moved forward, therefore, we

dialled back our use of *konta istoria* and instead suggested to our participants that their narratives were a kind of weaving together of future foodways.

This subtle but critical realization was a powerful check on our collective outsider perspective, and is in many ways a keystone of this paper. It is a metonym for the ways in which epistemologies are not always translatable, as well as reinforcement for deploying research paradigms that are heterogeneous and relational. For TLFIX, however, it was also an important turning point for adjusting the project’s subsequent phases.

Having involved elders, adults, and youth in the oral narrative event at Manukoko Rek in Vila

Figure 4. The Oral Narrative Event at Manukoko Rek in Vila, on Ataúro



Photo by Crystal Chiu.

Figure 5. The Biqueli Village Oral Narrative Event



Photo by Jeff Hann.

(Figure 4), the project team became aware of the value of actively engaging young people in food innovation and communications. Originally, we had intended to use the stories and food products as “raw material” for an eventual culinary innovation workshop. In response to the energy demonstrated for youth engagement, however, a second intergenerational community gathering was organized. Again, by taking a relational and responsive approach, the team was able to elicit opportunities and outcomes that would not otherwise have existed. The second event took place in Biqueli village on Ataúro, approximately one month after the Vila event (Figure 5). The program included food stories and tastings, as well as performances by Ego Lemos, a local musician and celebrity whose work also includes permaculture, curriculum development, and food activism. From this moment of intergenerational sharing, several community leaders stepped forward with the desire to participate in further workshops.

Recombinant Foodways

The original TLFIX scoping had included a set of culinary innovation workshops and consumer-oriented market testing sessions, intended to develop commercializable food products based on the Ataúro eater surveys, market observations, and storytelling sessions. However, due to Timor’s political deadlock and economic stagnation in this period, that phase of the work became untenable. Two other opportunities emerged, however, enabling the project team to reimagine the culinary component of the project. Both illustrate what recombination might offer as a framework for future projects, because of the ways in which they bring together multiple intentions and outcomes related to the holistic nature of food.

Contemporary Timorese food culture emphasizes rice as a staple grain. Although white rice was introduced before the Indonesian occupation, its elevated status has substantially grown in recent decades, so much so that farmers will sell their own red and black rice crops to purchase it. Corn, a Portuguese colonial holdover, and the more historic millet and sorghum have been largely supplanted. The most recently adopted grain is wheat, often imported in the form of industrial baked

goods and instant cup noodles—locally known as *super mie*. These two highly processed foods occupy the hearts and stomachs of the Timorese people, being both sensorially pleasing and symbols of the post-occupation era in which transnational products are increasingly present in the market. Youth, in particular, consume *super mie* in vast quantities, troubling for its impact on both human and environmental health (Adejuwon et al., 2020; Wilcove & Koh, 2010).

In the first opportunity, the Timorese culinary staff at Agora Food Studio organized a workshop to experiment with alternate forms of both bread and noodles. The two foods were identified by the AHA members, who were asked, following the storytelling workshops, what they would like to learn to make. This very straightforward approach typified what had become the TLFIX ethos: redirect efforts toward the needs of local stakeholders.

The culinary workshop took place in collaboration with some AHA members, including Meriam Soares, who had self-selected following the Ataúro events. Agora’s lead baker, Julio da Cunha, chose to riff on Mark Notaras’s Greek heritage and helped the team develop several types of pita-like flatbread. Rather than making a wheat-only dough, he incorporated purple sweet potato—a native variety—as well as puréed pumpkin squash. These ingredients are both nutritious and locally produced in different growing seasons, and were thus considered practical alternates; whichever is available, the bread maintains its seasonality and relevance. Both types of flatbread were served to Agora customers, with feedback actively solicited. The responses were almost unanimously positive, and so while formalized and quantitative market testing was not conducted, the team considered both new breads to be successful outcomes. The sweet potato bread, in particular, was adopted by several AHA operators, for the relatively simple production method and ingredient availability, as well as for the spectacular taste and pinkish-purple hue. It was also retailed at four supermarkets in Dili.

Of particular note was the noodle-making workshop, during which three varieties of fresh and dried *mie* were developed by Julio da Cunha and his colleagues. Incorporating moringa, pump-

kin, and sweet potato, and avoiding the problematic palm oil present in instant ramen, these quick-cooking noodles contain notably high degrees of protein as well as Vitamins B₁, B₂, and A, calcium, and iron (Figure 6). Again served to Agora customers, “Timor Mie” was extremely popular, prompting the kitchen to prepare the noodles for both on-site eating and in dried and packaged form for preparation at home. Timor Mie has also been commercialized for supermarket sales. Notably, in 2020, the United Nations Development Programme placed an order for 10,000 packets of Timor Mie, which were distributed as part of their COVID-related humanitarian support packages.⁸

After the TLFIX pilot wrapped up, members of the Agora team participated in the first annual Youth Co:Lab Timor-Leste National Youth Forum on Leadership, Innovation and Entrepreneurship, in December 2019. Founded in 2017 by the United Nations Development Programme (UNDP, 2019), the program “aims to establish a common agenda for countries in the Asia-Pacific region to empower and invest in youth, so that they can accelerate the implementation of the [UN’s] Sustainable Development Goals (SDGs) through leadership, social innovation and entrepreneurship” (Youth Co-Lab, 2020). The Timor Mie team won first prize, receiving US\$1,500 in seed funding to continue to develop the product and travel arrangements to Kuala Lumpur to compete at the 2020 Youth Co:Lab Summit in Malaysia.⁹

Even more than the flatbread, the noodles were an exemplar of recombination. Their blending of local ingredients with transnational taste demonstrates how Timorese heritage and present-day commercial realities can create a new, hybrid result. They symbolize a food future in which pleasure, health, and environmental-economic sustainability are united, rather than at odds. As AHA operator and TLFIX participant Mispa da Costa stated, “My favorite part from the TLFIX program is transforming local foods to innovative foods.”

A second experiment in recombination took place in February 2019, representing a key moment in which research, outcomes, and knowledge dissemination coalesced. Through their relationship with LAUNCH Food (the global innovation program that funded TLFIX), Alva Lim and Mark Notaras invited New Zealand chef Robert Oliver to Dili to encounter Timorese cuisine and learn about the TLFIX outcomes. In collaboration with Oliver, the AHA operators, led by Meriam Soares, developed a “Flavours of Ataúro” tasting dinner, which was prepared and formally served to the Timor-Leste Prime Minister, key ambassadors, and members of the National Nutrition Council. The dinner was extensively covered by national media outlets, and received high praise from the Prime Minister. The country’s digital television channel, GMNTV, featured interviews with TLFIX policy advisor Filipe da Costa and team lead Mark Notaras, and covered Oliver’s visit and the meal preparation itself.

Propelled by the media coverage, two additional outreach events were organized during Oliver’s visit. The first featured Oliver and da Costa, discussing the nutritional and sensorial value of local foods in Timor and the South Pacific. It was attended by more than 200 University of Dili (UNDIL) students, enrolled in the school’s medicine and public health program. The second event, held in response to demand from the UNDIL students, took the form of a food innovation session coordinated by TLFIX, effectively extending the previous youth-engagement workshops and furthering the project objectives.

The impact of the Flavours meal went on to produce outcomes over the following months, including social media pick-up and traffic directed to the TLFIX YouTube channel.¹⁰ This space, designed as a component of the project communications, represents both an archive of the Agora and TLFIX initiatives, as well as a knowledge transfer and translation tool for ongoing youth engagement.

Two youth members of the team continue to

⁸ This put approximately US\$20,000 into the local economy, money that otherwise would have been used to import non-Timorese food into the country.

⁹ The Kuala Lumpur summit was eventually cancelled due to the COVID pandemic.

¹⁰ <https://www.youtube.com/channel/UC5x7Hk5uYLalQ6ExmlWxQw/videos>

experience transformative outcomes, suggesting that at least some of the “food systems DNA” of Timor has evolved. Storytelling coordinator Safira Gutérres, through mentorship and support from team member Luke Simmons, applied to and received an Australia Awards Scholarship, funded through the Department of Foreign Affairs and Trade. At the time of this writing, Gutérres was enrolled in a four-year nutrition science program. Program and finance manager Josh Fernandes, through the negotiated process of developing and deploying the research surveys, acquired new field research skills and a self-reported increase in confidence in his current work. Coached by Filipe da Costa, and motivated by his experience with TLFIX, Fernandes also applied for and received US\$15,000 in start-up funding for his own food

survey project. He initiated the network, AHI (Gathering Food Innovators), to conduct food research in remote areas of Timor, following the TLFIX model and collaborating with members of the Agora team. Both outcomes—as well as the future outcomes that Gutérres and Fernandes will no doubt generate—can be attributed to the embodied learning that TLFIX enabled, and further suggest the value of using recombination as an interpretive framework.¹¹

For their part, Mark Notaras and Alva Lim chose to evolve Agora’s day-to-day operations as a public-facing food outlet, and redirected resources to focus on youth training and delivering consulting services. This included occasional offsite catering services and other non-restaurant food provision, providing occasions for both practice-based

Figure 6. Three Varieties of Timor Mie and Their Nutritional Content

Moringa Noodles	Pumpkin Noodles	Purple Sweet Potato Noodles
		
<p>Ingredients 2 teaspoons moringa powder (10g) 400g bread flour 100g noodle flour 2 teaspoons baking soda (10g) 1 teaspoon bakers yeast (fermipan) (5g) 2 teaspoon salt (10g) 1 egg (50g) About 200ml water, add slowly</p>	<p>Ingredients 150g steamed pumpkin 250g bread flour 100g noodle flour 2 teaspoons baking soda (10g) 1 teaspoon bakers yeast (fermipan) (5g) 2 teaspoon salt (10g) 1 egg (50g)</p>	<p>Ingredients 150g steamed purple sweet potato 250g bread flour 100g noodle flour 2 teaspoons baking soda (10g) 1 teaspoon bakers yeast (fermipan) (5g) 2 teaspoon salt (10g) 1 egg (50g)</p>
<p>Nutrition (per 100g noodles) - 51g carbohydrates, 8.3g protein, 1.4g fat - 2.4g dietary fibre - 20% recommended daily intake Vitamin B1 - 26% recommended daily intake Vitamin B2 - 24% recommended daily intake Vitamin A - 8% recommended daily intake Calcium - 10% recommended daily intake Iron</p>	<p>Nutrition (per 100g noodles) - 49g carbohydrates, 8.1g protein, 1.6g fat - 2.5g dietary fibre - 20% recommended daily intake Vitamin B1 - 8% recommended daily intake Vitamin B2 - 6% recommended daily intake Vitamin A - 7% recommended daily intake Calcium - 8% recommended daily intake Iron</p>	<p>Nutrition (per 100g noodles) - 54g carbohydrates, 8.2g protein, 1.6g fat - 3.0g dietary fibre - 19% recommended daily intake Vitamin B1 - 8% recommended daily intake Vitamin B2 - 20% recommended daily intake Vitamin A - 7% recommended daily intake Calcium - 9% recommended daily intake Iron</p>

¹¹ A third youth member of the TLFIX team also experienced transformation as an outcome of the project. In 2022, just as this paper was going to press, Julio da Cunha launched his own business, aptly named “Timor Mie,” which produces and sells the “recombinant” noodles for both dining in and takeout.

training as well as operational revenue generation.¹² The TLFIL team went on to apply the TLFIX approach to other projects in Timor-Leste, in the Oecusse and Likisa Municipalities (with support from Oxfam and USAID, respectively), and in Maubisse (with support from The Asia Foundation).

The outcomes above suggest that “recombination” may take many forms within food systems. Future-oriented change through the transformation of researchers, adaptive models of cooking and reflecting on taste, the weaving together of oral narrative and digital media, and the integration of small-scale, local businesses within the larger circles of international aid and development—all may be understood as merging past and present, local and transnational, outsider and Indigenous. Though largely unmeasurable in quantitative terms, such results suggest alternate ways of valorizing collaborative food research.

Reflections and Conclusion

As a pilot in the sphere of international development, TLFIX was designed to generate a series of outcomes that might be leveraged into ongoing international funding and expansion into a series of future initiatives. But it also aimed to work against the normativities of conventional development projects, in which individual empowerment may be less valued than the delivery of project reports (Peake, 2021). It achieved multiple goals, with impact in the media and in civil society, among the highest ranks of the national government, and on many individual lives, tastes, and capabilities. The TLFIX team members were themselves sought out for consultation on other food-related projects, and received numerous forms of attention and accolades.

These outcomes are perhaps more intriguing when understood as having emerged from a blend of scholarly, commercial, and development efforts, which mixed collaborators, objectives, and methods, and focused less on data-gathering and more on responding to whatever came next. The outcomes described above are only a partial portrait of what happens when responsiveness and relation-

ality are supported. They are also illustrative of the genetic sense of recombination, in which transformation today can produce evolutionarily improved “progeny” in the future. Tangible benefits will continue to be produced for the local participants and their communities, including knowledge outcomes, culinary and communications skills, and cross-sector relationships, as well as increased pride, confidence, and curiosity. For the outsiders, numerous aspects of Timorese food and cultural heritage were surfaced. I now view the country as a set of deeply woven relationships among food, colonialism, pride/shame identities, and commercial-political-nutritional challenges. Furthermore, despite my theoretical understanding of “multiple knowledge paradigms,” to be confronted with the ways in which knowing and showing are not directly translatable was both humbling and inspiring.

Despite and indeed because of its inherent risks, complexities, and challenges, food systems research presents opportunities for scholarly experimentation and reflection. As the broader project of academia as a whole is interrogated, food work also offers a space in which we might refigure the role of scholarship—perhaps more in service to the day-to-day needs of the communities and individuals with which academic researchers often engage. This may also lend support to projects that weave together multiple frameworks and deploy responsive and relational models; for example, projects in which local and outsider perspectives merge with practice-based and scholarly tools.

As a whole, TLFIX and its outcomes demonstrate that the mixing of research methods—scientific and embodied, messy and disciplined—and the involvement of collaborators with diverse knowledge paradigms can be effective modes of producing outcomes that are meaningful, rigorous, opportunistic, and just. Situated in a context of heterogeneous cultural identity, the work may also help move scholarship within and about post-colonial food contexts beyond simplistic dualities, and toward the reinforcement of difference and

¹² As noted above, Lim and Notaras left Timor-Leste in 2020 due to the COVID pandemic, and Agora is now operated by an all-Timorese staff.

“Two-Eyed Seeing.” That TLFIX produced recombinant outcomes, including formalized and embodied knowledge, as well as influences on policy development and day-to-day eating habits, supports the value of pluralism.

Because food systems are only increasing in complexity, moving toward pluralist approaches appears to be necessary. TLFIX may therefore serve as a useful reference for future efforts that embrace diversity, serendipity, and even uncertainty. As to the recombinant future of sweet potato flatbread and Timor Mie, time and taste will tell.



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Preserving farm freshness: Consumer preferences for local value-added products at urban farmers markets

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Abstract

Farmers markets (FMs) are known for fresh fruits and vegetables, but many also feature shelf-stable,

value-added products (VAPs) like sauces, jams, and fermented produce. Despite the potential importance of locally sourced VAPs to FMs, farmers, and food-insecure communities, few if any studies have examined consumer preferences related to small-batch VAPs of the kind often prepared for sale at FMs. To address this gap in knowledge, this study presents the results of a collaboration between farmers, researchers, and a not-for-profit community kitchen in New Jersey. First, using the Food Choice Process Model as a framework, we

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Author Contributions

All authors carried out the research study, collected data, and participated in the draft of the manuscript. EDS, AC, LBE, and VQ conceived the study and participated in its design and coordination. SD transcribed verbatim the digitally recorded focus groups. GC and VQ conducted the analyses for the sensory food evaluation tests. VQ, LBE, and GEB were involved in the qualitative analysis of the transcribed scripts. All authors have read and approved the final manuscript.

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conducted focus groups (four focus groups: 6-10 participants per group; 33 participants total) to gain insight into what would make locally sourced VAPs appealing to residents of food-insecure areas. Major themes that emerged were cost, quality, and health; less common themes included culture, food safety, and ethical values. Second, drawing on focus group data, we developed new VAPs—including tomato sauce, applesauce, hot pepper relish and pickled jalapeños—using ingredients from local farms. Third, we conducted controlled sensory evaluations to assess FM customer satisfaction with project-specific VAPs. Urban consumers ($N=49$) ranked a store-bought tomato sauce significantly higher on taste, sweetness, saltiness, and thickness, compared to the VAP version. However, VAP and store-bought applesauces were comparable across most attributes, and reactions to the hot pepper relish and pickled jalapeños were broadly positive. Overall, findings suggest that locally sourced VAPs tailored to the preferences of particular markets may constitute a valuable addition to the local food landscape in food-insecure areas.

Keywords

Farmers Market, Value-Added Product, Local Food, Food Security, Food Choice, Urban Consumers

Introduction

Local food systems, understood as networks of food supply chains structured to minimize physical and relational distance between farmers who grow food and people who eat it (Dansero & Puttilli, 2014; Schoolman, 2020), have experienced dramatic growth over the past 20 years. Once a niche market for counterculture consumers, local food has become, since the early 1990s, a US\$8.7 billion market involving 169,000 farms (U.S. Department of Agriculture, National Agricultural Statistics Service [USDA NASS], 2016a). Farmers markets (FMs), defined as “a public and reoccurring assembly of farmers or their representatives selling the food that they produced directly to consumers” (Farmers Market Coalition, 2016), are perhaps the most recognizable kind of direct marketing channel for connecting consumers with nearby farmers.

Surging interest in local food can clearly be seen in how FMs have multiplied. According to the USDA Agricultural Marketing Service, in 1994 there were 1,755 FMs in the U.S.; in 2019, there were 8,771 (Tropp, 2019), with over \$711 million in direct market sales (USDA NASS, 2016b).

Farmers markets have the potential to provide a wide range of social and economic benefits to consumers, farmers, and communities. Regarding consumers in general, several studies have found that access to local food through FMs and community supported agriculture (CSA) is associated with positive health outcomes such as reductions in childhood obesity and lower adult body mass index (Berning, 2012; Bimbo et al., 2015; Rundle et al., 2009). Farmers markets are particularly important for low-income communities in urban areas where access to grocery stores is limited and food insecurity is high (Evans et al., 2015; McGill, 2015; Ruelas et al., 2012; Spalding et al., 2012). Controlled intervention experiments have shown that introducing FMs can increase fruit and vegetable consumption among key clienteles, including women using family planning clinics, expectant mothers, and WIC recipients (Ball et al., 2018; Evans et al., 2012; Grin et al., 2013; Pitts et al., 2013; but see Olsho et al., 2015; Pellegrino et al., 2018). Indeed, motivated by the capacity of FMs to help address inequalities in healthy food access, a growing number of states prioritize making FMs and participating farmers eligible to accept payments via SNAP, WIC, and other food assistance programs (Briggs et al., 2010).

The community health implications of successful FMs are synergistic with other public goods. Beyond meeting the needs of individual consumers, FMs serve as highly social public spaces, enlivening communities and bringing shoppers to downtown areas (Darnton, 2012; Farmer et al., 2011; Johnson, 2013; Silkes, 2012) while potentially boosting property values (Collins, 2020). Farmers and small food businesses directly benefit from FMs by building a loyal, local customer base, retaining the full sale price of their products, and learning first-hand where consumer demand is going unmet (Gerbasi, 2006; Gillespie et al., 2007; Hinrichs et al., 2004). More broadly, by bringing farmers, food entrepreneurs, “locavores,” and

miscellaneous actors in the local food economy physically together, FMs create fertile ground for social learning and facilitate new collaborations in business and civil society around the idea of local food (Beckie et al., 2012; Gillespie et al., 2007; Wittman et al., 2012).

Farmers markets have thrived over the past twenty years, and researchers have documented their benefits to consumers and communities, particularly for economically vulnerable groups (Ball et al., 2018; Gillespie et al., 2007). It is for precisely this reason that recent challenges to FMs present an urgent concern. Growth in FMs has been dramatic when viewed over a timespan measured in decades. But this growth has essentially plateaued since 2016, while total sales through direct-to-consumer markets have also stagnated or declined (McKee, 2021; Printezis & Grebitus, 2018). Supermarkets, wholesale clubs, and most recently meal-kit delivery services increasingly highlight when products are sourced from farms that share a state or region with consumers (Bloom & Hinrichs, 2017; McKee, 2021). Efforts by large, conventional stores to establish local sourcing bona fides may appeal especially to consumers whose idea of what constitutes “local” food is relatively flexible, and who find FMs too inconvenient to be a primary shopping destination (Dunne et al., 2011; McKee, 2021). Even intermediated short food supply chains may be siphoning customers away from FMs and CSA (Printezis & Grebitus, 2018). Moreover, economic challenges for FMs and participating farmers were evident even before the COVID-19 pandemic (Helmer, 2019). In the wake of the nationwide economic crisis of 2020 and 2021, early evidence paints a grim picture of closures and steep losses for FMs and other channels for locally sourced food (O’Hara et al., 2021; Thilmany et al., 2020).

Given the clear relevance of successful FMs to public health, community wellbeing, and small farmer livelihoods, it is important that FMs find ways to continue to thrive in a competitive environment for the attention of local food shoppers. This will be especially true once the economic suffocation of the pandemic has subsided. Direct farmer participation in the production and marketing of value-added products (VAPs) may make an

important contribution to efforts to stabilize FMs and strengthen business for participating farmers, according to reports from agricultural organizations and cooperative extension (Berry, 2019; Born & Bachman, 2006; Brzozowski, 2019). Historically, the concept of farmers “adding value” to raw farm products has mainly described when “farmers participate in stages beyond production in the agricultural supply chain, such as product transformation, distribution, [and] storage ... and transform their roles from raw commodity producers to agribusiness owners with extended capabilities” (Lu & Dudensing, 2015, p. 3). “Traditional” value-adding in this sense includes both on-farm processing of crops into products like sauces and jams, and also when farmers outsource the actual “transformation” of crops—e.g., cooking, pickling, fermenting—but still retain a role in the distribution of the finished product (Born, 2001; Born & Bachman, 2006; Sayre, 2006). More recently, adding value has also been used, in an “emerging” sense, to describe differentiations made in how crops are grown and marketed; for instance, by applying designations related to sustainability, labor practices, or shared commitments to place (Clark et al., 2020; Lu & Dudensing, 2015, p. 3).

In this study, we are interested in what Lu and Dudensing (2015) call “traditional” value-added agriculture because of the potential for increased marketing of VAPs by farmer-vendors at FMs to make progress toward several economic and social goals at once. First and foremost, VAPs have the potential to help FMs and participating farmers by increasing sales (e.g., Born & Bachman, 2006). In a recent review of the literature on FMs, “lack of food variety” was the most frequently cited “service delivery barrier” to FMs attracting more customers (Freedman et al., 2016, p. 1148). Robust offerings of VAPs like sauces and condiments could prove important for consumers for whom lack of food variety, and the inability to do “one-stop shopping,” constitutes a significant impediment to regularly patronizing FMs. VAPs also enable farmers to reduce waste by processing surplus produce—including imperfect “seconds”—for consumption, rather than selling at cost or at a loss to wholesalers. Moreover, FMs with a robust selection of VAPs have more to offer customers during

cold-weather months; popular “winter markets,” in turn, extend the economic usefulness of FMs for farmers (Sparks, 2012).

Crucially, increased offerings of VAPs at FMs also stand to benefit consumers and communities. For a number of reasons, this is arguably nowhere more true than in low-income urban areas where, as noted above, FMs already constitute an important source of fresh, healthy food. First, FMs may be able to attract more farmers and stay open for more days and longer hours, if participating farmers are able to earn income not just from fresh produce but also from VAPs. Extra days and hours to shop at FMs, in turn, would create more opportunities for consumers to buy fresh fruits and vegetables, with proven positive impacts on health. Indeed, at winter markets where VAPs may constitute a significant source of income for vendors, farmers can offer greenhouse-grown produce and hardy winter crops to low-income consumers, including those purchasing with WIC and SNAP benefits (Downs, 2016). Second, for people who face significant constraints on time and economic resources (Giurge et al., 2020; LeDoux & Vojnovic, 2013), the ability to minimize time spent shopping represents a powerful incentive to patronize full-service grocery stores. FMs that offer a relatively competitive selection of VAPs may thus make it possible for low-income consumers in particular to take more frequent advantage of the fresh fruits and vegetables for which FMs are best known. Third, locally sourced VAPs, when made with minimal processing and fewer added sugars, may present a healthier alternative to highly processed, brand-name products available at conventional grocery stores (McManus, 2020; Neri et al., 2019). Finally, as we note above, FMs can deliver tangible benefits to entire communities, serving as downtown anchors and visible signs of economic revival and civic spirit. To the extent that VAPs allow FMs to draw more customers and stay open for more of the year, the possibility of significant, positive impacts for neighboring businesses and the social economy should not be overlooked (Beckie et al., 2012; Darnton, 2012; Wittman et al., 2012).

Few if any studies have examined consumer expectations and preferences related to small-batch

VAPs prepared by farmers or small food businesses for sale at FMs, despite their potential importance to farmers, consumers, and communities (Govindasamy et al., 2002). Moreover, because the health impacts of FMs are likely greatest in areas where existing access to healthy food is lowest, the need for research into consumers and FM VAPs is especially pressing where FMs in low-income, food-insecure areas are concerned. It is this gap in the literature that we aim to address with this study. Specifically, we present the results of a collaboration between farmers, researchers, and a not-for-profit community kitchen to develop and market VAPs for FMs in the city of New Brunswick, New Jersey. Drawing on existing models that situate food choices in the context of “personal food systems” (Connors et al., 2001; Furst et al., 1996), we conducted focus groups with New Brunswick-area consumers to gain insight into what would make locally sourced VAPs appealing to residents of food-insecure areas. In collaboration with farmers and chefs at a local community kitchen, we developed new VAPs to meet the needs and preferences of this particular population. We then conducted controlled sensory evaluations to assess FM customer satisfaction with VAPs made using ingredients from local farms. The results of this mixed-methods study offer insight into what residents of a city with high rates of food insecurity are looking for in locally sourced VAPs. More generally, this project demonstrates the usefulness and feasibility of basic, inexpensive market research for farmers and community organizations interested in bringing new VAPs to urban farmers markets.

Materials and Methods

This study was conducted by researchers at Rutgers University and staff at Elijah’s Promise (EP), a New Brunswick, New Jersey-based not-for-profit food aid and empowerment organization whose motto is “Food Changes Lives.” In addition to a community soup kitchen that serves over 100,000 meals a year to food-insecure individuals, EP runs the Promise Culinary School and provides numerous social services to New Brunswick residents. This multidisciplinary and mixed-methods study was approved by the Institutional Review Board at Rutgers University.

Community Focus Groups

To understand which aspects of locally sourced VAPs might be of interest to primarily low-income, urban area consumers, we conducted a series of focus groups with New Brunswick residents. A focus group can be thought of as a “group interview” where a moderator presents questions or prompts to a small number of participants, who then engage in guided discussion (Oates, 2000). As with in-depth interviews with one subject, focus groups give participants significant agency in what is talked about, within the bounds of the motivating research questions. Focus groups can be especially useful for gaining insight into under-represented or marginalized social groups because sampling is purposive and people who share core values and experiences can add to, expand on, and ask questions about one another’s stories (Kevern & Webb, 2001; Kagawa-Singer et al., 2009). Focus groups are also ideal for research on food consumption practices, because feelings and thoughts on shopping and food are generally relatively amenable to being shared in a group setting (e.g., Jefrydin et al., 2019; Tiedje et al., 2014; Zepeda et al., 2006). When the topic of discussion is largely non-sensitive in nature, focus groups allow researchers to gather rich, qualitative data from more people in a shorter period of time, relative to in-depth interviews. Further, conversation generated among participants in a group setting may spur valuable input beyond what would be shared in an individual interview.

Sampling and subject recruitment

The city of New Brunswick is located in central New Jersey, about 40 miles southwest of New York City. During the study period (2019), 46.8% of New Brunswick’s 55,960 residents identified as Hispanic or Latino, 26.7% identified as White alone, 15.3% as Black or African-American alone, and 9.7% as Asian alone (U.S. Census Bureau, 2019a); the median household income was \$43,783; and 34.4% of residents were below the federal poverty line (U.S. Census Bureau, 2019b). New Brunswick thus has significantly more non-White and low-income persons than New Jersey as a whole (U.S. Census Bureau, 2019c). The Hispanic/Latino population of New Brunswick is diverse, and has

grown significantly in recent decades (Listokin et al., 2016). In 2019, immigrants and descendants of immigrants from Mexico made up the largest percentage (42.3%, down from 50.1% in 2016) of people who identified as Hispanic or Latino. The next largest Hispanic/Latino group consisted of people who trace their origin to the Dominican Republic (15.5% in 2016, and likely greater in 2019), followed by Central American countries, then Puerto Rico (Sandoval, n.d.; U.S. Census Bureau, 2019a). According to a 2016 survey of New Brunswick residents who were born outside the U.S., 27% were born in the Dominican Republic, 23% were born in Mexico, and 13% were born in El Salvador, Guatemala, or Honduras (Koning et al., 2017).

Four focus groups were held in New Brunswick from February to April of 2019. The first two focus groups were held during a community event at a city public school. Information about the research project was circulated prior to the event by sponsoring organizations. Participants were recruited on-site by research team members carrying sandwich boards with recruitment text and positioned at designated locations. Focus group sessions were then held at a classroom in the school. The second set of two focus groups was held in meeting rooms connected to the EP community soup kitchen; participants for these sessions were recruited through EP’s email list and word-of-mouth on site. All prospective participants were offered a US\$25 gift card for participating. Recruitment materials and messaging were provided in both English and Spanish. Persons who expressed interest in the project were invited to attend a focus group session on a first-come, first-serve basis, with a limit of 10 participants at each session. The principal moderator at each focus group session was a faculty researcher who spoke in English. A bilingual research assistant who spoke fluent English and Spanish was also present at each session to translate moderator questions and directions into Spanish, and to translate participant responses delivered in Spanish into English for the moderator.

The number of focus group sessions was based on judgments made by the researchers as to when sufficient data had been collected for project purposes. Once four focus group sessions had been

conducted with a total of 33 participants, it was apparent that a coherent and consistent set of major themes and suggestions about VAPs was emerging. Additional sessions appeared unlikely to significantly change study conclusions (Hennink & Kaiser, 2019).

Data collection

The semi-structured interview guide for focus group moderators was designed to facilitate discussion and gather rich and nuanced data around four issues: (1) Where participants usually purchase their food, and any positive or negative experiences at these venues (e.g., supermarkets, convenience stores, bodegas, FMs); (2) What foods/meals participants prepare with items purchased; (3) What kinds of VAPs are not currently offered at these venues, but which participants would like to be able to purchase; (4) What kinds of considerations, broadly speaking, would be important to participants considering whether to buy locally sourced VAPs at farmers markets and other venues.

The third and fourth topics on the interview guide were considered especially crucial, as data would directly inform the development of new VAPs at EP's community kitchen. To provide a guided

approach to inquiry, the food choice process model (FCPM), developed by the Cornell Food Choice Research Group (Cornell University, College of Human Ecology, 2021), was utilized to formulate subquestions for these topics. The Cornell Group used a “constructionist” approach for the original FCPM in order to give interviewees maximum flexibility to describe the complexities of food choices (Connors et al., 2001; Furst et al., 1996). For this study, we used what we term a “partially constructionist” approach. Specifically, our resource- and time-constrained interviewees were encouraged to speak freely and openly about their food preferences and choices. However, the FCPM and our knowledge about locally sourced VAPs were used to develop subquestions to probe for specific VAP attributes—such as taste, cost, and quality—which would be important to later stages of the project (Table 1). The goal was to systematically collect information using uniform questions while also enabling participants to provide insights into their experiences. Each focus group session lasted about an hour, after which participants received a handout describing the goals of the project and a \$25 gift card. All sessions were recorded with participants' consent.

Table 1. Semi-structured Interview Guide for Focus Groups with New Brunswick Community Members

Questions and Follow-Up Questions

1. Can you tell us where you usually buy your food (e.g., bodegas, corner stores, farmers markets)? *If not mentioned, probe about whether they shop at farmers markets.*
 - a. Can you share some positive experiences you've had at these places?
 - b. Can you share some negative experiences you've had at these places?
 2. What foods/meals do you prepare with the items purchased at these places?
 3. Are there any value-added products (such as canned, jarred, wrapped, etc.) currently not offered at these kinds of places, but that you wish were available for purchase?
 - a. Why would you want these value-added products to be offered?
 - b. Are certain products difficult to prepare yourself? Explain.
 - c. How much would you be willing to pay for these value-added products?
 - d. How often would you purchase these value-added products?
 - e. What foods/meals would you prepare with these value-added products?
 4. What kinds of things do you think about before purchasing value-added products at these places? *Probe for the following things:*
 - a. Food quality (freshness, seasonality, nutrition, etc.)
 - b. Cost
 - c. Convenience (pre-packaged, ease of preparation, buying in bulk, etc.)
 - d. Taste
 - e. Food customs & culture
 - f. Other things we haven't asked about
 - g. Are some of these things more important than others? Why?
-

Data analysis

Focus group recordings were transcribed verbatim and readied for analysis using standard research procedures (Breakwell et al., 2006). Following a “thematic analysis” approach (Braun & Clarke, 2006), personal food values identified in the FCPM literature and notes from focus group sessions were used first to develop an initial list of potential codes—brief tags or summaries of content. Each transcript was then reviewed independently by three trained coders (two co-investigators and a graduate student), who identified major themes, broadened and refined the codebook, and applied codes to project data. Coders met several times to compare analyses and come to consensus where discrepancies existed. A final codebook and set of coded focus group transcripts were then produced.

Sensory Evaluation of VAPs

The next phase of the study was aimed at understanding how New Brunswick-area consumers might react to healthy, locally sourced VAPs created with their preferences in mind. Based on findings from focus groups and interviews with local farmers on produce availability (Errickson et al., 2020), EP Promise Culinary School and project researchers worked together to develop recipes for new products. Several possible products were considered; recipe research, experimentation, internal taste tests, and nutrient analysis by a registered dietitian nutritionist took place from May to July 2019. From this process, five VAPs were successfully produced with produce provided by three local farms: tomato sauce, applesauce, zucchini pickles, hot pepper relish, and pickled jalapeños. Of these, tomato sauce and applesauce were made in large quantities due to greater availability of raw ingredients from farm partners, while the other VAPs were made in smaller quantities and later in the fall. Tomato sauce and applesauce were selected for the most extensive sensory evaluations, including comparison with store-bought brands. Hot pepper relish and pickled jalapeños were subjected to single-sample taste tests with smaller numbers of FM customers due to timing of production and available quantities.

Setting and subject recruitment

Sensory evaluation tests were conducted at FMs and community fairs in New Brunswick from September through November 2019. Researchers set up a private, tented booth at each site, and used a standardized script to ask FM customers and fair attendees who visited the booth if they would like to participate in a research study. Prospective participants were told that they would be tasting a series of products and then sharing their opinions on taste, smell, and other food characteristics. Screening questions ensured that participants with food allergies were excluded from the study.

Data collection

Sensory evaluation tests were designed to allow study participants to assess VAPs created by EP; in the case of tomato sauce and applesauce, we also collected data on participant reactions to equivalent brand-name products. After consenting to participate, participants were seated in the project’s tented area and presented with samples of one or two products: (1) the VAP produced by EP (called “VAP” in results and tables for this study); and, in the case of tomato sauce and applesauce, (2) a brand-name version of the same kind of product (called “Brand”). Following standard sensory evaluation practices (Carpenter et al., 2000), product samples were served at a standard temperature and in equal amounts, and the tented area for the taste tests was private and quiet. For VAP and Brand comparisons, participants were told that the products were different examples of the same kind of food, but were not given details about specific differences in the origins or manufacture of the products. When appropriate, samples were served with a suitable accompaniment (e.g., tomato sauce with pasta). Water and saltine crackers were made available for participants to cleanse their palates between samplings.

Each VAP was assessed on its own; participants also directly compared the tomato sauce and applesauce VAP with a Brand sample. Participants scored each sample individually using a 7-point hedonic scale (1=dislike very strongly to 7=like very strongly) to evaluate sensory attributes such as smell, taste, look, and mouthfeel (i.e., texture). For tomato sauce and applesauce, participants were

also asked to complete a paired comparison test in which they indicated what sample was preferred based on attributes such as sweetness, spiciness, freshness, and overall taste. Finally, demographic and food frequency questions were asked of all participants in tests for tomato sauce and applesauce. These questions were not asked a second time for participants who, after evaluating tomato sauce and/or applesauce, also agreed to sample one of the other, late-season VAPs.

Data analysis

Mean scores for sensory characteristics were calculated for all samples. Paired sample *t*-tests were conducted to compare the mean score differences between Brand and VAP samples of tomato sauce and applesauce. Frequencies were also generated to illustrate preference attributes between VAP and Brand samples. Finally, descriptive statistics were produced for sociodemographic characteristics and food consumption frequencies. All analyses were conducted using Microsoft Excel.

Results

Community Focus Groups

Drawing on the FCPM Personal Food System as a guide, our analyses of the four focus groups detected 11 major themes. Following the approach taken in previous FCPM research (Connors et al., 2001), which characterized the most frequently discussed “food-related values” as “primary” and others as “additional,” we grouped themes that emerged from the focus group data into two main tiers. The three major themes (with number of times mentioned by focus group participants in parentheses) were cost (37), quality (35), and health (22). Relatively minor themes were culture (14), food safety (11), familiarity (9), taste (8), convenience (7), variety (6), seasonality (6), and ethical values (6) like “buying green” and “buying local.” Table 2 presents the major themes, definitions, and selected quotes supporting these themes. Throughout this section, participant comments originally made in Spanish have been translated into English.

Cost was the most frequent theme that emerged from the focus group sessions. Participants stressed the importance of comparing food

prices between stores and product brands in a focused effort to maximize their limited budgets for groceries. Stores known for big sales and coupons were highly prized by nearly all participants. As one participant stated, “wherever the sales are” is where she would go to purchase food items. The overarching concern with cost carried over to how participants talked about VAPs like multi-ingredient sauces, marinades, or fruit spreads. VAPs, sometimes called “specialty” products by participants, typically were described as too expensive unless there were other compelling reasons for purchase, such as health benefits or a better overall quality product. As one participant put it: “The specialty products are kind of pricey though. So, there has to be a certain reason [to buy them].” Thus, when talking about VAPs, the discussion often turned to the topics of quality and health:

If they were homemade, I’d pay more—yeah, I’d pay more than I’d pay at a grocery store, if I knew they were homemade. And they were fresh.

So when you go to the store you’re not looking for the healthy stuff, you’re looking for what’s on sale. You know what I mean. And that’s sometimes an issue, you know what I mean, like, what you can afford. ...

Quality—broadly defined as the way food is grown, stored, prepared, or presented—was held up nearly as often as cost as a consideration in buying VAPs and other foods. Participants wanted to eat high-quality food themselves and serve the best they could afford to their families. The importance of quality to many participants made it imperative to find ways to identify food products that met their standards. This was not always easy; several participants noted that complicated labels and deceptive marketing made it hard to tell a quality product apart from look-alikes:

One of the things we always look for is whether the product has a listing of ingredients. Sometimes if it’s just labeled, and there’s no ingredient list, you’re not sure what’s in it or how it’s made, so you don’t trust buying it.

As a relatively sure sign of quality, participants generally landed on one property above all: freshness. If something was fresh, it was likely to be of high quality. The intuitiveness of this relationship, and the relative ease with which the “freshness” rule could be applied, led participants to often

mention “quality” and “fresh” in the same breath, as in: “I feel it’s more fresh, and . . . it’s like the quality, you can see the difference.” In response to a facilitator’s question about important characteristics other than price, one participant said, “the sight [of the product]: if it’s fresh, if it’s quality.”

Table 2. Summary of Themes from Focus Groups (N=4 focus groups, with 33 participants)

Major Theme (frequency)	Definition	Selected Quotes
Cost (37)	Monetary considerations related to food choice, including the cost of food	“You gotta explain to me why I should pay this price for this. Cuz, if ShopRite got canned corn for ... ten for two dollars, and you got pickled corn for 75 cents a jar ... I’m probably going to ShopRite.”
Quality (35)	Considerations related to how food is grown, stored, prepared, or presented	“One of the things we always look for is whether the product has a listing of ingredients. Sometimes if it’s just labeled, and there’s no ingredient list, you’re not sure what’s in it or how it’s made, so you don’t trust buying it.”
Health (22)	Considerations related to physical well-being, both short-term (e.g., allergic reactions, digestion) and long-term (e.g., weight control, illness management)	“And I try to buy more healthy and change my mind about food to change my kids’ mind. So I give them more healthy things every day, because I think with the example, you teach them.”
Culture (14)	Considerations related to ethnic/national identity or religious beliefs	“Her ^a main point is that she would like to see, um, see more of the farmers markets getting involved and bringing more of the cultural products that we need.”
Food Safety (11)	Perceived safety of the product and ingredients used in preparation	“... if you use it today, is it gonna be good tomorrow? Or, next week? Can you store it? What’s the storage? You know, how long will it keep in that same?”
Familiarity (9)	Brand recognition with a place, product, or person	“When it comes to canned goods, for frozen goods, I look for brand names ... I grew up seeing them commercials ... Regardless of price, I just look for the name brand.”
Taste (8)	Considerations related to the sensory perceptions of eating and drinking	“... I want to eat healthy, but I also want it to have flavor, so that’s a way to make the food taste good but it’s still good for you.”
Convenience (7)	Considerations related to the time and effort that individuals employ in constructing food choices, including time spent on acquiring, preparing, eating, and cleaning up after food	“So, she ^a would prefer to buy vegetables um, frozen than canned. If they are frozen, she would get them, because they are fresher and they require less time to prepare.”
Variety (6)	Considerations related to the availability and accessibility of a variety of products that fit people’s needs	“Yeah, when you go to the farmers market and basically what’s growing in New Jersey, so there’s not a lot of the variety that you know, the Latino community can get at the farmers market.”
Seasonality (6)	The availability of foods during certain times of the year	“Summertime she ^a would like to buy fresh, and wintertime she understands she can only find it frozen.”
Ethical Value (6)	Stated preferences for supporting small, local businesses and/or buying “green” products	“I noticed that in the past bunch of years a lot of people like to support local businesses and farms and stuff like that.” “... and, as they say, reduce the blueprint, or the food—whatever it’s called. The carbon print.”

^a Translation for a Spanish-speaking focus group participant.

Asked why she liked to shop at a particular store, another participant said, “I find that [food there] is really fresh. And that’s what I want.”

Health, although not as frequently mentioned as cost and quality, was also an important theme during focus group sessions. In general, participants expected healthy foods to cost more, but they believed the extra expense was worth it. As one participant stated, “it’s to the conscience to the people ... to buy healthy. And healthy means a little bit more expensive than what we’re used to paying.” Another was more blunt: “Either you pay the price to eat healthy, or you get sick, and you go to the doctor and pay that price.” As with quality, participants held up certain easily identifiable properties of food as evidence of its connection to health. First, and mapping precisely onto quality, participants equated a food’s healthiness with its freshness. “When you think of freshness you think, more nutritious,” said one participant; another, talking about how to use fresh fruit, remarked that, “because it—and it’s good, it’s healthy, [so] you make *agua fresca* ... and you give fresh drinks to your family instead of giving some sodas.” Second, food was viewed as healthy to the extent that it had not been adulterated with added ingredients, especially sodium and artificial preservatives, in order to remain safe and flavorful. Indeed, participants took the presence of preservatives in food personally—not just as a threat to one’s own health, but as an offense to people in their communities:

I hate preservatives. And I hate, like, you know what I mean, the fact that people aren’t as aware of how much like additives go in there. Like a lot that we eat that’s really not good for you. Causes a lot of cancers and a lot of sicknesses and disease, you know what I mean. And that’s a major issue among, you know, certain communities, you know.

I want to eat healthy, but I also want it to have flavor ... without all the processed stuff with a whole bunch of sodium that is killing people.

As discussed in detail above, the main goal of this project was to understand consumer food values as they might relate to VAPs produced with

farm-fresh, locally sourced ingredients. Research team chefs and nutritionists found it largely encouraging that focus group participants attached high importance to food quality and health. But there were also indications that consumers’ emphasis on food freshness, as an emblem of quality and health, might present a challenge to applied project goals. Specifically, many participants drew on concerns about quality and health to express *negative* views of canned and pre-prepared foods, which could be transposed even to locally made VAPs. Speaking about people in her social circle, one participant said, “They think that canned or jarred food is processed. When they think of quality they assume it’s fresh, and by thinking like, nutrients, they think ‘fresh.’” Another volunteered that, “I don’t like canned or frozen, I try to use fresh most of the time.” One participant recalled a specific dish as an example of why she did *not* like to use VAPs: “I prefer to use the fresh. Like, fresh asparagus and fresh tomatoes when I do my salmon. I’ll use a can if I have to but if I have—if I can get the fresh I’ll prefer that.” Some participants even expressed surprise that certain foods could be bought pre-made at all: “You know, I never knew pickled could be in a jar ... I thought it should be natural. You know, like, you can cut it.”

Focus groups provided additional information that shaped how project staff created new VAPs for the New Brunswick community. What we coded as “culture”—conceptualized as “considerations related to ethnic/national identity or religious beliefs”—was the fourth-most common theme that emerged from participant comments. As noted earlier, a plurality of New Brunswick residents identify as Hispanic or Latino, including many immigrants or relatives of immigrants from Mexico, the Dominican Republic, Puerto Rico, and Central American countries (Sandoval, n.d.). Participants in focus groups reported that many of their favorite foods were not currently available at nearby FMs, including mole, dried or preserved hot peppers, Mexican sweet breads, and *salsa verde*. Lamenting the absence of culturally important foods, one participant summed up several minutes of group conversation about what was missing at FMs: “Me, personally, I’m from the Dominican Republic—when I come back [from a visit home] I would like

to bring all the stuff we have there.” Many participants made a point of actually sourcing pantry staples from their country-of-origin, like the participant who proclaimed that “my oregano comes from the D.R. [Dominican Republic]—my [family member] brings it to me every year.” Moreover, the taste of store-bought foods central to Mexican, Caribbean, and Central American cultures, even when available, was seen as lacking in assertiveness, flavor, and heat. One participant described cooks in her Mexican-American family:

So when they buy the mole, they add more chili, oregano, pepper, onions, garlic, and um, chicken broth, to make it more—especially the chili—to make it more spicy. Because most of the time it’s like not spicy enough for them. And the chicken is to give it more flavor.

Frequent testimonials to the effect of “there’s not a lot of variety that, you know, the Latino community can get at the farmers market” made clear the importance of considering the cultural identities and culturally informed preferences of customers when developing new VAPs for specific local markets.

Food safety, environmental factors, and a preference for the familiar also influenced food purchasing decisions. Indeed, participants often conflated the issue of food contamination due to poor handling or spoilage with “contamination” due to agricultural chemicals and preservatives used in the production process. This overall negative disposition to added chemicals in food, no matter their origin, comes through in the following representative comments from two participants:

As far as like, with the handling or pesticides being on your food or whatever before you get it, all you have to do is take baking soda and water and do a soap bath before you eat it ... kills all pesticides, germs, whatever. You good.

I agree with, like, the sanitation. And also I just wanna know that it’s, like, not a lot of chemicals are added into the products.

As indicated by earlier comments about health,

participants largely expressed a preference for foods made without added synthetic preservatives, as the health risks of added chemicals were seen to outweigh any benefits in shelf stability. Few participants characterized themselves as adventurous eaters or interested in trying new and unfamiliar foods. However, some expressed greater willingness to try new foods, including VAPs, if they could be sure of where the product was coming from. Asked if a locally sourced VAP could ever be as appealing as the “Uncle Ben’s rice” he noted by name, one participant said, “I would have to know the farm ... and the origin, the country of origin.”

Themes that appeared relatively infrequently during focus groups included convenience, product variety, seasonality, and ethical values. Participants cited lack of food variety and seasonal limitations as barriers to making FMs a more central part of their shopping routines. Knowing that many FMs are only open from April to November, participants shopped at FMs for fresh fruits and vegetables during this time, but the lack of other products at FMs could make it hard to justify a separate trip for those with limited transportation. Views about “ethical consumption” surfaced only a handful of times during focus group sessions, and sometimes indirectly, as when one participant observed, “I noticed that in the past bunch of years a lot of people like to support local businesses and farms and stuff like that.” Some participants, however, voiced a personal interest in using food dollars to effect social change, including through buying locally sourced VAPs: “So, I think it’s good to buy local. Good to know if it’s the local farm we know around, and then you know it’s okay.”

Sensory Evaluation of VAPs

Focus group findings guided the development of pilot batches of tomato sauce, applesauce, hot pepper relish, and pickled jalapeños VAPs to be field tested within urban FM settings. Nutrient analysis for tomato sauce and applesauce—the products made in the largest quantities—indicated that these EP-made VAPs were healthier in terms of total calories, added sugars, and amount of sodium. VAP tomato sauce had half the calories, one-quarter the sodium, and two grams fewer total sugars compared to the Brand product (Ragu Traditional

tomato sauce). VAP applesauce had less than one-third the total calories and less than half the total sugars, compared to the Brand product (Motts sweetened applesauce). These nutritional results were taken to align with health attributes that consumers identified as desirable during focus groups.

Among the VAPs that focus group participants specifically said were missing at New Brunswick FMs, hot pepper relish and pickled jalapeños—inspired by traditional *escabeche* and *chiles en vinagre* in Mexican cuisine (Jaramillo-Flores et al., 2010; Ko, 2020)—were the best fit with the surplus produce that was available from farm partners. Habanero peppers were the principal ingredient in the relish; the jalapeños were pickled whole with carrots, garlic, onion, and spices, and served chopped at the sensory evaluations.

Sample characteristics

Twenty-four participants completed a sensory evaluation test for tomato sauce and 25 subjects completed a test for applesauce. Hot pepper relish and pickled jalapeños each had eight subjects complete a test; as noted earlier, demographic information was not collected for these late-season VAPs, because subjects had already completed a questionnaire for tomato sauce and/or applesauce. Most participants were residents of New Brunswick or a neighboring town (tomato sauce, 87%; applesauce, 65%), and most were also frequent customers at the events where tests were conducted. Participants in all tests were majority female (tomato sauce, 62.5%; applesauce, 73.9%) and in their late 20s to early 40s (mean age 38.8 for tomato sauce participants; 31.6 for applesauce participants). Samples for both tests were diverse, with substantial numbers of participants identifying as Hispanic (tomato sauce, 41.7%; applesauce, 36%), Black and African American (tomato sauce, 27.3%; applesauce, 12.0%), and White (tomato sauce, 36.4%; applesauce, 45.5%). Among tomato sauce participants, 23.8% consumed tomato sauce more than once a week, and 33% between once a month and once a week. Among applesauce participants, 60.9% did not consume applesauce at all, and 21.7% consumed applesauce less than once a month.

Tomato sauce

Relatively high hedonic scale mean scores for all eight attributes indicated that participants were generally satisfied with both the VAP and Brand tomato sauce. However, paired samples *t*-tests indicated significant ($p < 0.05$) differences between products on several attributes. The Brand tomato sauce was ranked significantly higher on overall taste ($6.13 \pm 1.15SD$ vs. $5.13 \pm 1.73SD$), sweetness ($5.75 \pm 1.42SD$ vs. $4.71 \pm 1.83SD$), saltiness ($5.78 \pm 1.28SD$ vs. $5.04 \pm 1.57SD$), and thickness ($6.33 \pm 1.20SD$ vs. $5.21 \pm 1.64SD$) compared to the VAP (Table 3a). Results from preference and appearance tests showed comparable differences (Table 3b). About two-thirds of participants found the Brand tomato sauce to be better tasting (66.7%), better smelling (65.2%) and better looking (65.2%). Most participants (70.8%) also preferred to purchase the Brand sample over VAP (29.2%).

Applesauce

Paired *t*-tests revealed that the VAP and Brand applesauces were broadly comparable across all attributes, except for mouthfeel, where the VAP sauce was rated significantly higher ($6.17 \pm 1.05SD$ vs. $5.08 \pm 1.98SD$) (Table 4a). In side-by-side comparisons, most participants chose the VAP as the better smelling, better looking, and overall better tasting sample, while they preferred the Brand for freshness, sweetness, and thickness (Table 4b). Overall, 54.2% of participants said they would rather purchase the VAP than Brand applesauce.

Table 3a. Sensory Evaluation Results for Brand vs. VAP Tomato Sauce Samples

Characteristic	Tomato Sauce (N=24)		
	Brand ^a	VAP	Paired <i>t</i> -test
	Mean±SD	Mean±SD	<i>p</i> -value
Overall taste	6.13±1.15	5.13±1.73	0.020
Appearance	6.29±1.12	5.75±1.48	0.183
Sweetness	5.75±1.42	4.71±1.83	0.031
Smell	5.88±1.26	5.88±1.15	1.000
Saltiness	5.78±1.28	5.04±1.57	0.044
Thickness	6.33±1.20	5.21±1.64	0.013
Mouthfeel	6.00±1.50	5.38±1.44	0.182
Color	6.38±0.88	6.29±0.95	0.732

^a Brand product was Ragu Traditional.

Table 3b. Preference and Appearance Tests Between Brand and VAP Tomato Sauce Samples

Characteristic	Tomato Sauce (N=24)	
	Brand ^a	VAP
	N (%)	N (%)
Overall tastes better	16 (66.7)	8 (33.3)
Spicier	10 (41.7)	14 (58.3)
Sweeter	17 (70.8)	7 (29.2)
Fresher	13 (54.2)	11 (45.8)
Smells better (n=23)	15 (65.2)	8 (34.8)
Looks better (n=23)	15 (65.2)	8 (34.8)
Saltier (n=21)	14 (66.7)	7 (33.3)
Thicker	12 (50.0)	12 (50.0)
Prefer to purchase	17 (70.8)	7 (29.2)

^a Brand product was Ragu Traditional.

Table 4a. Sensory Evaluations Results for Brand vs. VAP Applesauce Samples

Characteristic	Applesauce (N=25)		
	Brand ^a	VAP	Paired t-test
	Mean±SD	Mean±SD	p-value
Overall taste	5.29±1.92	6.02±1.14	0.089
Appearance	5.64±1.35	6.12±1.05	0.149
Sweetness	5.56±1.61	5.76±1.39	0.760
Smell	5.88±0.85	6.24±0.88	0.053
Thickness	5.28±1.88	5.92±1.08	0.151
Mouthfeel	5.08±1.98	6.17±1.05	0.030
Sourness	4.88±2.01	5.40±1.41	0.306
Color	6.00±1.02	5.96±1.31	1.000

^a Brand product was Motts (sweetened).

Table 4b. Preference and Appearance Tests Between Brand and VAP Applesauce Samples

Characteristic	Applesauce (N=25)	
	Brand ^a	VAP
	N(%)	N(%)
Overall tastes better (n=24)	11 (45.8)	13 (54.2)
Sweeter (n=24)	14 (58.3)	10 (41.7)
Fresher (n=23)	12 (52.2)	11 (47.8)
Smells better (n=21)	7 (33.3)	14 (66.7)
Looks better (n=21)	10 (47.6)	11 (52.4)
Thicker (n=22)	12 (54.5)	10 (45.5)
Prefer to purchase (n=24)	11 (45.8)	13 (54.2)

^a Brand product was Motts (sweetened).

Additional VAPs

The overall taste mean score for hot pepper relish (5.63±1.30SD) was higher than that for VAP tomato sauce but lower than that for VAP apple-sauce (Table 5). The overall taste mean score for pickled jalapeños (4.50±1.60SD) was lower than for all other VAPs (Table 6). The best category for the jalapeños was the spiciness category (5.75±1.83SD), while the hot pepper relish scored at least five in six out of eight categories, including overall taste.

Discussion

For this project, a mixed-methods study design informed the development of programs to produce locally sourced VAPs for urban, direct-to-consumer markets serving food-insecure

consumers. Few, if any, studies have investigated the specific attributes of locally produced, small-batch VAPs that would appeal to consumers whose current access to these products is limited.

As elaborated below, findings from this project have implications for future academic research and for concrete initiatives to produce VAPs with farm-fresh ingredients at not-for-profit food aid organizations in urban areas.

The emergence of cost as a key determinant of potential product purchases suggests that price will need to remain at the forefront of VAP programs such as that piloted for this study (Lucan et al., 2015). Finding the right price point for locally sourced VAPs requires balancing the need for revenue for farmers and food manufacturers with the imperative to maintain affordable community access to the VAPs produced. Along these lines, the acceptance of Supplemental Nutrition Assistance Program (SNAP) benefits at FMs has been shown to encourage shoppers in urban areas to attend FMs (Cotter et al., 2017), especially when paired with incentive programs such as “Double Bucks” that reward SNAP use at FMs (Charles, 2014). As most VAPs (e.g., sauces, jams, marinades) would be considered

qualifying purchases under SNAP regulations, SNAP acceptance at FMs may provide a mechanism for alleviating urban consumers' concerns about cost as a barrier to VAP consumption. Several focus group participants also noted that buying food sourced from nearby farms could help the local economy—a perception supported in the literature (Jablonski et al., 2018). Marketing locally sourced VAPs in a manner that consistently highlights benefits to the local economy—including for farmers, food producers, and culinary workers—could increase customers' tolerance for marginally higher prices.

Thematic analysis of focus group data indicated that New Brunswick consumers would potentially be willing to pay more for FM products, including locally sourced VAPs, perceived as high quality or healthy. Quality, though deemed a main consideration in the study that first introduced the concept of a “personal food system” (Furst et al., 1996), was not a “major” value for low- to-moderate-income adults in subsequent research (Connors et al., 2001). In our study, quality again emerged as a central preoccupation for focus group participants. Moreover, in the wider academic literature on “local food,” the opportunity to buy high quality, healthy food at reasonable prices is often seen as an advantage of direct-to-consumer venues like FMs (Connell et al., 2008; Freedman et al., 2016), especially when such venues are made more accessible through SNAP and similar programs. Thus, it might be expected that VAPs at FMs would benefit from their association with produce sourced from nearby farms.

However, the use of freshness by focus group participants as a key criterion for determining food quality and healthiness raises a different possibility. Specifically, even VAPs produced with fruits and vegetables from local farms may be susceptible to being viewed as not necessarily healthy, and even of questionable quality, because they are no longer in a raw, unprocessed state. Indeed, significant skepticism about the quality and healthiness of VAPs in general was an unexpected persistent theme of focus group conversations. To the extent that this finding accurately reflects sentiments among the wider population, makers of locally sourced VAPs cannot necessarily count on the

Table 5. Sensory Evaluations Results for Hot Pepper Relish

Hot Pepper Relish VAP (N=8)	
Characteristic	Mean±SD
Overall taste	5.63±1.30
Appearance	5.38±1.41
Sweetness	5.38±1.19
Spiciness	5.38±1.77
Smell	5.13±1.64
Saltiness	4.75±1.28
Mouthfeel	5.00±2.20
Sourness	4.63±1.77

Table 6. Sensory Evaluations Results for Pickled Jalapeños

Pickled Jalapeños VAP (N=8)	
Characteristic	Mean±SD
Overall taste	4.50±1.60
Appearance	5.38±1.60
Sweetness	4.43±0.53
Spiciness	5.75±1.83
Smell	4.86±1.21
Saltiness	3.86±1.07
Mouthfeel	4.75±1.49
Sourness	4.25±0.71

freshness penumbra of FM produce—the way that customers instinctively associate freshness with FMs—carrying over to products in cans or jars.

In the context of the underlying goal of this project to produce usable information for farmers and small-scale food producers, this finding clearly calls for VAP recipes, production practices, and marketing that could assuage concerns about freshness and quality among consumers in places like New Brunswick. Consumers in food insecure areas are often all too conscious of eating too few fruits and vegetables and too much processed food (Inglis et al., 2009; Valera et al., 2009; Zenk et al., 2011). When New Brunswick residents visit FMs, they are looking for food that is fresh, because freshness is taken as a sign of quality and health. With this characteristic of the customer base in mind, producers of small-batch VAPs for FMs, including farmers and community kitchens, would

likely do well to prioritize creating a perception of freshness for their products among urban consumers. This could be done through marketing and product design that center the healthfulness of the original ingredients, eschewing (whenever possible) preservatives and added sugars, and quantifying the nutritional content of the final product. Other strategies to reassure consumers might include displaying samples of the raw ingredients or posting appealing illustrations of the production process. When possible, FM staff or community nutrition educators might showcase VAPs in on-site demonstrations, introducing customers to new products and highlighting their roots in nearby farms. In sum, the connection of freshness, quality, and health to locally sourced VAPs cannot be taken for granted; producers must make it explicit.

Focus group results also expand the personal value system of the FCPM to include values that reflect recent FM consumer trends, including attention to ethical goals and food safety. The present study is the first to use the FCPM as a framework for exploring food choice decisions at FMs. Previous research has shown that while freshness, taste, and an enjoyable social experience are the biggest attractions of FMs for most people, a notable minority of FM shoppers attach significant importance to buying sustainable food for environmental reasons and to supporting local farmers (Carolan, 2017). While ethical and environmental considerations emerged as minor themes during focus groups, U.S. consumers as a whole are increasingly likely to consider environmental impacts when making purchasing decisions (Reganold & Wachter, 2016). In the context of these larger social trends, factors shaping ethical consumption practices among low-income, urban consumers warrant further consideration. It is also notable that during focus groups, debate over “buying green” often went hand-in-hand with concerns over food safety. No thick line separated preferences for food that was clean, handled with care, and grown or processed without harmful chemicals, and preferences for food that was better for the environment because it was grown without pesticides. Future marketing of locally sourced VAPs might take advantage of this multidimensional attitude toward the “safety” of food, by

encouraging consumers to think of their own health and the health of the broader environment as benefiting from common food system practices.

Sensory analyses offered an important ground-truthing process as follow-up to the focus group sessions, allowing for the evaluation of actual—as opposed to hypothetical—VAPs by New Brunswick–area residents. It was hypothesized that consumers would find the healthier versions of VAPs to be just as palatable as comparable brand products. Contrary to expectations, participants showed a more favorable opinion of the Brand tomato sauce compared to the EP-made tomato sauce: more than two-thirds of participants chose the Brand tomato sauce as the better tasting, sweeter, saltier, and better-looking sample, and the preferred product overall. On the other hand, slightly more than half (54.2%) preferred the VAP applesauce to the store-bought variety. The hot pepper relish and pickled jalapeños elicited ratings that were on balance positive, but both fell short of the highest possible scores.

These results leave ample opportunity to improve urban consumer reception of VAPs. Although taste was infrequently mentioned as a food purchasing criterion during focus groups, prior FCPM research has pointed to taste as a predominant personal value in food choice (Connors et al., 2001; Furst et al., 1996). From the standpoint of concrete project goals for EP and farm partners, it was concerning that the VAP tomato sauce performed poorly versus a national brand in a blind taste test, and the pickled jalapeños did not score higher on overall taste. Clearly, recipe development must be an iterative process, and small-batch producers would benefit from being able to gather systematic, unbiased data on what consumers think of their products. At the same time, it is important to remember that, as a condition of the blind taste test, participants did not know the connection of EP products to local farms. Based on focus group findings, it stands to reason that VAPs may have a more favorable reception by urban consumers under informed conditions, where it is transparent that they are made with fresh, locally grown farm produce. As noted earlier in this section, it is likely also important to quantify the nutritional content of VAPs and highlight that information for poten-

tial customers. Communicating these and other positive attributes to consumers, and affixing to locally sourced VAPs a price consistent with—or less than—brand products, may provide an important boost to VAPs in direct-to-consumer marketplaces like FMs.

Increasing urban consumer familiarity with the differential flavors and textures of small-batch VAPs in comparison to store brands might also improve VAP reception. Early exposure to certain foods from a young age can have a significant impact on food acceptance. Prior work has examined how visual familiarity (the awareness of foods within one's environment), taste familiarity (knowledge and experience of the taste of foods), and contextual familiarity (knowledge of how foods should be presented) begin at childhood and may determine long-term dietary development in adulthood (Aldridge et al., 2009). Indeed, as people age they tend to gravitate toward foods they have already been exposed to, as those foods give them a sense of comfort and familiarity (Aldridge et al., 2009; Locher et al., 2005).

Our finding that participants preferred the Brand tomato sauce over the healthier VAP version developed by project staff may be partially explained by lack of familiarity with, or even exposure to, healthier food products. Consumers who are unfamiliar with small-batch VAPs reminiscent of home-cooked “from scratch” meals may not perceive the VAPs as favorably as they do the store brands. The Brand tomato sauce was higher in both sugar and sodium, compared to the VAP tomato sauce. In addition, the Brand tomato sauce had a smoother appearance than the VAP tomato sauce, in which more of the tomato skins were visible. Hence, sensory evaluation participants may have preferred the Brand tomato sauce due to its familiar consistency and salty/sweet taste.

The Brand applesauce also had higher amounts of total sugar, compared to the VAP applesauce. However, more than half of participants did not regularly consume applesauce, so they may not have been influenced by past exposure to this product. In terms of appearance, both the Brand applesauce and the VAP applesauce looked very similar. Participants may have slightly favored the VAP applesauce due to the newness of the food

and the generally comparable appearance of both versions.

The relatively inexpensive market research that we undertook for this study may be of interest to producers of small-batch VAPs, as well as academic investigators. With future applications in mind, it seems useful to draw attention to several limitations to our methods and to suggest ways in which these limitations could be addressed. Perhaps most important, it was evident from focus groups that many New Brunswick consumers would be eager to see new, locally sourced VAPs that fill a gap in culturally appropriate and relevant food at FMs. Participants at several focus groups mentioned pickled peppers and *chiles en vinagre*, suggestions which inspired the hot pepper relish and pickled jalapeños that we created with produce from farm partners. In the course of making these and other suggestions, focus group participants occasionally volunteered their country-of-origin or other aspects of their cultural identity. We did not, however, intentionally collect detailed data on what food cultures people might have identified with, or on other aspects of participants' identities that likely helped to shape their food preferences, such as country-of-origin or length of residence in the U.S. In large part, our decision not to ask these questions was based in concerns about privacy and participant recruitment. Yet, as we have stressed throughout this paper, New Brunswick is a highly diverse city, home to large numbers of people who identify with Mexican, Dominican, Puerto Rican, and other Hispanic or Latino communities. Foods that are traditional in one of these communities, like Mexican *escabeche* and pickled vegetables (Jaramillo-Flores et al., 2010), are not necessarily traditional or even familiar to others. With the importance of cultural diversity and its relationship to food preferences in mind, future researchers might find it useful to collect more detailed data on what VAP products would be considered culturally relevant and appropriate for the particular groups represented in specific communities and local markets.

Other limitations to our study concern how recruitment for the sensory evaluations might have shaped results. Sensory evaluations were conducted with a convenience sample of current FM custom-

ers; this sample might not have been representative of consumers who do not currently shop at FMs, but would consider doing so in the future. Due to participants being recruited on the day of the sensory evaluations, foods or drinks that participants had consumed prior to the sensory evaluations may have impacted their taste buds and influenced their opinions. Additionally, the tomato sauce samples were presented with an accompaniment of pasta. Although tomato sauce and pasta are commonly eaten together in some cultures, in others tomato sauce is used as a base ingredient for other dishes. As such, this combination of foods may have influenced responses.

Lastly, all empirical data for this study was collected in the context of a relatively small, USDA-funded pilot project. Results suggest that significant opportunity, as well as real challenges, exist for farmers and start-up food businesses who want to earn revenue by supplying VAPs to FMs and other direct-to-consumer food venues. But additional research must be conducted, with larger sample sizes and in a wider range of areas, in order to give interested parties full confidence in the substantive, business-related conclusions of this study.

Future work on this project would likely include fine-tuning recipes for existing VAPs and adding new products to EP's portfolio. For instance, tomato skins in the EP-made VAP could be completely blended to have an appearance and texture like the generic brand product, which might better align with consumer expectations. Since most participants did not regularly consume applesauce, it would fall within the EP community service mission to work on VAPs that are more regularly consumed by New Brunswick residents. Given that applesauce may be a product of continued interest both to farmers (who are likely to have surplus fruit) and EP chefs (who now have experience producing this product), another option might be to consider an alternative market, such as a farm-to-school partnership focused on VAPs with the New Brunswick school district.

In addition, nutrition education lessons that specifically feature the healthy VAPs could be presented to FM customers at the point of purchase to help them understand the importance and health

benefits of consuming low-sodium and low-sugar foods. In 2015, for example, New York's SNAP-Ed program conducted nutrition education interventions at 18 New York City FMs, leading to an increase in fruit and vegetable purchases (Dannefer et al., 2015). Hence, increasing consumer awareness and knowledge of the adverse health effects of high sodium/sugar foods may encourage them to try, and eventually even prefer, the healthier VAPs. Similarly, incorporating other aspects of VAPs indicated as desirable by consumers—such as quality, health, and cost—into nutrition education lessons could increase consumers' willingness to try locally sourced VAPs at FMs. Future research projects could treat these intriguing possibilities as hypotheses to be tested through field experiments at FMs, perhaps conducted in collaboration with cooperative extension or public health organizations.

Conclusion

VAP partnerships that use community-based, mixed-methods market research to bring together small farmers, food aid organizations, local food producers, and food-insecure consumers, have the potential to yield many rewards. For this study, consumer focus groups provided the opportunity for New Brunswick residents to voice personal food values that would be relevant to VAP purchasing decisions. Evaluating this qualitative data and identifying major themes informed VAP recipe development, marketing projection exercises, and sensory analyses. First-round sensory evaluations of new VAPs clearly demonstrated the challenges inherent in making healthy, locally sourced products that would satisfy the preferences of everyday consumers.

Nevertheless, this pilot project was considered a success by its directors. Focus group data was translated into product development insights, and the resulting products were competitive with, if not necessarily preferred to, store brand products. Particularly as the U.S. slowly recovers from the COVID-19 pandemic, FMs seem likely to face strong economic headwinds, even as consumer faith in the reliability of global supply chains has been shaken. The results of this study may be of use for farmers, kitchen operators, and food

security NGOs in places like New Brunswick, where locally sourced VAPs would constitute a valuable addition to the local food landscape. 

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An appreciative inquiry and inventory of Indigenous food sovereignty initiatives within the western U.S.

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Abstract

Indigenous food sovereignty is informed by—and is a framework and movement that supports—all the various means through which Indigenous people are revitalizing and reclaiming their traditional foodways. These efforts incorporate established values, processes, and outcomes, including relationality, self-determination, decolonization, and wellbeing. Through appreciative inquiry, this research inventories Indigenous food sovereignty initiatives in the western United States and identifies their common themes and key features. A systematic search of scholarly and popular sources yielded a database of 123 initiatives that vary by

type, land base, and geographic location. Three themes emerged across initiatives. First, concrete strategies include growing and food production, harvesting and food acquisition, food preparation, and distribution and exchange. Second, cultural revitalization occurs through community development, youth and young adult education, other forms of education, and regenerating cultural identity through traditions. Finally, initiative foundations include advocacy, policy, and environmental stewardship; funding mechanisms; and partnerships with non-Indigenous actors. Across themes, individual initiatives include numerous interconnected food sovereignty efforts and demonstrate

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the adaptive capacities of Indigenous people. This research compiles and aims to respectfully celebrate the myriad ways Indigenous people in the western U.S. are revitalizing their foodways as part of a larger movement toward Indigenous food sovereignty.

Keywords

Indigenous Food Sovereignty, Appreciative Inquiry, Systematic Search, Inventory, Interconnection, Adaptability, Cultural Revitalization, Western United States

Introduction

Indigenous people across the lands currently known as the United States¹ have suffered colonization and genocide at the hands of European settlers and subsequent governments. Despite these atrocities, Indigenous people and their food systems remain resilient (e.g., Arthur & Porter, 2019; Budowle et al., 2019; Fast & Collin-Vézina, 2010). Many are revitalizing and reclaiming their foodways through Indigenous food sovereignty (IFS), which is the “ability of an [i]ndigenous nation or community to control its own food system and food-producing resources free of control or limitations put on it by an outside power (such as a settler/colonizer government)” (Indian Education Division, n.d., para. 1).

Before foreign intrusion, Indigenous North American people cultivated, hunted, and gathered their food in their own ways (Arthur & Porter, 2019). The 574 federally recognized tribes—and hundreds more non-federally recognized tribes comprising Indigenous people who maintain tribal identities—within the U.S. each has unique food traditions and practices (Arthur, 2020; United States Government Accountability Office, 2012). IFS manifests in various ways due to these unique cultures and histories (Whyte, 2019). It provides a “tool to protect Indigenous food systems that are specifically evolved in different communities, and therefore depend on a community’s own social, political, historical, and cultural contexts” (Settee &

Shukla, 2020, p. 4). In addition to tribal and reservation contexts, over 70% of Native American people live in cities (Whittle, 2017). Nine of the top 13 cities with the largest Native American populations—Albuquerque, Houston, Los Angeles, Oklahoma City, Phoenix, San Antonio, San Diego, and Tulsa—are in the western U.S. (United States Census Bureau, 2012).

While studies have documented IFS initiatives across the entirety of the U.S. or Canada, to our knowledge, none comprehensively inventory and map these efforts with a specific focus on the Indigenous tribes and populations in the western U.S. (Centers for Disease Control and Prevention, 2013; Indigenous Food and Agriculture Initiative, 2015; Sumner et al., 2019). Additionally, the existing inventories of IFS initiatives in the U.S. do not employ a systematic search methodology, suggesting that room potentially remains to identify additional initiatives. For these reasons and due to the many interrelated yet unique cultures and foodways informing IFS, this research inventories, compiles, and aims to respectfully celebrate the many ways Indigenous people are reclaiming their food systems with a specific focus on the western U.S. Our ultimate goal is to illuminate and support their and non-Indigenous allies’ work by compiling the range and variety of western U.S. IFS initiatives in an accessible, searchable, and amendable database. This paper explores two questions through a systematic search and appreciative inquiry: (1) What are the current IFS initiatives in the western U.S.? and (2) What are their common themes and key features?

Literature Review

To provide context for this inventory, we review the literature on IFS and the underlying values, processes, and outcomes that connect the many different foodways and initiatives informing and contributing to it. Additionally, we briefly review other relevant IFS inventories and compilations, including their methods and goals.

In 1996, farmer and peasant organizations

¹ For ease of reading and because Indigenous food sovereignty scholars (see Coté, 2016; Hoover, 2017; Robin, 2019) do so, we refer to so-called U.S., North America, etc. by present colonial nation-state names. We acknowledge, however, that these are unceded and appropriated lands.

worldwide met to address food insecurity and other agrarian concerns, formalizing the term “food sovereignty” as “the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems” (Vía Campesina, 1996, 2007, para. 3). This global “movement” centers a rights-based, bottom-up, participatory, and integrated approach (Agarwal, 2014, p. 1247; Carney, 2011). Indigenous people have found the food sovereignty movement helpful in advocating against the “hegemony of the globalized, neoliberal, industrial, capital-intensive, corporate-led model of agriculture that created destructive economic policies” (Coté, 2016, p. 1).

Food sovereignty’s alternative to a global, industrial food system is often a local, agriculture-centric food system (Desmarais & Wittman, 2014). However, the general agrarian-based food sovereignty framework may lack applicability to all Indigenous people, given the centrality of game and wild plants in many Indigenous foodways and the uniqueness of foodways across tribes (Grey & Patel, 2015). Additionally, “rights” and “sovereignty” are colonial, Anglo-European concepts emerging from paradigms of domination, control, and authority (Coté, 2016, Grey & Patel, 2015). Indigenous people advocate for moving beyond rights-based food sovereignty approaches that have historically failed them. For example, governments overlook legal treaties and enforce policies that privilege corporations, perpetuating the oppression of Indigenous Nations and devaluing relationality with and responsibility for their families and nature (Corntassel, 2008; Coté, 2016; Morrison, 2011). Thus, debate over the usefulness of the term “sovereignty” to Indigenous justice efforts, including food sovereignty, is ongoing (Bauder & Mueller, 2021; Desmarais & Wittman, 2014; Hoover, 2017; Morrison, 2011).

Indigenous Food Sovereignty (IFS)

Regardless of terminology, Indigenous people had exercised what amounts to food sovereignty for millennia before it was “dismantled by colonialism” (Robin, 2019, p. 95). Today, underlying food sovereignty ideals occur through “Indigenous people’s

struggles for autonomy, self-sufficiency, and self-determination” (Coté, 2016, p. 9). IFS aims “to honor, value, and protect traditional food practices and networks in the face of ongoing pressures of [colonialism]” (Desmarais & Wittman, 2014, p. 1165). Through self-determination, IFS revitalizes food practices and ecological knowledge, refuting the colonial land ownership principles embedded in many food systems efforts (Coté, 2016; Daigle, 2017). Indigenous people often share worldviews and values that inform IFS despite the uniqueness of their food systems and cultures. Commonalities include (1) sacred or divine sovereignty restoring land-based relationships; (2) active participation to maintain land, soil, water, air, plants, and animals; (3) self-determination to maintain freedom from colonial systems; and (4) culturally appropriate legislation and policy (Morrison, 2011). In addition, IFS often highlights history, identity, land reform and redistribution, environmental restoration, and social determinants of health (People’s Food Policy Project, 2011; Robin, 2019). These commonalities emerge from key values, processes, and outcomes that distinguish IFS from mainstream food sovereignty and are vital to the initiatives we explored in this research.

IFS Values

IFS reconnects people with land and food through values of relationality, responsibility, reciprocity, and respect, which emerge from an Indigenous worldview (Coté, 2016; Hoover, 2017; Kimmerer, 2013; Morrison, 2011; Robin, 2019). The relationships between Indigenous people, foodways, and the land undergird IFS (Grey & Patel, 2015). Kinship—between people, non-human beings, and natural entities as an ecological family sharing ancestry—helps restore and foster healthy relationships (Coté, 2016; Kimmerer, 2013; Kuhnlein, 2020; Salmón, 2000). Foods are, therefore, relatives forming a bond between humans and the land (Grey & Patel, 2015). The White Earth band of Ojibwe, for example, codified the legal rights of their relative, manoomin (wild rice), to protect it from pollution, patenting, and contamination (LaDuke, 2019). Healthy relationships with foodways sustain a community’s capacity to respond and adapt to social or environmental changes

(Whyte, 2017).

Therefore, IFS requires human responsibility to the natural world, ensuring healthy food and ecosystems to support mutually beneficial relationships (Hoover, 2017). Responsible protection of ecosystems creates accountability for efficient and respectful interactions (James et al., 2021). Relatedly, reciprocity acknowledges the interdependence of all beings (Hoover, 2017). When one takes a gift from the Earth, they must give something back in gratitude as part of all beings' duty to one another (Cornassel, 2008; Kimmerer, 2013). Lastly, an Indigenous worldview sees the Earth as a living being, which demands the ethical and respectful treatment of the land in support of the other values outlined above (Coté, 2016; Miller, 2008; Robin, 2019).

IFS Processes

Interrelated processes influencing, embedded in, and resulting from IFS include self-determination, decolonization, and education. Self-determination re-emphasizes relationships with and responsibilities to the land through self-sufficiency (Alfred, 2005; Cornassel, 2008; Coté, 2016; Grey & Patel, 2015; Morrison, 2011; Robin, 2019; Stanciu 2019; Whyte, 2016). Stanciu (2019) asserts, "food sovereignty, environmental protection, and economic self-determination [are] essential platforms for community regeneration, renewal, and survival" (p. 121). Self-determination through foodways reduces reliance on outside companies, multinational corporations, and governments and instead supports culturally appropriate eating and achieving community balance for improved wellbeing (Huambachano, 2019; Kuhnlein, 2020; Robin, 2019).

To attain authentic self-determination in IFS, Indigenous people engage in ongoing, strategic processes of decolonizing foodways for cultural resurgence (Grey & Patel, 2015; Hoover, 2017; James et al., 2021, Robin, 2019). Decolonization allows Indigenous people to reclaim their identity and food choices independently from Western influences, supporting perpetual access to healthy food. Like self-determination, decolonization is a process, not a destination (Grey & Patel, 2015). IFS strives to regain access to land and food independently of the oppressive global food system

(Hoover, 2017). When Indigenous people reclaim their land, they can fully regain autonomy from colonization and pursue self-determination (Coté, 2016; James et al., 2021; Tuck & Yang, 2012).

Decolonization and self-determination of foodways entail: (1) restoring and revitalizing land-based presence and practices, including reconnecting to traditional foodways; (2) reincorporating traditional diets to regain health; (3) transmitting culture, spiritual teachings, and knowledge across generations between Elders and youth; (4) centralizing food by facilitating family activities and the re-emergence of sociocultural institutions as governing authorities; and (5) initiating and improving upon sustainable land-based economies in both reservation- and urban-based communities for food system revitalization (Alfred, 2009).

In addition to self-determination and decolonization, reinvigorating culturally responsible education is an ongoing IFS process (Bagelman, 2018; Lowan-Trudeau, 2012). Indigenous education decompartmentalizes and recontextualizes subjects counter to Western educational approaches (Kawagley & Barnhardt, 1998; Medin & Bang, 2014). For example, storytelling and revitalizing language strengthen identity and perpetuate culture (Lowan-Trudeau, 2012). Pairing Elders with children revitalizes foodways through multigenerational knowledge production and strengthens Indigenous communities (Bagelman, 2018; Coté, 2016; Morrison, 2011; Simpson, 2002). Community-based education supporting Indigenous worldviews is central to achieving self-determination (Bang & Medin, 2010).

IFS Outcomes

Broad IFS outcomes include health and healing and environmental wellbeing and justice. There is no word for 'health' in many Indigenous languages, as the concept overlaps with relationships to land and food (Grey & Patel, 2015). Indigenous people experience health benefits from restoring culture and traditions (Bodirsky & Johnson, 2008; Hoover, 2017). Reconnecting with the land through IFS supports healing from generational trauma (Budowle et al., 2019; Hoover, 2017). As people become healthier through restored relationships with land, food, and culture, their entire commu-

nity becomes healthier (Hoover, 2017; Morrison, 2011). Healing and health increase resilience, which in turn further strengthens self-determination and cultural revitalization (Egeland & Harrison, 2013).

The revitalization of cultural knowledge heals both the people and land (Hoover, 2017). IFS initiatives often emphasize decarbonization, diversification, and decommodification (James et al., 2021). Collective IFS efforts help mitigate climate change, biodiversity loss, and declining water quality and inform sustainable land management practices (Whyte, 2019). These practices support systemic change that benefits all of humanity, because “as the original inhabitants of the land, we [Indigenous people] offer guidance in changing human behavior and ending destructive relationships to Mother Earth and the land and food systems that sustain all human beings” (Morrison, 2011, p. 112).

However, Indigenous people continue to experience environmental injustices to their lands, food systems, and waterways from outside development. For example, Indigenous people and allies spent months at Standing Rock protesting the Dakota Access Pipeline, which threatened to contaminate the water that sustains local foodways (Gilio-Whitaker, 2019). Defending the land and food systems integrity, including land reform and land back efforts that confront private ownership, intertwines IFS with environmental justice (Huambachano, 2019; Kepkiewicz & Dale, 2019; Whyte, 2015; Wires & LaRose, 2019).

North American IFS Inventories

The above values, processes, and goals occur throughout the IFS initiatives that we examine and similar inventories characterizing the range of IFS initiatives in North America. One study systematically searched and mapped Indigenous food procurement efforts in Canada to explicitly support Indigenous people’s just transition efforts away from colonial food systems toward place-based food systems through and for IFS (Sumner et al., 2019). Another employed a survey methodology across the U.S. to inform potential funders, food system practitioners, and researchers about Indigenous change-makers transforming the food system. This compilation specifically aims to advance collaboration for Indigenous health by highlighting

how IFS is not merely conceptual but comprises “deliberate action taken every day” (Indigenous Food and Agriculture Initiative, 2015, p. 3). A third interviewed tribal representatives and IFS champions across the U.S. to share their stories about IFS so that others may learn from them and further share stories (Centers for Disease Control and Prevention, 2013).

However, to our knowledge, no IFS initiative inventories have used a systematic search methodology specifically focused on the western U.S. These existing inventories’ specific methodologies and geographic range provide room for extension through our focused systematic search of western U.S. initiatives. Additionally, we ground our work in the aims of the above inventories to highlight Indigenous people’s deliberate, ongoing action for IFS and share information about these initiatives on which others can build. Such initiatives emerge from and are informed by the IFS values, processes, and outcomes reviewed above.

Methods

Appreciative inquiry and grounded theory methodologies—the latter of which we return to in our analysis section below—inform this research. Appreciative inquiry identifies and evaluates organizational strengths for positive, future organizational development (Reed, 2006). This methodological stance allowed us to identify IFS initiatives’ strengths and key features. Beyond appreciating these initiatives in and of themselves, Morrison (2011, p. 98) maintains that appreciative inquiry through IFS supports “exploring, transforming, and rebuilding the industrial food system towards a more just and ecological model for all.” Specifically, this research project centers on the first component of appreciative inquiry’s 4-D Cycle: *discovery*, through which we identify IFS initiatives and features to appreciate the best of what is (Cooperrider & Whitney, 2005). Following Wilson’s (2008) guidance, however, we recognize that we cannot claim ownership or discovery of these initiatives. They are led by Indigenous people, and both these initiatives and those people flourish regardless of this research.

The first author is a woman of Euro-settler descent who collected and analyzed these data and

wrote an initial version of this paper for her graduate research. The second author is a White woman who mentored that graduate research and cowrote this version of the paper. Through this study, we aspire to be allies to Indigenous people with a “desire to actively support social justice, to promote the rights of non-dominant groups, and to eliminate social inequalities that they benefit from” (Smith et al., 2016, p. 6). We hope that compiling these many initiatives supports IFS leaders, including practitioners, researchers, and their allies, in their ongoing and future food sovereignty work. In this way, the remaining points in the 4-D cycle of appreciative inquiry may emerge following this research, by, with, and for Indigenous people and communities: *dream*, envisioning what IFS, as a movement and framework, is calling for; *design*, considering how to co-construct ideal IFS initiatives; and *destiny*, adjusting, empowering and sustaining IFS initiatives in the western U.S. (Cooper-riders & Whitney, 2005). The focus on the discovery aspect of appreciative inquiry through a systematic search in ways that do not, as of yet, engage Indigenous people or communities, squarely situates this research in a Western methodological approach. However, we hope that future phases of this work may directly engage those communities and apply Indigenous methodologies that broadly inspire us and this research (e.g., Smith, 2012; Wilson, 2008).

Data Collection

This study systematically searched academic literature and popular websites, adopting a similar methodology to Sumner et al. (2019), who produced an initiative map and database in another geographic region using different search terms. They searched popular and academic databases with initial search terms and then each type of food procurement initiative yielded from the initial search. Additionally, they searched Indigenous-led food procurement and support program websites and gray literature. Those authors compiled data in an Excel spreadsheet and used Google MyMaps to spatially represent results.

We took a similar approach by searching both scholarly literature through Google Scholar and our university’s Libraries Quick Search database and popular websites through Google. *Indigenous*

food sovereignty served as a keyword alone and in combination with *gardening*, *hunting*, *gathering*, *foraging*, *fishing*, and *farming* in each search engine. Search terms yielded scholarly journal articles, books, news articles, reports, and organization or program websites documenting specific IFS initiatives.

Criteria for inclusion in the dataset were those IFS initiatives that were (1) predominantly Indigenous-led or directly supporting Indigenous-led initiatives, and (2) located within the mainland western U.S. Watersheds provided land-based boundaries and parameters for the inventory. We included the Missouri, Arkansas-White-Red, and Texas Gulf watersheds; the western half of North Dakota; South Dakota; western Iowa, Missouri, Arkansas, and Louisiana; and all other mainland states further west (United States Geological Survey, n.d.). Given previous studies’ geographic foci (see Centers for Disease Control and Prevention, 2013; Indigenous Food and Agriculture Initiative, 2015; Sumner et al., 2019) and our own context in Wyoming—in which the second author has previously engaged in regional action research supporting IFS—we narrowed our focus to the western U.S. for a manageable scope and scale, which afforded deeper emphasis on a singular geographic region.

The first author scanned the first 150 sources yielded in the academic literature search for *Indigenous food sovereignty* and the first 100 sources for combined terms (e.g., *Indigenous food sovereignty AND gardening*), as there was ample repetition in results from the parent search term. The popular search involved scanning the first 50 sources for IFS initiatives. Searches concluded at a point of “diminishing returns,” using the qualitative approach of saturation (Glaser & Strauss, 1967; Rowlands et al., 2016, p. 41). Given that the claim “further data collection yields no new information” is often vaguely and inconsistently applied in qualitative studies, we acknowledge that “there can [never] be an absolute or complete end point” in data collection (Low, 2019, p. 136; Rowlands et al., 2016). Moreover, some IFS initiatives are likely not documented in the literature or on the internet. Additionally, an opportunistic sampling approach captured initiatives that emerged during the data collection process but were outside of the systemic search itself

(Onwuegbuzie & Collins, 2007). We included initiatives that emerged from the first author’s personal investigations, friends’ and colleagues’ suggestions, and the broader literature review for this paper. For example, the other U.S.-focused inventories and compilations we reviewed above augmented the systematic search (i.e., most of the initiatives we identified emerged anew from this search, but we did flesh out the inventory with a few western U.S. IFS initiatives documented in these previous efforts). We included any IFS initiatives emerging outside the systematic search only if they met the above search criteria.

The first author skimmed relevant sources for specific IFS initiatives and added each to a Google spreadsheet, including several columns described below in our results. Following Sumner et al. (2019), the spreadsheet includes a “location” column linked with Google MyMaps to spatially visualize each IFS effort and its key features. An additional web search gleaned further information about features not readily available from the initial search for many initiatives.

Data Analysis

Deductive and inductive principles for theme generation supported the organization of IFS initiatives and their features in the spreadsheet (Ligurgo

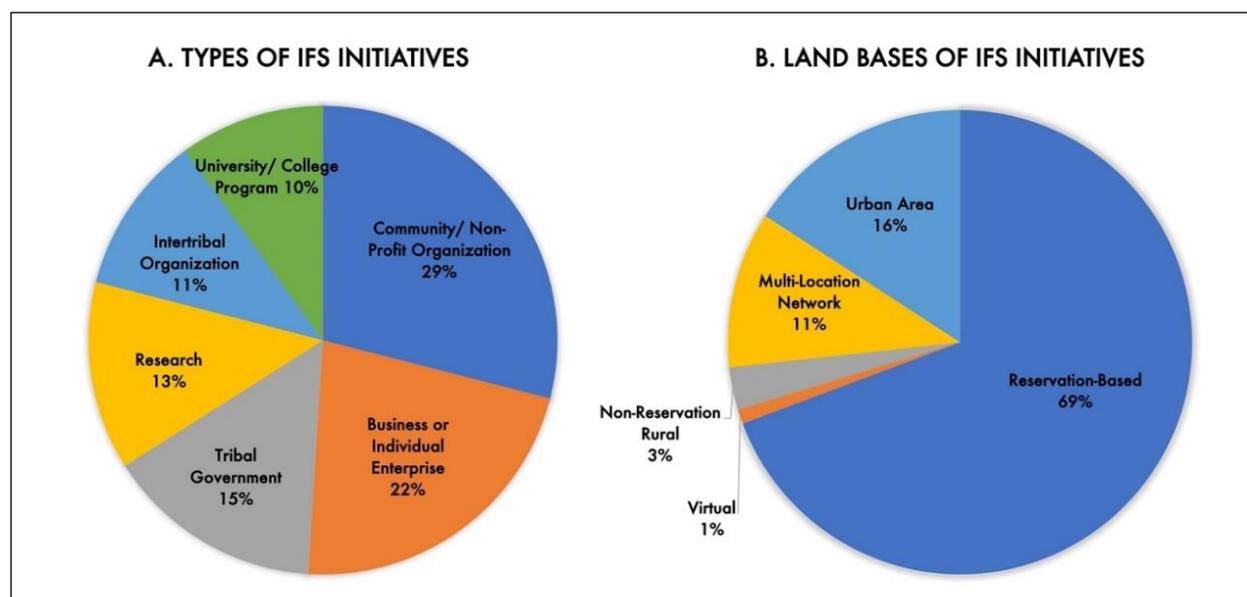
et al., 2018). Deductive themes informed by key IFS values, processes, and goals outlined in the literature review generated initial spreadsheet column headings (Bernard, 2006). After data collection, the first author identified inductive, emergent themes by taking an “active role . . . in identifying patterns/themes, selecting which are of interest” (Braun & Clark, 2006, p. 80). An iterative, thematic approach informed analysis, including generating initial themes, familiarizing ourselves with the data, searching for themes, reviewing themes, and defining and naming themes (Braun & Clarke, 2006; Nowell et al., 2017).

We also adopted a grounded theory analytical approach to identify key IFS initiative features by inductively identifying, reducing, and adjusting sub-themes (Strauss & Corbin, 1990; Glaser & Strauss, 1967). However, we did not generate new theory *per se*. The most frequently appearing IFS efforts yielded common themes and subthematic features, which we used to verify source and theme saturation with multiple supportive examples (Morse, 2015; Saldaña, 2011). We present three major IFS initiative themes and subthemes in detail below.

Results

The search identified 123 unique IFS initiatives, many of which employ multiple IFS efforts and are

Figure 1. Western U.S. Indigenous Food Sovereignty Initiatives Categorized by Type and Land Base



diverse across types and land bases (see Figure 1). Three interrelated thematic categories organize initiatives based on their explicit descriptions in identified sources and—wherever possible—the initiatives’ self-descriptions. Themes include concrete IFS strategies, cultural revitalization efforts, and IFS initiative foundations, each of which includes subthemes of key initiative features. Results show the uniqueness of initiatives to culture and place, but we categorize IFS initiatives to identify the common, interrelated features between them. Below, we define themes and subthemes and provide brief descriptions of supportive example initiatives for each. Many initiatives appear in multiple themes and subthemes but are only counted once here as distinct initiatives. The database² includes all 123 inventoried initiatives and more comprehensive details about their features (see Figure 2 for an excerpt of the database). In addition to key features, database categories include IFS initiative title; tribal, national, or other affiliation; watershed/region; location; type; land-base; mission, vision, and/or goal(s); search source(s) and complimentary URL(s); basic frequencies; and a key for category acronyms. However, in the results below, we narratively summarize these data and mainly present initiatives as examples of just one theme or subtheme for the sake of brevity and readability (i.e., descriptions below do not always explain the entirety of IFS efforts involved in each initiative). We invite

readers to visit the database to fully explore initiatives and their key features. Additionally, Figure 3 shows the geographic distribution of initiatives in Google MyMaps. We present these geographic data rather than a visual depiction of initiatives across tribes, as many initiatives occur across multiple tribes, and some are not officially or practically affiliated with any specific tribe. However, the database itself identifies and categorizes initiatives by tribe as relevant.

Concrete IFS Strategies

The largest number of initiatives fall into the concrete IFS strategies theme, including specific Indigenous foodways practices. The four subthemes are growing and food production, harvesting and food acquisition, food preparation, and distribution and exchange.

Growing and Food Production

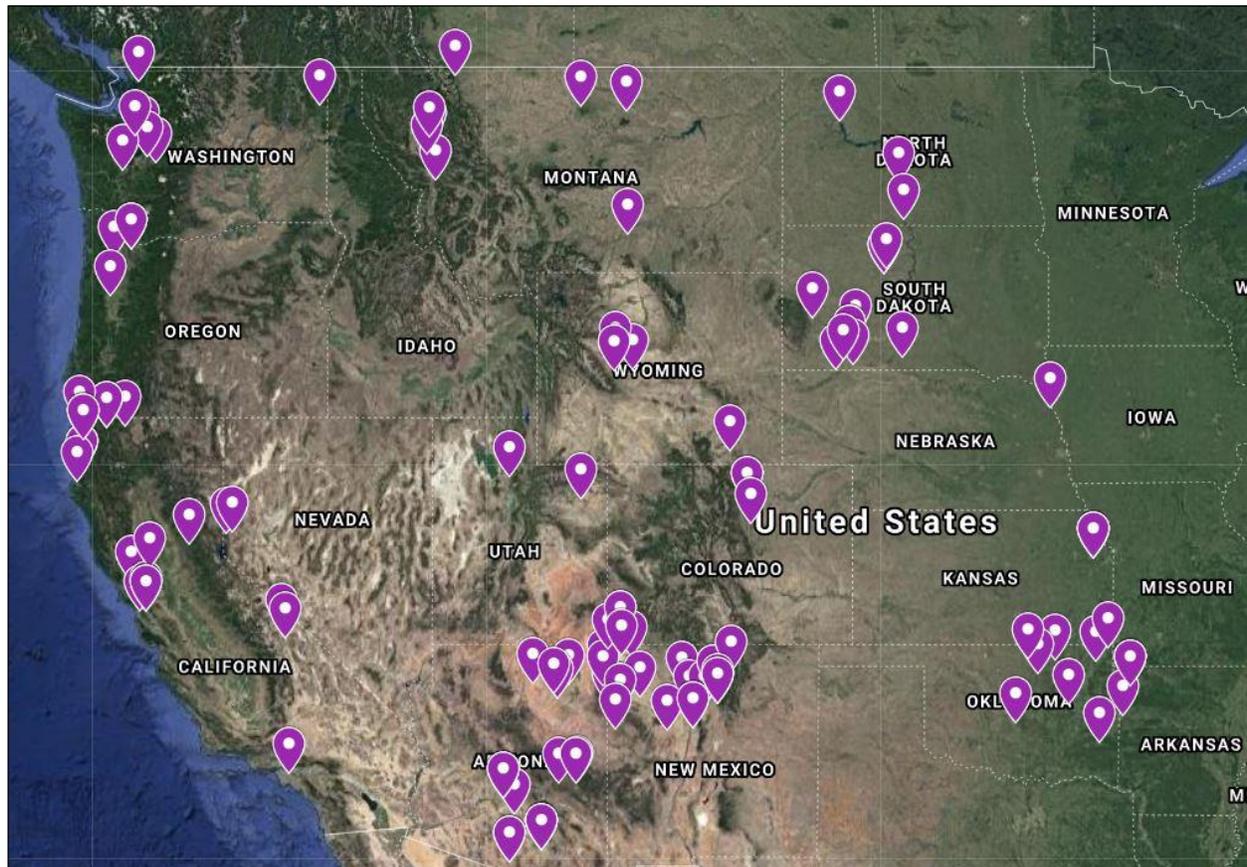
Growing—including gardening, tree planting, composting, farming, animal husbandry, beekeeping, seed-saving, and ranching—is the most common strategy, occurring in 138 efforts (i.e., some initiatives include more than one growing effort). Gardening is the most frequent strategy, appearing 50 times in the dataset. Gardens occur as demonstration plots, at the community and home levels, at schools, and in urban settings. For example, the Aaniiih Nakoda College Extension Program in

Figure 2. Western U.S. Indigenous Food Sovereignty (IFS) Initiatives and Key Features Inventory Database Excerpt

IFS Initiative	Tribal or National Affiliation	Location	Gardens / Horticulture
Grow Your Own Nueta Hidatsa Sahnish College	Mandan, Hidatsa, and Arikara Nations	New Town, ND	"Grow Your Own" that encouraged people to start their own backyard gardens or join the college's community garden
Tesuque Pueblo Farm	Tesuque Pueblo	Tesuque, NM	A small greenhouse built off to the side currently shelters 16 different types of tomatoes and a medicinal plant from Africa that is supposed to be useful in the treatment of cancer, diabetes and AIDS, according to the medicine man who gave it to Emigdio in South Africa
Black Star Farmers	Black/Indigenous Partnership	Seattle, WA	Black Star Farmers grow high-quality produce, plants, and traditional medicines to create self-sufficient communities.
Squamish Community Health Program	Squamish Tribe	Squamish, WA	Classes planned for the coming year include gardening classes in the spring with raised bed kits and seeds to participants, women's herbal wellness, herbs for summertime wellness and first aid. General raising of awareness about traditional foods and organic gardening.
Wiyot Tribe Natural Resource Department	Wiyot Tribe	Loleta, CA	Community Garden

² Access the Western U.S. IFS initiatives and key features inventory database at https://docs.google.com/spreadsheets/d/19T89mmNEx0PLoEDirB3yPHs4YJ4mQIjO9t2GBT_rycg/edit#gid=1122191871

Figure 3. Geographic Distribution of Indigenous Food Sovereignty (IFS) Initiatives in the Western U.S.



Montana hosts a demonstration garden with hands-on learning opportunities, which led to community gardens in every Fort Belknap Reservation community (Morales & Friskics, 2019). The Growing Resilience study in the Wind River Reservation of Wyoming helped almost one hundred families install home gardens (Porter et al., 2019). After years of bringing students to the White Mountain Apache's Ndee Bikiyaa ("People's Farm") in Arizona to learn about corn, the farm now supports school gardens (The Edible Schoolyard Project, n.d.; Hoover, 2014f). In the second Healthy Children, Strong Families study, one anonymous Indigenous community incorporated an urban garden into the local health center (Adams et al., 2012).

Growing also includes 17 initiatives with tree planting, orchards, composting, or soil health efforts. Grow Our Own in the Wind River Reservation of Wyoming organizes tree planting events

to connect people with each other and growing food (Wind River Grow Our Own 307, n.d.). The Muckleshoot Food Sovereignty Project includes fruit orchards in their garden (Hoover, 2014i). Among other efforts, the Traditional Native American Farmers Association in Santa Fe hosts workshops on building healthy soil (Traditional Native American Farmers Association, n.d.-b). The Big Pine Paiute Nation's Sustainable Food System Development Project in California composts to avoid chemical fertilizers and protect their water source (Hoover, 2014h).

Other food production strategies include 31 farming efforts, with five animal husbandry and beekeeping and six ranching efforts. The Alexander Pancho Memorial Learning Farm, part of the Tohono O'odham Community Action Program in Arizona, trains new and veteran farmers on traditional dryland farming techniques (Hoover, 2014e). The Eloheh Farm and Indigenous Center for Earth

Justice in Oregon keeps bees to pollinate their crops and maintain the health of their farm ecosystem in addition to raising free-roaming chickens (Eloheh Indigenous Center for Earth Justice, n.d.). The Ponca Agricultural Program reclaimed a former boarding school and now runs a cattle operation crossbreeding their unique Angus-longhorn (Hoover, 2014a).

In 29 strategies, seed-saving protects ancestral crop varieties by returning seeds to their places of origin and avoiding cross-contamination. Native Seeds/SEARCH, a Tucson-based nonprofit, donates or sells ancestral seed varieties to support IFS across many Nations in the Southwest (Native Seeds/SEARCH, n.d.-a). Mohawk tribal member Rowan White of Sierra Seeds in California rematriates³ seeds back to the land where they originated through teaching, mentoring, and reconnecting people with their kin—the seed relatives (White, 2018; White, 2019). The Laguna Pueblo's Seven Arrows Garden in New Mexico intentionally protects their seeds from cross-pollinating with genetically modified organisms (GMOs) through traditional planting techniques (Centers for Disease Control and Prevention, 2013).

Harvesting and Food Acquisition

Wild harvesting—including gathering, hunting, and fishing—appears in 30 initiatives. Twenty gathering efforts highlight benefits beyond food collection. The Veggies for Kids research study in Nevada supported Washoe, Shoshone, and Paiute Tribes to collect traditional food like wild onions, buck berries, and pine nuts to bring “the current and past worlds together” (Emm et al., 2019, p. 218). The Squamish Community Health Program promotes physical activity through harvesting (Centers for Disease Control and Prevention, 2013).

Seven IFS initiatives incorporate hunting. The Oglala Lakota Sioux Nation's Teca WaWokiye Cokata (Teca Wawokiye Cokata, n.d.-a) in South

Dakota organizes buffalo, deer, and elk hunts and teaches youth how to traditionally dry and store meat (Teca WaWokiye Cokata, n.d.-b). The Intertribal Buffalo Council based in South Dakota—comprising 69 federally recognized tribes across 19 states—returns buffalo to the land as a wild, non-livestock animal for collective healing (Intertribal Buffalo Council, n.d.). As a result, programs like the Oglala Lakota Sioux Nation's Generations Indigenous Ways in South Dakota hosts a traditional Buffalo Kill and community feed, honoring the animal. Any excess goes to seasonal camps and informal science seminars throughout the year (Generations Indigenous Ways, n.d.).

Fishing occurred in three efforts near waterways. The Yurok Tribe's Food Sovereignty Division of the Environmental Program in California engages youth in fishing events to restore and protect salmon habitat in partnership with federal and state agencies (Montalvo, 2021; Vanderheiden, 2021). Native Fish Keepers, a business run by Confederated Salish & Kootenai tribal members in Montana, provides native trout for customers and partially invests proceeds into species conservation strategies in Flathead Lake (Made in Montana, n.d.).

Food Preparation

Food preparation—including preservation, processing, cooking, and recipe sharing—appears 57 times. Preservation (e.g., canning, dehydrating, and smoking) and processing occur 24 times. The Oglala Lakota Sioux Nation's Oyate Teca (Young Peoples) Project in the Pine Ridge Reservation of South Dakota teaches youth water-bath and pressure canning and dehydration processes (Oyate Teca Project, n.d.). The Karuk Tribe Collaborative's Enhancing Tribal Health and Food Security in the Klamath Basin of Oregon and California by Building a Sustainable Regional Food System program at the University of California Berkeley offers

³ Rematriation is the “reclaiming of ancestral remains, spirituality, culture, knowledge, and resources, instead of the more patriarchal associated repatriation” (Huambachano, 2019, p. 4). Rematriating land entails “returning the land to its original stewards and inhabitants” (Wires & LaRose, 2019, p. 31). Rematriation particularly applies to seed-saving, as the responsibility of caring for and protecting seeds often rests with women (White, 2018). Sierra Seeds also notes, “Rematriation is deep and multi-layered...Part of this rematriation path, of finding our seed relatives and carrying them home, is reawakening the intertwined harmonies of seedsongs of our ancestors, ourselves and those yet to come” (White, 2019, para. 10–13).

over 250 workshops and camps. It connects experienced cultural practitioners and Elders with youth and young adults to, for example, smoke salmon and prepare eel (Sowerwine et al., 2019). In the Standing Rock Sioux Tribe's Native Garden Project in North Dakota, "participants learned how to grind and toast corn wasná, can wild plum jelly, dry chokecherry patties, make box-elder syrup, and prepare medicine from elderberries" (Ruelle, 2017, p. 120).

Cooking—through classes, demonstrations, and events—emerges 18 times. Indigikitchen, a virtual platform created by two food activists who are Native American in Montana, shares online cooking classes, presents to school and public audiences, and posts recipes on its website (Indigikitchen, n.d.). The Indian Pueblo Cultural Center's Pante Project in Albuquerque—a collaborative between 19 New Mexico Pueblo Tribal Communities—is "an innovative teaching kitchen and restaurant centered around Indigenous cuisine education and exploration" that hosts cooking classes and demonstrations (Indian Pueblo Cultural Center, n.d., para. 1). The Restoring Shoshone Ancestral Food Gathering group organizes collaborative events where participants cook food together (Arthur & Porter, 2019).

Recipe sharing occurs 15 times in a variety of ways. Some appear in books like *The Pueblo Food Experience*, which documents the health benefits experienced by 14 Puebloan participants who ate only ancestral diets for three months (Swentzell & Perea, 2016). In Colorado, the Ute Mountain Ute's Bow and Arrow Brand posts cornmeal recipes online for customers (Bow and Arrow Brand, n.d.). The Northwest Indian College Traditional Plants and Foods Program in Washington sends "recipes and instructions on how to prepare and preserve the foods received in CSA boxes" to recipients as part of the Lummi Traditional Food Project (NWIC Plants and Food, n.d., para. 16).

Distribution and Exchange

The search revealed 85 food distribution and exchange efforts—including farmers markets and community-supported agriculture (CSA), sales, restaurants, and increased access and sharing. Seventeen IFS initiatives employ farmers markets and

CSAs. The Cheyenne River Youth Project farmers market is collaboratively run by four of the seven traditional bands of Lakota—the Minneconjou, Oohenumpa, IT'azipco, and SiHaSapa. Proceeds feed back into the project (Cheyenne River Youth Project, n.d.; Hoover, 2014j). Mobile farmers markets, like the Navajo-run Hasbídító in New Mexico, bring produce to food-insecure locations around the reservation (Fisher, 2018). The Hopi Food Cooperative co-sponsors the Hopi Farmers Market and a weekly CSA with local farmers (Hopi Food Cooperative, n.d.).

Food sales occur in 17 diverse ways. The largescale Intertribal Agriculture Council based in Montana runs the American Indian Foods Program. It supports Native American businesses through an international trade export program, Food Connection, which increases exposure in domestic and specialty markets and provides a certification program for a Native American-made product guarantee (Intertribal Agriculture Council, n.d.-b). The Yocha Dehe Wintun Nation's farm and ranch sell wine, olive oil, and other products directly to consumers and online (Yocha Dehe Wintun Nation, n.d.). Several research studies, like Apache Healthy Stores in Arizona, facilitate the increased stocking of healthy products in community stores (Maudrie et al., 2021).

Restaurants and catering occur 14 times as another food distribution strategy. The Quapaw Services Authority in Oklahoma supplies greenhouse produce, beef, and bison to its casino and hotel restaurants (McClennan, 2018; Montalvo, 2021). The proprietors of Tocabe—the only Native American restaurant in Denver—are descendants of Osage people from Oklahoma who educate customers by supporting Native American farmers, sharing family recipes, and positively representing Native American culture (Tocabe, n.d.). Itality: Plant Based Wellness in Jemez Pueblo, New Mexico, provides catering services using locally sourced produce grown by farmers who are Native American to cultivate wellness in Indigenous communities (Itality, n.d.).

Seventeen initiatives facilitate access to healthy food, and 20 share food with community members. The Hopi Tutskwa Permaculture Institute in Arizona supports bartering for fresh produce, vegeta-

bles, crafts, and home-prepared foods (Hopi Tutskwa Permaculture, n.d.). Amidst the COVID-19 pandemic, the Taos Pueblo's Red Willow Center in New Mexico initiated a Food Systems Matchmaker program to facilitate food movement between producers, distributors, and consumers (Red Willow Center, n.d.). Farmers market food access efforts include the Bishop Paiute Food Sovereignty Program in California that accepts CalFresh/Supplemental Nutrition Assistance Program (SNAP) benefits and the Cheyenne River Youth Project that accepts Electronic Benefit Transfer (EBT) cards (Bishop Paiute Food Sovereignty Program, n.d.; Steinberger, 2014). Both channel government assistance to Native American communities (Hoover, 2017).

Food-sharing practices, 20 in total, often prioritize Elders and children. For example, the WahZahZee Osage Nation's Bird Creek Farm Harvest Land program in Oklahoma provides produce and other food to the Elder Nutrition Program, Head Start, and community cultural events (The Osage Nation, n.d.). The Oglala Lakota Nation's Thunder Valley Community Development Corporation's Food Sovereignty Coalition in the Pine Ridge Reservation of South Dakota makes produce available to community members (Thunder Valley, n.d.). Sierra Seeds calls for re-establishing historic intertribal trade routes to strengthen Indigenous trading networks and increase economic sustainability (Hoover, 2017; Sierra Seeds, n.d.). The Native American Agriculture Fund in Arkansas is planning 10 regional food hubs supported by smaller sub-hubs in tribal communities to rebuild Native American food systems (Segrest et al., 2020, p. 26).

Cultural Revitalization

A second major IFS initiative theme is cultural revitalization, or restoring Indigenous food systems relationships to address community, culture, health, and education (Whyte, 2016). Subthemes include community development, youth education, other forms of education, and cultural identity efforts.

Community Development

The search revealed 102 community development strategies focused on community education and

events, family-specific education, and relationship-building. Forty-five efforts include some form of community education, and nine include community-wide events. The Cultural Conservancy, an intertribal organization in the Bay Area of California, hosts public events to facilitate intergenerational, intercultural, and intertribal exchanges where participants "of all ages [can] connect with and learn from the land" (The Cultural Conservancy, n.d.-a, para. 12). The Yurok Agricultural Corporation's Weitchpec Nursery in California educates community members on food sovereignty, including why and how to grow a garden (IndianZ.com, 2020). Some host annual events, like the Santa Clara Pueblo's H.O.P.E. New Mexico Food and Seed Sovereignty Alliance in New Mexico, which shares the Tewa language to honor generations of Indigenous people who have protected and saved seeds (H.O.P.E. New Mexico Food and Seed Sovereignty Alliance, n.d.).

Eleven efforts include family-focused education. The Cochiti Pueblo's Keres Children's Learning Center in New Mexico educates entire families about healthy eating habits to support their young students (Keres Children's Learning Center, n.d.-a). The Traditional Native American Farmers Association states, "family oriented scale farming is the best approach in developing a sound future in agriculture" (Traditional Native American Farmers Association, n.d.-a).

Relationship-building strategies and connections within communities and to the land occur 31 times, with six incorporating a central community space. The Northwest Indian College supports participants in building strong relationships with the land and each other through cultivating, harvesting, processing, preparing, and serving native foods (NWIC Plants and Food, n.d.). The Navajo Nation's Black Mesa Coalition in New Mexico specifically highlights relationships as vital to their growing processes by "revitalizing the food system using a kinship-based approach" and reinstating pre-colonization collective farming practices (Hoover, 2014g, para. 4). The Seven Arrows Garden provides a space for community members to gather and prioritizes veterans' healing from post-traumatic stress disorder (Centers for Disease Control and Prevention, 2013).

Youth Education

Eighty-nine efforts focus on youth education, including K-12 and young adult programming, leadership and scholarship opportunities, and Elders as teachers. For K-12-aged youth, 38 IFS initiatives include summer or year-round options. The Zuni Youth Enrichment program provides summer camp experiences to learn traditional food knowledge and grow empowerment (Hoover, 2014d). The Oyate Teca Project offers year-long classes in gardening, food entrepreneurship, and traditional food preservation (Running Strong for American Indian Youth, n.d.-d). The Karuk–UC Berkeley Collaborative’s Pikyav Field Institute hosts field trips integrated into a culturally relevant K-12 Native American foods curriculum (Karuk–UC Berkeley Collaborative, n.d.). The Intertribal Agriculture Council supports 4-H livestock auction sales for youth to learn about agriculture and business in Montana (Intertribal Agriculture Council, n.d.-c).

Data show 18 educational efforts for young adults. At Aaniiih Nakoda College, Demonstration Garden participants engage in university research, which helps them generate culturally appropriate agricultural sciences knowledge (Morales & Friskics, 2019). The Navajo Ethno-Agriculture Education Farm in New Mexico partners with high schools and colleges to teach traditional agricultural practices through hands-on learning outside of the classroom and offers a full curriculum for college credit (Navajo Ethno-Agriculture, n.d.-a). Similarly, the New Mexico Acequia Association of Pueblo Nations in Santa Fe hosts Los Sembradores Farming Training Project. This nine-month intensive apprenticeship blends ancestral and modern agricultural methods with business planning (New Mexico Acequia Association, n.d.-a).

Youth leadership opportunities and scholarships occur 20 times. The University of Arkansas Indigenous Food and Agriculture Initiative hosts a Native Youth in Food and Agriculture Leadership Summit on agriculture, law, policy, stewardship, and more (Indigenous Food and Agriculture Initiative, n.d.). First Nations Development Institute’s Native Agriculture and Food Systems Initiative awards scholarships for college-aged Indigenous students across the country (Phillips, 2015). The

New Mexico Acequia Association supports 10 local Indigenous youth to learn about history and culture and brainstorm solutions for food and waterways challenges (New Mexico Acequia Association, n.d.-b).

Thirteen initiatives focus on Elders as teachers. The Standing Rock Sioux Nation’s Native Garden Project in the Pine Ridge Reservation has an Elders Advisory Board that plans youth trips for learning stories and Lakota food-gathering practices (Wesner, 2012). On the WahZahZee Osage Nation’s Bird Creek Farm in Oklahoma, Elders pass down food harvesting knowledge through storytelling (Jacob, 2019). With the goal of “strengthening the resilience of our Native food systems,” the Cultural Conservancy—a Native American–led nonprofit in the California Bay Area—integrates youth and Elders into all of its work, “serving not only living generations, but also our ancestors and descendants” (The Cultural Conservancy, n.d.-a, para. 2; The Cultural Conservancy, n.d.-b, para. 1).

Other Forms of Education

Initiatives include 109 other forms of education focused on health and diet, traditional medicine, educational resources, and conferences. Twenty-eight use health and diet education, including 17 health baseline screenings that teach improvement through diet. The Ponca Agricultural Program hosts cooking classes where chefs teach people with diabetes about healthy eating (Hoover, 2014a). Northwest Tribal Food Sovereignty Coalition—part of Wellness for Every American Indian to View and Achieve Health Equity—collects health data to determine priorities for future health and diet educational programming (Frank-Buckner & Northwest Tribal Food Sovereignty Coalition, 2019; Tribal Epidemiology Centers, n.d.).

Fifteen efforts support better health for Indigenous people through education, and six incorporate traditional medicine. The New Mexico Acequia Association teaches participants to make traditional medicines from farm-grown plants (New Mexico Acequia Association, n.d.-a). The Aaniiih Nakoda College Extension Program grows a medicine wheel garden to teach about native

plants that prevent and cure illnesses (Morales & Friskies, 2019).

Educational resources for community members arise 24 times. Well for Culture—an Indigenous wellness initiative in Phoenix—provides an online blog, podcast, videos, and book recommendations to educate about health and diet and optimize the mind-body-spirit connection (Well for Culture, n.d.). Grow Your Own at Nueta Hidatsa Sahnish College in North Dakota provides online videos that teach people how to improve soil health and prepare foods (Benallie, 2021). The Tribal Health and Resilience in Vulnerable Environments (THRIVE) study with the Chickasaw and Choctaw Nations in Oklahoma created a documentary film to “engage tribal citizens, enhance local knowledge, and guide other tribes to improve their food and physical activity environments” (University of Oklahoma, 2019, “Detailed Description,” para. 1).

Nineteen IFS conferences appear in the data. The Intertribal Agriculture Council hosts an annual conference where Indigenous people from across the U.S. share their IFS success stories, furthering their mission “to pursue and promote the conservation, development and use of our agricultural resources for the betterment of our people” (Intertribal Agriculture Council, n.d.-a, para. 1). Similarly, intertribal events occur with Native American chefs, food producers, artisans, students, and scholars, like the Tohono O’odham Native American Culinary Association’s (NACA) Indigenous Food Symposium (Hoover, 2016).

Cultural Identity

Seventy-two IFS efforts support regenerating cultural identity through traditions, language, and food-related crafts. Thirty-four focus on cultural traditions, with nine emphasizing ceremony and spirituality and eight including storytelling. The Pima Indian-owned Ramona Farms in Arizona focuses on revitalizing the bafv, or tepary bean, to restore community relations with cultural heritage (Ramona Farms, n.d.). Sierra Seeds cultivates “intimacy with the earth and ancestral food traditions through medicinal storytelling on seed songs and seed rematriation in innovative, grounding, rich fertile, nourishing learning circles” (Sierra Seeds,

n.d., para. 1). The women-led Sogorea Te’ Land Trust in the ancestral homelands of the Chochoyeno and Karkin Ohlone in the California Bay Area explicitly acquires land to restore Native American foodways and create a sacred space for ceremony (Wires & LaRose, 2019).

Language revitalization efforts occur 14 times. The Oglala Lakota Sioux Nation’s Slim Buttes Agricultural Project in South Dakota hosts a bilingual radio show for gardeners from multiple Lakota Nations (Running Strong for American Indian Youth, n.d.-c). The Montessori school Cochiti Pueblo’s Keres Children’s Learning Center (KCLC) in New Mexico teaches language immersion and traditional food practices for a healthy lifestyle (Keres Children’s Learning Center, n.d.-b). The Mvskoke Food Sovereignty Initiative and the Cherokee Nation of Oklahoma Heritage Seeds teach gardening skills through partnerships with language immersion programs (Hoover, 2014b; Hoover, 2017).

Seven initiatives incorporate culturally relevant craft-making activities directly related to food systems and sovereignty. Skills like basket-weaving, taught by Tohono O’odham Community Action, provide vessels that support food gathering (Hoover, 2014e). Teca WaWokiye Cokata support hunting by teaching skills like bow- and arrow-making and hide preparation (Teca Wawokiye Cokata, n.d.-b).

IFS Initiative Foundations

Lastly, three subthemes provide foundational support for IFS initiatives: advocacy, policy, and stewardship; funding mechanisms; and non-Indigenous partnerships.

Advocacy, Policy, and Stewardship

Fifty-six efforts focus on advocacy and policy, including specific land and waterways stewardship strategies to support IFS. Twenty-one advocacy efforts center on factors like environmental quality, GMOs, and collaboration, and eight explicitly support policymaking. The Ponca Agricultural Program networks with local partners to hold oil refineries accountable for decreased environmental quality and preserve the integrity of their lands and foodways (Hoover, 2014b). Seven Arrows Garden

advocates against GMO seeds (Centers for Disease Control and Prevention, 2013). The Tolowa Dee-ni' Nation's Tribal Food Sovereignty Program in California collaborates with local and federal agencies to manage the land for the long-term perpetuation of their food sources (True, 2020). The Black Mesa Water Coalition, which addresses mining threats to Navajo and Hopi waterways and health, advocates for policies protecting land and food sovereignty (United States Food Sovereignty Alliance, 2019). The Navajo Reservation-based Community Outreach and Patient Empowerment (COPE) compiles policy reports to support Diné food sovereignty (Fisher, 2018).

Land and waterways stewardship efforts occur 16 and 11 times, respectively. Some initiatives work to reacquire land, while others work to restore environmental integrity. As part of work “focused on ecological farming and food justice,” the women-led Sogorea Te' Land Trust facilitates the repatriation of Indigenous lands to Indigenous people (Sogorea Te' Land Trust, n.d., para. 3). The Yurok Tribe has acquired thousands of acres of land through direct purchase and land transfers to restore salmon habitat (Montalvo, 2021). The Muckleshoot Tribe purchased almost 100,000 acres of timberland to promote future food harvesting (Hoover, 2014i). Because mining results in poor water quality and threatens productive agriculture in the Navajo reservation, the Navajo Ethno-Agriculture Farm teaches water quality testing to participants (Navajo Ethno-Agriculture, n.d.-b). The Tesuque Pueblo Farm also protects water as part of their IFS efforts (Hoover, 2014c). In response to devastated salmon populations, which have dwindled due to low water flows and warmer temperatures, the Yurok Tribe has advocated for dam removal for over 20 years (Romero-Briones, n.d.). Four dams are now on the brink of removal (Montalvo, 2021). The Nisqually Tribe Department of Natural Resources successfully removed a dam to restore salmon habitat, producing hundreds of acres of farmland, including the Tribe's Community Garden (Nisqually Indian Tribe, n.d.).

Funding Mechanisms

The second IFS foundation subtheme includes 44 funding mechanisms. These strategies involve 17

broad economic sustainability efforts, 16 Indigenous funding efforts, and 11 business training programs. The proprietors of mak-'amham and Cafe Ohlone donate a portion of their proceeds to stimulate the Ohlone community economy and feed back into the business (mak-'amham/Cafe Ohlone, n.d.). Mvskoke Food Sovereignty Initiative provides food to casinos from in-reservation producers, thereby creating jobs and keeping money in the community (Hoover, 2017). Native American-led nonprofits like Running Strong for American Indian Youth (RSAIY) provide financial resources to IFS initiatives. RSAIY expanded from an initial focus on the Pine Ridge and Cheyenne River Reservations in South Dakota to now support Native American youth and IFS efforts in 30 states (Running Strong for American Indian Youth, n.d.-a, n.d.-b). Funding also comes from larger, Native American-led nonprofits, like the First Nations Development Institute, which nourishes Native American foods, health, and financial empowerment by investing in Native American youth. This work strengthens tribal and community institutions, advances household and community asset-building strategies, and stewards Native Lands (First Nations Development Institute, n.d., para. 3).

Non-Indigenous Partnerships

While not directly or entirely led by Indigenous people, partnerships with non-Indigenous actors emerged as key initiatives for supporting Indigenous-led food sovereignty efforts. These include research, direct funding, and collaboration, which together appear 19 times. University-sponsored funding supports participatory action research projects that assist communities in identifying and achieving their priorities. The Yéego Gardening! study aimed “to learn more about healthy eating and gardening [i]n the Navajo Indian Reservation” and established two community gardens to improve health (Ornelas et al., 2017). The Chippewa Cree Tribal Health and Stone Child Community College in Montana partnered with researchers to determine barriers to entry for community gardens (Brown et al., 2020).

The Kellogg Foundation provides generous support for the Native Agriculture and Food Systems Initiative, which in turn supports smaller IFS

initiatives (Phillips, 2015). The Standing Rock Sioux’s Native Garden Project collaborates with the non-Indigenous organization, Boys and Girls Club (Wesner, 2012). The Black Earth Farm in the California Bay Area is an urban-based holistic healing collaborative between Indigenous and Black people. It grows food for underserved populations, rescues unused food from community gardens, and provides services like nutritional counseling (Black Earth Farms, n.d.).

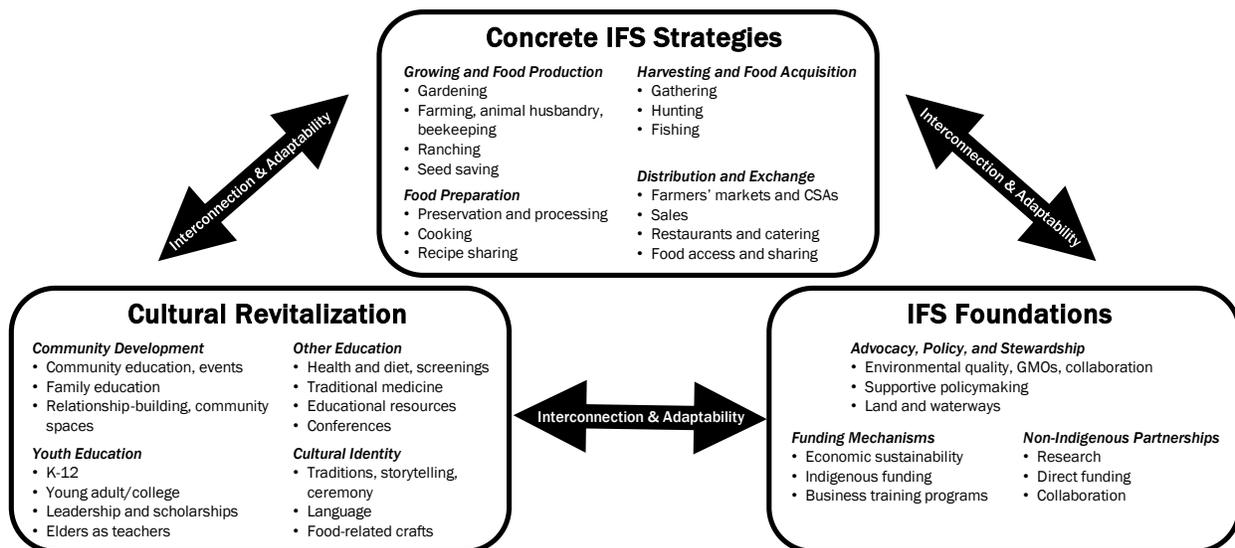
Discussion and Conclusion

IFS is informed by—and is a framework and movement that supports—all the various means through which Indigenous people are revitalizing and reclaiming their traditional foodways. The IFS initiatives described above—organized into themes of concrete strategies, cultural revitalization, and foundations—occur across multiple scales, types, and land bases. This study compiles and provides a glimpse into the many diverse IFS initiatives across the western U.S. and their common themes and key features (see Figure 4). As previous inventories have found and ours confirms, these various initiatives occur through IFS leaders’ deliberate ongoing action (Indigenous Food and Agriculture Initiative, 2015). Initiatives emerge from the leadership and resilience of numerous Indigenous people across the region.

Individually and collectively, these initiatives also demonstrate the IFS values of relationality, responsibility, respect, and reciprocity. These values support the processes of self-determination, decolonization, and education to move toward outcomes of human and environmental health and wellbeing, all of which emerged in our review of the IFS literature. The diverse concrete strategies both restoring traditional foodways and employing contemporary approaches exemplify the many unique manifestations of food sovereignty and the process of self-determination, as noted by Grey & Patel (2015) and Morrison (2011). For example, the Restoring Shoshone Ancestral Food Gathering initiative supports restoring traditional foodways through food preparation events, among other efforts (Arthur & Porter, 2019). The Growing Resilience community-based participatory research project, on the other hand, engaged Eastern Shoshone and Northern Arapaho families in home gardening (Porter et al., 2019). While these tribes did not predominantly engage in agricultural foodways before foreign intrusion, this initiative serves as a manifestation of their present-day food sovereignty (Budowle et al., 2019).

Numerous efforts contribute to IFS outcomes of both environmental and human wellbeing—particularly in the IFS foundations theme—by addressing environmental degradation through leg-

Figure 4. Common Themes and Key Features of Western U.S. Indigenous Food Sovereignty (IFS) Initiatives



isolation and policy, advocating for land and water stewardship, and redistributing land (see Morrison, 2011; People's Food Policy Project, 2011; Robin, 2019). For example, the Black Mesa Water Coalition's waterways and health advocacy demonstrates an emphasis on these IFS outcomes, as does the Yurok Tribe's acquisition of land to restore salmon habitat (Montalvo, 2021; United States Food Sovereignty Alliance, 2019). In addition, emphasizing nutrition through food production and distribution rebuilds health as an IFS outcome (see Alfred, 2009; People's Food Policy Project, 2011). The WahZahZee Osage Nation's Bird Creek Farm Harvest Land program's distribution to Elders, youth, and the community provides an example of how initiatives pursue the IFS outcome of human wellbeing (The Osage Nation, n.d.).

Efforts to revitalize culture through rebuilding community foundations demonstrate an ongoing practice of and commitment to processes of decolonization and education that appear in the IFS literature (Morrison, 2011; Robin, 2019). Indeed, education and learning are important overarching aspects for many IFS initiatives. Youth, young adult, family, and other forms of community and broader education often occur with cultural revitalization efforts. Beyond the cultural revitalization theme and its education-based subthemes, education and learning appear in over half of all initiatives, including those that additionally appear in concrete strategies and IFS foundations themes. An emphasis on intergenerational knowledge exchange between Elders and youth is a key feature in many efforts, as Coté (2016) and Morrison (2011) recommend. The Elders Advisory Board that plans youth trips for learning stories and Lakota food-gathering practices in the Standing Rock Sioux Nation's Native Garden Project in the Pine Ridge Reservation provides an example of this intergenerational education (Wesner, 2012). Many IFS initiatives emphasize youth, such as Zuni Youth Enrichment summer camp experiences for learning traditional food knowledge and growing empowerment, which speaks to the youngest generation's important role in perpetuating culture, as argued by Bagelman (2018) (Hoover, 2014d). Our findings demonstrate that IFS initiatives aim to empower Indigenous people, especially youth, to

better understand, appreciate, and perpetuate their culture through their foodways in accordance with IFS literature (Sowerwine et al., 2019).

In addition to compiling and illuminating initiatives and their key features, this research both echoes and extends scholarly literature on IFS as a movement and framework. Initiatives exemplify values, processes, and outcomes from the literature, as detailed above, and demonstrate two key takeaways that emerge across all IFS initiatives and themes: interconnection and adaptability, also depicted in Figure 4. First, interconnection manifests in both the multiple IFS efforts employed by single initiatives and the relationality within them. While this compilation categorizes initiatives into themes and subthemes to communicate both their range and commonality, nearly all contain elements of multiple themes and employ multiple efforts. For example, the Bishop Paiute Food Sovereignty Program spans all three themes and numerous features. It includes many concrete IFS strategies (i.e., gardening and horticulture, tree planting and composting, animal husbandry, seed saving, gathering, food preparation, mobile markets, and food access). The initiative also engages in cultural revitalization through community, family, youth, and young adult education; community events; intergenerational learning; ceremony; and language revitalization. Finally, the program includes non-Indigenous funding partnerships and advocacy through stewardship services.

Other than the general types and land bases outlined in Figure 1 and themes and key features in Figure 4 and the database itself, we avoid overly typologizing IFS initiatives in ways that would impose Eurocentric worldviews and diminish their richness. Rather, their interconnection is the more resonant finding. It demonstrates the holistic, values-based nature of IFS and is already well-established by IFS scholars (e.g., Morrison, 2011). Interconnection occurs within initiatives, for example, through community gardens, community education, and increasing food access to strengthen bonds between people and their foodways. Relationship-building occurs between individuals, communities, sovereign Nations, and with non-Indigenous partners, with many IFS initiatives serving as collaborative ventures. This demonstrates the value

of relationality emphasized by numerous scholars (e.g., Coté, 2016; Grey & Patel, 2015; Morrison, 2011).

Second, adaptability is an overarching feature of IFS initiatives across all themes. Though foreign intrusion disrupted all Native American foodways, Indigenous people have adapted and continue to adapt to the conditions of colonialism while maintaining and incorporating ancestral traditions (Arthur & Porter, 2019). For example, the historically non-agricultural Sioux Nation has developed robust gardening programs to increase self-determination—much like the aforementioned Growing Resilience example. IFS efforts improve health, restore community wellbeing, and steward ecosystems as adaptive processes that respond to shifting social, political, and environmental systems over time (Whyte, 2019). These include advocating for policy change, protesting environmentally degrading mining and damming projects, and action research to explore and ameliorate health disparities or demonstrate the value of community gardening. Moreover, IFS efforts continue to grow, with many new initiatives emerging in recent years (Centers for Disease Control and Prevention, 2013; Hoover, 2017; Montalvo, 2021). The COVID-19 pandemic further illuminated the importance of adaptive initiatives grounded in IFS (James et al., 2021).

This research contributes a western U.S. perspective to the scholarly literature on IFS, as much of it focuses on Canada, including another compilation we found (Sumner et al., 2019). It also adds to existing inventories and compilations by being the first, to our knowledge, to apply a systematic search methodology to a U.S. context. Additionally, it offers more geographic depth than previous initiatives for a sharp focus on IFS leaders' action in a particular region as opposed to an entire country. Moreover, it provides aggregated, ground-level examples of the IFS values and concepts discussed in the literature. Practically, this inventory compiles these initiatives into one open-access database, which we find to be the most important outcome of this research due to its potential to support IFS initiatives and action in the future. We hope that Indigenous leaders and their allies can use—and, ideally, add to—this

dynamic, living inventory in ways that bolster their current work and help them design future initiatives. We are particularly eager to connect with an organization that can maintain, update, and share this inventory over the long term to reach the greatest number of IFS practitioners, researchers, and educators.

Additionally, we hope this inventory provides exemplary approaches to the mounting food systems challenges faced by all of humanity and other living beings. While Indigenous people and their food systems remain resilient, IFS efforts exist amidst a colonized and commodified global food system. For example, only some of the land and water stewardship IFS foundations initiatives yielded by this search explicitly involve land back or repatriation efforts that are key to IFS. Again, initiatives are part of the ongoing *process* of striving for land access so that Indigenous people and foodways may survive and thrive more independently of the oppressive global food system, as we reviewed above and is noted by several scholars (Coté, 2016; Hoover, 2017; James et al., 2021; Tuck & Yang, 2012). Also, non-Indigenous people can learn much from the interconnection and adaptability demonstrated in these initiatives, following Morrison's (2011) note that appreciative inquiry through IFS can lead to more just and ecologically sound broader food systems. This is particularly relevant amidst the mounting, ongoing, and interrelated social-environmental crises embroiled with and emerging from colonialist and capitalist political-economic and food systems (Arthur & Porter, 2019).

While we attempted to comprehensively inventory IFS initiatives across the western U.S., this compilation is far from exhaustive. Some efforts only occurred once or have not operated in years; ascertaining the recency or currency of some initiatives proved difficult. Many likely have limited descriptions, are inaccessible via internet searches, or lack formal documentation. Furthermore, we suspect our search terms have failed to capture all the nuanced strategies in existence. This study is a mere snapshot of the many IFS efforts warranting celebration, support, and expansion.

Future studies might extend the scope of this

work by updating the inventory over time. Those updates may use additional and more specific search terms, such as “seed-saving” or “rematriation,” that only emerged for us during our systematic search. Additionally, future research should check the descriptions and categorization of these efforts directly with IFS initiative leaders to confirm or adjust our depictions of their work and better understand if initiatives are ongoing or not. We also hope to explore whether and how IFS leaders, practitioners, and researchers are using this inventory in the future and ways to enhance its usability to support their and allies’ work. Finally, while this research uniquely offers a sharp regional focus compared to other broader inventories, aggregating IFS initiatives in

Canada, Mexico, the eastern U.S., Hawaii, and Alaska into one inventory using a uniform systematic search process would more comprehensively shed light on IFS efforts across North America.

In conclusion, Indigenous people have maintained sustainable and adaptive foodways across the so-called western U.S. for thousands of years. Despite foreign intrusion, they are reclaiming and redefining their foodways through IFS. This study identifies IFS initiatives, their themes, and key features in an accessible inventory to appreciate and respectfully celebrate the myriad strategies that manifest as part of a larger movement toward food sovereignty led by Indigenous people. 

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Gardens in a postsuburban region: Community garden governance and ethos in Orange County

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Abstract

Considerable research has examined the changing values and governing approaches of urban community gardens since the nineteenth century in the United States. However, few studies exist for community gardens located in postsuburban contexts. This study reports the findings from six case studies of community gardens in southern Orange County, California, that asked, how are the themes of garden governance and an overarching garden ethos elaborated at community gardens? Our findings suggest that gardens manifest one of three governance approaches which we labeled anarchic, democratic, and corporate. In addition, we found two values frameworks or garden ethoses among

these gardens. One is a community ethos oriented toward realizing values promoting greater community engagement, and the other is an individualistic ethos oriented toward promoting the value of gardening as an independent activity for each gardener in their plot. We argue that just as gardens in the inner city have been sites to address urban problems, gardens in postsuburban environments might also address perceived shortcomings in postsuburban regions. Our findings also suggest that community gardens, particularly in newer suburban developments, reflect a shift in the utopian visions of postsuburban planning away from a consumerist lifestyle to a newer one that enables access to nature and sustained social connections among residents.

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Introduction

Urban community gardening in the United States began at the end of the nineteenth century, when community gardens were created for poverty alleviation and city beautification (Lawson, 2005). Over this history, the values that lie behind urban community gardens have evolved during different periods, such as performing one's patriotic duty during wartime, and, more recently, expressing values of self-reliance, civic engagement, and sustainability. Studies have also identified motivations for community gardening such as food security, health benefits, income generation, youth education, preservation of open space, cultural preservation and expression, and sustainability (Draper & Freedman, 2010; Lawson, 2005; McClintock & Simpson, 2018).

Most existing studies, however, focus on community gardens in traditional urban centers that often lack green space and are densely developed, and in neighborhoods that suffer from higher rates of food insecurity, poverty, and crime. The values and governing characteristics of community gardens in newer, post-suburban cities, defined as multicentered metropolitan regions that grew out of earlier suburban regions to become culturally and economically independent from the older urban core (Kling et al., 1991), have not been investigated extensively. Community gardens in postsuburban regions merit more focused study, given increased scholarly recognition of the deceleration in economic and demographic growth in the world's largest city centers and the inevitability of new suburban and postsuburban development to accommodate the growing global urban populations (Keil, 2018; Kotkin, 2016). The present study examines community gardens in a highly urbanized postsuburban county: Orange County, California. Through the exploratory analysis of six cases, this report aims to illuminate the types of community gardens in postsuburban cities with a particular emphasis on their value orientations, which we call a "garden ethos," and their governance approaches, as these were the two dominant themes for the cases in our study.

Literature Review

Community Gardens in the United States

We begin with a brief overview of the history of community gardening in the United States. Between the 1890s and World War I, industrial cities experienced rapid growth of population, economic instability, and health issues due to the rapidly industrializing urban environment (Lawson, 2005). In response to a series of economic depressions from 1893 to 1915, social reformers began to advocate vacant-lot urban gardening programs for unemployed laborers to relieve poverty (Lawson, 2005). School gardens also emerged during this time as an educational space to teach civic involvement and good work habits (Lawson, 2005). A few decades later, civic beautification movements also attracted support from garden clubs, women's groups, and civic organizations to promote urban gardening. Although these urban gardening programs could be characterized as bottom-up movements, they were often organized by reform-minded wealthy and upper-middle-income volunteers who primarily structured gardening programs with their leadership and land (Lawson, 2005).

From World War I through the Great Depression and World War II, millions of households grew food in the backyard and community gardens in response to a series of nationwide crises. War gardens during World War I encouraged urban residents of all ages to engage in gardening as a patriotic duty to ensure domestic food security and stable food provision for American soldiers overseas (Lawson, 2005). During the Great Depression, subsistence gardens and work-relief gardens provided the unemployed with a source of nutrition and income. Victory gardens during the World War II emphasized promotion of nutrition, recreation, and household quality of life rather than food security. These garden programs stressed the participation of all people regardless of socioeconomic status, "where bosses and workers, husbands and wives, and people from varied ethnic backgrounds worked shoulder to shoulder" (Lawson, 2005, p. 8). Government agencies were crucial in providing leadership and advocacy. Heavy reliance on federal support, however, led to the decline of urban community gardens when the war crisis subsided and

government support decreased. After World War II, urban community gardens largely disappeared.

The urban gardening movement regained popularity in the 1970s, as community organizing, self-reliance, and neighborhood activism through community gardening grew in response to rising food prices, the energy crisis, racial tensions, urban decline, urban renewal projects, and increasing environmental consciousness (Lawson, 2005; Okvat & Zautra, 2011). Unlike the gardening programs in earlier periods that heavily relied on outside civic organizations and government agencies to fund and govern the gardens, urban community gardens since the 1970s have operated primarily with grassroots control and maintenance, with little government oversight or funding. The transition to self-management obligated local gardeners to perform the responsibilities of community outreach and negotiations with city agencies and other organizations to protect their gardens from destruction to make way for other land uses (Lawson, 2005).

This history demonstrates that community gardens have been operated by different actors who governed the gardens and were oriented around different values or an overarching “gardening ethos” that developed through community gardening over time. In the first period, values of charity for the poor and unemployed were realized through community garden programs provided by wealthier urban reformers. In the second period, the state led the governance and promotion of community gardens to promote patriotic values through the democratic participation of all citizens. In the third period, grassroots garden activists took a more “anarchic” approach to garden governance by maintaining the garden themselves to promote an ethos of self-reliance and reclamation of idle land for more productive, community-oriented purposes.

More recent studies further support the evidence for these historical trends. For example, McClintock and Simpson (2018) have described the values and motivations associated with community gardens in traditional urban cores in the United States and Canada, finding six overlapping motivational frames: (1) sustainable development, with an emphasis on food quality, public health,

food security, sustainability, self-sufficiency, food sovereignty, and community building; (2) a radical frame, entails social justice, food justice, food sovereignty, and reclamation of the commons; (3) a do-it-yourself (DIY) secessionist frame that involves an attempted disengagement from the dominant food system based on commodity and market relations, includes reclamation of the commons, gardening as a recreational hobby, therapeutic and rehabilitative qualities, and alternative economy or anti-capitalist exchange; (4) the educational frame, addresses educational values for both youth and adults; (5) the eco-centric frame, involves environmental and agroecological values and sustainability; (6) the entrepreneurial frame, illustrates monetary (income or profitability) values and job training or workforce development purposes.

Other recent studies highlight the more practical benefits of urban community gardening. Horst, McClintock, and Hoey (2017) describe six primary social benefits of growing food in urban areas: food access and food security enhancement, health benefits, income generation, skill building, community development, and incubation of broader efforts to challenge structural causes of inequality. Burdine and Taylor (2018) provide a brief summary of social and environmental benefits of community gardening, such as reducing crime, providing culturally meaningful food, raising real-estate values, especially in impoverished neighborhoods, offering ecosystem services such as stormwater retention and mitigation of urban heat island effect, and facilitating pollination and biodiversity. Community gardening as a way to enhance community beautification and to provide educational spaces has also persisted to the present (Lawson, 2005).

Purcell and Tyman (2019) have reported urban community gardeners’ motivations to promote food justice and reclaim “the right to the city” to establish democratic space within neoliberal cities. Noting the “small but pervasive” practice of urban gardening in the United States, Lawson (2005) states, “urban gardening has been and remains an appealing approach [to improve American urban conditions] because it shows immediate results, is highly participatory, and is relatively cheap compared to other strategies” (p. 11). Poulsen et al. (2014) conducted a qualitative study that explored

self-reported benefits of community gardening rather than objective benefits, indicating that community gardeners perceive community gardening as an “urban oasis” that provides a place to thrive and opportunities to reclaim the city and construct community (p. 73).

Postsuburban Regions and Community Gardening

Most studies frame community gardening predominantly as a phenomenon found in traditional urban cores (Horst et al., 2017; Larson, 2006; Okvat & Zautra, 2011). Lawson (2005) suggests that gardens are currently “described as oases of green in a concrete-dominated urban world [and] [t]hus gardens appear in very urban spaces” (p. 3). Yet Lawson also acknowledges that the word “urban” in urban gardening “broadly refers to the city, its suburbs, and the urban edge” (p. 7). The 2012 American Community Garden Association (ACGA) survey results show that 73% of the community gardens were in urban areas, 19% were in the suburbs, and 8% were in rural areas (Lawson & Drake, 2013).

This urban-suburban-rural continuum ignores the rapid emergence of postsuburban polycentric urban landscapes in many urban regions around the world from the last decades of the twentieth century to the present (Kling, Olin, & Poster, 1991; Scott, 2019). These multicentered metropolitan regions are considered to have emerged out of earlier suburban forms, where the latter is often defined as primarily providing housing and associated services for workers who then commute to the city center for work (Kling et al., 1991). However, postsuburban regions develop their own cultural and economic independence from the urban core with which they were originally associated. Additionally, unlike the typically unplanned development of traditional suburbs, postsuburban regions are often characterized by development through master-planned communities. These planned “new city” developments are often guided by certain ideals for what developers imagine to be ideal middle-class communities, giving these planning efforts a somewhat utopian character from the perspective of the professional middle classes to include “safe” (often meaning demographically homogenous) neighborhoods, local professional

employment, and family- and consumerist-oriented lifestyle amenities. For example, in Southern California, postsuburban development has tended to reflect the class-based utopian ideals found in the much earlier British Garden City Movement (Kling et al., 1991).

With the emergence of postsuburban regions, what had once been suburban regions dependent on a nearby urban core have since become the dominant site in the United States of culture, residence, and economic growth (Hayden, 2003). However, with ongoing suburban and postsuburban growth, tensions persist between the residents’ desire to retain scenic nature and developer interests in converting the green landscape into more profitable suburban development (Hayden, 2003). In postsuburban regions, where population density can be orders of magnitude greater than that of traditional suburbs, these tensions over land use and preserving the scenic and natural aspects of the landscape can be intense. In addition, while postsuburban development initially promised a better life for both wealthy and low-income households, over time class, racial, and ethnic forms of polarization have increased (Scott, 2019). Furthermore, the auto-dependent postsuburban regions have also been associated with inefficient uses of resources and with large amounts of greenhouse gas emissions.

Despite these problems, suburban and postsuburban areas are expected to continue growing. Keil (2018) argues that “under conditions of current trends in technology, capital accumulation, land development and urban governance, the expected global urbanization will necessarily be largely suburbanization” (p. 9). We would add that, particularly for third-wave capitalist developments such as those associated with the information economy, postsuburban development will play a significant role in any regional urban expansion. This argument is not to dismiss the expected contributions of urbanization to societal modernization and environmental sustainability but to challenge the imagined “dichotomy of city and suburb” and to argue that re-urbanization and postsuburban development are a dual process. The growing global population that needs to be accommodated will push out existing urban residents through gen-

trification or migration of mobile city dwellers to entirely new, postsuburban cities (Scott, 2019).

Most studies on community gardening have emphasized the benefits of the gardens and the tensions surrounding deindustrialization and gentrification in the traditional urban cores of many cities in the United States. A very different set of issues associated with community gardening are likely to be present in postsuburban regions, but what they might be has not been well explored. This study seeks to fill this gap by exploring the overarching values (i.e., garden ethos) and governance approaches present in several postsuburban sites in southern Orange County, California.

Study Site: Orange County, California

Orange County is a mostly postsuburban county with more than three million residents, within the Los Angeles-Long Beach-Anaheim metropolitan region. Kling et al. (1991) describe Orange County's transformation over 40 years after World War II from a rural agricultural economy to a postindustrial, multicentered metropolitan region with a robust subregional economy based primarily on technology and information industries, real estate, and lifestyle consumerism. In the 1950s, as open space diminished and land values increased with post-war development, many families and war veterans emigrated from Los Angeles to Orange County as new suburban developments were constructed for workers in the aerospace industry based in Los Angeles. By the 1960s, new businesses and firms, particularly in southern Orange County, rapidly began transforming the region's economic landscape, a new pattern of development consistent with the postsuburban model. Postsuburban development of the new cities of South Orange County like Irvine, Mission Viejo, and Laguna Niguel involved a much higher degree of planning. In the 1970s and 1980s, newly arrived, internationally operated firms headquartered in Orange County increasingly globalized the region's economy (Kling et al., 1991). In the last decades of the twentieth century, through postsuburban development Orange County emerged as a multicentered metropolitan region increasingly independent of cultural and economic ties to Los

Angeles. It is also important to note that, unlike many suburban areas, new cities in southern Orange County were planned for much higher population densities, partly to help secure a better tax base. As a result, even single-family homes lack the large yards that might accommodate gardening activities in many housing tracts.

Research Question

To better understand the role of community gardens in postsuburban southern Orange County, our study is guided by the research question: how are the themes of garden governance and an overarching garden ethos elaborated at postsuburban community gardens in southern Orange County? We address this question through a qualitative comparative case study of six southern Orange County community gardens. In discussing these themes in the final section, we explore how they reflect those identified in previous studies.

Methods

To identify gardens to enroll in the study and to better understand the types and spatial distribution of community gardens in Orange County, the names and locations of forty-one community gardens in the county were identified through an online search. Based on publicly available information, they were categorized into four types: (1) grassroots, (2) municipal, (3) amenity, (4) university. Grassroots community gardens are established and maintained through grassroots organizing by local gardening enthusiasts. Municipal community gardens are owned and managed by a city. Amenity gardens are community gardens provided as an amenity service, typically by the homeowner association (HOA) in master-planned housing developments. University gardens are located within university properties, some of which are partially open to community members unaffiliated with the institution. The four categories were mapped with GIS software.

To select a sample of southern Orange County gardens for interviews and guided walking tours, we identified community gardens using a simple random selection procedure. Six gardens were ultimately enrolled in the study during the period available to the researchers (ending in mid-March

2020 due to imposition of COVID-19 restrictions), representing 35% of gardens in southern Orange County. Table 1 shows the pseudonym names and types of the six community gardens, the year the garden was established, the number of plots, type of land ownership, the overall financial situation of the garden, the neighborhood density level, the percentage of white (non-Hispanic or Latino) neighborhood residents (based on zip code reported in U.S. Census data), and household median income for the zip code in which the garden is located. Table 2 lists the names (pseudonyms) of the interviewees for each garden.

The qualitative methods used to gather data for each of the six cases consist of semi-structured interviews and guided walking tours of each garden site with the garden supervisors, aiming to collect

information about the history, values, and governance of the gardens. Semi-structured interviews were conducted with garden directors at garden sites. Regular gardeners were only invited to share their experiences, informally and spontaneously, during guided walking tours. Interviewees were invited to share the history and management of the community garden, demographics of the neighborhood and the garden users, gardener motivations to participate in community gardening, and challenges associated with maintaining the garden. The interview concluded with a guided walking tour during which the interviewees were invited to share the highlights of the garden.

At only one grassroots community garden and one amenity garden did the directors interviewed participate in gardening themselves. Interviewees

Table 1. Qualitative Research Sample Community Garden

Name (Year Established)	Type	# of Plots	Land Ownership	Density	Budget	Percent White (2017) ^a	Median Income (2017) ^b
Hillside Community Garden (2009)	Grassroots	53	Private land (temporary)	High	Tight	83.1%	\$156,875
East Valley Community Garden (1996)	Municipal	73	Public land	Medium	Tight	58.7%	\$60,218
Verde Community Garden (1977)	Municipal (Senior Center)	58	Public land	Medium	Stable	90.0%	\$138,902
Pacific Community Garden (2000)	Amenity (HOA)	75	Owned by HOA	Low	Stable	65.7%	\$159,504
La Paz Community Garden (2016)	Amenity (HOA)	N/A	Owned by HOA	Low	Stable	82.8%	\$151,723
Cherrywood Community Garden (1995)	Amenity (HOA)	86	Owned by HOA	Low	Stable	50.9%	\$80,234

^a County average (2017) is 41.4%.

^b All values in US\$; county median (2017) is \$86,217.

Table 2. Research Interviewees

Sample Community Gardens	Interviewees (N=9)
Hillside Community Garden	Monica (founder, gardener), Angela (committee member, gardener)
East Valley Community Garden	John (city officer, former garden supervisor), Maria (city officer, current garden supervisor)
Pacific Community Garden	Evelyn (HOA service manager, garden supervisor)
La Paz Community Garden	Claire (private project manager)
Verde Community Garden	Sherry (senior center director), David (gardener)
Cherrywood Community Garden	Michelle (garden club president)

from the other gardens included HOA representatives, a project manager of a private company that ran the garden site for the HOA, and municipal workers who do not engage in community gardening themselves, limiting their experiences and perspectives to those of non-gardeners. However, interviewees' regular interactions with community gardeners, and their knowledge about the history and operational aspects of the gardens, provided useful information for the study.

Findings

Figure 1 illustrates the locations of the four types of community gardens in Orange County. Of the forty-one community gardens identified, nine were grassroots, sixteen were municipal, twelve were amenity, and four were university (Table 3). In North Orange County, municipal community gardens accounted for 58.3% of 24 community gardens. In South Orange County, amenity gardens accounted for 58.8% of 17 gardens. Thus grassroots gardens and publicly funded community gardens potentially open to all city residents are more common in the traditional suburban northern county, suggesting that a public-friendly ethos is more prevalent and accentuated in North Orange County. In contrast, privately operated gardens with limited access are more common in the post-suburban southern part of the county.

From analysis of the interviews, we identified two major dimensions that were common across the six community gardens. The first is the dimension of garden founding and governance, or the responsibility and control that garden members have for establishment and management of the garden site. We identified three garden governance approaches: (1) anarchic governance, in which grassroots activists founded the garden and relied on volunteers from among the members to manage all aspects of the garden through a self-organized

community garden club effort; (2) democratic/public governance, in which a garden is started by community enthusiasts but maintained and governed by the city recreation or parks department; (3) corporate HOA governance, in which a garden has been planned as part of the design of a housing tract without input of garden enthusiasts, and is managed by an HOA employee or outside contractor. A second dimension is the two overall ethos of a garden: (1) a community ethos, oriented toward realizing values promoting greater community engagement, (2) an individualistic ethos, oriented toward promoting the value of gardening as an independent activity for each gardener in their plot,

Figure 1. Community Garden Types and Locations in Orange County, CA

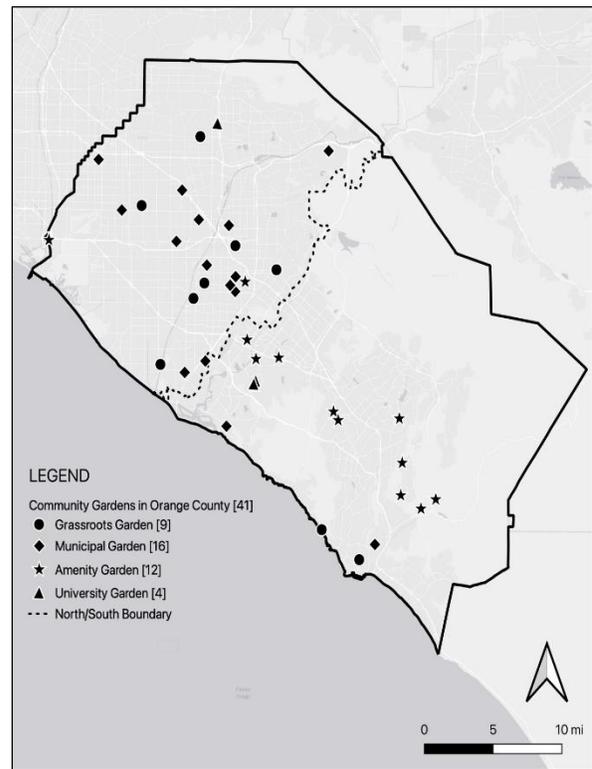


Table 3. Community Garden Types in Orange County, CA

	Grassroots	Municipal	Amenity	University	Total
Total (%)	9 (22.0%)	16 (39.0%)	12 (29.3%)	4 (9.7%)	41 (100.0%)
North Orange County	7 (17.0%)	14 (34.1%)	2 (4.9%)	1 (2.4%)	24 (58.5%)
South Orange County	2 (4.9%)	2 (4.9%)	10 (24.4%)	3 (7.3%)	17 (41.5%)

with an emphasis on the importance, creativity, and joy of gardening one’s own plot alone. The ethos, or value framework, of a garden can exist at different poles of each dimension or be balanced in the spectrum between the two extremes. The individual garden ethos was both noted by the interviewees and physically reflected in the material configuration of each garden. The placement of each garden on the two dimensions is illustrated in Table 4.

We now elaborate on how these two dimensions are represented in the six cases.

Hillside Community Garden

Hillside community garden is on a busy street corner lot in a wealthy Orange County southern beach city. The garden site was very well maintained and designed. One enters it through a wooden handmade gate colored with red paint that welcomes visitors and gardeners alike as they enter the lush green garden area with its colorful flowers and decorations. On the day of our visit, children were playing inside the garden area as their mothers chatted nearby under a tree by a picnic table. Although its origins date to 2003 when a local vegetable seller established an illegal “guerilla garden” on what had been an unused plot of land, the city-sanctioned garden site was established in 2009 on privately owned land whose owner allowed the garden organizers to use it for this purpose. Originally, the garden included 30 raised-bed planter boxes, but it expanded in 2011 to 53.

When we met with two garden board members, Monica and Angela, to find out more about the garden’s origins and management and the values that gardeners realize in the garden, we quickly learned that Hillside reflects a strongly community-

oriented grassroots organization. At Hillside, a membership committee interviews and approves new gardeners before accepting them to the garden and assigning a plot to ensure that they understand the level of commitment gardening requires and are ready to take care of their plots with a sense of responsibility. Gardeners felt a high level of commitment to and responsibility for the preservation and maintenance of the garden site as a whole, including securing land use rights, constructing and maintaining infrastructure, fund raising, and ensuring member adherence to garden rules and regulations. As Monica explained:

I guess [a] unique thing about this garden is that we maintain the whole property. So, [for] a lot of other gardens, I think the city maintains the property as a whole and the person who has the plot just takes care of their plot. They don’t have to worry about the shrubbery around the edge or the mulch on the ground or the water system. We handle everything. So that’s why we have workdays to kind of keep things looking good.

This sense of “handling everything” is one of the unique features of Hillside community garden relative to the other gardens we visited. It stood out as an excellent example of a grassroots community-oriented garden, as both gardener volunteerism and shared responsibility and shared governance of the site were strongly emphasized in the interview. It well represents the anarchic type of garden governance.

Monica and Angela also described a strong ethos of community engagement at Hillside. For example, recounting the garden’s construction and

Table 4. Garden Governance and Ethos for Six SOC Gardens

		Garden Ethos	
		Community	Individualistic
Garden Governance	Anarchic	Hillside CG Verde CG	Cherrywood CG
	Public/ Democratic	Verde CG	Verde CG East Valley CG
	Corporate	La Paz CG	Pacific CG

the community spirit of volunteerism that supported the effort, Monica recalled:

So, all [the garden's] land was just sloping before so all that was re-graded by hand by the volunteers. And so, what we did is, we put signs up on the bulletin board "going to start building the community garden on Saturday. Show up!" And we had no idea who was going to come or how many were going to come or anything, and a whole bunch of people showed up. And they kept coming every Saturday.

Angela added:

What was neat was when we were out here working, some kids were skateboarding down the street when we were trying to place these rocks and do stuff. And he goes, "you need help?" "Yeah," and he just came in, and he wasn't a member of the garden, but the people that walked by. And you know, for me, the most valuable thing about this is the community.

The active engagement and volunteerism of both gardeners and neighbors, as well as in the garden's construction, continued as a central theme throughout the interview. The gardeners at Hillside were strongly committed to allowing non-members to also engage in the garden site. Angela noted that the garden functions as a park and a point of social connection for the community. Monica and Angela described some of the ways that they are open to the general public:

Monica: We don't fence, we don't lock the gates. People are invited to come in, whenever they want. ... I think that's one of the things that's unique about this garden. It's so open to the public and it functions as a park. So, we look at it like, you know, you could have this whole area planted in grass. And you could have a couple of picnic tables and benches all around it, or you could have planter beds and the same benches and picnic tables.

Angela: Right. We are sharing. We are sharing our space.

The community ethos is also elaborated materially at the garden site, with a small concert stage to host concerts, tables and benches, and a little free library. The planter boxes are identical in size and shape, and not as decorative as the common areas. Individual plots are not fenced or gated just like the whole garden itself being open to anyone in the neighborhood. Emphasizing the garden's value to the larger community, Monica summed up the community ethos: "I mean, they [local residents] have seen how we transformed this barren lot with a chain-link fence around it into something that is an asset to the community."

Cherrywood Community Garden

Cherrywood is in a large contemporary suburban housing development that generally houses professional-class workers. The surrounding neighborhood is a picturesque-style community, with winding roads, two artificial lakes in its center, and a flood basin at its edge. At the gated entry to the garden, Michelle, the president of Cherrywood Community Garden Club, welcomed us into about an acre-size garden with 86 plots. Two wooden chairs were next to citrus trees in a garden plot owned by an old couple, and a professional carpenter's plot accommodated handmade stepped planter boxes, reflecting the unique garden vision of each gardener. The garden, located on what had been unused HOA land set aside as a flood plain, was established because of the activism of resident garden enthusiasts in 1995. Michelle described its founding:

I believe it started with one of our senior members. I think he has been here the longest ... I heard it used to be just a basin. And I guess, you know, he and a few members started talking to [the HOA], saying "Hey, why don't we utilize this? It's going to be just piles of dirt and weeds."

As with Hillside community garden, volunteerism is an important aspect of Cherrywood management. The garden club is headed by volunteers

who perform the duties associated with membership management, rule enforcement, and event planning. The garden club is entirely financed by membership fees. However, unlike Hillside, the HOA provides the land and helps with gardener registration. While the garden club's management approach allows the gardeners to retain control of their operations and supports gardener autonomy of their plots, volunteer recruitment for leadership positions was a persistent issue. Michelle said, "It's kind of hard to recruit volunteers. A lot of people just do their garden. They don't want to do anything else. You know, it's more work without pay."

While an ethic of community involvement dominated the discussion at Hillside, Cherrywood demonstrated a more individualistic ethos. The major value framework seemed to be the reward of designing, building, and maintaining a garden plot, as well as learning to plant, tend, and harvest fruits and vegetables. A major motivation for engaging in community gardening mentioned in the interview was the sense of reward and pride that comes with the activity. Michelle said, "You know, [gardening] makes you very happy. It's like raising little kids. It prospers and it becomes something beautiful. You just feel like your kids grow into something really beautiful. And you want to eat it (laughter)." A gardener we encountered during our walking tour shared that she appreciated the relaxing qualities of the garden and the opportunities to connect with other residents from around the world. The interactions among gardeners were not necessarily oriented toward community building but rather focused on exchanging information specifically relevant to a gardener's own plot, including conditions of one's garden and tips on managing plants. Michelle summarized this point: "They really love to garden. They like big plots, and also to communicate with each other." She added:

If you go out there and basically everybody kind of knows everybody, maybe not by names, but they kind of say, you know, whoever goes in their plots, and they will compliment your plants or ask questions. And you know, there are no secrets in gardening. And most people are willing to share what they've found out.

The individualistic ethos at Cherrywood was also reflected in the material arrangement of the garden. Unlike the garden boxes at Hillside, individual garden plots at Cherrywood were fenced, with some as much as five feet high. They are closed off with small gates and locks, demarcating the community and personal realms within the community garden. Public benches or tables were absent at this garden, except for a small table outside the garden perimeter fence where gardeners can leave their excess produce for others to share.

Verde Community Garden

The Verde community garden is located on the property of a city-run municipal senior center in a wealthy coastal city in Orange County several miles to the north of Hillside. As a part of diverse amenity options, such as a fitness center and art studio, the 58-plot garden is a popular option for seniors who use the senior center. The garden was established in 1977 as a result of the activism of a resident senior who was a community garden enthusiast. Sherry, the director of the center, explained the garden's history:

This center opened up in 1977. And shortly after that, one of the seniors who liked to garden said, "Well, there's this whole piece of property, still unused. And we don't have big backyards [in our neighborhoods]. It would be nice to be able to provide garden plots for people." So, it was really one of the senior's ideas.

The land used for the senior center is owned by the city, providing the garden with secure access to the land. The city also covers most garden maintenance and operation costs. The entire garden area was well maintained and designed with concrete walkways installed during center renovation in 2008.

Garden governance at Verde combines the anarchic and the democratic/public types, the latter because the city council ultimately has oversight over the garden as part of the public senior center. The city provided the land and water for the garden site and was responsible for deciding whether the garden site would continue or be used for some other purpose, depending on the needs and wants

of the members of the senior recreation center. However, like Hillside and Cherrywood, Verde was also generally managed by volunteers. Most of the day-to-day operations were under the control of elected officers of the garden club. Sherry described the garden club's management activities:

What the garden club does is they collect a fee upfront, and then the person uses their garden and if they don't use the garden [properly], like if they let it go to weed, then the garden club comes around and says, "I see your gardens not being maintained properly," either maintain it properly or basically they kick them out and take the next person on the waitlist. The garden club also has a monthly meeting where they'll have like a speaker come in and talk about, you know, composting or insecticides or different topics.

The ethos of Verde seemed to emphasize both a sense of community engagement and social connections, and the value of each gardener's personal enjoyment of their plot. For example, David, a gardener who spoke with us, after greeting another gardener, remarked, "That's how it is. [When we see another gardener, we say] 'Hi, how are you? How's it going?'" And that's one of the beauties of a community garden. We come together from everywhere here. And this is a place that we can get to know people and it's a wonderful hobby." He explained further:

But why do we have a garden here? Because it provides an opportunity for seniors to be doing something outside their home. We don't want them sitting in front of a TV, watching TV all day long. And that's why our center exists. To get people here to be active and involved, socially interacting with other people, and it makes us live longer!

Providing a place for seniors to remain engaged in the community appeared to be a major theme. The garden, fitness facility, and art studios are placed next to each other within the property of the senior center, a physical configuration that conveys that gardening is one of diverse options

for seniors to be active and to interact.

The value that gardeners find in tending creatively to their plots came through distinctly. David described this value in terms of why the garden site was so popular among senior center users:

I mean, it's always been popular because people do like to garden, and some don't have a place to do that. And here we provide them with that place to do whatever they want to do. They can grow vegetables. They can grow flowers. They can do whatever they choose that makes them feel good. So that was initially why it was brought out.

As at Cherrywood, individual plots at Verde were closed in by low fences and materially elaborated in ways suiting the tastes of each gardener. David admired the results, such as the work of the gardener whose plot was next to his own: "This is [my neighbor's garden]. I admire everything she does, and I learn from her all the time. None of us are professional gardeners. We're all volunteers or just love it. And it's a hobby." The absence of benches, tables, and common areas within the garden site also implied that garden land was dedicated for individual garden activities rather than extensive social use by the gardeners themselves or outside community members.

East Valley Community Garden

East Valley community garden is in a lower-income city where many Latino service workers reside, surrounded by the wealthier cities in the southernmost region of the county. The garden opened in 1996 on a city-owned property in response to a local garden enthusiast's request for establishing a city garden program. The city provides water and trash removal and covers about 60% of the maintenance costs. As we toured the garden, watching out for the occasional errant baseball that might fly in from the nearby field, Maria, the current garden supervisor, showed the 73 plots of four different sizes that make up the garden site. Although some plots had benches, parasols, and painted gates, these gardens were relatively less decorated compared to other gardens we visited.

Unlike the previous three gardens, gardener-

organized community engagement and garden management are absent at East Valley community garden. The staff for the city recreation department handles all administrative aspects of the garden other than the maintenance of individual garden plots. The garden administrators are answerable directly to the city council, making East Valley the clearest representative of the public/democratic governance approach. City workers perform all the maintenance and garden management work other than individual plots, such as managing the membership and waiting lists, rule enforcement, fee collections, and weeding the walkways. The city also pays for water and trash removal. One of the former garden program directors, John, described city employee's work in the gardens:

It takes Maria time and effort to go out to look at the gardens and see if they're being kept up the way they should be. If they're not, then she has to come back and type a letter and mail it out to them. ... And sometimes you've got to go out and check if people are saying the faucets are leaking, or that, you know, the water is coming out from the hose. You've got to go check and see ... that [everything] is working.

The city was unable to organize community events for the gardeners, largely due to the limited city budget for the garden program. While touring the garden and discussing other gardens in the area, the subject of the strong community orientation and community events held at Hillside came up. Maria responded: "See, I want something like that. That's what our director was saying she'd like. ... But, you know, budget cuts. We'll see if it happens."

The ethos at East Valley community garden seemed to emphasize the realization of individual gardener needs and values, such as a sense of reward and capacity to supplement household grocery needs. John, a former garden supervisor, discussed the values that the garden supports for program participants:

I think there's a sense of pride, a little bit in growing something from scratch, a seed, and then seeing the ultimate, you know, prize, kind

of, tomatoes or onions or cabbage. ... In some cases, it's a sense of urgency because they may need that food to supplement their meals. I think in a lot of cases, as Maria said, we've got a lot of retired people, and it's to organize it in the right way, so in this little portion of the section of my garden parcel, I've got onions and in this one I've got tomatoes, and this one I'm going to have cabbage. So, there's a sense of pride, not only in growing the final product, but a sense in organizing it, and keeping it organized.

Maria continued:

Some of them. They get creative, and they add like anything, like because you can if it's within our rules, you can get creative and add whatever you want. So, some people, you know, they can bring their benches and have them in there and, you know, a lot of them do. They go in there and they just relax, they sit there for a while. It's like very peaceful and that's what they do. They go there to relax.

The biggest plots available (29 by 20 feet) looked more like a small farm than a garden plot, allowing for a larger scale of food production. Like Cherrywood and Verde, no tables or benches intended for social interactions for gardeners were installed. Small, decorated gates and short fences also demarcated the individual garden spaces and common walkways.

Pacific Community Garden

Pacific community garden is in an unincorporated, master-planned suburban housing development that houses professional-class residents. Unlike the previous four cases, this garden with 75 individual plots was established in 2000 by the developer as a part of the housing development. The garden area is part of a larger outdoor park complex, with paved hiking trails, well-manicured lawns, and picnic tables, near a large outdoor sports complex.

We met with Evelyn, an HOA employee and the supervisor of the garden for our interview. The absence of community control over this community garden soon became clear. Under the corpo-

rate garden governance approach, the HOA enforces rules, manages membership, sends out emails, collects fees, and maintains the common areas. Although gardeners have autonomy and active control over the configurations and crop tending in their plots, there is no garden club or event planning that facilitates community ownership of the garden. Evelyn explained:

The garden used to be run more by the residents with very little of the HOA management intervention. However, we found that the residents weren't very good at managing the money and managing the budget. We had residents accusing the people that were managing the budget of not using the money properly or of stealing money. So, at that point (sometime around 2012 or 2013), the board of directors for the HOA decided that we needed to take that over.

Evelyn noted that the HOA provides and maintains the perimeter fences and landscaping, weeding the walkways, trash cans and trash removal, garden tool sheds, and even growing rosemary on small sections of the common area. The garden hires a professional arborist and two horticulturalists who oversee the landscaping of the common areas. When we asked if the garden hosts workshops or social activities, Evelyn described the gardeners' dependence on the HOA for organizing gardener activities:

There really isn't. The reason for that is, because it's really up to them. If they come to me and say, "Hey, we like to have a meeting and create a garden club," I could help with that as far as sending emails out. I can provide them with a clubhouse at no charge. But just, we don't have staff to be able to really be able to dig in and facilitate that stuff. It would be great if we could. We just don't have anybody.

As we shifted our conversation to the values of this community garden, we learned that it was founded upon the housing tract developer's strong desire to provide a green space that would promote

a sense of community and social interaction among residents. Evelyn explained:

I think it's just, you know, for a sense of community to bring people together. The developer, they are very big on community spaces. So, we have quite a long trail system. We have, I want to say, about 125 parks. We have a lot of neighborhoods where the homes face each other with a walkway in between to encourage neighbors to see each other and interact. So, this is just another way to help bring people together, doing something fun, getting them outside, bringing their kids in to learn about gardening.

For gardeners, an individualistic ethos seemed more prominent. Motivations and values seemed to range from the opportunity for outdoor exercise, access to healthy food, social interactions, expression of creativity, to educational values of teaching and learning about how to grow food. Evelyn listed the reasons why residents would start community gardening:

I think that being outside. Just probably maybe the different types of meals that they can create. ... Of course, an interest in gardening and an interest in plants and for a lot of them, I think, it's just social interaction, too. They're here they're doing something that they love with other people, that also have those same interests, you know. ... I would say that probably a lot of the gardeners are interested in organic gardening, so you know I'm sure that's a big topic as well. Some people get really creative and fancy with their gardens. Other people just want to come in and garden, they don't really care to make it super fancy looking. They just want to come and garden, just kind of the basics.

Although some residents could garden at home, the community garden attracts gardeners because it is more spacious than their balconies or backyards, and allows sharing of gardening knowledge and ideas among gardeners.

Some benches for common use were available

along the walkways in the common areas. But tables and open spaces for more extensive social use or for a garden club and community programming that would allow social interaction were absent. Some gardeners had installed chairs, tables, and parasols within their individual plots, but most plots had low fences to keep out other gardeners as well as wildlife. Some plots were highly decorative with animal decoys and pinwheels, and others were paved with stepping stones.

La Paz Community Garden

La Paz community garden is in a fairly new, wealthy suburban development built in 2013. La Paz reflects the corporate garden governance approach, and the ethos is strongly centered around the values of community development and social interaction. The garden was established in 2016 as a part of the development, or “development supported agriculture,” as Claire, the contracted manager of the garden, put it. Behind a robust wooden entry gate, four long picnic tables with overhead terracing welcomed our team. The garden includes open plots for crops, raised planter beds, fruit trees, a chicken coop, and a playground for children, providing about 200 members of the garden program with access to a variety of foods and to various planned community activities. The interview began at a picnic table next to a large garden shed housing larger farming tools, an office space, and a walk-in refrigerator to store harvested produce. Unlike the other gardens we visited, there are no individually assigned plots at La Paz. Members work communally, tending crops that are planned by one of three professional farmers who work for the company that manages the HOA-sponsored garden program.

When we asked why the developer decided to provide this amenity for food production, we were surprised that it was perceived as a marketing opportunity to homebuyers. Claire explained that the combination of real estate and food opportunities, such as restaurants, farmers markets, and farms and garden spaces, has become a booming trend in forward-thinking housing development. Here, we see a shift in the tendency of postsuburban regions from promoting an older, class-based, consumerist lifestyle as identified by Kling et al.

(1991) toward a newer, class-based lifestyle that promises a greater engagement in nature and opportunities to participate directly in urban agriculture. Interestingly, the relatively new planned development of which La Paz is part does not include a large “big-box store” commercial development but does include extensive open green spaces for residents to enjoy. Claire noted that, “If you look at like, well, what’s trending, people, especially our age [younger generations] are interested in where their food comes from, high-quality food organic food. And so, providing an amenity like this is extremely attractive to homebuyers.” Claire also pointed out that community gardens and farms benefit developers by allowing them to save development costs and fulfill development requirements:

Additionally, it’s a very affordable amenity. So, if you think about how expensive it is to build a clubhouse and a pool and a gym and maintain it, a farm can be just a unique similar amenity, right? You don’t swim, you farm. You don’t work out, you farm, right? And so, I think it provides the developer unique marketing affordable amenity space. And it also has stacking opportunities, so developers are required to provide a certain amount of recreation space. They’re also required to provide a certain amount of green space and have a certain respect for the ecology. So, a farm kind of hits all those spots, right? The ecology, the recreation space, and the green space.

Since the garden has been established as a part of development requirements on a developer’s property, the garden land is secure.

Like Pacific community garden, La Paz operates with the corporate garden governance type. The HOA contracts with a private company that provides staff to oversee all aspects of the management of La Paz. As the garden project manager, Claire also plans community events for members. Unlike the first three community gardens described above, the garden members’ active role in garden management is not required.

Claire made it clear that the garden ethos at La Paz reflects a strong emphasis on communal work

and community engagement rather than supporting individual gardeners to realize particular needs and values within their plot. Members participate together in various aspects of food production, generally under the direction of the garden staff. Claire described the value of this communal approach:

When we farm together with a whole space, you can harvest from all these different crops that you might otherwise not have room for. [However,] when you have a small garden plot, you don't really have the potential to do things like that. ... The other thing is individuals make a lot of mistakes. Like, I don't know if you've tried to ever grow anything, but even for me I've been growing food for almost eight years, and I still make really bad mistakes you know like, "oh!" And then if I fail, then I don't get any food. But here, there's a lot of room for mistakes to be made and a lot of chances to collaborate and share knowledge. And, say, you are part of our farm, and you go on vacation for a month, your whole community keeps the garden going whereas you have your own plot, then all of a sudden, things don't get watered, things don't get weeded, things might die, a rabbit might eat your food. So those are some of the benefits of growing food together. ... So, we grow everything together. It's all nobody's. It's all everybody's.

There are several non-farming spaces designed for social uses, such as picnic tables, playgrounds, a farm stand, and a large open space where monthly potlucks and an annual barn dance take place. Claire described the garden's collective spaces that residents can enjoy:

So, obviously one of the things that's unique about [this garden] is it was really designed to be able to entertain, right? So, you have like the grand entry, you have the terracing overhead, kind of this like big barn space that could be cleaned out for events that we want it to be. And so, it was designed with all this landscape in place. And it's all ADA accessible. You know, you could set up tables or games or any-

thing sort of all over the place so that it's really accommodating for things like events.

Asked to describe the values that the members of the garden can realize, Claire presented three, derived from the communal nature of the garden's design and management. They were access to healthy food, access to therapeutic activities, and social connection and interaction:

I mean obviously, anyone who's a member gets free organic food, right? I think a lot of people are very attracted to the therapeutic quality of like coming, getting their hands in the dirt, growing something to the point of being able to eat it. ... A lot of people appreciate ... a fun way to get to know your neighbors like how else do you meet your neighbors, other than like going and shaking their hand. ... And you get to know them in a very casual setting, right? ... You know you're just out here pulling weeds and you start chit-chatting about life. And that's such a natural way to connect that people find that really rewarding.

While the HOA provides other amenities and community events, so that residents can exercise and socialize, the garden's unique potential to bring residents together regularly was emphasized. What was decidedly absent at La Paz, as compared to other gardens, was a sense of being able to express oneself creatively and to invest in the personal care and nurturing of one's own crops.

Discussion

This study's research question is, how are the themes of garden governance and an overarching garden ethos elaborated at community gardens in southern Orange County? A gradient of community garden governance approaches and garden ethoses were observed, from older areas to newer housing developments. The community gardens found in relatively older developments, such as Hillside, Cherrywood, and Verde were primarily operated by community gardeners through an anarchic governance approach. Some gardens in denser areas demonstrated a democratic/public govern-

ance approach, through which gardens are managed by municipal workers. These community gardens are located in developments established by the 1980s and 1990s. Community gardens located in developments established after the 2000s, such as La Paz and Pacific, have been founded and managed through the corporate governance approach. The near total control over garden governance by agents of the HOA reflects the substantial degree of corporate planning of the entire community.

An overall garden ethos also strongly characterized the community gardens. The main motivations and values described by the interviewees include building social connections; accessing free, healthy food; and gardening as a recreational hobby. Some gardens emphasized community development while others focused on more individual enjoyment of the garden (i.e., growing and harvesting plants in individual plots, expressing creativity, a personal hobby). Gardens with a strong individualistic ethos were characterized by less community involvement and greater privacy and individual autonomy over gardening activities. On the other hand, a community ethos promoted a collective and communal experience of the gardens, where common space is elaborated, fences are low, and community events take place frequently to facilitate social interactions.

The values of community gardens for social connections, healthy food, and as a recreational hobby found in our study support what has been found in other studies. The 2012 ACGA Community Gardening Organization Survey results show that almost all community garden organizations listed social engagement and well-being, food production and access, nutrition and improved diet, and individual personal satisfaction as a community garden's primary and secondary benefits (Lawson & Drake, 2013). Our findings also are consistent with a qualitative study by Poulsen et al. (2014) that describes the major benefits of community gardens as building social bonds, connecting with the larger community, breaking down social barriers, and having a personal place to thrive by enhancing bodily health and cultivating psychological well-being (p. 73). In addition, McClintock and Simpson's (2018) first motivational framework (Sustainable Development, particularly food quality and

community building) and third motivational framework (DIY secessionist, particularly reclamation of the commons, gardening as a recreational hobby, and therapeutic and rehabilitative qualities) reflect the values found in our case studies. However, other practical benefits and values of community gardens (Burdine & Taylor, 2018; Horst et al., 2017) did not appear, perhaps because they are intended to address issues primarily at more traditional urban cores.

The history of community gardening in the United States suggests that the values and ethos realized by gardening have been defined by those who govern the gardens. In the first period of community garden history, social reformers defined the ethos of the gardens as improvement of individual minds and alleviation of poverty. During wartime, the state defined the garden ethos as a patriotic duty, and garden activists after the 1970s defined their ethos as reclamation of urban land and anarchic self-reliance. The history of community gardens also suggests that community gardens can contribute substantially to solving problems in urban cores, such as poverty, unemployment, brownfields and urban blight, and lack of access to fresh, high-quality food. In the postsuburban context, community gardens appear to help mitigate the persistent lack of social interactions and space for shared values in postsuburban neighborhoods. In addition, as the residents of master-planned communities lack space for creativity and personal expression due to the uniformity and strict rules placed on land use, the anarchic and public/democratic gardens that emphasize an individualistic ethos seem to provide opportunities for creativity and resident control on the individual lot level (i.e., Cherrywood, Verde, and East Valley) and the community garden site as a whole (Hillside).

Another dimension of the history of community gardens is that they become sites for the realization of different utopian ideals that gardeners and those who govern them have pursued. The images of utopia that garden advocates have pursued range from neighborhood beautification, creating ideal democratic and patriotic citizens, promoting an ethic of self-reliance, and promoting environmental sustainability and healthy communities. Our case studies reveal that some community

gardens in the newest postsuburban developments emerged as part of private developers' utopian vision of middle-class life, which promotes sustained social connections among residents and access to nature. Both the La Paz and Pacific community gardens were built because of the visions of their developers for creating spaces that enabled residents to foster connections to one another and productive relationships to nature through tending crops. This utopian image may reflect changing planner visions, from middle-class privacy of older developments in the 1980s and the 1990s to the community orientation of newer postsuburban communities after 2000. These newer gardens are also associated with a decline of gardener control over the governance of the gardens they cultivate, and thus community gardens have become a true amenity that tends to be a site of production and consumption rather than a place to be built, managed, and sustained by the hands of gardeners themselves.

Conclusion

Our study investigated how community gardens in postsuburban regions can be characterized by a range of governance approaches and also different sets of gardening values. In some ways, the issues of garden governance and gardening ethos are like those found in other studies of gardens located in the traditional urban core. In the postsuburban environment of southern Orange County, community gardens are governed by gardener volunteers, municipal workers, or the corporate offices of the HOA. The gardens we visited were also characterized by either an individual-focused or a community-focused ethos. The realization in the gardens of different poles along these two dimensions may represent the articulation of different utopian visions for ideal middle-class communities, visions that are often at the heart of postsuburban planning and development. As one of the commentators on this article noted, how community gardens

in postsuburban regions might reflect a broader effort to realize a pastoral and therapeutic vision of the United States is an interesting topic that merits further study. Historical examples of such efforts include Olmstead's design of Central Park and Boston's emerald necklace, and also the founding of the national parks. Community gardens in the postsuburban development might be considered a continuation of the earlier visions of ideals for the picturesque, remote, and healthy suburban life that informed the design of early elite suburbs in the late nineteenth century and away from the mass-production, consumerist image of suburban life that reflected post-World War II developments, such as those of the Levitt Brothers (Hayden, 2003).

Despite this study's contribution through attempting to expand the scope of community garden literature from primarily urban to postsuburban contexts, one crucial limitation is the small sample size of our cases. A larger sample and the investigation of community gardens in different postsuburban cities will help to better understand the characteristics of community gardens in postsuburban regions and their relationship to underlying problems and ideals of postsuburban development. An investigation of community gardens in other postsuburban and suburban environments could also provide additional information that could allow a more thorough comparative analysis of community gardens, and enables illumination of the unique characteristics of postsuburban community gardens compared to urban and suburban community gardens. 

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Farmer perceptions of climate, adaptation, and management of farmworker risk in California

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Abstract

Adaptation across systems¹ in agriculture is essential for sustainability under ongoing climate change. Farmers and agricultural employers implement changes in their work (e.g., mechanization, changing crops, managing workspaces) in ways that may directly impact worker health. In this study, semi-structured interviews were conducted with farmers

and farm labor contractors in three agriculturally productive regions of California. We investigated (1) how farmers view changing climate in terms of worker safety and health; (2) how they are currently adapting to long-term weather patterns; (3) how their choices of management practices might impact their workers; (4) how they view their responsibility for their workers; and (5) what their

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Declaration of Interest Statement

No potential conflict of interest to report.

¹ We use the term “agricultural system” to refer to any system that produces livestock and crops, including the social, political, and economic components of that system.

overall observations are concerning environmental changes. Many employers made a clear distinction between weather and climate but not all agreed on whether they were experiencing climate change. Heat was notably the biggest climate hazard farmers identified. Most of the employers interviewed were proud of their longevity and ability to adapt to changing conditions in the field; however, they did not have established emergency procedures. Despite regulations that put the onus on employers, most participants believed that workers needed to take individual responsibility to keep themselves safe in the workplace. This research is one step in an ongoing research process designed to address the impacts of health and safety for agricultural workers in the context of climate change.

Keywords

Agriculture, Climate Change, Farmworker Health, Extreme Weather

Introduction

Background

In 1938, the U.S. implemented the Fair Labor Standards Act. However, this act and the included labor standards exempted agricultural employers, resulting in “agricultural exceptionalism.”² As a result of this exclusion of agricultural workers from labor standards, agricultural employers have greater freedom to manage their employees than employers in other industries (Irfan, 2020). This has contributed to generally lower wages, fewer workplace protections, and a high annual number of fatal and non-fatal injuries (American Public Health Association [APHA], 2011).

California, ranked first in the United States for agricultural production, generated over US\$50 billion in cash receipts in 2018 (California Department of Food and Agriculture, 2019). California’s agriculture focuses on specialty crops that rely heavily on hand labor. Historically, much of California’s success could be attributed to the dis-

advantage of workers. Yet, in recent years, California has striven to bring state laws for farmworkers into accord with the broader Fair Labor Standards Act³ against much industry opposition (Getz et al., 2008). The state has successfully passed laws protecting farmworkers from abusive employers and health and safety risks.

In 1975, California farmworkers were allowed to organize as a result of the grape strikes 10 years earlier (Garcia, 2013). This movement led by farmworker advocates eventually led to an overtime rule enacted to limit regular pay for farmworkers to 10 hours a day or 60 hours a week in 1976. In 2005, the first legislation on worker safety under high outdoor temperatures was passed. This policy was designed, along with an aggressive campaign, to target farmworkers in the state who were dying at high rates due to heat-related illness. In 2016, legislation was passed to raise the minimum wage to US\$15, phase in overtime pay, and reduce the standard workday for farmworkers to comply with the state standard for all other workers (Agricultural Workers: Wages, Hours, and Working Conditions, 2015–2016). Alongside this legislation, additional laws were developed to protect vulnerable outdoor workers.

Extreme weather events caused by a warming climate will result in dramatic changes over the next 50 years, including increases in the number and intensity of heatwaves, longer wildfire seasons with more intense fires, and extreme weather conditions leading to flooding and drought (Tippett, 2018). Climate change has the potential to seriously affect agricultural workers in California; in fact, they may already be experiencing consequences. Increased risk to workers for heat-related illness is just one component of a changing climate. It is anticipated that rising temperatures may also increase exposure to hazardous chemicals in the field that have unfavorable impacts on farmworker health (Levy & Roelofs, 2019). As temperatures continue to increase and heatwaves persist longer, scientists predict that the distribution of weeds,

² Agricultural exceptionalism—a current term in the political science literature—holds that the farming industry is different from most economic sectors in modern societies, contributing to broader national interests and goals, and warranting extensive state intervention.

³ <https://www.dir.ca.gov/dlse/>

insects, and plant diseases will change, potentially introducing new pathogens. These new pathogens could subsequently alter the levels and types of pesticides to which workers are exposed (Boxall et al., 2009). Each day farmworkers are exposed to conditions—for long durations and at high intensities—that most other workers do not experience. While farmworkers cannot avoid these conditions at work, they face the additional challenge of recovering from them due to their low socioeconomic status and substandard housing conditions (Ramos et al., 2016).

Since changing climate poses risks to workers, employers need to consider both adaptations to the changing climate and potential rescue measures in the case of extreme events. Conditions such as increasing wildfires will decrease air quality and directly risk workers in wildfire-prone areas (Bedsworth et al., 2018; Riden et al., 2020). Research is beginning to address how changing weather patterns will impact human health in general. Still, there is little information on how it will specifically affect the health and safety of farmers, farmworkers, and agricultural communities. California agricultural workers in field labor are exposed daily to the elements and experience firsthand the effects of a changing climate.

Objective

This research was designed to examine the perspectives of farm employers in three agriculturally diverse regions of California, with a focus on climate change and worker risk. The overall aim of the research project is to address possible impacts on the health and safety of workers by developing informational materials for both employers and workers on risks associated with climate change. Moreover, the objective of this work was to gain a more nuanced understanding of how farmers view changing climate and how climate change will impact their management practices, including labor.

Therefore, we gathered information on how employers view the effects of climate change on

the health and safety of their workers, what employers are doing to address extreme weather events and respond to risks faced by their field crews, and how employers view their role in adapting to risk and mitigating it for their workers.

Our data show (1) what farmers' overall observations are concerning environmental changes, (2) how farmers view changing climate in terms of worker safety and health, (3) how they are currently adapting to long term weather patterns, (4) how their choices of management practices might impact their workers, and (5) how they view their responsibility for their workers. This research represents one of the first steps to address impacts for the health and safety of agricultural workers in the context of climate change.

Materials and Methods

Study Area and Selection of Interviewees

As part of a larger ongoing research project entitled “Agriculture and Climate Change Impacts on Workers’ Health and Safety,” interviews were conducted in 2018 in the Fresno, Salinas, Imperial, and Coachella regions of California, as described by Riden et al. (2020). (See Figure 1 for the location of the study areas and Table 1 for the workforce population in each region.) These regions were selected because they all have ample production of specialty products reliant on hand labor. For example, in Monterey County (including the Salinas Valley), it is estimated that 50–60% of the cost of strawberry production is labor (Martin, 2020). We also collected historical information from employers on recent weather-related experiences for our selected regions, focusing on heat and drought, poor air quality and wildfires, and extreme rain events and flooding. Institutional review board approval was received for this study.⁴

The California Institute for Rural Studies (CIRS) developed a list of over 50 potential interviewees based on more than 40 years of prior research and established connections in agricultural areas, as well as information gathered from farm-

⁴ Approved July 28, 2017; IRB Registration Numbers IRB00008463, IRB00003657, IRB00004920, IRB00001035, and IRB00006075. IRB by IntegReview, 3815 S. Capital of Texas Hwy, Suite 320; Austin, TX 78704 USA; +1-512-326-3001; <http://www.integreview.com>

based organizations. Individuals on the list of potential interviewees were screened for eligibility as described by Riden et al. (2020). The list was culled to 30 potential participants, and 16 agreed to participate. Agricultural employers, including direct-hire growers and farm labor contractors, were eligible for interviews. Throughout this paper, we will refer to agricultural employers as growers (only farm owner-operators who hire crews directly) or employers (direct-hire and farm labor contractors).

Interviews

This study was completed through semi-structured interviews with farm employers—both owner-operators and farm labor contractors (Appendix A). There was a wide range of types and sizes of employers reflecting the diversity of California agricultural employers (see Figure 2). Based on employer responses, we predicted the issues that the agricultural workforce may or will face as employers work to mitigate and adapt to climate change.

In our interviews, we asked employers about their knowledge, experiences, and perceptions related to climate change. We also asked employers about their specific adaptations to changes in long-term weather patterns, including how these weather patterns affect their labor management.

Our interview guide (Appendix A) was organized by specific weather and climate topics. It consisted of open-ended but targeted questions on heat impacts and responses, air quality impacts and responses, and rain and flooding impacts and responses. The questions were designed to better understand which factors most impact employers' choices related to labor management and worker safety. With a comprehensive understanding of these factors, it is hoped that the collected data can develop future strategies and policies needed to protect the health and safety of agricultural workers in California.

Telephone interviews were conducted with 16 growers: six in Fresno County, four in the Imperial/Coachella Valleys, and six in the Salinas Valley. One primary interviewer was supported by two other experienced interviewers. Interviews ranged in length from 30 to 90 minutes, with most lasting no more than 45 minutes. Since participants

Figure 1. Map of the Study Area



Table 1. Farm Labor Workforce Estimates in Selected Counties, 2017

County	Farmworker population estimate
Riverside*	12,600
Imperial*	11,700
Monterey **	52,500
Fresno	46,500

* These counties include the Imperial and Coachella Valleys

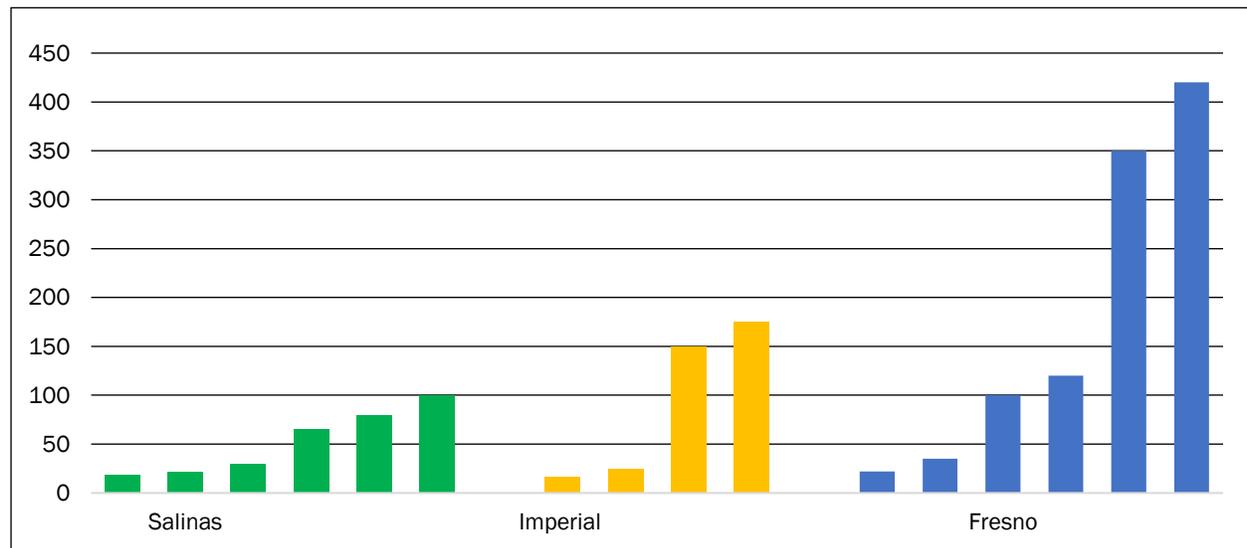
** This county includes the Salinas Valley

Source: Employment estimates from California Employment Development Department (2018).

preferred that interviews not be recorded, detailed notes were taken during interviews, read back to the interviewees for accuracy before closing the interviews, and reviewed by the CIRS project director as described in our previous publication (Riden et al., 2020).

Because the sample size is relatively small, there was some concern that respondents could potentially be identified. Therefore, the gender of growers is alternated between male and female to increase participants' confidentiality. In addition, all employers in the Imperial/Coachella Valleys are referred to as "Imperial" with regard to their quotations.

Figure 2. Crew Size by Region in This Study



Analyses

Prior to analysis, all personal identifying information was removed from the interviewer's notes, and participant codes were assigned. Analysis began with a method called "Qualitative Description."

The researchers examined the interviews in a non-theoretical way, allowing for flexibility in creating a theory or framework (Neergard et al., 2009; Sandelowski, 2000; Sandelowski, 2009). The goal of using qualitative description is to provide a clear and straightforward account of responses without bias. It is not designed to develop dense descriptions, generate theories of behavior or decision-making, or interpret hidden meanings in interviews. While it allows for analysis of emerging themes, both the analytical process and data representation adhere to the data. The process of analysis is described below.

- All interview notes were first thoroughly analyzed for content. This type of analysis is dynamic and oriented to summarizing information in the qualitative data (Altheide, 1987; Morgan, 1993). Interview notes were open-coded and analyzed using Atlas.Ti qualitative analysis software, allowing for the identification of closely related codes

and the development of networks of these related codes. Code categories were based on the structure of the interview guide and were grouped according to the topics investigated: heat, rain, and air quality.

- More in-depth coding was determined by trends that developed from the interview notes. Themes emerged from the initial broad coding categories, allowing for network development that led to conclusions about interactions among concepts introduced by the participants and coded by the analyst. Some of the themes that emerged were related to pride, adaptation, worker behavior, the future, and climate vs. weather.
- Atlas.Ti software allows the analyst to view related topics, codes, notes, and quotations and how they are related, developing networks of related themes. This enables the analyst to graphically see relationships among themes and helps the analyst delve into these relationships.⁵

Results

We have categorized our results into five broad categories: farmers' observations on environmental

⁵ <https://atlasti.com/2020/12/11/visualizingrelationshipswithnetworks/>

changes, how farmers view the changing climate and its relationship to worker safety and health, how individual management practices may impact workers, how farmers are adapting to long-term weather patterns, and employer perception of worker responsibility and behavior. Each of these is presented below.

Farmer Observations on Environmental Changes

Climate vs. Weather

There was a clear distinction for many farmers between weather and climate. Most discussed long-term changes in weather patterns, yet only four specifically related these to climate change. One of these four stated that he had no concerns for his workers' health and safety due to extreme weather "because God controls the weather and he's going to make it what it is, and I don't see change of climate making any significant changes in our weather."

He further stated that a cooling climate trend was not related to human activity but God. Some of the farmers discussed records of weather and planting or harvest times that they had going back more than 50 years.

Still, when relating weather observations over time, farmers began by referencing their most recent year of experience. One interviewee shared that the previous winter was longer with more rain, while another stated that the winters recently had been drier and very hot. These observations were dependent on the region.

We've had some very dry, hot winters. In table grapes, 20–30% lighter crops. This year was horrible, terrible, I want to cry. From 26,000 boxes down to 15,000 boxes. 90–100% of one crop I lost during the 112–114 degree heat-wave during the spring. That's never happened! (Fresno #5)

Now the [drought] conversation is over all of a sudden, but the effects aren't. If it's happened once, it's going to happen again, probably multiple times. If I look forward, I have to look forward to [a new] commodity, one that is drought tolerant. For a grower, these heat waves coming in at all the wrong times—not

the summer when you are expecting it. Three years ago, I was irrigating in December; I've never done that. Irrigating on a dormant plant! My vines were dying out in the winter. (Imperial #1)

The conversations around climate change itself were varied. As stated above, a few employers acknowledged that weather trends they perceived were related to climate change, but most stated that weather is always unpredictable. A few bemoaned the unpredictability of the weather from year to year but noted that their harvest window always happened about the same week every year. The difference in perspective is notable in the quotes below.

Water is a big part of our system, we haven't experienced water shortages. A lot of what they're talking about [in the Central Valley] is climate change. Realistically, a coastal desert is being farmed. Now we're getting a lot less water with climate change. A lot is just not really accepting the reality. (Imperial #1)

Let me preface my answer to your question about weather changes over time with the comment that the real meaning of changes in weather is you're asking about is climate change. Let me make sure to say that climate change is not happening as a result of man-produced CO₂. We are still recovering from a once global flood that happened about 4,000 years ago. (Imperial #2)

How Farmers View Changing Climate and Its Relationship to Worker Safety and Health

Heat

Heat was the most cited challenge for managing employees in the field. Employers notice an increasing frequency of heatwaves as well as overall higher temperatures. They stated that this impacts both their crops and their workers. Heat has caused some to lose crops and thus their workforce because if there is no work, workers go elsewhere. The perception of a labor shortage was not mentioned frequently. Still, employers did worry about

losing workers for reasons such as drops in immigration rates, fear of travel among workers due to immigration status, and an aging workforce.

In fact, when discussing heat, the aging workforce was mentioned more than once. The perception is that workers are getting older, and it is hard for them to work at a fast pace for long hours. When these aging, experienced workers are gone, there is no one to replace them. A few of the employers in the Fresno region stated that they are not sure if they will have a sustainable workforce in the future. They see the physical impact of the work on their long-term employees and are pinched by the reduction in immigration of new workers. One of these employers relies on H-2A visa⁶ crews to supplement her established crews who live locally because she has been unable to recruit local workers.

The responses to questions about weather were coded to capture how employers alter their workdays as a result of the weather. The findings showed that most responses were related to heat. Many employers have adapted to rising heat and heatwaves by changing daily work schedules: start early, end early. One employer even stated that on really hot days, they start crews at 4 a.m. and end at 9 a.m. When asked about reasons for this extreme response, the employer stated first that the produce reacts poorly to being harvested in the heat and then secondarily stated that it helps his crews as well.

Employers are well educated about state regulations around employee management under hot conditions.⁷ However, there is a tendency among employers to pass responsibility for heat protection on to workers themselves. So, while employers are conscious of the need to follow the rules and provide what is required (e.g., water, shade, rest, and training), there is still ambivalence around enforcing clothing standards and breaks.

During coding, networks among heat, water, worker behavior, and night work were revealed. Heat is closely linked with water and drought, and

when discussing heat and its impacts on worker behavior, there are some interesting trends. Specifically, there is a tendency to place responsibility for self-care on the worker, as shown in previous research related to heat illness (Courville et al., 2013). In addition, there are clear indications that employers, while not always agreeing with workers' choices in clothes, believe the workers must take responsibility for how they dress and that workers themselves "know how to dress." None of the employers we spoke to had night crews, but one had tried out night harvesting of citrus with little success. Color is a determining characteristic of ripeness when hand-harvesting fruit, and the color under lights was not easy to discern. Furthermore, some comments may be considered racist. For example, in several coded quotations, employers stated that workers "prefer the heat" and that "people who are used to it can withstand it."⁸

Regional differences concerning heat and worker management are notable. In the Imperial Valley, growers move workers to shaded fields at 108°F (42°C) and take them out of the fields at 115°F (46°C). In Fresno, growers stated that 100°F (38°C) and above was the problem temperature. In the Salinas Valley, growers talked about 80–90°F (27–32°C) days causing distress among workers. The Imperial and Coachella Valleys are in the Inland Desert Region in southern California, while the Salinas Valley is located on the northern coast. The Fresno region is in the San Joaquin Valley, inland but not as far south as the Imperial and Coachella Valleys. These differences in worker management correspond to the differences in the climatic regions where employers are located. Employers' decisions are clearly based on what is viewed as normal weather in these regions. However, all employers recognize the need to alter work patterns on hot days. No matter what the thermometer says, employers keep an eye on their crews, start them earlier and send them home earlier. Additionally, employers state that crews slow down on hot days, and the quotas employers set

⁶ The H-2A visa program allows U.S. employers to bring foreign nationals to the United States to fill temporary on-farm jobs.

⁷ https://www.dir.ca.gov/dosh/etools/08-006/EWP_shade.htm

⁸ While acclimatization in outdoor work is important, the implication from this employer was more of an innate characteristic of the workforce.

for harvest are generally reduced, despite the increased need to quickly get crops out of the fields during hot weather.

Rain

Most responses about rain and wet weather were obtained from employers in the Imperial/ Coachella and Salinas Valleys. These regions have extremely different weather. In the Salinas Valley, rain is common but not usually intense. In the Imperial/ Coachella Valleys, rain is uncommon, but when it comes, it can be very intense.

Most interviewees in all three regions stated that they do not send crews out into muddy fields because wet soil creates difficult, dangerous, and costly work conditions. More than one employer mentioned the danger of getting vehicles stuck in the mud out in fields during intense rainstorms and preferred to avoid this situation. In addition, it is not conducive for crops to be harvested in the rain, and employers cannot require workers to wear appropriate footwear and rain gear. Employers in the Imperial and Coachella Valleys also mentioned the danger of lightning.

There were no clear recommendations from growers regarding responses to extreme rain conditions or flooding. One farmer stated that she provided rain gear to crews at one time; however, this was unsuccessful.

We make sure our crews are safe under wet conditions. We don't have lightning issues. But if we do, we move people out of the field. We limit the work we do. It's too hazardous. Mainly we worry about slips, trips, and falls. Everyone has rain boots and whatnot. We provide those. Rain gear itself is provided by employees. In the past, we did provide it, but it was hard to keep track of and maintain, so we just asked them to provide it, and they take good care of it. (Salinas #3)

Pests

The discussion of rain also prompted some observations about pests that can be harmful to workers. One employer in the Coachella Valley noted that the previous season's increased rainfall led to standing pools of water in his fields that bred mos-

quitos carrying West Nile virus. As a result, he kept his crews out of the fields until he could drain the standing water. Another stated that with increased cool, wet weather on the coast, she noticed more black widow spiders under stacked pallets; she had decided to add training for her crews on dangerous environmental hazards at the edges of her fields where more wild vegetation was common.

We have a couple [of] farms with poison oak. We try to avoid working there. The vegetation grows onto fences that could be a risk. We provide protective equipment. In some areas, we don't have ag-on-ag land. Our ranches about natural areas, and there can be rattlesnakes, ticks, spiders. We do safety training to alert workers on those hazards. What to do. There are black widows in one field on the pallets. They love to nest there, but there have been no incidents. (Salinas #3)

Employers also noted the impacts of humid weather combined with higher temperatures on their crops (more mildew, spoilage, and insects) and their workers (the additive impact of heat and humidity).

Air Quality

Most growers had not thought about creating a formal response to poor air quality occurring when their workers were out in the field. However, some did have experience with crews exposed to smoke and/or dust. There are various responses to the risks workers face from dust and smoke.

One employer stated:

We've never set up protocols for that, it's not like rain that hits or doesn't. You don't see it [coming]. Sometimes you see it, but it's more vague where you can measure it. We don't have [the] means for measuring air quality. This hasn't happened a lot until with the fires. This is new for us. We're just getting complaints now for the first time. It doesn't affect everyone the same. In general, it makes everyone feel somewhat bad. Like they're starting to get a cold—overall feeling bad. (Fresno #6)

Employers in the Imperial and Coachella valleys are more concerned with direct wind impacts rather than the effects of wind on air quality. For example, date workers (*palmeros*) cannot safely climb the trees when it's windy. Additionally, there are wide expanses of desert landscape surrounding farm fields in the region, and wind moving across this desert picks up dust and sand and makes it impossible for crews to work. There is also real potential for haboobs (dust storms) to cover roads and crops. These are usually predicted, and workers do not go into the fields under these conditions.

However, there is almost always poor air quality in these southern inland valleys due to their proximity to Los Angeles smog and diesel trucks moving goods to Mexico along major highways. Farmers in this area state that they do not have knowledge of local air quality and when it is safe for workers to be out in the fields.

How Management Practices Might Affect Workers

Farmers interviewed in this project discussed their management practices freely. Many of them were proud of how they manage their crews and how this has resulted in a successful business. The theme of “pride and adaptation” was developed in analyzing employers' responses to multiple questions about labor management. Employers expressed pride differently but commonly in many of these interviews.

Pride and Adaptation

The importance of this specific theme relates to the willingness of employers to adapt their practices as conditions change and to identify business and personal priorities. Expressing pride in the longevity of one's farm and plans for the future are positive aspects with regard to adapting practices to change. Language interactions show up in coded networks that reveal statements of pride while referring to adaptation and pragmatism. Farmers expressed that if a farm has been in business for five generations, for example, that is a good indication of the ability of the owners to adapt to change. While some employers we spoke to are proud of how long their farm has been around or in the family, some are

proud of the quality of their crops or how they treat their workers. Other participants were proud of their employees and how hard they work and respond to challenges.

We're constantly moving crews around. If things just don't seem right, we move the crews to keep them happy and make sure they have a better work environment—so if we can move people to a cooler part of [the] valley, we do. (Imperial #3)

At the heart of everything we do, we really put the crews first when we make decisions. If it's uncomfortable for crews to do, we scrutinize whether we should be doing it. We make individual accommodations when possible. There's always sun, wind, dust. But we try to make people as safe and comfortable as possible when working outside or in our greenhouses. (Salinas #3)

These employers are taking responsibility for real-time assessment of the conditions in the field and responding to them positively. Rather than handing responsibility over to the crews to stop when they are uncomfortable, employers take control by moving crews to cooler conditions when necessary. These are both safety and comfort issues and point to active management under harsh conditions.

We have an agreement with our workers: hotter than 90 degrees, you go home. If you want to stay, you can, but you can only work 8 hours, not 10. That way they don't feel pressured, they aren't afraid to complain. You have to have this kind of climate in your workforce. You don't want them working under duress. I'm really conscious as an owner—and as a human being! All the heat illness laws make sense because not everybody is that naturally conscious. (Salinas #2)

This employer has clear standards for workers to assess and decide for themselves when they can continue working. He also limits their choice, so if they decide to stay when it's hot, they are forced to

work a shorter day. While this shifts some of the responsibility to the workers, it also provides choice without judgment. The statements above clearly point to helping workers build some power in their workplace.

I do something called tip of the week. It's always related to what we're doing ... and when I am being inspected, the inspector goes to talk to the workers, and the workers always say what I have said. So, they are listening. There's always going to be something that happens during the week. It gives you an opportunity to address some issues. If someone falls down, you have an opportunity to address that. To tell them to be careful and slow down in their work. It's not worth getting hurt. (Fresno #2)

This employer values workers for listening and taking training on board. In addition, she acknowledges that accidents happen and views them as an opportunity. She's proud of her innovation in creating a "tip of the week," specifically addressing some recent issues. She reinforces positive behaviors by addressing the need to slow down to avoid getting hurt.

The pride in worker management and trust in employees to work hard is a double-edged sword. While workers respond positively to respect in the workplace and higher wages, placing the responsibility on workers for deciding when to stop work relieves the employer of some responsibility. This was not a major trend in employer responses to hazards in the workplace, but it was evident.

Emergencies

While discussing extreme weather events, the topic of emergency procedures was explored. We were especially interested in how employers perceived emergencies and their thoughts about responding to fast-moving, extreme conditions that might exist during wildfires and intense rain and wind events. We asked employers how they respond to emergencies in the field, if they have established procedures, and what they think is necessary to safeguard their crews. Overall, employers stated that they did not have established emergency evacua-

tion plans. This response reflected the overall lack of employer readiness for extreme weather risks like fast-moving wildfires or sudden, intense rainstorms.

While some employers stated they do not need an emergency evacuation protocol because they cannot imagine what would trigger such an episode, others said they keep such close watch on their crews that they can evacuate at a moment's notice. None of the interviewed employers had a formal emergency evacuation plan. However, most did have standard operating procedures for contacting crew leaders quickly, and all had established protocols for responding to accidents or illnesses in the field. The biggest issue with these procedures is the lack of complete cell service in many rural regions of California and the long distances between fields and resources.

How Farmers Are Adapting to Long-term Weather Patterns

Adaptation to change was one of the most frequent codes in these interview notes. Farmers often stated that one of their most valuable skills was adapting to changing conditions. This skill bodes well for future sustainability in the face of climate change.

I think farming is all about adapting, so we have to keep on adapting. You can't predict [the] weather, so we need to implement protocols for dealing with conditions. So, we can follow specific protocols you have to keep up and stay ahead [and] be able to adapt and foresee upcoming issues... I think we just have to see what tech ideas develop. We are growing windbreaks to reduce wind and dust in our fields. Any kind of idea that can help reduce or cut back on extreme conditions can help. (Imperial #3)

When envisioning the future and what his farm would look like in five to 10 years, one farmer said:

Probably not terribly different than it is right now. We seem to have come to a fairly stable position—[the] right number of people, [the] right amount of housing for the number of

people we have. [The] right balance of crops. It might vary a little, but ... (Salinas #1)

This is also clearly a statement of pride in having reached the optimum production level and management of resources, including workers.

Looking more deeply into the responses related to the future of their farms, most farmers expressed uncertainty about both the short and long term. This uncertainty is based on economics, competition, the labor market, and the climate. Below are examples of how employers are currently thinking about survival into the future.

I think the ability to do what we're doing now will change. The crops we're growing will change. A hotter climate will limit people who want to work. The more extreme it gets, the shorter the days. All kinds of implications. They [workers] need the pay. A farm is going to have a much more difficult time attracting good workers ... if conditions continue to get warmer and warmer, water is an issue. The labor situation is a mixed bag. I think that the likelihood of us doing what we are doing now in 20-30 years is not great. My kids will have to figure that out—ag-tourism, value-added. Clearly, the next generation will have to determine that but based on the past, I think the chances are low that the operation will keep going as it is now. (Fresno #3)

If the temperatures continue to go up, and there is more frequent hot weather, we'll see more potential for heat-related problems. Not now, though. We might do more night or early morning activities. We may consider that to avoid working in the heat. But this also poses risks with visibility issues. If there is increased rain? I'm not thinking that will happen. The uncertainty of patterns is more [of] the challenge. The uncertainty will impact cropping schemes and cascade onto [the] staff. This causes delays in production work. (Salinas #3)

Overall, the differences in individual employers' visions for the future were based on the age and stage of the operation. While we did not col-

lect age data, it was either known by the interviewers or employers voluntarily disclosed their age or indicated the stage of their experience in other responses. Older growers thought that their operations might not survive, and if they did, they would look very different. Younger growers were concerned with taking action now to adapt to perceived future changes so that they could continue in their occupation.

Employer Perception of Worker Responsibility and Behavior

We coded responses related to how employers perceived the behavior and responsibility of their workers. These are discussed below and focus on training efforts and requirements and how the workers responded.

Many farmers talked about workers' responses to training and how workers alter their work behavior under various weather conditions. There was the acknowledgment that the behavioral changes observed by employers may or may not be related to the training given by the employer. There was some discussion of what workers understand and whether they listen during training. One employer said he did not think the workers listened to him, but when he observed them in the field and quizzed them, there was ample evidence that they did listen.

I think the most challenging thing is that sometimes our workers don't really want to follow our direction in respect to what happens to them. They may not report. May not feel comfortable reporting. Sometimes they don't. Sometimes you only know when it's too late. I wish that they would feel comfortable enough to report or stop work when they feel bad. (Fresno FLC)

Another stated that, regarding heat, she was more focused on crop damage than worker risk. In this instance, the employer also noted that training was a "drain on productivity."

The direct supervisor on the specific ranch is the one that will deal with instances of heat-related illness; issues will be reported to that

person. I am more focused on crop damage in the heat—the people are important, for sure, but there aren't that many issues with them.

The training is more of a drain on productivity than the actual heat; it's not the training itself—it's the documentation. You do the training for 30-40 employees, that doesn't take too long, but then you have to do the documentation for all of them. On top of other "tailgate trainings," this takes up a lot of time. The worst is that the trainings often happen in the morning, which is precious productivity time. It's a drain. (Salinas #4)

There were also comments about the pace of work: a rapid pace benefits the grower and slows under hot conditions, impacting productivity and, in the long term, income. The productivity of crews declines under adverse conditions, whether it's heat, rain, or poor air quality.

I think what farmers have to do is be aware of their crew. I had a field manager who wasn't the same [after he returned from a break]. He fell asleep twice, he was heavy set. I asked what was wrong. He denied any issues. But he admitted that since he got back from Mexico, he wasn't the same. He went to urgent care. He was admitted with an enlarged heart. So, it's important to know your workers and keep track of what the crews are doing and any weird time. And when you ask the workers, they say they're fine. They don't want to admit any weakness. [We] need to have workers who are comfortable talking about it. (Fresno #4)

One employer noted that workers on his farm commented last year about the smoke and poor air quality. This was the first time he had gotten complaints, and he has noticed an increase in cold or allergy-like symptoms on days with poor air quality. Despite these noted complaints, there is no evidence that any employer response followed. In fact, the employer stated that he is not sure what he can do under these circumstances.

An interesting thing I heard on the radio the

other day—most of the people who die from heat-related illness are from areas that don't typically experience extreme heat. They're not used to it. People who are used to it can withstand it. (Salinas #3)

If they don't take precautions, workers can be dramatically affected. [I've seen] a couple of instances of people getting medical attention because of heat exhaustion recently. They got help and came back to work within a couple days. (Salinas #4)

Overall, many employers believe that workers need to take responsibility for themselves. This is in agreement with previous research, where there was a theme of workers assuming responsibility for regulating themselves when taking breaks and drinking water (Wadsworth et al., 2018). Employers state that crews want to take breaks at different times; therefore, the employers believe that they must allow crews to take breaks when they want and not mandate them. Several interviewees also mentioned throughout the interviews that workers slow their pace under both heat and poor air conditions. Most employers agree that workers know how to dress to protect themselves from heat and that this should not be mandated. Paralleling this perception is the contrasting perception that employers are actively caring for their crews and are responsive to their needs. The same employer often holds these contradicting observations.

Discussion

Federal legislation has led to poor working conditions for farmworkers in the United States, and these conditions are the direct result of agricultural exceptionalism. Historically, agriculture has been exempt from social, labor, and health and safety legislation. These exemptions highlight the current low status and high-risk conditions farmworkers face across the country. The status of farmworkers will inevitably affect their ability to respond to changes in the environment of their workplaces (Holdier, 2019; Rodman, 2016).

Through interviews with 16 agricultural employers in three regions of California, this research has provided preliminary information on address-

ing impacts to the health and safety of agricultural workers in the context of climate change. Employers are aware of the risks crews face while working under high temperatures. Our findings suggest that the employers we interviewed took the required and mandated steps to reduce risk. From these responses and other work completed over the past five years (Nelson, 2017), we can tentatively conclude that legislation to reduce heat-related illness on California farms has worked. Employers understand their responsibility in providing shade, water, breaks, and training as required by law in California (Mitchell & Langer, 2019). The campaigns to reduce heat-related illness and death in California have been successful (University of California, Berkeley, Labor Occupational Health Program, 2013). With regard to heat and climate change, employers expect the conditions to worsen, resulting in longer and more intense heatwaves. However, there remains a belief among employers that workers hold individual responsibility for taking breaks, resting in the shade, and drinking water.

Other environmental hazards that may worsen with climate change, such as rainfall, poor air quality, and fires, were not as carefully addressed by employers. This may be because of the stringent state regulations protecting outdoor workers under hot conditions and active statewide campaigns to mitigate worker risk. So, while employers talked about how they train their crews on heat regulations and symptoms, there was little discussion of training on other environmental hazards.

Under heavy rainfall conditions, adaptation protocols are informal; however, almost all employers interviewed had rainfall protocols. It is challenging for the crews to work when it rains and is detrimental to the crops; therefore, very few employers discussed risks to workers on rainy days. This is likely because crews will generally not be working under rainy conditions. However, the aftermath of a period of intense rain was discussed by one grower concerned with West Nile virus in standing pools on his fields.

Poor air quality on California farms can be due to pollution, dust, and wildfires. Some awareness exists around air quality issues, but this is not universal. While air quality is not a condition that farmers monitor, some are aware of dust and

smoke and how these can affect employee productivity. However, they do not understand how to manage their crews under these conditions. Wildfires pose a dual hazard for agricultural workers of direct danger and poor air quality. One farmer had clear protocols in place when wildfires were nearby, likely because he was also a volunteer firefighter and kept up to date on local conditions.

Employers in the Fresno region noted that poor air quality is the norm. Last year, this resulted from wildfire smoke drifting into the valley from the north, but most of the time, particle pollution and ozone levels are high in the Central Valley. Farmers in Imperial/Riverside noted that their region is not attaining levels set by the EPA but are unsure about how to keep their workers safe under these ubiquitous conditions. There is clearly a divide between what are viewed as “normal” poor conditions and “emergency” poor conditions.

Similar to farmers in a Kentucky study (Hunt et al., 2018), there was very little consideration of emergency planning, particularly as it relates to environmental hazards. In conversations about emergency conditions, employers’ responses were divergent. Some stated that they were only prepared for health or accident emergencies. The idea of an environmental emergency plan was of interest to most interviewees. But for some, it was beyond their ability to imagine an instance where emergency field evacuation would be necessary. There are many studies of this issue among farmers in developing countries, but fewer have been done in the U.S. (Budhathoki et al., 2020; Mishra et al., 2017; Yorose et al., 2021).

As shown in other studies (Courville et al., 2016; Wadsworth, 2018), there is a gap in understanding employer responsibility for worker welfare in California agriculture, even with strong health and safety policies and regulations in place. The history of agricultural exceptionalism in the U.S. has contributed to this gap.

Ultimately, to the detriment of workers, two principal benefits resulting from farm worker exclusion aid the agricultural sector. First, agriculture benefits from the failure to examine the nature of employer/employee relations in the sector. The lack of study thereby disallows

accountability and promotes the exclusion of workers. Second, the isolation of workers remains entrenched without opportunity for beneficial change in farm worker communities. Reversing the outsider standing of farm workers therefore requires examining agricultural law and policy from a race-based perspective. (Luna, 1998)

When moving forward with training and policies for farmers, language use must be sensitive because agricultural employers often feel that they are under more scrutiny than other employers and often fear increased regulations on their businesses. Most participants in this study believed that more regulation is inevitable as climate change progresses and environmental risks to employees become greater. Farmers as a rule, are against policies that regulate their work but are in favor of policies that assist them (Liu et al., 2018; Puglia, 2020). This group was no exception. The biggest challenge noted by farmers in this discussion was spending the time required to train their employees when they could be “working.” Some also stated they have difficulty in keeping up with changes in rules. The fact that some employers do not see training workers as an essential part of their business is a challenging barrier to overcome.

Agriculture is one of the most dangerous jobs in the U.S. (Centers for Disease Control and Prevention, National Institute for Occupational Health and Safety, 2020). A safe working environ-

ment is a common expectation of employees in most industries. Agriculture should be no exception. While our work in the past focused on employee perceptions of workplace safety, this study focused solely on employer perceptions and their expectations are for the future (Courville et al., 2016; Wadsworth et al., 2018;). In this study, when asked if they expected the health and safety of their workers to be of greater concern in the future, there was a wide diversity of responses. Most employers stated that safety and health would be of greater concern, while several believed that labor would continue to get scarcer and employers would rely more on mechanization in the future. This has been an ongoing push in California agriculture since the 1970s (Martin & Olmstead, 1985; Sun, 1984) but has not materialized. Both employers and employees need to accept responsibility for safe working conditions in farm fields, but the onus lies with employers. According to the U.S. Occupational Safety and Health Administration, employers are responsible for providing a safe workplace (U.S. Department of Labor, Occupational Safety and Health Administration, n.d.) and California has passed laws to specifically protect farmworkers (California Department of Industrial Relations, 2020). With changes in climate, more laws can be expected. How agricultural employers adapt to these laws will determine which growers remain in business and which businesses are sustainable.

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Appendix A. Interview Guide

Key Informant Interview Protocol for Farm Employers

30–45 minutes semi-structured survey, with pre-screen for basic information that could be gathered before the full interview.

- Start off with a “rich” question, so the answer will not be short and too focused, which would set the wrong tone for the interview.
- Keep to only a few main topics or themes.
- Pilot on two farmers and see if the instrument yields good information, and modify as needed before the full set of interviews. As part of the pilot, get feedback on the questions from the farmers at the end of the interviews to strengthen the survey results.

Aim: To address possible impacts to the health and safety of workers with informational materials for both employer and worker on changing practices compounded by climate change. To get a more nuanced understanding of how farmers view changing climate in terms of worker safety and health, and how climate changes will affect their management practices, including crops and water supply, and therefore try and predict what issues will or may exist for their work force.

INTRODUCTION

Hi. My name is _____. I work for the California Institute for Rural Studies. We're working on a project with the University of California, Davis, Western Center for Agricultural Health and Safety.

INFORMED CONSENT:

This is part of a research study aimed at determining if farm employers are experiencing any changes in agricultural employment and HR management practices resulting from changing weather patterns. We are interested in hearing from you about any practices or experiences you have had with worker health and safety related to changing weather. The study is funded by the National Institute of Occupational Safety and Health.

I'm hoping you will participate in a (telephone or in-person) interview that will last up to 45 minutes. There are no right or wrong answers, and your participation is entirely voluntary. Our ultimate aim is to produce better health and safety training messages for those who work in farming as agricultural practices adapt to changing weather patterns in California.

All interviews will be kept confidential. I'll ask you to agree verbally and will not need your signature. Quotes from interviews will not be associated with names. Research documents will be kept confidential in accordance with the law and UC Davis policies. With your permission, this interview will be recorded using a digital recorder. We will use it only for report reference, and the audiotapes will be destroyed after the report is compiled.

You do not have to participate in this activity if you do not wish to, there will be no penalty if you do not participate, and you may discontinue at any time. We are not offering any compensation for your participation.

If you do not want to talk to the investigator or study staff, if you have concerns or complaints about the research, or to ask questions about your rights as a study subject, you may contact IntegReview. IntegReview's policy indicates that all concerns or complaints are to be submitted in writing for review at a convened IRB meeting to:

Mailing Address OR Email Address:	
Chairperson IntegReview IRB	integreview@integreview.com

3815 S. Capital of Texas Highway Suite 320 Austin, Texas 78704	
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If you are unable to provide your concerns or complaints in writing or if this is an emergency situation regarding subject safety, contact our office at:

512-326-3001 or toll free at 1-877-562-1589

Do you agree to participate? (circle) Y N

LOCATION: Can be recorded by interviewer; does not need to be asked

NAME:

POSITION:

CROPS/COMMODITIES:

LENGTH OF TIME IN BUSINESS:

Do you expect to still be farming in 5 years? Y N

Number of employees: (15 MINIMUM):

1. Weather Observations

Just to start out, will you tell me about any changes in the weather over time that you've noticed?

Now, let's talk about how different weather conditions may affect you and your crews as you work outside:

I'd like to focus on three specific weather related conditions: heat, rain, and poor air quality, either from dust or smoke. I'd like to ask you a series of questions that I hope will allow us to understand how changing weather patterns affect the health and safety of you and your employees.

First, will you tell me if and how any of these listed weather related conditions presents (or has presented) a specific management challenge in your operation?

(If they prioritize one, move to that one first and focus on it.)

Rain and Flooding

1. Has your farm been impacted by high intensity rain or flooding?
2. What kind of plan do you have to manage your crews with rain and potential flooding while working?
3. What do you do to make sure you and your workers are safe while working under wet conditions?

Air Quality

There are multiple elements that impact air quality. I'd like to talk to you about two: dust and smoke. As you know, crews working in the field last year were impacted by smoke from wildfires.

1. What would you do if the air quality declined by either dust or smoke while you or your crews were working?
2. What kind of plan do you have in place to manage a possible evacuation?

3. How have dusty or smoky days impacted your scheduling of crews and/or tasks? (time of day, season, actual methods, crew size, work day length)
4. What do you think can be done to protect workers from the risks posed by poor air quality?

Heat

1. How do you manage your workers on hot days?
2. Tell me if you've had to do anything different as temperatures or lengths of heat waves increased in recent years?
3. How do you think high temperatures affect your workers? Have you noticed anything changing on hot days?

Now I'd like you to think about your crews at work. Is there any other situation related to the weather that represents a health risk for outdoor workers that we haven't touched on? (Animals, insects, wildfire smoke, working hours, etc.)

2. HR Management Practices

1. Will you describe to me, if you can, how changes in weather conditions as we discussed above might have led you to change how you manage your workers?
[PROBE: For example, do you ever have to start work early or end early? Are there seasons when previously you didn't have crews working that you do now? Have you changed how you pay workers because of weather—like hiring larger crews or paying by the piece during harvest when crops are ready and temperatures are high?]
2. How do these conditions impact your scheduling of crews and/or tasks? (time of day, season, actual methods, crew size, work day length)
[Probe on health and safety challenges or expected challenges. With both of these questions if this does not come up]

3. Future Changes

1. What kinds of health and safety issues do you expect your workers will face if weather continues to change and there are more droughts, heat waves, extreme rain events, etc.?
2. If the weather continues to change, and challenges you've mentioned intensify, how do you think you will adapt? *[PROBE: Will you continue to farm? Will you move away from hired labor?]*
3. *Do you expect the health and safety of your workers will be a greater concern going forward, specifically because of weather changes?*

- Y
 N

a. *Why or why not?*

4. Describe any regulatory and policy changes you imagine resulting from more extreme weather events, like heat waves, high winds/dust, wildfires or flooding?

4. Closing

1. Is there anything you'd like to mention to us regarding worker safety and health that we didn't talk about?

2. Are your crews direct hire or contract?
 - a. If contract, ask for the name and contact information for FLC.
3. When you look for educational and training materials for your crews, where do you get it and what format do you prefer?
4. Where do find the most useful information on health and safety?
5. If trainings or materials were available, what types of materials—and on which topics—would be most useful to you? There are currently materials available at no cost from UC Davis.

IN CLOSING:

Can we follow up with you in case we have additional questions?

Would you like us to provide you with a copy of the final report?

Aspects of the sustainability of the camel milk value chain and its regulatory framework in Isiolo County, Northern Kenya

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Abstract

The camel milk value chain plays a critical role as a primary foundation of livelihoods among the pastoralist communities, but it faces a great challenge in control mechanisms to enhance a sustainable marketing system. Our study analyzes the drivers and processes influencing the sustainability of the camel milk value chain in Isiolo County, northern Kenya. In this paper, we report on aspects of the

characteristics of the value chain players and efficacy of its regulatory frameworks, and propose a model for an enhanced system. We conducted the study using primary data from a field survey and obtained secondary data from a desk study. We collected primary data through interviews with households using a survey questionnaire. Using a survey guide, we also conducted key informant

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Author Contributions

This paper is an original work developed by Steve N. Machan (Ph.D. student). Professors Nicholas O. Oguge and Jones F. Agwata have assisted in conceptualization, supervision, original draft preparation, revisions, and have contributed to writing the final text.

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Conflicts of Interest

The authors declare no conflict of interest.

interviews to supplement the household information. Secondary data was obtained from the literature review. We report that the camel milk value chain has three categories of actors: the micro-actors (input suppliers, producers, bulking centers, processors, and marketers), the support services providers (e.g., extension services, financial institutions), and the policy-makers who shape the enabling environment of the system. Lack of processing capacity and poor institutional coordination among the chain actors and support institutions were identified as major challenges affecting the sustainability of the camel milk value chain. We present a well-regulated camel milk value chain model for the county with a focus on establishing a camel milk policy to lead to a sustainable system.

Keywords

Camel Milk, Value Chain, Regulatory Framework, Environment, Northern Kenya

Introduction

The livestock food system globally contributes significantly to the livelihoods of about one-fifth of the global population (Herrero & Thornton, 2013; Reay et al., 2020), and most of the world's pastoralists' livelihoods are dependent on livestock production (Downie, 2011; Ndiritu, 2020; Noor et al., 2013). Studies also indicate that by 2050, 50% of the African population will be urban dwellers, and this combined with an anticipated increase in global human population to 9 billion will likely create a growing demand for livestock products worldwide (Willet et al., 2019). In order to address this gap, various food value chain development approaches were developed to identify the underlying concerns. Notably, the Food and Agriculture Organization of the United Nations (Neven, 2014) reports that there are challenges in sustainable food value chains due to dynamic and market-driven systems in which vertical governance and coordination mechanisms are the central dimension. Other studies have also indicated that the constraints to achieving sustainable value chains are due to different phases of production, transportation, processing, and distribution that collectively determine food availability, food access, and food utilization (Colonna et al., 2013; Ingram, 2011; McGinnis &

Ostrom, 2014); this finding calls for further understanding of the dynamics in these systems to meet the growing market demands.

In sub-Saharan Africa, the Horn of Africa hosts the largest grouping of pastoralists, and more than half the livestock is kept in arid and semi-arid regions of Africa, which occupy almost 70% of the region (Ndiritu, 2020). In the regions where pastoralism is the major land use system, an estimated 532 million livestock contribute to at least 50% of total production consumed by the average pastoralist household (Noor et al. 2013). Livestock rearing is considered to be the dominant economic activity in Somalia, Djibouti, Sudan, South Sudan, Kenya, Ethiopia, and Uganda, among others. Hence, livestock value chains play an important role as a primary source of subsistence and other livelihoods for pastoral communities living in drought-prone environments (Demissie et al., 2017).

The Eastern African region is home to 60% of the world's camel population, and the popularity of camel products, particularly milk, has rapidly increased in recent years, both locally and increasingly in urban areas (Odhiambo, 2013). For Kenya, the livestock subsector contributes 12% of the total gross domestic product [GDP] and supports the livelihoods of over 80% of the pastoral communities (Government of Kenya [GOK], 2012, 2017). Specifically, Ndiritu (2020) reports that Kenya's pastoralists occupy vast areas defined as arid and semi-arid lands [ASAL]. These areas account for 84% of Kenya's land surface area and receive less than 300 mm (12 inches) of rain per year. Such lands are characterized by long drought spells interspersed with low and erratic rainfall; these weather conditions are worsened by climate change (Harison et al., 2017). A study by Mwanyumba et al. (2015) indicates that camel rearing is an appropriate livestock choice in such fragile environments, since camels are resilient during drought episodes. Camels are a source of food and income, and also provide significant cultural functions to pastoral communities in these arid environments (Noor et al., 2013). According to Behnke and Muthami (2011), Kenya's pastoralist community makes up about 25% of the country's population and holds over 50% of the country's

livestock. Other than providing food and cash income, camels also have a significant role in traditional and cultural functions, and in transport to pastoral communities living in these regions (Kenya National Bureau of Statistics [KNBS], 2020; Noor et al., 2013).

Isiolo County is one of Kenya's major camel-keeping zones, with a camel population of 148,858 and annual milk production of 486 million liters (128 million gallons) in 2019 (KNBS, 2020). The milk is produced in almost all the drier parts of the county and has been found to boost sales and income, cushioning household demand, and also to contribute to the county revenue collection (County Government of Isiolo, 2018). The price of milk at production sites fluctuates between US\$.40 and US\$.50¹ per liter and has never been stable (Noor et al., 2013). There are also variations in the quantities of milk supplied depending on the season and availability of grazing resources. This has led to a recognition of local micro-actors in the system, to the need to aggregate and establish formal groups to make their prices more stable, and to open up to wider markets for higher incomes. Among the established groups are two main cooperative societies, Anolei and Tawakal, that were established for the purposes of aggregating, processing, and marketing of camel milk products in order to create a reliable marketing system. These locally established cooperative societies collect fresh milk from different production sites and widely distributed areas, such as Burat, Shaab, Mlango, Merti, Kulamawe, and Garbatulla. Some of the milk is transported from as far as 80 to 120 km (50 to 75 miles) by motorbikes, and sometimes by donkeys for short distances, posing great challenges to the timely delivery of milk to bulking centers.

Other challenges arise from climate change and subsequent drought episodes, which are on the rise, and few adaptation mechanisms have been put in place. In order to boost the productivity of the livestock subsector, the county plan for putting in place new strategies for modernizing the value

chains, including commercializing a camel milk value chain, through the 2018-2022 Isiolo County Integrated Development Plan (CIDP). The overall implication is that there are increasing challenges in the continued production of dairy to meet Kenya's future food requirements (GOK, 2017). This has stimulated increased interest on how to develop a modernized and reliable camel milk value chain system in the county.

Purpose

Our study investigated the camel milk value chain drivers and processes that influence the viability of the system in Isiolo County in northern Kenya. We established four objectives: (1) examine the socio-economic characteristics of the households involved in the camel milk value chain, (2) identify characteristics of potential value chain players, (3) evaluate the efficacy of the regulatory frameworks influencing the system, and (4) develop an alternative model for a modernized camel milk value chain with a well-regulated framework for Isiolo County. We used a field survey approach by collecting households' information using questionnaires and key informant interviews using an interview guide. From the survey data, we mapped the camel milk value chain process and identified the different actors involved in the system. We used the results to develop a modernized model for a sustainable camel milk regulatory framework to enhance the system.

Literature Review

The world food prices crises of 2007, 2008, and 2010 generated increased interest in the analysis of food systems by many policy-makers (Ericksen, 2008a; McGinnis & Ostrom, 2014). Currently, about 820 million people, mainly from arid and semi-arid regions of the world, have insufficient food (Willett et al., 2019). Studies show that persistent food insecurity, increasing environmental degradation, and poverty levels in the dry lands of sub-Saharan Africa indicate a "food system crisis" (McGinnis & Ostrom, 2014). In order to remedy

¹ All currencies in this paper are US\$ unless otherwise noted.

the situation, there is a need for broader levels of engagement in the global policy frameworks to support sustainable value chains (Colonna et al., 2013). These call for multidisciplinary approaches toward the development of potential value chains. Research that analyzes livestock value chains reveals that there is increasing demand for livestock and livestock products both at regional and international levels (Dandesa, 2017; Neven, 2014). Thus, an inadequate marketing system limits the system's ability to meet these needs or requirements to attain national markets.

The FAO (Neven, 2014) defines a sustainable food value chain (SFVC) as the full range of farms and firms and their successive coordinated value-adding activities that produce particular raw agricultural materials and transform them into particular food products which are sold to final consumers and disposed of after use in a manner that is profitable throughout, has broad-based benefits for society, and does not permanently deplete natural resources. These activities or services include input supply, production, bulking, processing, marketing, and final consumption. Such activities can be contained in a single geographical location or spread over more extensive areas (Colonna et al., 2013; Francis et al., 2008). Studies have been conducted of various livestock-based value chains to assess their productivity and market potentials (Colonna et al., 2013; Ericksen, 2008b). The findings of these studies associate the failure of the overall livestock-based food systems to a lack of comprehensive analysis and understanding of potential value chains (Farmer & Mbwika, 2012). However, no studies have been conducted aimed at understanding the challenges in production and marketing of a camel milk value chain in a pastoralist community practicing nomadic pastoralism, nor that provide an alternative modernized regulatory framework to enhance the system. Previous studies on camel milk value chain have investigated the links in the milk supply chain and overall value chain efficiency (Shukla & Jharkharia, 2013). For instance, studies done in southern Ethiopia, Somalia, and Saudi Arabia show that the interconnectedness of the camel milk value chain actors is weak and that institutional arrangements are poorly coordinated (Anastasiadis & Poole, 2015). A study conducted

by Mwanyumba and colleagues (2015) indicated that in Kenya's ASALs, there are low levels of milk production, collection, processing, and marketing, and these stages are also not well developed as a result of weak marketing infrastructure characterized by poor marketing facilities and services. Hence, we note that no major studies have been conducted to investigate the regulatory aspects that influence the sustainability of the camel milk value chain. We conducted the present study with the aim of providing adequate information on a camel milk value chain, not only to actors in Isiolo County but also to similar regions undertaking camel milk marketing. Such information would be useful for initiating policy planning and implementing a camel milk value chain.

Specifically, analyses of camel milk value chains indicate that income from the sale of camel milk exceeds other livestock income sources, especially among the pastoralists in northern Kenya (Hussein, 2015; Noor et al., 2013). These studies have been argued that even resource-poor households are involved in the value chain, despite having fewer animals. Studies analyzing camel milk value chains in regions with similar environments, such as Saudi Arabia and eastern Ethiopia, have also mainly looked at the production and marketing of camel milk (Yilma et al., 2017). Many studies have focused mainly on challenges influencing husbandry practices and, to a lesser degree, on the hygienic practices and microbial loads in traditional camel milk production (Ndiritu, 2020; Yilma et al., 2017).

Noor et al. (2013) and Rashid, H. (2014) also report that camel milk value chains have been studied in similar regions in Africa, such as Morocco, Djibouti, Mauritania, Sudan, and Ethiopia. Traditionally, camel milk was consumed either in fresh form or as fermented milk regardless of whether the milk was spoiled (Nato et al. 2018). The study also revealed that traditional milk production methods contribute to increased bacterial loads due to low hygiene practices that subject the product to poor quality and safety standards. The assumption is that the sustainability of a reliable value chain can only be achieved if appropriate social, institutional, and political support can be strengthened to improve the adaptive capacity of the local value

chain's actors. Studies have pointed out that the development of organized marketing channels and the strengthening of processes that add value to milk would enable camel milk producers to earn more from their stock and guarantee safety and quality to urban consumers (Nato et al., 2018; Farmer & Mbwika, 2012). Also, Noor et al., 2013 indicates that camel milk is a strong boost for sales, and in certain regions, such as the Middle East, is the driver for intensification of camel dairying. It is, therefore, imperative to note that the challenges in the overall camel milk value chain, particularly in the ASAL of the Sahel and Horn of Africa, are characterized by informal marketing systems (Neven, 2014). This has led to tremendously unpredictable and fluctuating camel milk prices due to an unstable market infrastructure. This lack of an organized marketing system is likely due to a lack of awareness of the prevailing national, regional, and global regulations governing the system.

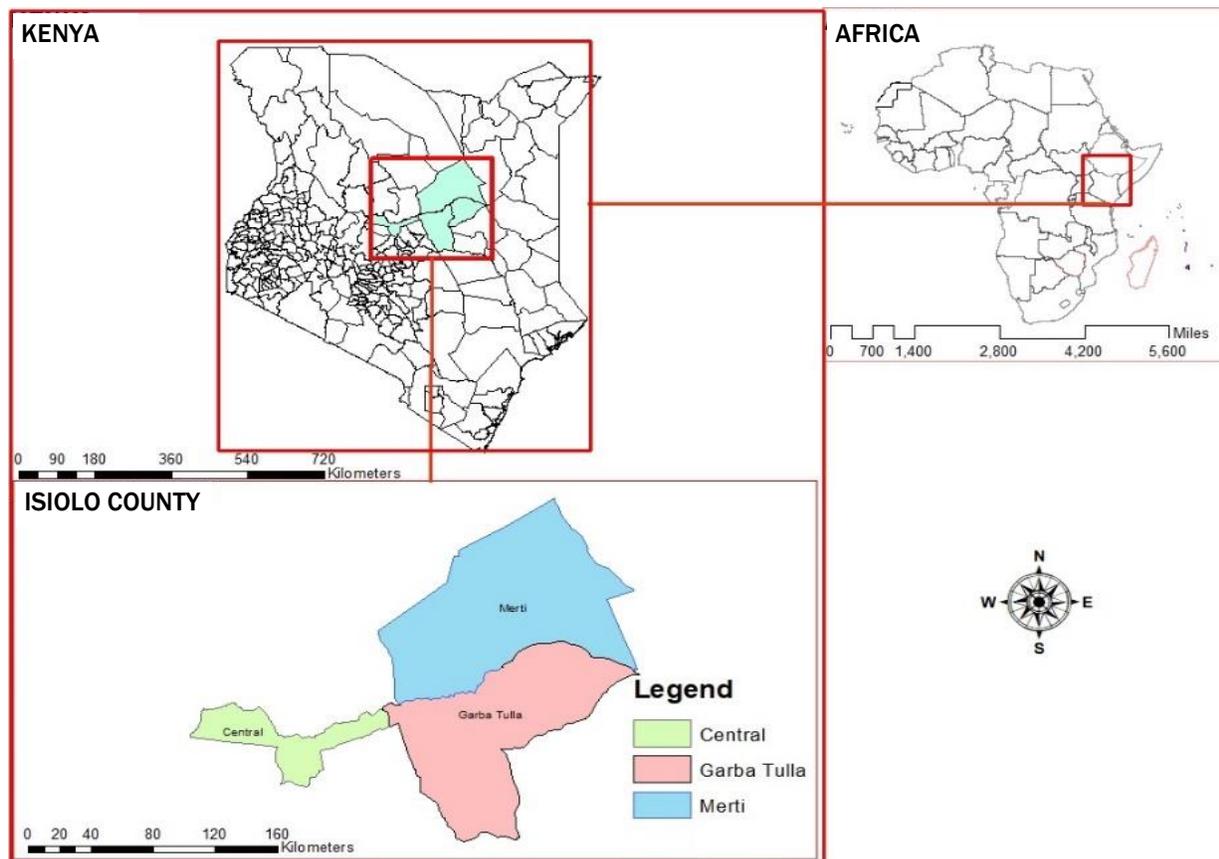
Ericksen, 2008a indicates that unless local food systems, underlying value chains, and environmental integrity are strengthened, information for designing interventions to protect value chain actors and limit their vulnerability may not be effective in the policy-making process. Thus, inappropriate market regulatory mechanisms have great impact on productivity, market access, and price stability (Colonna et al., 2013). One of the recommendations for improving the camel milk value chain is to carry out research to understand the dynamics of the enabling environment that support the system (Colonna et al., 2013; Ericksen, 2008a; McGinnis & Ostrom, 2014).

Research Methods

Background of the Study Area

The study area, Isiolo County, has a land area of 25,350.6 km² and a population of 268,002 persons

Figure 1. The Location of the Study Area in Kenya



(KNBS, 2020) (Figure 1). Administratively, the county is divided into three sub-counties: Isiolo central, Garbatulla, and Merti. According to the 2019 census, Isiolo central had the highest population, with 121,066 persons, Garbatulla had 99,730 persons, and Merti had the lowest population with 47,206 persons. In terms of climate and land-use system, Isiolo County is a typical arid and semi-arid region with a bimodal rainfall pattern, characterized by long rains from March to May, and short rains from October to December (Nato et al., 2013, 2018; Noor et al., 2013). The temperatures are high throughout the year, ranging from a mean minimum of 27°C and a maximum of 30°C, in almost all parts of the county (Nato et al., 2018). About 95% of the county is classified as arid or very arid, while only 5% is semi-arid, generally receiving an average annual rainfall below 300 mm (12 inches), which is also unevenly distributed (National Drought Management Authority, Ministry of Devolution and Planning, 2015). The topography of the landscape influences the amount of rainfall received; slightly higher areas receive relatively more rainfall due to the influence of Mount Kenya and Nyambene Hills in the neighboring Meru County. Generally, this type of rainfall supports grassland, dry land trees, and shrubs.

In these areas, keeping livestock is the main economic activity for over 80% of the population and also offers a source of livelihood for the citizens of Isiolo County. The main livestock kept are sheep, goats, cattle, and camels (County Government of Isiolo, 2018). Among the livestock-based value chains in the county, camel milk is the most common enterprise. The value chain also attracts the most vulnerable groups, such as women and youth, into the system.

The majority of land is communally owned (80%); public land and wildlife conservancies account for 19% and only 1% of the land is privately owned. Over 80% of the rural population is dependent on camel milk produced under the dominant, traditional production system (County Government of Isiolo, 2018). The system supports the livelihoods of these pastoral communities either directly or indirectly through the value chain. Although the support is significant, the sustainability of the system has not been well understood.

Overall, the camel milk value chain is a major boost in county revenue compared to other livestock-based value chains, but the chain is not well connected. Although there are many interested stakeholders in the value chain, and county regulatory frameworks governing the system, the value chain system still experiences low productivity and an informal market infrastructure. However, there are opportunities for understanding and establishing a reliable camel milk value chain system with a well-structured regulatory framework to enhance the sustainability of the system.

Data Collection Method

Both primary and secondary data were collected using quantitative and qualitative research methods from camel milk value chain actors. Specifically, surveys, observations, key informant interviews, and desk reviews were conducted. We conducted a survey using questionnaire for collecting quantitative data from the selected households involved in the camel milk value chain. The survey was carried out in the three sub-counties of Isiolo County (Isiolo central, Garbatulla, and Merti) between January and December 2019. We conducted face-to-face interviews and used the telephone for clarification of certain information during data collection and field observations. The interviews were conducted at the village level with selected households. A household head was considered to take part in the interview if the individual was 18 years or older. To gather information on the fresh milk supplied, milk processed, and milk marketed, we conducted interviews at the camel milk bulking and processing centers in the county.

Data on the drivers of the studied camel milk value chain included the socio-demographic and socio-economic characteristics of the value chain players. We collected information on the sex of the household heads involved in a camel milk value chain, level of education of household heads, and quantities of milk supplied along the value chain system. Primary data were collected to provide insights on the characteristics of the camel milk value chain players based on their socio-demographic and socio-economic characteristics and the efficacy of the regulatory frameworks influencing the system. Records on the quantities of milk supplied to

bulking centers and processing units were obtained mainly from the two active cooperative societies (Anolei and Tawakal). During the survey, we used different interview guides for each category of actors. For example, in the case of input suppliers, we collected information on the kind of services they offered to support the system. In the case of producers, we gathered information on the amount of milk produced at the household level and the surplus for sale or delivery to bulking centers. For processors and marketers, we collected information from their records to estimate the quantities of milk supplied, processed, and marketed. Specifically, the types and numbers of value chain actors interviewed included input suppliers (31), producers (110), bulking centers (18), processors (104), marketers (39), and consumers (50).

In terms of processes influencing the sustainability of the camel milk value chain, we collected data from all the actors on the levels of awareness of existing camel milk regulatory frameworks influencing the system. In addition, desk reviews were used to collect qualitative data on past records from public institutions, such as the livestock department, veterinary department, public health department, and relevant development agencies, to add value to the statistical analysis and to check for bias. The survey adopted the open data kit (ODK) design for use in a mobile data platform. Data were collected through an Android platform running on tablets to ensure validity and reliability of the data. Trained local enumerators who spoke the language of the respondents administered the questionnaires during the survey. We conducted pretesting of the questionnaires for data collection to remove errors and to assure data quality.

Sampling

In order to establish the number of households participating in a camel milk value chain in the county, we consulted the county administrators, including chiefs and village heads, who provided data on 1,100 households. Using the simple random sampling method with the aid of the Raosoft sample size calculator for the determined target population, 316 households were randomly selected for interviews. We adopted the probability-proportional-to-size (PPS) sampling tech-

nique to get the actual sample size by sex and age and disaggregated them into input suppliers, producers, traders, transporters, and consumers. We selected key informants ($n=20$) using the snowball purposive sampling technique based on their knowledge of the camel milk value chain system. These data types were necessary to complement one another so as to reduce the biases and weaknesses in both quantitative and qualitative methods. The respondents for the selected households and key informants were contacted, briefed about the research, and asked for their consent as stipulated by research ethics. The information collected from KII's and field observations were recorded in a Microsoft Word document and summarized into narratives; hence they were not included in the statistical data.

Data Analysis

Data were entered into a Microsoft Excel spreadsheet for cleaning and then transferred to IBM SPSS Statistics for Windows (Version 23.0.0). We analyzed data on the socio-demographic and socio-economic information of the household heads interviewed, quantities of milk supplied, mapping of the camel milk value chain system using the information provided by respondents, categories of support institutions, and levels of awareness on regulatory frameworks by value chain microplayers. In these we used the household head as the unit of analysis. We computed measures of central tendency (mean) and dispersion (range) to summarize the socio-demographic and socio-economic data. The perceptions of the levels of awareness of regulatory aspects were analyzed using descriptive statistics. In this case, the simple response variable may add up to a maximum of 100%. We collected data on the total quantities of milk supplied by producers to bulking centers in 2018 and used descriptive statistics to get the means. The milk measurements were given in the form of liters. The secondary data from the literature review provided supplementary information and support. A combination of these analyzes was then used for interpretation and also provided opportunity for researchers' triangulation to develop a modern camel milk value chain regulatory framework for the county.

Results

Socio-demographic and Socio-economic Characteristics of the Respondents

The results show that 62% of the total respondents in all categories had no formal education and none had university education (Table 1). The study also showed that female respondents were the most disadvantaged in education, indicating 45% with informal education, 18% with primary education, 6.3% with secondary level education, and none with either tertiary or university education. The education level of male respondents was also recorded at 17% with no formal education, 7.4% primary, 4.6% secondary, while 1.4% had tertiary.

Average Camel Milk Data Collected by the Bulking Centers (2014–2019)

The results of the milk data collected from the bulking centers over the six-year period indicate

that an average of 1,727,834 liters of milk were generated in the county annually (Table 2). Out of this, 1,465,911 liters (85%) were delivered on average to the bulking centers annually, and thus to the local processors. About 261,922 liters (15%) of the milk produced was consumed at the household level. We also found that 293,182 liters (20%) of the milk delivered to processors spoiled or became wastage. The value addition of milk at the county is low, standing at 74,362 liters (5%) annually.

The results also indicate that the average sales of milk across 6 years was \$829,360, processed fresh milk delivered to bulking centers was \$1,172,729, and milk processed into yoghurt was \$100,339 annually (Table 3). If the cooperative societies could process all the fresh milk into yoghurt, it would be valued at \$1,978,980, compared to the current value of \$1,172,729 offered at the processing centers. This is a 68% increase in total revenue earnings annually.

Table 1. Response Rate by Sex and Education of the Respondents Involved in a Camel Milk Value Chain

Level of education of the respondents	Sex of the respondents		
	Male (n=86) (%)	Female (n=198) (%)	Total (n=284), %
No formal education	48 (17)	128 (45)	62.0%
Primary	21 (7.4)	52 (18)	25.4%
Secondary	13 (4.6)	18 (6.3)	10.9%
Tertiary	4 (1.4)	0 (0)	1.4%
University	0 (0)	0 (0)	0 (0)

The nominal values show the number who responded, while the figures in parentheses show the frequency in the levels of education (%).

Mapping the Camel Milk Value Chain in Isiolo County, Kenya

We used the data displayed in Table 3 to map the flow of products from the point of production to consumption. The flow chart (Figure 2) provides a clear movement of products from the point of production to final consumption points and the points of intervention by support services providers and the

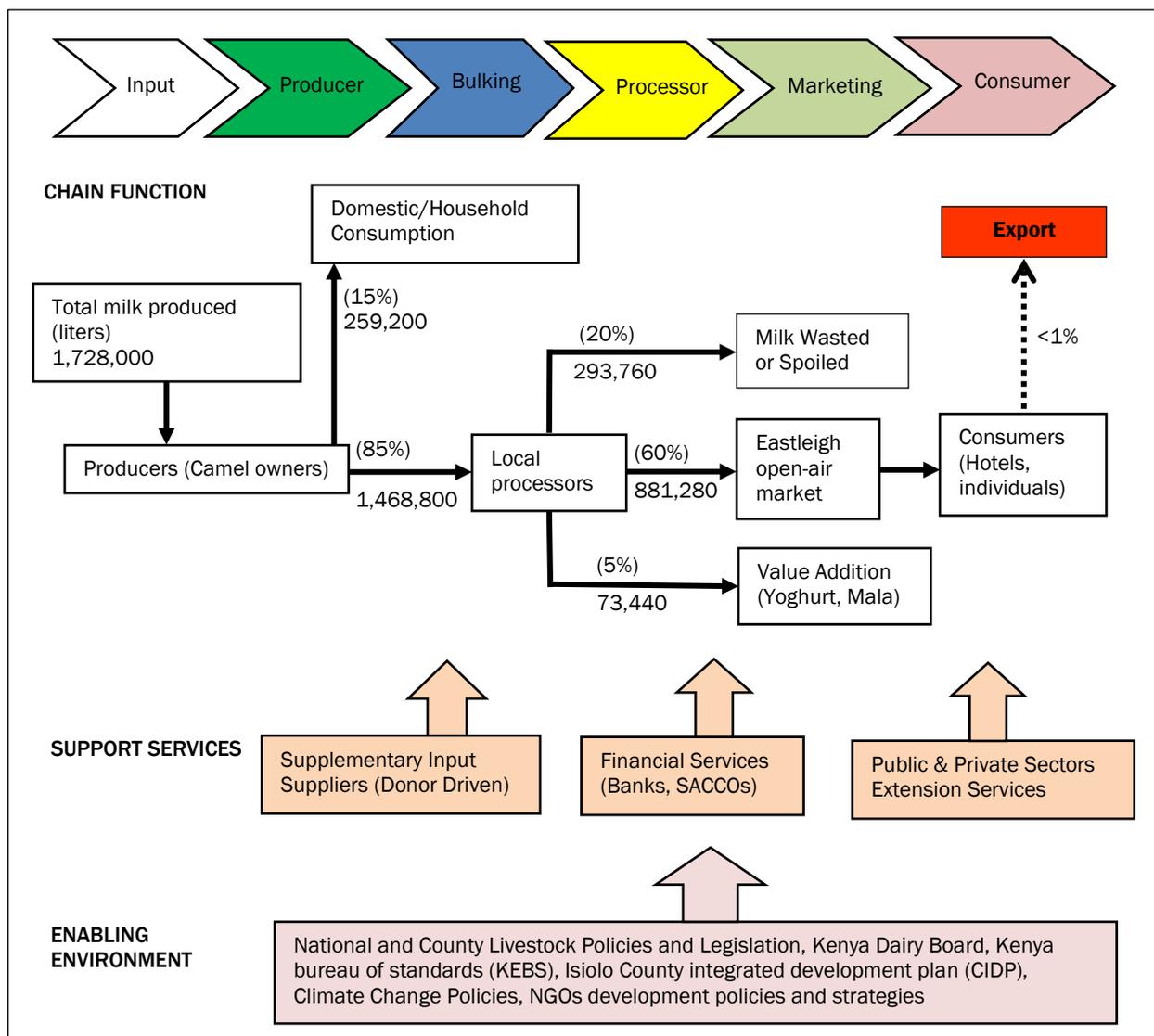
Table 2. Quantities of Camel Milk Produced in the County During 2014–2019

Period (Year)	Quantity of fresh milk produced (liters)	Milk consumed at household level	Milk delivered to bulking centers	Spoiled milk (liters)	Processed milk into yoghurt (liters)
2014	1,687,900	286,943	1,400,957	266,182	56,038
2015	1,626,230	260,196.8	1,366,033.2	245,886	61,471.5
2016	1,702,912	272,465.92	1,430,446.08	271,789	71,523
2017	2,011,924	301,788.6	1,710,135.4	498,223	119,709.5
2018	1,619,662	226,752.68	1,392,909.32	222,865.5	62,681
2019	1,718,374	223,388.62	1,494,985.38	254,147.5	74,749
Total	10,367,002	1,571,536.00	8,795,466	1,759,093	446,172
Average	1,727,834	261,922	1,465,911	293,182	74,362

Table 3. Milk Sales from 2014–2019

Period (year)	Quantity of milk produced (liters)	Farmgate prices (per liter, US\$)	Total amount (US\$)	Processed fresh milk (liters)	Price (per liter, US\$)	Total amount (US\$)	Processed yoghurt (liters)	Price (per liter, US\$)	Total amount (US\$)
2014	1,687,900	.50	843,950	1,400,957	.70	980,669.9	56,038	1.20	67,245.6
2015	1,626,230	.50	813,115	1,366,033.2	.70	956,223.3	61,471.5	1.20	73,765.8
2016	1,702,912	.40	681,164.8	1,430,446.08	.80	1,144,372.9	71,523	1.30	92,979.9
2017	2,011,924	.40	804,796.6	1,710,135.4	.80	1,368,108.3	119,709.5	1.40	167,593.3
2018	1,619,662	.50	809,831	1,392,909.32	.90	1,253,618.4	62,681	1.50	94,021.5
2019	1,718,374	.60	1,031,024.4	1,494,985.38	.90	1,345,486.9	74,749	1.50	112,123.5
Average	1,727,834	.48	829,360.3	1,465,911	.80	1,172,728.8	74,362	1.35	100,388.7

Figure 2. A Schematic Presentation of the Analysis of a Typical Camel Milk Value Chain in Isiolo County, Northern Kenya



policy-makers who provide the enabling environment for the system. We show that the chain function is disaggregated into input suppliers, producers, milk aggregators, processors, marketers, and finally consumers. Figure 2 shows how milk flows from the point of production to the end and the points of intervention by support services providers and the policy-makers who provide the enabling environment for the system. Sixty percent of the milk traded ends up in the Eastleigh open-air market in the form of raw milk. High milk spoilage and wastage occurs at the production and transportation stages before reaching the processing centers. The support services providers include financial institutions, such as local banks and savings and credit cooperative societies (SACCOs), and general public and private advisory services for livestock production. The regulatory frameworks influencing the enabling environment for a sustainable camel milk value chain include national livestock policies, the national Kenya Dairy Board (KDB), Kenya Bureau of Standards (KEBS), Isiolo County integrated development plan (CIDP), and climate change policies and strategies.

Categories of Support Institutions Involved in the Camel Milk Value Chain in Isiolo County

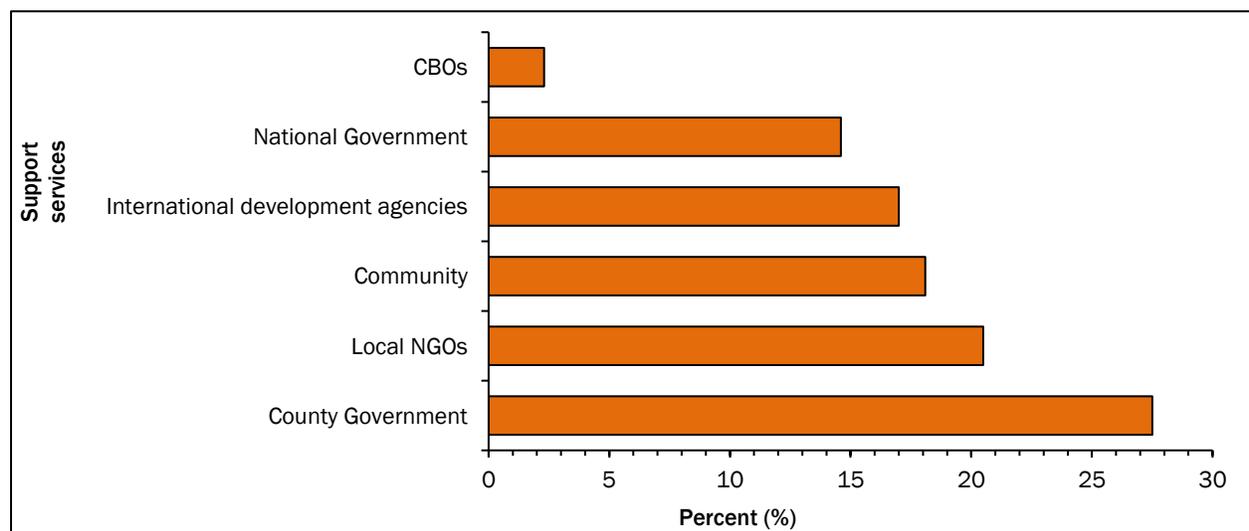
The results indicated various stakeholders who provide support services to enhance the develop-

ment of the camel milk value chain in the county (Figure 3). The results of the respondents' surveys on the role played by each actor indicated that the major services offered to the camel milk value chain are provided by the county government at 27.5% and local nongovernmental organizations (NGOs) at 20.5%, together contributing up to 49% of the services. The rest include the community (18.1%), international development agencies (17%), national government (14.6%), and the local community-based organizations at 2.3%. When the respondents were asked to share their experiences working with these players, 82.5% indicated weak networking and poor coordination mechanisms. However, 17.5% of the respondents noted that the existing institutions somehow work together, while reiterating that they are poorly coordinated.

Awareness of the Actors in the Existing Camel Milk Value Chain Regulatory Frameworks

The producers are most disadvantaged, indicating a high level of lack of awareness in regulatory frameworks, existing policies, and legislation influencing the camel milk value chain in the county (Table 4). Specifically, there is low awareness of national livestock and dairy policies influencing the chain. The findings also showed the micro-actors lack awareness of the regulatory bodies and legislation that influence the system. The level of lack of aware-

Figure 3. Perception of Actors on the Level of Support Services Offered by Varied Stakeholders in the Camel Milk Value Chain



ness by producers of the consumers was found to be 84%, transporters 69%, bulking centers 67%, and producers 62% (Table 4).

Discussion

Our study reveals a distinct camel milk value chain with three categories of actors. These include the micro-actors involved in daily activities, such as input suppliers, producers, bulking, processors, marketers, and consumers; the support services providers; and those who provide the enabling environment-the policy-makers. Out of the total respondents sampled for interviews, the majority were female respondents (65%), and among them

majority (58%) had no formal education. However, even without much education, the participation of females in the camel milk value chain is instrumental, mainly in the bulking and processing of camel milk products. The respondents selected for KII were not included in these statistics.

Our study shows that 85% of the camel milk is sold in raw form to the bulking and local processing centers, while only 15% is consumed at the household level. This is an indication that there is change from the previous traditional practices, where camels were only kept for milk consumed at the household level, to a commercialized system where camel milk is now traded to generate income

Table 4. Respondents' Awareness of Various Legislation, Policies and Regulatory Frameworks

Awareness	Value chain player					
	Input supplier (%)	Producer (%)	Bulking center (%)	Processor (%)	Transporters (%)	Consumers (%)
Existing regulatory frameworks						
Kenya Dairy Board (KDB)	21 (68)	42 (38)	6 (33)	79 (76)	12 (31)	8 (16)
Kenya Bureau of Standards (KEBS)	9 (29)	65 (59)	15 (83)	50 (48)	27 (69)	19 (38)
National Environmental Management Authority (NEMA)	5 (16)	32 (29)	8 (44)	24 (23)	29 (74)	18 (36)
Public Health	26 (84)	52 (47)	18 (100)	84 (81)	32 (82)	22 (44)
Existing policies						
National livestock policy (NLP)	7 (23)	28 (26)	15 (83)	80 (77)	29 (74)	8 (16)
National dairy policy (NDP)	9 (29)	2 (2)	3 (17)	31 (30)	9 (23)	11 (22)
Sustainable Development Goals (SDGs)	7 (23)	15 (14)	2 (11)	22 (21)	10 (26)	18 (36)
Existing legislation and laws						
The Constitution of Kenya, 2010	15 (48)	38 (35)	12 (67)	85 (82)	32 (82)	32 (64)
The Dairy Industry Act	11 (36)	40 (36)	15 (83)	76 (73)	14 (36)	13 (26)
Public Health Act	28 (90)	40 (36)	15 (83)	76 (73)	14 (36)	13 (26)
Standards Act	6 (19)	42 (38)	16 (89)	90 (87)	30 (77)	41 (82)
Food, Drugs and Chemical Substances Act	23 (74)	18 (16)	11 (61)	83 (80)	28 (72)	14 (28)
Animal Diseases Act	18 (58)	36 (33)	16 (89)	80 (77)	31 (79)	21 (42)
Environmental Management Coordination Act (EMCA)	10 (31)	79 (72)	18 (100)	92 (89)	39 (100)	37 (74)
Isiolo County Livestock Sales Yard Act, 2016	8 (26)	20 (18)	7 (39)	14 (14)	14 (36)	6 (12)
Isiolo County Climate Change and Adaptation Act, 2017	6 (19)	10 (9)	10 (9)	28 (27)	18 (46)	11 (22)

The nominal values represent those who responded yes, while figures in parentheses show the frequency in the levels of awareness (%).

and other livelihood options. Milk spoilage (20%) occurs at bulking centers and during transportation and is a major concern for a modern camel milk value chain. This has been associated with the long distances to delivery points and poor road infrastructure, inadequate milk production and handling techniques, and lack of milk cooling apparatus. The milk bulking centers and processors have conveyed their great concern to local milk producers due to challenges pertaining to clean milk production and adherence to milk quality and safety measures. The local producers as well as the majority of milk bulking centers are still resistant to adopting modern milk production methods. There continues to be a broad use of locally fumigated milking containers, or “jerry cans,” for milking camels and transporting milk to destination markets. For example, 60% of the milk is sold to milk vendors at the Eastleigh open-air market in Nairobi and a few neighboring markets. We also observed that vendors at these markets prefer milk preserved in traditionally fumigated containers due to the tastes and preferences of their final consumers. This has been found to be a big challenge to the sustainability of the system.

There is low (5%) value addition in the camel milk value chain implicating negligible (<1%) access of the milk to national, regional, and international markets. This is due mainly to a lack of skills and knowledge about a modernized camel milk value chain. We show that this is due to weak relationships among the value chain actors, exacerbated by weak regulatory mechanisms in the county. Our observations are in line with studies conducted by Nato et al. (2018) that revealed that such milk production methods contribute to an increased bacterial load in traditional camel milk production due to low compliance with hygiene practices, subjecting the product to poor quality and safety standards. The other challenge is weak networks among the milk producers and other support institutions. However, our study shows a similar trend in the value chain to that reported by other studies in similar regions of Africa such as Morocco, Djibouti, Mauritania, and Sudan (Idris, 2011), and Ethiopia (Dandesa, 2017). The current production and marketing practices make it difficult to sustain a camel milk value chain in the county. Our study also concurs with other findings

that indicate that the constraints to milk marketing in Isiolo County are mainly due to poor hygiene practices and low capacities for milk processing and marketing, all of which exacerbate low incomes due to low production (Wayua et al., 2012).

Our study is also in line with the findings of Colonna et al. (2013), who indicate that a value chain involves many value chain actors who have significant roles in characterizing complex networks and relationships among actors. Although livestock production and the subsequent value chains offer good opportunities for the pastoral communities, there is a weak relationship between the input suppliers and the producers. Our study also concurs with studies that show weak inter-farm linkages and uncoordinated market strategies in many undeveloped economies (Anastasiadis & Poole, 2015). Our findings also concur with other studies that observe challenges in regulatory mechanisms due to informal marketing systems exacerbated by poor control mechanisms (Colonna et al., 2013; Ericksen, 2008a; Kirwan & Maye, 2013).

This study also agrees with Herrero and Thornton (2013), who point out that a food system can only be sustainable if social, institutional, and political support are provided to the adaptive capacity of the local value chains. Our study has shown that a camel milk value chain is a potential source of pastoral livelihoods and accommodates varied categories of actors in the chain. It is also in line with other studies that have indicated that even resource-poor households involved in the value chain received earnings from the sale of milk (Nato et al., 2018; Noor et al., 2013). It is important to note there is no restriction or limit to enter into the system. This has stimulated increasing interests in the development of the camel milk value chain by many micro-actors, stakeholders, and development agencies, as also indicated by Odongo et al., 2016; Wayua et al., 2012. Although the traditional milk production and preservation methods may suffice for the domestic market, this practice is not sustainable, and it does not conform to global standards. The existing regulatory frameworks are weak and fail to recognize camel milk as dairy milk. Specifically, the KDB Policy of 2017 and related legislation refer dairy as the “milk from cow”

(GOK, 2017b). These pose a great challenge to the integration of the county's camel milk value chain into the national dairy system that requires quality and safety controls of milk products to meet those of national, regional, and international markets. According to the 2012 Kenya Public Health Act and the 2017 dairy industry regulations (GOK, 2017), all dealers in milk products are supposed to have adequate skills for clean milk production while adhering to quality safety standards and to have the requisite licenses and certificates obtained after the inspection and approval of their trade practices. We also found the 2008 Kenya national livestock policy [NLP] on to which the county regulatory frameworks (e.g. Isiolo County Sales Yard Act, 2016; Isiolo County Climate Change and Adaptation, 2016) are anchored, have become obsolete and outdated. There is also inadequate synergy among the existing pieces of legislation envisaged to boost the livestock industry. The Isiolo County sector development plans are supposed to match the national policies that cover a period of 10 years. Thereafter, the policies are reviewed depending on prevailing conditions and need. One can draw assumptions from the fact that the lack of awareness of the existing policies and legislation are due to weak extension services, consultative planning mechanisms, and capacity-building initiatives. This is also evidenced by the fact that the major role of the county is revenue collection (48%) and only 3% in policy implementation. Our study, therefore, agrees with the findings by Kirwan and Maye (2013) that there is a need to address the question of how local value chains can be structured and coordinated for sustainability.

Although there are many institutions providing regulatory and support services to the county's camel milk value chain, the system is still facing problems of low production and lack of skills in processing milk and milk products, evidenced by high post-harvest losses, to meet a sustainable and viable business environment. The identified regulatory frameworks for the system in the county, which included the Kenya Dairy Board [KDB], Public Health Department, Kenya Bureau of Standards [KEBS], National Environment Management Authority [NEMA], and the national and

county governments that are supposed to provide an enabling environment for the system, are also not well coordinated. Despite the existence of all these frameworks, there are no control mechanisms in the camel milk value chain to enhance a viable business environment.

The FAO's (Neven, 2014) sustainable food value chain [SFVC] concept is applied to regional and global levels, with a country's entire product measured on performance and assessed on the product's aggregated levels. Hence, the concept focuses more on efficiency improvements that increase consumer food availability than on locally instituted mechanisms to ensure the objectives of sustainable potential value chains. We find that this concept also does not recognize regulatory aspects as the main foundation for achieving a sustainable value chain. The main concern, therefore, is embedded in the fact that there are no strong regulatory frameworks in place to enhance the sustainability of the promising value chains in Isiolo County. This phenomenon disrupts a consistent and reliable marketing system because it makes it more difficult to meet the required standards to access national and regional markets to enhance a sustainable system.

Conclusion and Recommendations

The camel milk value chain incorporates the most vulnerable populations in the society, such as women and youth, into the system. Although the value chain is similar to those revealed in other studies, the system is operating in an informal marketing structure with loosely connected value chain actors. We observe there is a substantial challenge for the various players to achieve a modernized system in the production, processing, and marketing of camel milk products. These include weak connections among the actors and a lack of skills and capacities that accrue from a large number of value chain actors, such as women who lack formal education but play critical roles in milk handling and processing activities. There is a high volume of milk that spoils or goes to waste due to poor milk handling techniques and low value addition. The lack of coordination and poor institutional connectivity were major issues in enhancing a well-regulated system. Nevertheless, there is great

potential for the camel milk value chain in the county for domestic, national, and international markets.

Our study recommends certain policy options to strengthen a well regulated and functional camel milk value chain in Isiolo County. These include to (1) establish a camel milk dairy board that would help regulate the system more effectively and efficiently, (2) strengthen the institutional networks among the value chain actors, (3) enhance inclusivity in decision-making and control measures through gender mainstreaming particularly to uphold women's values, and (4) build capacity of the actors for an enhanced and sustainable system.

In order to put the county on a global camel milk products market standard, there is a need for operational control mechanisms that include establishing technical milk inspectors and laboratory technicians for milk quality and safety control measures. There is also need for adequate extension service providers to build the capacity of camel milk micro-actors on camel husbandry and health regulations. This will also help put in place the residue monitoring plan for the camel milk value chain that is compliant with the national, regional, and global standards.

Model for Sustainable Camel Milk Value Chain in Isiolo County

In this section, we present a model for a well regulated camel milk value chain in Isiolo County to improve on the current informal marketing system. The conceptual model is modified from the FAO (Neven, 2014) sustainable food value chains concept (SFVC). We identify the major drivers of the camel milk value chain by identifying their household socio-demographic and socio-economic status, and assess the value chain system, institutional arrangements, and regulatory frameworks influencing the system. These will enhance a commercially oriented and well-structured value chain with enhanced adaptation strategies and regulatory frameworks. The outcome is a sustainable camel milk value chain determined by increased productivity, enhanced capacities of the value chain actors with strong networks, increased market access, strengthened institutional arrangements, and effective regulatory mechanisms (Figure 4).

At the county level, the model recommends the development of a camel milk policy that puts in place strong institutional arrangements by establishing a camel dairy board to provide guidance on camel milk marketing legislation. This board would also establish coordination mechanisms aligned with the national livestock policy and food systems strategies. The model recognizes the need for coordination and knowledge transfer to various value chain actors through capacity-building that will ultimately trigger transformative innovations in the system. In order to determine the sustainability of the system, the model recommends that the camel milk value chain in the county be anchored on national frameworks, such as KEBS quality and safety standards and the national environmental frameworks that include the climate change policy and the ending drought emergencies (EDE) strategies. At the regional level, we recommend that the value chain align with regional agreements such as the Intergovernmental Authority on Development (IGAD), Common Markets for Eastern and Southern Africa (COMESA), and East African Community (EAC) for compliance in terms of quality and safety measures, as well as adherence to environmental integrity. Finally, we recommend all these frameworks be aligned with global food system policies and agreements, such as the United Nations Sustainable Development Goals (SDGs), climate change frameworks, and World Trade Organization (WTO) standards, in order to achieve a sustainable camel milk value chain in Isiolo County and other areas of Africa with similar value chains.

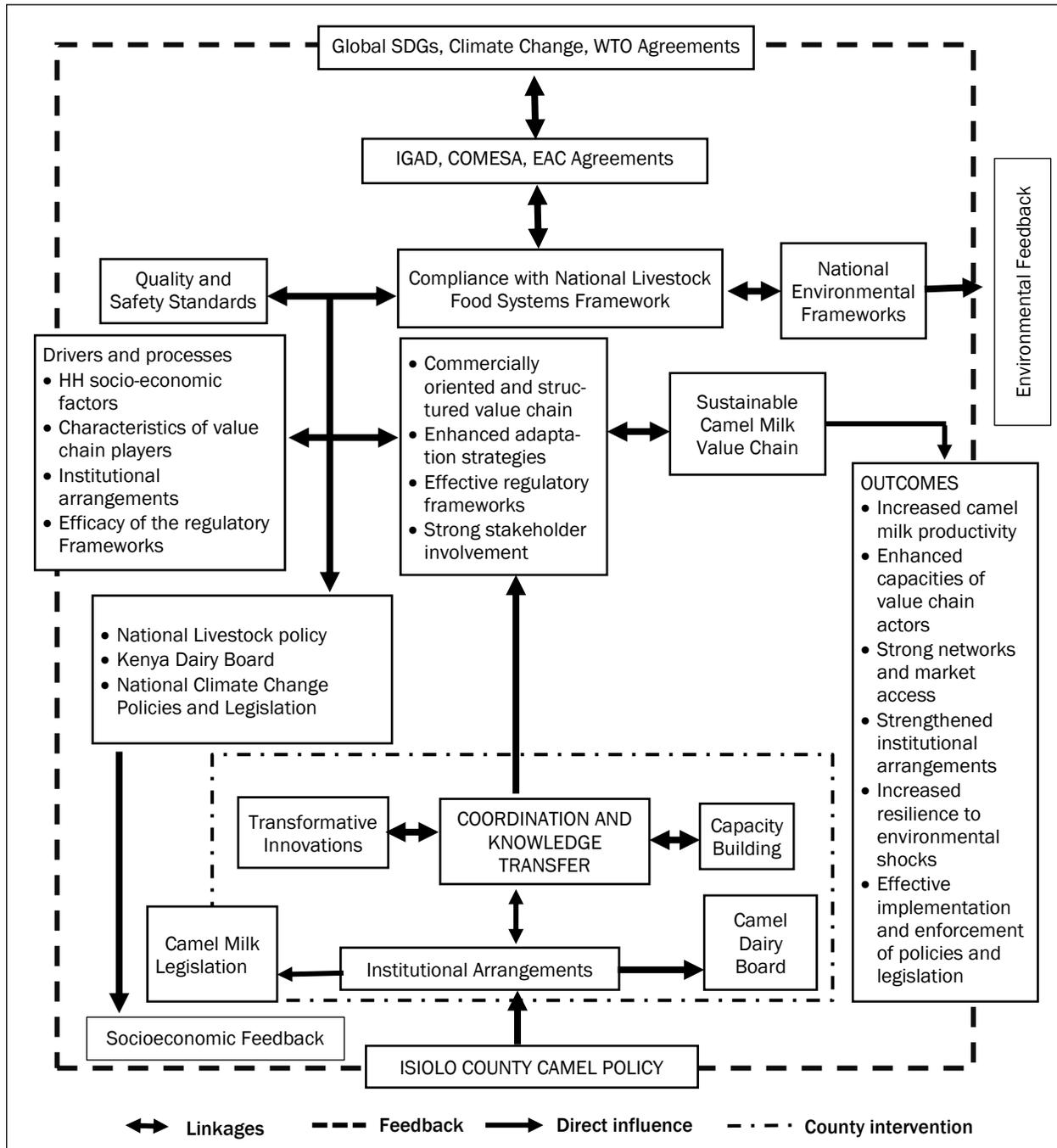
Recommendations for Further Research

A camel milk value chain in Isiolo County is critical to cushioning the pastoral community's requirements for food and other social amenities. The national and county demand for the contribution of camel milk to GDP and revenue is also raising concern. Thus there is a need to carry out research to understand the dynamics of the camel milk value chain and explore opportunities to modernize the value chain and enhance a sustainable system. Emerging camel diseases are also becoming more prevalent and affect milk production, which ultimately translates to low gains to meet the socio-

economic needs of the chain's dependents. Therefore, more research will be required on currently emerging diseases, such as camel sudden deaths and Rift Valley fever, which are also trade-sensitive

diseases. Land use is a major concern in pastoral production systems, since most of the land tenure is under communal grazing system. There is a need for further research to understand the implications

Figure 4. Model for Sustainable Camel Milk Value Chain in Isiolo County, Kenya



Note: IGAD=Intergovernmental Authority on Development; COMESA=Common Markets for Eastern and Southern Africa; KEBS=Kenya Bureau of Standards.

of the Community Land Act of 2016 in order to strengthen communal land ownership and sustainable production systems. Further research should also focus on frameworks for regional coordination and integration mechanisms to effectively implement and enforce global standards for quality and safety control measures in a camel milk value chain.

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Governance of risk management programs: Learning from Québec's Farm Income Stabilization Insurance program

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Abstract

Involving stakeholders in program decision-making can support existing programs and reduce tensions against the state. However, to be involved, stakeholders may request specific mechanisms to influence program design or outcomes. This paper analyzes the design of four consultation mechanisms and the resultant stakeholder experiences in a provincial Canadian program called Farm Income Stabilization Insurance (FISI). The program offers a protection against low prices. The findings of this paper are based on 18 semi-structured interviews conducted with current and former participants familiar with the mechanisms. An analysis is

accomplished through Arnstein's ladder of citizen participation and Glasser's choice theory. Results show that stakeholder representation can be improved by adequately designing consultation mechanisms and implementing specific actions. Recommended practices include separating political and technical discussions, asking a third party to take charge of the consultation mechanisms and prepare information, formally laying down recurrent mechanisms, and involving high-ranking individuals in the discussions.

Keywords

Stakeholder Participation, Agriculture Governance, Farm Income Stabilization Insurance, Assurance stabilisation des revenus agricoles

Disclosure

The author worked at Centre d'Études sur les Coûts de Production en Agriculture (CECPA) during the editing of this article, in a division that did not address Farm Income Stabilization Insurance (FISI), nor FISI-related activities. The underlying study behind this article and the first version of the article were written prior to any engagement with the CECPA.

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Introduction

Designing government-sponsored programs involves many factors. These include budget considerations, stakeholders' needs and demands, and the potential impact of the program on the environment, on society, or on other groups that may expect to receive similar support (Bellemare & Carnes, 2015; Daugbjerg & Swinbank, 2012; Josling, 2002; Mercier, 2016; Skogstad, 2008). Ideally, policymakers who design government programs rely on many sources of information to make sound decisions, leading to the efficient distribution of funds, thus achieving their primary objective of benefitting stakeholders.

Many of these funding decisions are based on data gathered by bureaucrats working with existing programs (Kelman, 2005; Lindblom, 1959). While this type of data is valuable, primary beneficiaries of programs also have knowledge and information that could influence the decision-making process (Gailmard & Patty, 2013). One way to access beneficiaries' input is to engage interest groups through the lobbyists who represent them and serve as their voice. This mechanism could convey information directly from interest groups to politicians and the state (Baumgartner et al., 2009).

The case study presented here showcases such a relationship regarding the design and implementation of one provincial risk management program in Canada, the Farm Income Stabilization Insurance (FISI)¹ program. This study enables the identification of factors supporting stakeholder participation and contributes to a better understanding of FISI, a program that has historically lacked attention from researchers (Gervais & Larue, 2007). Informational considerations are especially important for this program since problematic information can yield additional risks for farmers (Antón et al., 2011).

Drawing on Arnstein's (1969) ladder of citizen participation and Glasser's (1999) choice theory, this paper examines the involvement of Québec farmers in decisions affecting the FISI program through *mechanisms of consultation*, where farmers' groups have a voice in the establishment of parameters surrounding the program and the

eligibility of the beneficiaries. This specific combination of theories creates a framework covering the formal aspects of consultation and the interactions between stakeholders inside and around these consultations. Furthermore, it also addresses the relationship between beneficiaries' representatives and the state. By focusing on the relationship rather than the use of power or resources, this approach departs from the more traditional perspective of interest representation in some political science and public policy theories (see Bachrach & Baratz, 1962; Cawson, 1986; Cobb & Ross, 1987; Dahl, 1961; Kanol, 2015).

This research relies on an outcome evaluation of the mechanisms of consultation, particularly through expert interviews, to increase our understanding of how farmers' groups are incorporated into program decision-making.

The results suggest that since the early 2000s, when the state implemented these mechanisms of consultation, tensions related to risk management programs between the state and farmers' groups have lessened in Québec. The process has led to a climate of collaboration rather than one of mistrust and confrontation. The results also identify certain aspects of mechanism design that can foster participation.

This paper first includes a section presenting how Arnstein's ladder of citizen participation and Glasser's choice theory can be combined to inform farmer participation in the program decision-making process. A second section describes the FISI program and the mechanisms of consultation used to inform and update program parameters. A third section discusses the use of outcome evaluation and expert interviews to assess the utility of the mechanisms as perceived by the participants. Finally, the fourth section concludes with the results of this assessment, as well as the patterns that emerged that support sustaining stakeholder participation.

Stakeholder Involvement in Program Decision-making

This study focuses on the interaction between stakeholders' representatives via specific FISI

¹ In French: Assurance Stabilisation des Revenus Agricoles (ASRA).

mechanisms of consultation. The study adopts a combined perspective of individual participation and mechanism design by combining Arnstein's ladder of citizen participation and Glasser's choice theory.

In 1969, Sherry Arnstein developed a ladder representation of citizen involvement in decision-making processes, illustrating stakeholders' roles in the process and their level of influence. The ladder is focused on the capacity of citizens to gain power inside the institution in which they are involved through political mechanisms, such as lobbying (Collins & Ison, 2009). The theory considers that the greater importance given to consultation participants, the greater influence stakeholders will have. The visual manifestation of the theory is a ladder composed of several rungs that stakeholders can climb to acquire more power. Each rung is cumulative with precedents equalizing the relationship between participants and the organization in charge of the consultation. For instance (see Table 1), lower rungs of participation are associated with actions of manipulation or therapy. On these rungs, stakeholders are not asked about their position on the topic but rather to participate and learn the right attitude toward the organization's actions. Therefore, consultation mechanisms placing stakeholders on these rungs limit stakeholders' influence and participation. Stakeholders are included in proper consultation mechanisms for the middle

rungs, but usually as information receivers rather than actual contributors. Finally, the higher rungs of participation include partnership development, with the delegation of some power and control of the organization held by stakeholders. Participants are recognized as contributors on these rungs, and their perspective is heard. Thus, according to Arnstein (1969), by identifying which rung represents the involvement of stakeholders in decision-making processes, it is possible to depict who is actually making the decisions. The higher the rung that stakeholder reaches, the more power they have to influence decision outcomes.

Even though this ladder is over 50 years old, it is still regularly used by researchers from a wide variety of fields (e.g., health care, urban planning, public administration, climate change) (Collins & Ison, 2009; Schively Slotterback & Lauria, 2019; Stelmach, 2016; Tritter & McCallum, 2006). In agriculture, Beyuo (2020) used Arnstein's ladder to understand how the level of engagement by farmers in non-governmental organizations (NGOs) influences their adoption of sustainable agronomic practices.

Arnstein's ladder is a useful and appropriate tool to analyze and criticize public participation mechanisms as it focuses on the access and influence provided to stakeholders' representatives (Blue et al., 2019). This theory also allows us to consider multiple stakeholders in different mecha-

Table 1. Ladder of Citizen Participation in Instances Organized by Another Actor

Rung	Rung name	Maximum stakeholder power allowed for each rung
1	Manipulation	Information provided to change their opinion
2	Therapy	Accompanied by professionals that can diagnose their problem
3	Informing	Reception of information to increase their knowledge
4	Consultation	Inclusion in committees that have no decision-making power
5	Placation	Inclusion in decisional committees but without resources allowing them to be relevant
6	Partnership	Share the decision-making power
7	Delegated Power	Have delegated power to make decisions
8	Citizen Control	Have the sole control of the programs overseen

Source: Arnstein, 1969.

nisms, thus limiting potential influences from individual participant characteristics if the unit of analysis is kept at the mechanism of consultation level rather than at the individual stakeholder level (Stelmach, 2016; Tritter & McCallum, 2006). Furthermore, by using this theory, it is possible to do a first screening to qualify the place given to stakeholders in each mechanism.

However, Arnstein's ladder of citizen participation also has some serious limits, such as assuming a linear relationship between influence and place granted in consultation mechanisms (Blue et al., 2019; Collins & Ison, 2009). For instance, it assumes that citizen control is the best possible participation process, even if it might not align with participants' rationale, expectations, or capacity (Tritter & McCallum, 2006). Moreover, the framework considers that each stakeholder in a group is similar, obscuring the place of minorities (Blue et al., 2019; Tritter & McCallum, 2006).

To alleviate some of these limits, this paper adds a second theory, Glasser's (1999) choice theory, which allows a deeper examination of the aspects influencing relations in the mechanisms of consultation. It is a psychiatric theory explaining the behavior and motivation of individuals through their attempt to fulfill their needs (Milford & Kiddell, 2020). It posits that individuals act out of unhappiness rather than mental illness. Thus, an individual's actions can be explained by understanding the relationship between their current situation and the expected ideal situation. From a psychiatric perspective, it includes the concept that fulfilling the basic needs of individuals should be the core focus of intervention rather than medicating mental illnesses (Lyngstad, 2020; Milford & Kiddell, 2020). Glasser stipulates that individuals are constantly trying to change their situation to align it with their perceived ideal situation. Thus, individuals are incentivized to adjust their behaviors to fulfill their needs rather than palliating their symptoms (Brown et al., 2007; Glasser, 1999; Tanrikulu, 2014). In terms of consultation mechanisms, it would mean that changing the design of a mech-

anism could help shift the actual situation of participants toward their ideal one.

This broad theory has mostly been applied in educational settings and has focused on mental health issues. Though, as Bjornstad (2009, p.69) mentions, there is interest in adapting Glasser's theory to a political perspective since individuals also try to fulfill their goals in these situations: "Although choice theory and assessment of needs has mostly focused on intimate relationships and/or professional relationships within education, there is no explicit theoretical limitation that prohibits these principles from being applied to political relationships." Therefore, this study adjusts Glasser's (1999) choice theory to apply it to organization and mechanisms of consultation.

Following this theory, participants in the mechanisms of consultation seek to fulfill four basic needs: belonging, power, freedom, and fun.² Here, belonging refers to the capacity of an organization to make its stakeholders feel included and understood. Similarly, power refers to the ability of stakeholders to control their environment and influence other stakeholders in the decision-making process. In this case, during consultation meetings, the organization must ensure that the decisions made have an impact. Freedom refers to the capacity of stakeholders to express their opinion and assume the consequences of these opinions. The organization must then avoid restraining stakeholders' expression of any ideas or avenues of reflection. Finally, fun refers to the pleasure stakeholders feel when they participate in the mechanism's activities. For any organization, fun can be reached by ensuring that the other fundamental needs are fulfilled (Glasser, 1999; Serisès, 2012).

When participants cannot fulfill their needs, they should feel some discomfort or pain (Howatt, 2012). Applied to the mechanisms of consultation, and leading back to Arnstein's view, the decision-making control exerted by some individuals can create a poor relationship in which participation can hardly be reached (Bjornstad, 2009; Edwards, 2009; Tanrikulu, 2014). Thus, by understanding if

² A fifth one, survival, was developed by Glasser (1999) to refer to the physiological needs of survival, nourishment, and shelter. Following the work of Bjornstad (2009) and Serisès (2012), this study omits survival as it refers to actions outside of the scope of the mechanisms of consultation.

and how participants' needs are fulfilled in the context of a mechanism of consultation, it would be possible to infer a participant's situation. Combining both theories creates a framework that encompasses the influence of procedures and informal rules and habits between participants (Seriès, 2012).

The Farm Income Stabilization Insurance (FISI) Program

FISI was established in the province of Québec in 1975 with the primary objective of reducing farm income variation while guaranteeing a net positive income for farmers (Commission sur l'Avenir de l'Agriculture et de l'Agroalimentaire du Québec, 2008; Groupe de Travail sur la Sécurité du Revenu, 2014; St-Pierre, 2009). It was first implemented to support cow-calf production and has since been expanded to most of the important commodities produced in Québec that are not covered by supply management (Gervais & Larue, 2007; Lachappelle, 2007).

The program acts as insurance against market price fluctuations that would cause losses to farm-

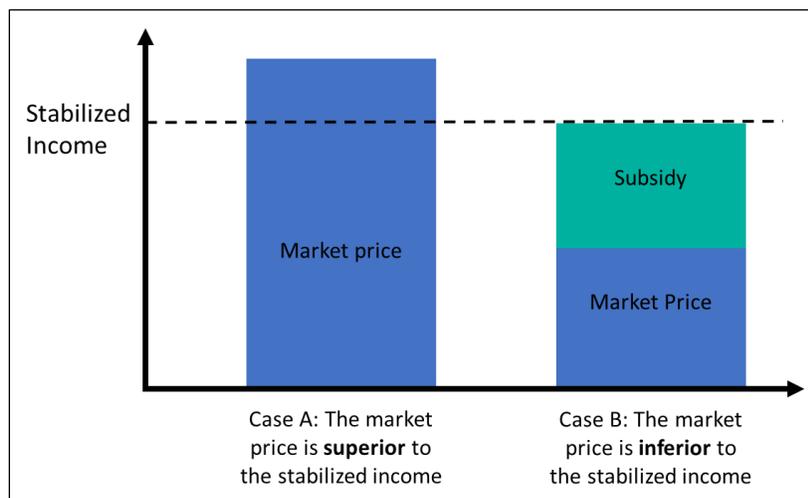
ers. Farmers pay a premium every year to enroll in FISI and receive a payment from the government if the market price is below the stabilized income. Hence, if the annual average market price is higher than or equal to the stabilized income, the producer receives nothing from the state (see Case A from Figure 1). If it is lower, the producer receives the difference between the stabilized income and the market price (see Case B from Figure 1) (FADQ, 2018).³ There is a different stabilized income for each of the 10 commodities covered (hogs, lamb, cattle, apples,⁴ and different cereals). In this sense, it is a classic protection program against low commodity prices, similar to the counter-cyclical payments included in the U.S. farm bill from 2002 to 2013 (Smith & Glauber, 2019).

The determination of the threshold for payment is the main difference between FISI and similar programs in the United States. The stabilized income threshold represents the actual price producers should receive if the market adequately covers their cost of production. It is determined by a production cost study that the Financière Agricole du Québec (FADQ) carries out through an independent non-profit organization, the Centre d'Études sur les Coûts de Production en Agriculture (CECPA).⁵

This study is conducted every five years through mandatory audits on a sample of farms producing the commodities, resulting in a model farm on which the FADQ bases all its calculations, such as the number of units produced and the production of non-FISI commodities.

Central to this paper is the idea that the determination method of each element of the stabilized income varies by commodity and time, with the

Figure 1. The Farm Income Stabilization Insurance Mechanisms of Compensation



Source: Author.

³ For most farmers, FISI does not have any copay.

⁴ FISI ended their coverage of apples a few months after the completion of this study.

⁵ Until 2001, when the Financière Agricole du Québec was created, decisions related to stabilized income were made by the Ministry of Agriculture, Food, and Fisheries. Since that time, the Financière Agricole du Québec has been responsible for most of the decisions related to FISI, along with the Centre d'Études sur les Coûts de Production en Agriculture.

potential for involvement of farmer’s groups in some cases (FADQ, 2018). The process currently includes four mechanisms of consultation that allow for farmer involvement through the farmers union—the Union des Producteurs Agricoles. Figure 2 highlights the four mechanisms (circled). Arrows represent the relationship inside mechanisms, and square boxes identify the institutions and groups involved. In Québec, Union des Producteurs Agricoles has specific chapters—or unions—grouped by commodities produced. This research focused on each of these mechanisms of consultation to highlight their impact on the decision-making processes.

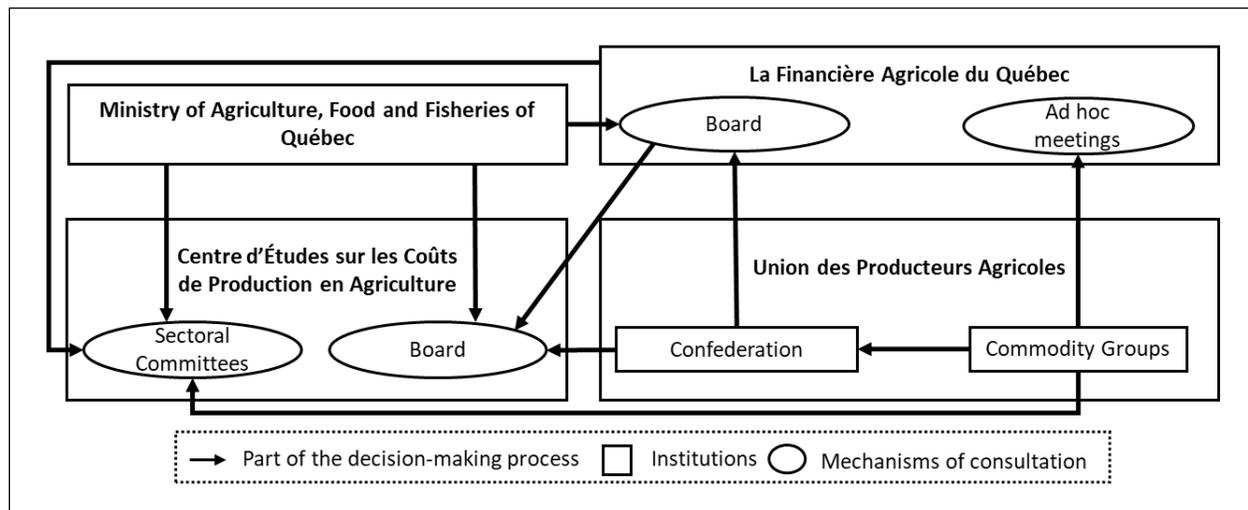
In the lower left corner of Figure 2 is the Centre d’Études sur les Coûts de Production en Agriculture (CECPA). It oversees two of the mechanisms of consultation: sectoral committees and CECPA’s board. The first step in determining production cost is the meeting of each sectoral committee; there is one committee for each commodity or group of commodities. They meet every five years for about 12 to 13 months. The committees ensure that the methodology used to determine production cost is adequately applied while respecting the uniqueness of each sector. The com-

position of the sectoral committees varies in number but always includes representatives from the FADQ, the Ministry, and commodity groups (CECPA, 2018).

Second, sectoral committees recommend results from the production cost studies for adoption by CECPA’s board. CECPA’s board must formally adopt the study once sectoral committees validate it. The board does not have the power to change the cost of production, but it can raise additional concerns or overlooked issues for discussion. This board includes equal members from Union des Producteurs Agricoles, FADQ, and the Ministry. Once the board is confident about the results, it sends the study to the FADQ, which uses the information to compute the stabilized income.

The FADQ is in the top right corner of Figure 3. It oversees the other two mechanisms of consultation: ad hoc meetings and the Financière Agricole du Québec’s board. First, FADQ holds ad hoc meetings to present the stabilized income to the commodity groups. In these meetings, FADQ usually invites multiple representatives from a single commodity group to discuss the circumstances associated with the commodity’s market conditions.⁶

Figure 2. Institutions Involved in FISl and Their Decision-Making Bodies



Source: Author.

⁶ Each commodity group can also request a meeting to discuss concerns about technical elements that need to be updated or changed to ensure the calculation represents the reality of farmers.

Finally, FADQ's board adopts the final cost of production so it can become the major component used to compute the stabilized income. As such, the board acts as the last resort for questions that would have been left unanswered. The board includes the deputy minister, representatives from Union des Producteurs Agricoles, and representatives from civil society that are not involved in agriculture.

Methods

This paper adopted a program evaluation methodology and conducted an outcome evaluation on the mechanisms of consultation to assess stakeholders' perceptions of how each of the four mechanisms works in Québec's FISI program. This approach is appropriate when assessing the capacity of a program to achieve its intended goals or its capacity to reach some standards (Kellaghan & Madaus, 2000; Schalock, 2007). Furthermore, applying this method to consultation mechanisms can facilitate the evaluation of different stakeholders in influencing program decision-making. By considering that the goal of each stakeholder is to influence FISI to achieve their own economic objectives (Godbout, 1983), conducting an outcome evaluation may indicate the extent to which the different stakeholders' interests are being met (Kellaghan & Madaus, 2000) since it values the judgments of those participating in the process (Schalock, 2007).

This study included 18 semi-structured interviews conducted with stakeholders representing the four organizations involved in FISI's mechanisms of consultation. The research was conducted under

the University of Arkansas IRB Protocol 1903182902. For each of the four mechanisms, at least five participants were interviewed (see Table 2 for details). Each interviewee must participate, be active in, or oversee other individuals who participate in the mechanisms of consultation. Most participants are involved in more than one mechanism, which explains the discrepancy between 18 interviewees and 33 participants in consultation mechanisms. The first round of interviews was with participants who organize meetings or supervise employees to familiarize them with this project and ask their help in identifying additional participants (McDavid et al., 2013).

A general interview guide was developed and then slightly modified so that each participant responded to questions related to their experience. Interviews were conducted in French (an English version of the interview guide is in Appendix A). As part of the interview guide design, the interviewer considered participants as experts with knowledge in their field inaccessible to members of the public (Froschauer & Lueger, 2009). According to Wroblewski & Leitner (2009), such participants are particularly helpful when the interview generates nonexistent data on the context of a program and the stakeholders involved in it. To increase participants' confidence and generate more detailed information regarding mechanism discussions, the interviews were not recorded. Instead, the interviewer took detailed notes regarding the key elements mentioned by participants.

The interviewer developed the interview guide and coding template for the thematic analysis of

Table 2. Affiliation of Interview Participants by Mechanism of Consultation

Affiliation	CECPA's sectoral committees	CECPA's board	Ad hoc meetings	FADQ's board
UPA and commodity groups	7	2	7	3
MAPAQ	2			1
FADQ	2	2	3	2
CECPA	1	1		
Total	12	5	10	6

Notes: CECPA: Centre d'Études sur les Coûts de Production en Agriculture
 FADQ: Financière Agricole du Québec
 MAPAQ: Québec Ministry of Agriculture, Food, and Fisheries
 UPA: Union des Producteurs Agricoles

the results (Owen, 2014) based on Arnstein's ladder of citizen participation and Glasser's choice theory (see Appendix B for the full codification grid). Table 3 presents the association of interview questions with Glasser's (1999) fundamental psychosocial needs for participation.

The interviewer reviewed the material grouped in each category and each mecha-

nism to look for similarities in participant responses. A deconstruction process was used to reduce the potential for identifying participants' codification. The data from each interview was divided into a new document to regroup all information mentioned for each theme. Identification of individual participants was kept with the information until the writing process. Some contextual information that could help the readers understand the meaning of the information was lost, but the trade-off for increased confidentiality was deemed more important since participants knew each other and received a copy of the study.

The interviewer developed themes to describe similarities as they appeared. As an example of coding elements, the theme 'Positive Climate' in the category 'Fun' for CECPA's board included "The climate is good, meetings are positive,"⁷ and "This is not a negotiation mechanism but a place for exchange and understanding." Moreover, the theme

'Acceptation of Different Ideas' in the 'Belonging' category of ad hoc meetings included "Topics must be well prepared [by those bringing them to the table], this is not a banking machine," and "Smaller commodity groups need to really prepare what they are looking for with great care because they often have preconceived notions that are not backed by facts."

The themes were then used to qualify the extent, or ladder rung, that each mechanism would occupy on Arnstein's ladder of citizen participation. Each theme could have a positive, negative, or neutral contribution to each variable. Some examples of themes with positive contributions included "Positive climate," "Capacity to express ideas," and "Dynamic of the meetings." Negative examples included mentions of "Tensions," "Opposition," and "Framing of information." Neutral examples included "CECPA's role," "Direction of the board," and "Type of topics addressed."

Table 3. Association of Interview Questions With Elements of Glasser's (1999) Choice Theory

Generic Question	Belonging	Power	Freedom	Fun
In general, how would you define the climate of the interactions between members of the mechanism? Are you satisfied with it?				X
Which factors do you think are contributing to maintain/obstacles to an adequate climate for mechanism's meetings?				X
Do you think that some members of the mechanism tend to have more influence than others? Is it linked to certain of their characteristics?	X			
To what extent are discussions in other mechanisms of consultation and their decisions influencing the decisions in your mechanism of consultation?		X		
Do you feel that the decisions you take are generally respected by other mechanisms of consultation?		X		
Are you generally able to influence the agenda of the discussions in your mechanism of consultation?			X	
Do you consider that the meetings are generally positive and help you push your claims?			X	X
Could some solutions be implemented to enhance the climate of the mechanism's meetings?	X	X	X	X

⁷ All quotes are translations of the participants' responses. Attempts were made to stay as close as possible to the syntax and word choice of the participants.

Table 4. Affiliation of Interview Participants by Mechanism of Consultation

Affiliation	Arnstein's Ladder of Citizen Participation	Glasser's fundamental needs			
		Belonging	Power	Freedom	Fun
CECPA's sectoral committees	Between placation and partnership	Strong	Weak	Strong	Strong
CECPA's board	Partnership	Strong	Medium	Medium	Strong
Ad hoc meetings	Informing	Weak	Weak	Medium	Medium
FADQ's board	Consultation	Strong	Medium	Medium	Strong

Notes: CECPA: Centre d'Études sur les Coûts de Production en Agriculture
 FADQ: Financière Agricole du Québec

Results

The following section presents where each mechanism of consultation fell on Arnstein's eight-rung ladder of citizen participation and its capacity to fulfill Glasser's psychosocial needs. Table 4 summarizes each mechanism's classification following these two theories.

Centre d'Études sur les Coûts de Production en Agriculture's sectoral committees

Sectoral committees are in charge of verifying that the application of production cost methodology is in line with the particularities of each sector. Accordingly, they orient their discussions toward technical aspects of production and how to capture them. As such, the discussions are not focused on data but on the processes used to gather data.

All participants recognized that the sectoral committees are purely consultative, making suggestions to the CECPA about data collection and treatment adjustments. However, participants also indicated that the committees' conclusions always result from a consensual discussion between different parties. This combination of consultation in an attempt to reach consensus and the comments from participants makes it hard to identify the mechanism as a pure placation or partnership on Arnstein's ladder.

The partnership aspect reflects the complementary roles of each actor as identified in participants' responses. They mentioned FADQ as focused on methodology and budget control, Union des Producteurs Agricoles and commodity groups as the most vocal actors representing the

preoccupations of farmers, and the Ministry's representatives as advocating for a program reflecting political orientations. Each participant mentioned that they could raise their concerns and felt that each actor played its role as intended. When talking about the relationships between committee members, conviviality, collaboration, respect, good faith, confidentiality, and constructiveness were mentioned frequently. These comments highlight a sense of participant belonging in this mechanism.

On the other side, the placation aspects of the mechanism had some impact as responses exposed participants' frustration with the relative lack of power they feel they have in the decision-making process. Specifically, the requirement to respect established methodological guidelines in the production cost study was repeatedly identified as a source of frustration by commodity groups. As an example, one participant shared the following when describing FADQ's attitude toward proposals for change: "The [Financière Agricole du Québec] is very active during the meetings. They are always quick to prevent any evolution of the study. They always want to go back to the methodological guidelines. They are perceived as grumpy."

This burden of proof requirement also limits the freedom of discussion. For instance, the tacit knowledge and anecdotal evidence offered by farmers are sometimes dismissed, according to some participants. Moreover, one participant mentioned that not all commodity groups have sufficient financial and human resources to collect the data they need to support their claims. CECPA can then supplement commodity groups by acquiring

information through the production cost study and conducting specific analysis on demand. “It is hard to bring new data because we do not have access to it. But recently, there is an opening by [Centre d’Études sur les Coûts de Production en Agriculture] to document most questions that are raised.” Moreover, other participants described the concern shown by CECPA as it listened to requests made by stakeholders. Hence, the freedom aspect appears to be present, though partially limited by FADQ’s request for data-driven discussions.

Finally, participants considered that stakeholders demonstrate mutual respect and shared understanding of other members’ goals. Participants shared how they trust one another and find common ground when disagreements arise. Members mentioned that the committee leader’s actions drive transparency. According to one member,

There is not much room to improve the positive climate because it is going so well. Participants have a lot of experience, so it helps. So, these people—whether they are farmers or not—they know the objectives of everyone. When there is some skirmish between participants, it does not last long. Though we have to understand that it can get emotional occasionally.

Centre d’Études sur les Coûts de Production en Agriculture’s board

Over the years, CECPA’s board has adopted and revised the methodology guidelines for the production cost studies. The board then can focus on assessing whether these guidelines were adequately followed to ensure the trustworthiness of the results.

Since each organization has seats reserved on the board and CECPA presents the information to its board members, it is possible to consider this mechanism as a partnership between stakeholders. Participants also indicated that the mechanism is one where decision-making is shared, and all perspectives and concerns are deemed valid. One participant mentioned, “It was created as a neutral entity, not affiliated to any of the stakeholders.”

Participants unanimously asserted that the inclusive environment led to a feeling that repre-

sentatives from diverse organizations have a voice in the process (belonging needs). It was also mentioned that board members could see beyond their own interests and focus on a shared goal. For instance, one participant said, “Everyone is [on board] for the best of [Centre d’Études sur les Coûts de Production en Agriculture] and not to act as a representative of their own organization.”

Participants mentioned that meeting discussions are organized around the technical aspects of production cost studies (e.g., choice of data sources, indexes to use, modulation factors of technology usage). However, participants also identified that a singular focus on technical aspects reduced their autonomy. In terms used by Glasser, this could mean that participants feel that their needs for freedom and power are not fully met. For example, one participant noted, “If [Financière Agricole du Québec is] not convinced, it is not a good start to ensure a follow-up of the decision.” Still, the board remained the mechanism in charge of adjusting the guidelines and thus had actual decision-making power. Participants also praised the capacity of the mechanism to openly share knowledge that complemented the information and suggestions shared by others. As one participant mentioned, “The diversity in stakeholders helps to bring different perspectives without creating redundancy.”

Hence, it is possible to consider that a positive climate is present during the meetings without strong opposition being raised. Participants especially identified transparency and professionalism as factors sustaining beneficial, and thus fun, collaborations.

Ad hoc meetings

Ad hoc meetings are held at least once a year to review the previous year of FISI actions or address issues with the parameters of the compensation calculation. They are an informal form of consultation with the FADQ, mostly presenting information to commodity groups. In this case, one actor leads the meeting while the others listen. This structural arrangement represents Consultation, which appears in the lower half of Arnstein’s ladder (rung 4 of 8). As one participant mentioned, “I feel that the Financière Agricole du Québec

doesn't really consider farmers' input, but follows their own preferences." This structure creates a climate of negotiation that is not present in the other mechanisms and is reflected in the participants' responses, with a pronounced divergence between the higher-level participants and farmers' representatives. Higher-level participants generally mentioned that meetings were held with the idea of collaboration, a willingness to listen to different perspectives, and a generally positive and fruitful climate. On the other side, there was a recognition that individuals in the meetings are cordial; however, participants critiqued the lack of willingness to understand the different perspectives presented in the meetings, with some individuals playing a political game instead. For instance, one participant mentioned a sentiment of paternalism in the discussions. Another noted that it was important to educate the producers to focus on relevant topics when voicing their demands. Glasser's belonging needs might be negatively affected by this situation.

Moreover, the terms used by participants (e.g., paternalism, need to educate) illustrate the existence of a power gap between participants. Some participants also indicated their suggestions for change were seldom enacted. For example, one participant claimed the FADQ sometimes misrepresented one mechanism's ideas and suggestions to another. This created confusion and tension between groups, with one thinking that another had made recommendations that conflicted with theirs and hindered them from meeting their objectives. Similarly, farmers mentioned that to maintain good relations with the FADQ, they sometimes had to choose their battles, in some cases accepting the will of the FADQ so that other objectives might be met in the future. In addition to power as a fundamental need, this situation likely affects Glasser's fun need. Still, fun's limitations are to be put in perspective since participants identified the climate as professional with respect demonstrated by all actors.

Finally, the structure of the ad hoc meetings has repercussions for the freedom of the discussions, especially for smaller groups. Participants mostly involved with smaller FISI productions talked about a lower frequency of meetings and some problems encountered in getting considera-

tions for their items. On the other hand, participants mostly involved with larger groups mentioned that ad hoc meetings were quite frequent and better able to realize additional inquiries. For the latter group, participants declared that they had the freedom to address various topics and be considered in their demands which seems to oppose the former group's experience.

Financière Agricole du Québec's board

The role of FADQ's board is to adopt the stabilized income (i.e., the basis for compensation). In addition, this board acknowledges the previous work of other mechanisms and acts upon their conclusions. Because Union des Producteurs Agricoles has a minority of reserved seats on the board, this mechanism can be considered a partnership between the Ministry and Union des Producteurs Agricoles.

This partnership is also reflected in participants' responses, though they mentioned that, in the past, the board's leadership questioned the Union des Producteurs Agricoles' presence on the board. One long-serving member claimed, "There were times when it was going quite awful on the board and we almost fought it out. The new chairman is knowledgeable about agriculture and wishes to have a stronger [Financière Agricole du Québec]."

Participants, however, mentioned that political decisions constrain FADQ's board. First, the Ministry and the government oversee the acts that define the scope of the FADQ's actions and FISI's intervention mechanisms. Second, participants mentioned how limited the board is in making decisions because those involving more than CA\$1M (less than 0.2% of FADQ's budget) must be submitted to the Council of Ministers. Third, three participants from different professional backgrounds mentioned that information presented at board meetings represents the priorities of the senior executives of the FADQ rather than what was discussed in the other consultation mechanisms. Thus, even if the formal process identifies a specific role of the board regarding FISI, the answers from the participants point toward limitations and barriers to expressing this power.

Furthermore, participants suggested that if

Union des Producteurs Agricoles strongly disagrees with a decision, it may rely on its political influence to address the Minister directly and bypass the whole consultation process. Nevertheless, the board's current leadership was praised by participants regarding the positive climate of the meetings. They specifically mentioned an environment of mutual respect and collegiality, alleviating the tension and controversy that was once present during meetings. Time also appeared to be given to board members to ensure they could fully process all the information before making a decision. One participant noted, "If a group of individuals feels uncomfortable with a proposition, or raises doubts, oftentimes the decision is postponed."

Discussion

Based on the experience of 18 participants in the four different mechanisms of consultation of Québec's FISI program, it is possible to identify emerging patterns in the capacity of these mechanisms to involve and satisfy stakeholders. Each of these patterns then affects the extent to which the fundamental needs of participants are met.

First, most mechanisms recognize the legitimacy of stakeholders regarding program decisions. Even if they appear on different rungs of Arnstein's ladder, the program's main beneficiaries at least have official recognition of their input. In public policy theories, this is not always the case (Arnstein, 1969; Schneider & Ingram, 1993, 1997), so involving stakeholders should not be considered as systematically granted.

Second, the hierarchical arrangement of the mechanisms presented in this paper creates opportunities for the involvement of different levels of actors. For instance, in sectoral committees, commodity groups and lower-level bureaucrats participate in discussions. In contrast, on the boards, discussions involve higher-ranking individuals with senior executives of Union des Producteurs

Agricoles and Ministry.⁸ This arrangement allows different levels of concerns to be addressed. In sectoral committees, questions and comments are more centered on the actual reality experienced by farmers. In contrast, the subjects discussed on both boards tend to be directed toward sectoral and industry concerns. The higher-level mechanisms also allow elements that were discarded previously but are important for beneficiaries to be brought back to the table. Similarly, they provide an opportunity to share elements from one sector to another to avoid discrepancies between sectors. Hence, other mechanisms may influence how discussions are held and what subjects are addressed. This element of collaboration illustrates a form of complementarity between the rungs depicted by Arnstein.

Third, multiple mechanisms can help to compartmentalize political and technical discussions. In the case of the FISI mechanisms, the focus of discussions is highly directed toward technical aspects of the program. This approach demonstrates that elements supported by facts and research are highly valued over tacit knowledge, experience, and opinions.⁹ Schneider and Ingram (1997) call these programs Scientific and Professional Policy Designs. In their concept, this design reduces the involvement of beneficiaries and political elements and instead recognizes that scientists (and professionals could be added here) control the information and thus the discussions. This may present a problem for stakeholders, as it requires them to mobilize financial resources to hire experts and professionals, thus creating a barrier to entry for some actors that wish to participate in the debate. In addition, smaller commodity groups highlighted their limited capacity for the data generation necessary to sustain group discussions. However, different participants identified that CECPA's team could conduct additional research when requested by committee and board members. Actions from the neutral

⁸ Even between the two boards, a hierarchical relationship can be observed. For instance, Centre d'Études sur les Coûts de Production en Agriculture's board involves individuals holding positions such as director and assistant deputy minister. Oppositely, on the Financière Agricole du Québec's board, individuals hold positions such as CEO and deputy ministers.

⁹ Participants also recognized that politics had a place and that meetings were held to address less technical aspects. However, these meetings tended to be held outside of the mechanisms of consultation covered in this research, conducted through a lobbying approach by stakeholders. Still, one participant recognized that such meetings forced discussions to acknowledge political aspects.

agency could then be used to improve the fulfillment of belonging and freedom needs, as discussed by Glasser.

Fourth, recurrent meetings organized into a formal schedule can support the belonging aspect for participants. This is achieved through a facilitated understanding of each participant's position. The proposal for recurrent meetings incorporates many conclusions from economic and political science theories on repeated contacts between agents and the benefits of official recognition from the state (Matthews, 2001; Williamson, 1989). In this study, many participants mentioned other participants' experiences as facilitators in the discussions and tension reducers. The fact that some participants have been involved in these mechanisms for almost 20 years also reduced the entry barrier of technical aspects as topics tend to repeat from one production study cycle to another.

Fifth, several participants identified the presence of a neutral agency, the CECPA, as a contributor in reducing the friction between actors. For instance, its leadership equalizes the position of each actor as it produces documentation to inform the discussions. However, it is important to note from participants' answers that the mere existence of a neutral agency would likely not have been a sufficient condition to achieve such leadership. Instead, participants mentioned that CECPA's attention to their concerns and its focus on involving everyone in the discussions were key factors in instituting a collaborative climate. As such, the experience and care shown by the agency staff might be as equally important as the existence of this agency.

Conclusion

This paper offered a unique perspective into the relationships between the state and stakeholders as they work on improving a long-lasting farm income support program. Based on the experience of 18 participants in the mechanisms of consultation, the paper identified solutions that can be implemented to reinforce existing programs and create some form of personal attachment to a pro-

gram. It showed that a neutral agency could facilitate such relationships by reducing power gaps between actors and reinforcing their sense of belonging. Moreover, the information obtained through this agency can focus the discussion on technical aspects rather than political considerations, which is an avenue to reduce tensions between actors. However, political discussions would likely remain, and formally laying down recurrent technical and political mechanisms could increase the involvement opportunities for representatives of different hierarchical levels. It is an expectation that adopting these characteristics would help to reduce tensions inherent to a lobbyist-based relation between state and interest groups if it was replicated elsewhere. Particularly, it could foster the adoption of a climate of consensus and support stability in existing programs.

However, these conclusions are inherently embedded in the particularities of FISI's program, which include, but are not limited to, a long-lasting presence, a strong reliance on farmer's data, and an official recognition of farmers' groups by the state. Similar analyses in different program designs are required to better understand how these program characteristics may affect the relationship between actors. Unfortunately, the work between lobbyists and the state most often is conducted behind closed doors (Baumgartner et al., 2009), and these mechanisms of consultation can be quite opaque. This opacity also limits the access to actual data to document these meetings,¹⁰ which may be a barrier to replicating a similar study.

In addition, the research design of this paper only focused on the actors invited to the discussions. As such, it neglected those left outside. First, the public—through its representatives—is not involved in technical program discussions, even though public funds are used to support FISI. Second, farmers are not a monolithic group, and involving a single group in the discussions may not represent this diversity. Hence, traditionally underrepresented groups with different perspectives may not have been captured by the research design.

The conclusions presented in this paper could

¹⁰ Having a neutral agency holding the discussions also had the effect of exempting these consultations from Freedom of Information requests.

benefit from the additional application of the design in different programs. Specifically, a comparative approach of consultation between programs could reinforce or challenge the observed impact of a neutral agency. Similarly, it would be interesting to identify different avenues that would contribute to the segregation of political and technical discussions while involving various actors. 

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Appendix A. Interview Guide

[Greetings]

As mentioned by email, I am currently working on a research project that focuses on FISl's mechanisms of consultation. More specifically, my attempt is to map the process that is followed by recommendation for change or adjustment to FISl and to assess whether the conditions in which the discussions are happening allow for fruitful and constructive exchanges at every step of the process. To do so, I am conducting a series of interview with members of the different mechanisms of consultation. Today, I would like to talk with you about your participation in the mechanism X and your perception regarding the meeting of this mechanism. The whole interview process is confidential to the extent of the limits of the law and University of Arkansas' policies, and your name will not appear in the report, nor in any other communication. Moreover, you will notice that my questions do not address the actual content of the discussion you can have in the mechanism X, but rather focus on the climate surrounding these discussions. Usually, the interview process is about 30 to 45 minutes. Before I start with my questions, do you have any questions for me?

I will start with basic questions on your experience with mechanism X. Then, I will ask you questions related to your perception of the meeting in the mechanism X where you are involved.

- I would like to know first for how long have you participated in mechanism X?
- Mechanism X involves participants from different organization. What is the role and place of each organization in mechanism X?
- Do you think that some members of the mechanism tend to dominate the discussions? Is it linked to certain of their characteristics (e.g., gender, experience, job, organization)?
- In general, how would you define the climate of the interactions between members of the mechanism? Are you satisfied of it?
- Which factors do you think are contributing to maintain an adequate climate for mechanism's meetings?
- Which factors do you think are creating obstacles to adequate climate for mechanism's meetings?
- To what extent discussions in other mechanisms of consultation and their decisions are influencing the decisions in mechanism X? Who has the ultimate word on that?
- Do you feel that the decisions you take are generally respected by other mechanisms of consultation?
- Could some solutions be implemented to enhance the climate of mechanism's meetings? Which ones? Why?
- Are you generally able to influence the agenda of the discussions of your mechanism of consultation?
- Do you consider that the meetings are generally positive and help you push your claims?
- If I had to speak with someone else on this topic, is there anyone you think I should not miss?

This ends all the questions I had for you today. Is there anything else you would like to add regarding anything you said, or an area that was left unexplored?

[Thankful note]

As mentioned by email, you will receive a copy of my evaluation report when completed. It should be around the middle of May 2019. You will find inside of it some recommendations regarding the different mechanisms and the process of adjustment to FISl.

Appendix B.

Table B1. Codification Grid

Categories	Themes (as classified by mechanism of consultation)			
	Sectoral Committees	CECPA's board	Ad Hoc Meetings	FADQ's board
Role	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Responsibilities • Utility 	<ul style="list-style-type: none"> • Frequency • Topics addressed 	<ul style="list-style-type: none"> • None
Structure of Participation	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None
Belonging	<ul style="list-style-type: none"> • FADQ's role • Ministry's role • Commodity Groups' role • CECPA's role • Participation and inclusion 	<ul style="list-style-type: none"> • UPA representatives' role • Ministry representatives' role • FADQ representatives' role • Participation and inclusion 	<ul style="list-style-type: none"> • Acceptation of different ideas • Forms of the meetings • UPA representatives' role • FADQ representatives' role 	<ul style="list-style-type: none"> • UPA representatives' role • Civil society representatives' role • Place of board members • Direction of the board
Power	<ul style="list-style-type: none"> • Limits from the methodology • Limits from the differences between sectors • Implementation of decisions • Scope of discussions 	<ul style="list-style-type: none"> • Level of discretion • Areas of influence 	<ul style="list-style-type: none"> • Obstacles to demands for change • Opportunities for change 	<ul style="list-style-type: none"> • Framing of information • Political constraints
Freedom	<ul style="list-style-type: none"> • Topics addressed • Burden of proof • Opposition of ideas 	<ul style="list-style-type: none"> • Additional inquiries • Direction of the board 	<ul style="list-style-type: none"> • Process to request a meeting • Type of topics addressed • Capacity to express ideas 	<ul style="list-style-type: none"> • Level of preparation prior to the meeting • Dynamic of the meetings
Fun	<ul style="list-style-type: none"> • Respect, good faith and transparency • Negative aspects • Influence of individuals 	<ul style="list-style-type: none"> • Positive climate • Respect and transparency • Opposition 	<ul style="list-style-type: none"> • Positive climate • Political imperatives • Tensions 	<ul style="list-style-type: none"> • Productive climate of the meetings • Influence of individuals

Appraising the administrative burden of USDA organic certification: A descriptive analysis of Notice of Noncompliance data

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Abstract

Many of the challenges organic producers and processors experience are caused by how organic standards compliance is monitored and enforced—in particular, the administrative procedures that are mandated to verify that operation practices meet organic certification requirements. In this policy analysis, we examine noncompliance documentation and verification by accredited certifiers under

the U.S. Department of Agriculture (USDA). Leveraging a novel and unique compilation of “Notice of Noncompliance” letters issued to organic producers and processors, we find a preponderance of administrative violations, relative to substantive ones. We discuss how the finding may help explain contemporary transformations in the organic market, as larger agri-food entities’ capacity to absorb the administrative costs that frustrate smaller operations may contribute to organic market “conventionalization” and consolidation.

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Keywords

Organic Food, Organic Certification, Notices of Noncompliance, Administrative Burden

Introduction

Throughout most of the world, organic food production and sales are regulated through certification schemes—voluntary programs in which food producers and processors opt into organic production and/or processing standards and the oversight that comes with them (Prakash & Potoski, 2007). For consumers, certification acts as a signal indicating that a product or production process has met certain standards (Aschemann-Witzel et al., 2013). For producers and suppliers, it offers a way to distinguish products and appeal to particular markets (Best, 2010).

How certification is experienced by producers and processors depends in large part on the way certification standards are monitored and enforced. Of particular concern to small and community farms is the extent to which certification imposes burdensome verification requirements. Both organic food advocates and the body of research suggest that the administrative side of compliance verification—from filling out paperwork to paying fees—favors large corporate operations over smaller “family” farms (Guthman, 2014), thereby causing some operations to abandon certification or discouraging them from pursuing it in the first place (Gómez Tovar et al., 2005; Sierra et al., 2008)

This policy analysis examines noncompliance and verification under the USDA National Organic Program. Drawing on a unique dataset of Notices of Noncompliance (NONCs), we present a descriptive snapshot of the types of noncompliance that are both more and less frequently cited among U.S. operations. Our findings suggest that National Organic Program verification processes attend more to administrative issues than substantive ones. We discuss the implications of our findings for the impact and durability of organic policy.

USDA Organic Certification

The 1990 Organic Foods Production Act restricts the use of the term “organic” to foods produced

without (non-exempted) synthetic inputs and in conformance with USDA organic crop, livestock, handling, and labeling requirements. Operations selling food labelled “organic” are required to hold USDA organic certification.¹ According to records of the USDA Agricultural Marketing Service (2018), roughly 27,000 U.S. operations held a certification in 2015. The USDA accredits independent agents to certify producers and processors and monitor them for organic standards compliance. In 2015, this included 79 accredited certification agents.

To attain certification, operators submit an organic system plan (OSP), certification documents, and a fee to a certification agent. The operation is then inspected for congruence with the OSP. Certification is renewed annually. Organic food regulations require unannounced inspections and chemical testing on 5% of each certifier’s clientele, although differences in certifier interpretations of program requirements translate to differences in implementation (Carter, 2019). USDA guidance distinguishes between “minor” and “major” noncompliance, where major noncompliance represents systematic failures that impede adherence to USDA standards. Certifier responses to noncompliance take one of four forms (Carter, 2019, p. 96):

- A non-documented directive that an operator corrects noncompliance, issued when a noncompliance is a minor issue not justifying a corrective action plan.
- A Notice of Noncompliance in which the National Organic Program is notified of the noncompliance, and the operator is required to develop a corrective action plan to ensure and verify compliance.
- A notice of proposed suspension (or denial of certification, in the case of new applicants), issued when an operator fails to correct noncompliance (or issued alongside a Notice of Noncompliance in the cases of major noncompliance).
- A notice of proposed revocation (or denial of certification, in the case of new appli-

¹ For background on the organic food movement and related policy in the U.S., see Carter, 2019, pp. 27–44.

cants), issued when a certifier finds evidence of deliberate violation of the USDA organic regulations, falsification of records, etc.

The Administrative Burdens of Organic Certification

This study examines organic standards compliance verification with emphasis on distinguishing the *substantive* and *administrative* dimensions of compliance and verification. The substantive dimension reflects operational adherence to the standards which define organic agriculture. The administrative dimension, in contrast, reflects actions and procedures by which an operation *demonstrates* its compliance (Aravind & Christmann, 2011), as well as those necessary to secure certification, such as applications and fees. Carter et al. (2018) describe the distinction when discussing the compliance costs borne by voluntary program participants:

... other voluntary program compliance costs are clearly administrative in nature—necessary for the delivery of a program, but not inherent to the production of positive program externalities. Examples include the time and resources devoted to initial application completion and documentation of program eligibility, repetition of these processes in periodic reenrollments, tracking and verification of initial and ongoing standards compliance and associated recordkeeping, etc. (p. 210)

The administrative burdens of organic certification have long drawn the attention of policy makers and advocates. The concern was raised, for example, at the International Federation of Organic Agriculture Movements (IFOAM) 18th World Congress:

Farmers have reported spending more time completing forms and maintaining records. A certain amount of records are essential to ensure organic farmers are meeting the organic standards... But, too much focus on paperwork can detract from farming activities that support organic principles, such as conservation and cycling of resources. (Yang, 2014, p. 2)

Sam Farr, U.S. Congressional Representative from California, expressed similar sentiments: “The concern here is how do the smaller growers, who may not have the resources to pay the cost and do all the background information that’s necessary for certification—the regulatory process is growing exponentially in terms of cost” (cited in Hattem, 2013). The sentiment is again echoed in a USDA review of the National Organic Program, in which an accredited certifier agent representative stated, “comments received from clients regarding the regulations were mostly concerned with the amount of paperwork required for recordkeeping, which some considered to be excessive and burdensome” (USDA Agricultural Marketing Service, 2015, para. 16).

Study Design

Our study is a descriptive analysis of data drawn from NONCs issued under the USDA National Organic Program. We obtained the records through a 2016 FOIA request (#2016-AMS-04768-F) for all notices issued to U.S.-based operators in 2013, 2014, and 2015. Due to the USDA obligation to redact certain information, records were delivered in batches beginning in early 2017. We received the last batch in March 2019, at which time the USDA confirmed that all records within the request scope had been delivered. At the time of the request, USDA representatives indicated the number of records that the request entailed was unknown. The total number of NONCs received was 5,403. Due to the number of records and the time-consuming coding process, we drew a random sample of 538 records (roughly 10%), which make up this study’s sample.

We extracted data from each record using a data entry portal in Qualtrics, an online survey platform. Because certification agents reference the Code of Federal Regulation (CFR) section numbers associated with noncompliance, we used relevant section numbers (7 CFR Part 205) as indicators of broader violation categories. We coded nine categories, with an additional “no response” category to indicate notices that were sent as a follow-up to a prior violation. An “other” category represents violations not anticipated by other categories. Table 1 summarizes the data.

Table 1. Noncompliance Violation Codes, Descriptions, and Indicators

Category	Description	Substantive/ Administrative	CFR indicators (section numbers)
<i>Certification and fees</i>	Certification requirements and procedures	Administrative	400–406
<i>Records</i>	Recordkeeping	Administrative	103
<i>OSP</i>	Organic production and handling system plans	Substantive/ Administrative	201
<i>Subject to</i>	What has to be certified, exemptions, exclusions	Substantive	100, 101, 102, 200, 670
<i>Substances</i>	Allowed and prohibited substances, methods, ingredients	Substantive	105, 601–606, 671, 672
<i>Crop</i>	Crop standards, land requirements, soil nutrient management, seeds, rotation practices, pest/weed/disease management, wild crops	Substantive	202–207
<i>Livestock</i>	Origin of livestock, feed, health care, living conditions, access to pasture	Substantive	236–240
<i>Handling</i>	Organic handling, facility pest management, commingling and contact with prohibited substances	Substantive	270–272
<i>Labeling</i>	Labeling, packaging, composition, marketing	Substantive	300–311
<i>No response</i>	Failed to respond to prior letter	n/a	n/a
<i>Other</i>	Cannot be categorized/no 205 subsections	n/a	n/a

We further used the coded categories to capture whether the violation precipitating a NONC was substantive or administrative in nature. Two codes, Certification and Fees and Records, reflect decidedly administrative matters. Four reflect organic production and handling standards: Substances, Crop, Livestock, and Handling; we consider these substantive matters. We likewise label Subject to and Labelling as substantive since they pertain to what practices fall under the purview of the organic standards and what/how “organic” claims are represented to consumers, respectively. We consider OSP matters both substantive and administrative, as they guide operations’ conformance with standards (substantive) but are also used to document compliance (administrative).

Findings

Our sample consisted of 538 NONCs randomly drawn from the 5,403 FOIA records; 84.84% were from 2015, 8.13% from 2014, 6.84% from 2013, and 0.18% from 2012, proportions which are in

line with the population provided by the USDA.² Although disparity in record years raised concerns regarding record population completeness (further addressed in the Discussion), the imbalance is not the product of sampling procedures. Notices ranged from one to nine pages in length, with a mean of two pages.

Table 2 presents a detailed breakdown of violation types. Because this is the first analysis of which we are aware to describe USDA organic NONCs, we present disaggregated results. We organize the findings according to violation categories, with the number of NONCs coded as exhibiting each violation type in parentheses. CFR section number frequencies follow, then the percentages of coded violations per category reflecting the section number in question. The last column reports the percentages of all NONCs in which a CFR section number was found. It is worth noting that when summed, the percentages total to over 100%, as some notices exhibited more than one violation type.

² For the yearly breakdown of the NONC population, we used text mining and natural language processing tools in R (Benoit & Matsuo, 2019; Ooms, 2018, 2019) to convert photocopied records to machine-readable text and extract each notice’s date. As a rough measure of dates mentioned across our population, the automated extraction results support the randomness of the study sample.

Table 2. Detailed Violation-Type Coding Results

Violation categories and types by Code of Federal Regulation (CFR) section number	Frequency	% of violation category	% of all notices
Certification and fees (n=323)	–	–	60.0%
400: General certification requirements	138	35.4%	25.7%
401: Certification application	22	5.6%	4.1%
402: Application review	12	3.1%	2.2%
403: On-site inspections	3	0.8%	0.6%
404: Granting certification	21	5.4%	3.9%
405: Certification denial	14	3.6%	2.6%
406: Certification continuation	180	46.2%	33.5%
Records (n=90)	–	–	16.7%
103: Recordkeeping	90	100%	16.7%
OSP (n=72)	–	–	13.4%
201: Organic system plan	72	100%	13.4%
Subject to (n=21)	–	–	3.9%
100: What has to be certified	8	33.3%	1.5%
101: Exemptions and exclusions	2	8.3%	0.4%
102: Use of the term “organic”	6	25.0%	1.1%
200: General	7	29.2%	1.3%
670: Product inspection and testing	1	4.2%	0.2%
Substances (n=41)	–	–	7.6%
105: Allowed and prohibited substances	28	56.0%	5.2%
601: Synthetics allowed in organic crop production	10	20.0%	1.9%
602: Nonsynthetics prohibited in organic crop production	1	2.0%	0.2%
603: Synthetics allowed in organic livestock production	3	6.0%	0.6%
604: Nonsynthetics prohibited in organic livestock production	2	4.0%	0.4%
605: Nonagricultural substances allowed in/on processed products	5	10.0%	0.9%
606: Nonorganic agricultural products allowed as ingredients	1	2.0%	0.2%
Crop (n=56)	–	–	10.4%
202: Land requirements	23	33.3%	4.3%
203: Soil fertility and crop nutrients	7	10.1%	1.3%
204: Seeds and planting stock	22	31.9%	4.1%
205: Crop rotation standard	3	4.3%	0.6%
206: Crop pest, weed, disease management	13	18.8%	2.4%
207: Wild-crop harvesting standard	1	1.4%	0.2%
Livestock (n=27)	–	–	5.0%
236: Origin of livestock	6	17.6%	1.1%
237: Livestock feed	9	26.5%	1.7%
238: Livestock health care standard	2	5.9%	0.4%
239: Livestock living conditions	15	44.1%	2.8%
240: Pasture standard	2	5.9%	0.4%
Handling (n=30)	–	–	5.6%
271: Facility pest management	6	18.2%	1.1%
272: Commingling and contact with prohibited substances	27	81.8%	5.0%

continued

continued from previous page

Labeling (n=22)	–	–	4.1%
300: Use of the term “organic”	4	14.3%	0.7%
301: Product composition	3	10.7%	0.6%
303: Packaged products labeled “100 percent organic”	13	46.4%	2.4%
304: Packaged products labeled “made with organic ingredients”	2	7.1%	0.4%
307: Labeling of nonretail containers	3	10.7%	0.6%
311: USDA Seal	3	10.7%	0.6%
No response (n=50)	–	–	9.3%
Other (n=9)	–	–	1.7%

Violations related to Certification procedures, recertification, and/or payment of fees constituted the most prevalent coding category, 323 NONCs (60%). The second most frequent was Records and recordkeeping, 90 NONCs (16.7%). The least frequent violation types were those related to Live-stock standards (27 notices, 5%) and General requirements for certification (“Subject to”; 21 notices, 3.9%). Nine notices (1.7%) fell outside the coding parameters.

Table 3 simplifies the results by grouping the violation categories as administrative, substantive, or both. No response NONCs and Other violations are omitted. The violations were predominantly administrative in nature (73%). Fourteen percent of the notices exhibited violations related to OSPs, straddling the divide between administrative and substantive issues. Roughly 30% exhibited substantive violations, such as those related to substances or adherence to organic standards.

Discussion and Conclusion

We set out to better understand standards non-compliance and verification under the USDA National Organic Program. Drawing on unique data extracted from organic NONCs, our descriptive snapshot suggests that noncompliance largely concerns administrative aspects of verification. Indeed, our findings indicate that documented noncompliances pertaining to administrative issues outnumber those related to substantive ones by more than two-to-one.

The preponderance of administrative NONCs is not inherently a cause for concern. First, organic certification is a records-based verification process,

Table 3. Substantive versus Administrative Violations Findings

	Frequency	Percent
Administrative	392	72.9%
Administrative/substantive	72	13.4%
Substantive	155	28.8%

Note: Percentages exceed 100% when summed, as some notices exhibited more than one category.

what regulatory scholars refer to as “systems” or “management-based” regulation (Carter, 2019, p. 47).³ As such, some administrative requirements are necessary for verification of substantive standards compliance, and many substantive noncompliances are likely found through administrative review (e.g., of records). Recognizing that our categorization is relatively simple, we suggest that future research be directed toward more nuanced conceptualization and operationalization of administrative and substantive certification requirements, including the large “grey area” in which they overlap.

The prevalence of administrative noncompliances could further indicate nothing more than that some operators have a hard time adhering to administrative requirements. In this respect, our results support qualitative evidence of the challenges in navigating bureaucratic certification hoops (Gómez Tovar et al., 2005; Guthman, 2004a, 2014; Sierra et al., 2008). Coupled with existing scholarship and anecdotal accounts (such as those cited above), the findings add evidence to claims that the structure of U.S. organic certification makes the program especially demanding for

³ We thank an anonymous reviewer for highlighting this point.

operations without the resources, personnel, or capacity to meet paperwork and recordkeeping requirements.

The implications are especially meaningful when considering an increasingly consolidated organic market. High administrative burdens may cause some organic operations to sell out to large agribusinesses, resulting in further vertical and horizontal market integration (Howard, 2009; Obach, 2007). Administrative requirements may further constitute sometimes insurmountable obstacles for producers and processors in less affluent countries (Gómez Tovar et al., 2005; Mutersbaugh, 2005). The ability of larger agri-food entities to absorb the administrative costs that frustrate smaller operations may thus contribute to organic market “conventionalization” (Guthman, 2004b).

This discussion should be considered in light of our study’s notable limitations, however. Most important is the descriptive, snapshot nature of our data and simple analysis. While our data suggest that administrative issues are more prevalent than substantive ones in certification agent records, they provide no indication of why. Because our FOIA records do not contain information about operator characteristics, we have no way of knowing, for example, the extent to which administrative non-compliance issues are more prevalent among smaller operations over larger ones, much less whether they cause operations to abandon organic certification or exit organic food markets. Future research linking the data presented here to other measures offers promising lines of research. In our estimation, among the more important of such

measures are operation type, relative size, ownership (e.g., sole proprietorship, partnership, corporate), and geographic location.

There is also the issue of the distribution of the Notice of Noncompliance records we received from the USDA across the three years the FOIA request was meant to cover. As noted above, while we requested all notices issued to domestic U.S. operations between 2013 and 2015, almost 85% of the records provided by the USDA were from 2015. The cause of the imbalance is unknown to us; however, the fact that the USDA was not aware of how many records they had when we submitted the FOIA request suggests the answer lies with the agency’s recordkeeping. As a check on our findings, we ran the same descriptive statistics on only 2015 records, with similar results to those presented here. Nonetheless, our results clearly depict 2015 noncompliance and verification actions under the National Organic Program more completely than in the preceding years.

These limitations notwithstanding, this study’s findings offer a valuable insight into organic standards noncompliance and verification. Perhaps most notably, they offer a glimpse into the most prevalent type of verification action taken under USDA National Organic Program authority, about which data have been unavailable to this point (Carter, 2019). Future research building from the findings we present here can provide additional insights into the causes and consequences of administrative burdens in organic certification, for small-scale producers and for the organic market, generally speaking.

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Farm-to-hospital programs and public health: Leveraging local food for organizational and behavioral change

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Abstract

Farm-to-hospital (FTH) programs have emerged over the last decade as an approach for hospitals to leverage their buying power and growing influence in the food system to support healthier eating habits, as well as stimulate local economic development and community wealth building, often within a broader set of policy, systems, and environmental (PSE) interventions. While FTH programs have increased in prominence over the last decade, several challenges prevent widespread adoption. These include distributor contracts that limit outside purchases, logistical challenges receiving products

from local vendors, and a lack of buy-in from key decision-makers. These challenges frequently reflect foodservice operations organized to maximize revenue, which lends itself to an approach that sources cheap and unhealthy food products. In this paper, we present findings from a case study of two hospitals part of the University of Wisconsin Health system in their efforts to develop a farm-to-hospital program from 2008 to 2017. Specifically, we study the organizational strategies used by the We Are Health Committee (WAHC) and its informal predecessors to create the conditions to facilitate and encourage local food procurement. We

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find that stakeholders reorganized their foodservice operations around the value of supporting public health, leveraging their clinics' mission as a public health institution. This resulted in the creation of new organizational structures and roles, including merging their nutritional and foodservice departments, creating the infrastructure for institution-wide change. Local food procurement was perceived as a means to develop nutritional interventions targeting the availability of healthier food items without creating the perception of paternalism among visitors. Finally, as stakeholders observed the local economic impact of their purchasing decisions, the values of their foodservice evolved to explicitly include supporting local economic development, resulting in an evolution of their relationship with their broadline distributor to facilitate increased local food purchases.

Keywords

Farm-to-Institution, Local Food, Nutrition, Community Wealth Building, Sustainable Food Systems, Behavioral Nutrition

Introduction

Over the last two decades, the role that hospitals play in their local communities has evolved significantly. Traditionally considered solely as providers of medical services, hospitals have increasingly embraced their impact on their communities' public, economic, and environmental health. Hospitals spent over US\$750 billion in 2011, much of which by publicly-owned or not-for-profit hospitals (Dubb & Howard, 2012). This spending power, as well as their relative permanence in place, have led many to call hospitals 'anchor institutions,' alongside universities, libraries, or museums (Norris & Howard, 2015). In the wake of the Great Recession, scholars and organizations, such as the Democracy Collaborative, have studied strategies to leverage this power to generate sustainable and equitable economic development (Norris & Howard, 2015; Oostra et al., 2018; Schildt & Rubin, 2015; Ubhayakar et al., 2017). Approaches, like the Cleveland Model and the Preston Model, have utilized anchor-centric strategies for economic development such as redirecting spending to local firms, specifically targeting those with cooper-

ative ownership structures and 'sustainable' business practices, and ensuring the creation of high quality and stable local employment (Alperovitz et al., 2010; Dubb, 2016; O'Neill & Brown, 2016).

In recent years, growing attention has been given to how hospitals can support the development of sustainable food systems. The number of total meals served by hospitals and the share of those meals prepared for non-patients has steadily increased over the last decade (Foodservice Director Staff, 2016). These retail trends have converged with the growth of literature within behavioral economics and public health documenting the role of food environments on consumer choices and public health outcomes. This scholarship suggests that changes in the choice architecture facing consumers, such as product placement, labeling, pricing, and promotional strategies, can 'nudge' consumers towards specific products, creating the potential for institutions to encourage healthier eating habits (for a review, see Ensaaff, 2021). Recent research has further suggested that hospitals could serve as a valuable site for such interventions targeting the consumption patterns of its visitors (Mazza et al., 2018; Warsaw & Morales, 2020; Winston et al., 2013).

The confluence of these public health and economic trends is reflected in the rise of farm to institution programs over the last three decades (Lakind et al., 2016). Through local food procurement, these programs leverage the mission of anchor institutions to support the local community and position foodservice as a vital component of pursuing that mission. In this paper, we present a case study of the evolution of a farm-to-hospital program as part of a series of Policy, Systems, and Environmental (PSE) interventions at two clinics within the University of Wisconsin (UW) Health system: University Hospital (UH) and its affiliated pediatric hospital, American Family Children's Hospital (AFCH, UH-AFCH) between 2008–2017. Specifically, we discuss how organizational values, structures, and roles shifted to accommodate a foodservice operation centered on public health and local food procurement and marketing to produce organizational and community support for these changes. Further, we discuss how organizational decision-makers' understanding of their role

in the local food system evolved as they increased their local food procurement and the impact of this evolution on their interactions with the food system.

Literature Review

Over the last two decades, PSE interventions have emerged as a common framework used by public health professionals to promote preventative healthcare by mitigating common risk factors, including tobacco usage, physical inactivity, and nutritional deficiencies (Kegler et al., 2015). Here, policy refers to rules set by governments or organizations, such as a school purchasing policy that mandates increased local spending. System change refers to the infrastructure of a given organization, such as creating a farm to institution program. Environmental change refers to the physical environment, such as creating signage to encourage specific eating behaviors. PSE strategies take a socio-ecological approach to behavior modification, recognizing that individual behaviors are significantly influenced by societal and environmental forces (Kegler et al., 2015). PSE strategies design interventions at multiple levels, making desired public health choices easy and economically beneficial for the targeted population. The rise in PSE strategies in community health settings has been fostered by a surge in funding from organizations such as the Centers for Disease Control and Prevention (Bunnell et al., 2012).

Institutions, such as schools, are considered a useful site for PSE interventions because their infrastructure facilitates the design and integration of interventions at multiple levels while allowing for input from the targeted population (Lepe et al., 2019). FTI programs have become an increasingly common intervention targeting nutritional deficiencies due to their documented ability to synergize public health, economic, and environmental goals within the food system. Farm to school programs (FTS) were the first national FTI movement in the late 1990s, developing in response to concerns about school nutrition and public health outcomes in children (Feenstra & Ohmart, 2012). Since then, FTS programs have remained prominent and extensively studied across multiple disciplines (Prescott et al., 2020). Programs vary by

institution but typically feature one or more of the following components: education (e.g., changes to nutritional curriculum and experiential learning in school gardens), procurement (purchasing and promoting local food in school cafeterias), and community support (e.g., integrating FTS into school wellness policy) (UNC Center for Health Promotion and Disease Prevention, 2016).

Previous research has indicated that FTS programs can increase the consumption of fresh produce while decreasing the consumption of soda and processed food items, increase willingness to try new food products, and improve nutritional literacy (Moss et al., 2013). Economically, scholars have argued that FTS programs may provide a stable source of revenue to producers, particularly small farms, allowing them to diversify their streams of revenue, and stimulate local economies through job creation and increased local spending by producers and their employees (Christensen et al., 2019; Feenstra et al., 2011). Environmentally, FTS programs may reduce waste in the supply chain and give institutions stronger influence over the growing practices of their vendors (Izumi et al., 2010; Rutz et al., 2018; Yoder et al., 2015).

To date, farm-to-hospital (FTH) programs have received less attention within the literature. However, previous scholarship has indicated that nutrition-based interventions to product availability and pricing in hospital vending machines and cafeterias may affect consumer behavior (Pechey et al., 2019; Warsaw & Morales, 2020). Further, a small but growing body of literature suggests that local food procurement by hospitals can stimulate economic activity (Becot et al., 2016) and that hospital decision-makers are increasingly interested in procurement strategies that minimize their environmental impact (Carino et al., 2020). These examples illustrate the potential for FTH programs to integrate nutritional, economic, and environmental goals under a broader umbrella of procurement-based interventions.

Despite the potential benefits of FTH programs, several barriers have slowed their widespread adoption across U.S. hospital systems. As in the case of FTS programs, FTH programs are often limited by the perception or existence of higher costs associated with procuring local food

amidst pressures to reduce costs, contracts with broadline distributors which favor or exclusively use industrial supply chains, and a lack of support from administrators who do not see foodservice as a part of the hospital's core mission but solely a means for revenue generation (Boys & Fraser, 2019; Klein, 2015; Perline et al., 2015; Sachs & Feenstra, 2008).

Addressing these roadblocks thus requires a vision for organizational food policy to facilitate local food procurement and simultaneously develop new organizational structures to accommodate that vision. As such, there is a continued need for scholarship studying hospital food procurement to identify organizational strategies which facilitate nutritional interventions that address public health goals and support the development of sustainable food systems. It is this need that our case study addresses. We analyze the development of a farm-to-hospital program at UH-AFCH between 2008-2017, including the organizational strategies used to reorganize its foodservice around public health and the role of local food procurement in facilitating and expanding the scope of its evolving operations. We address the following research questions:

1. How did UH-AFCH's organizational roles and values evolve to facilitate the development and implementation of its PSE interventions?
2. What was the perceived role of local food procurement in the success of UH-AFCH's PSE interventions?
3. How did local food procurement influence how UH-AFCH staff viewed the role of UH-AFCH in the community and local economy?

Case Study: University of Wisconsin Hospital

To address these questions, we utilize a descriptive case study approach (Baxter & Jack, 2008) to investigate the development of UH-AFCH's PSE interventions from 2008 to 2017. As Yin (2009) described, a descriptive case study approach is appropriate as the intervention of local food procurement studied here cannot be clearly separated from the context it occurred in; the real-life context

is relevant for consideration in our findings.

UH is a 505-bed hospital facility located in Madison, Wisconsin. AFCH is a 111-bed pediatric facility that opened in 2007, replacing the previous children's hospital housed within UH. Both hospitals operate under a shared organizational structure; for instance, foodservice employees report to a single department head, who oversees food preparation for UH and AFCH. However, within several individual departments, some employees specifically oversee operations at AFCH; as such, we refer to them both separately and jointly as appropriate in this paper. In 2008, AFCH joined a cohort of 23 pediatric hospitals to participate in a national pilot program funded by the Mattel Corporation called Focus on a Fitter Future. The aim of the pilot was to develop strategies to reduce childhood obesity by modeling healthy eating habits in pediatric care settings. AFCH overhauled its cafeteria space to replace processed, high-fat foods with freshly prepared food products, emphasizing local produce as part of that program.

During this pilot, AFCH also tested the Centers for Disease Control and Prevention's Healthy Hospital Food Environment Assessment (HFEA) Tool, a scan of hospital food environments to determine the availability and affordability of healthy food options. After the conclusion of the pilot program, clinical nutritionists conducted the HFEA across the rest of UH-AFCH's foodservice operations. The assessment found that six of the seven retail spaces assessed met less than 20% of the HFEA criteria, with the exception being the recently renovated AFCH cafeteria. In response, stakeholders across the hospital created an interdisciplinary working group named the We Are Health Committee (WAHC), consisting of senior leadership, administrators, and employees across departments involved in public health and wellness, and non-affiliated members of the community. The committee's objectives were to develop and advocate for interventions in the food environment to bring retail, vending, and catering operations into at least 60% compliance with the HFEA guidelines, referred to as the '60/40' criteria. A summary of these interventions is provided in Table 1, and a timeline of their implementation is provided in Figure 1.

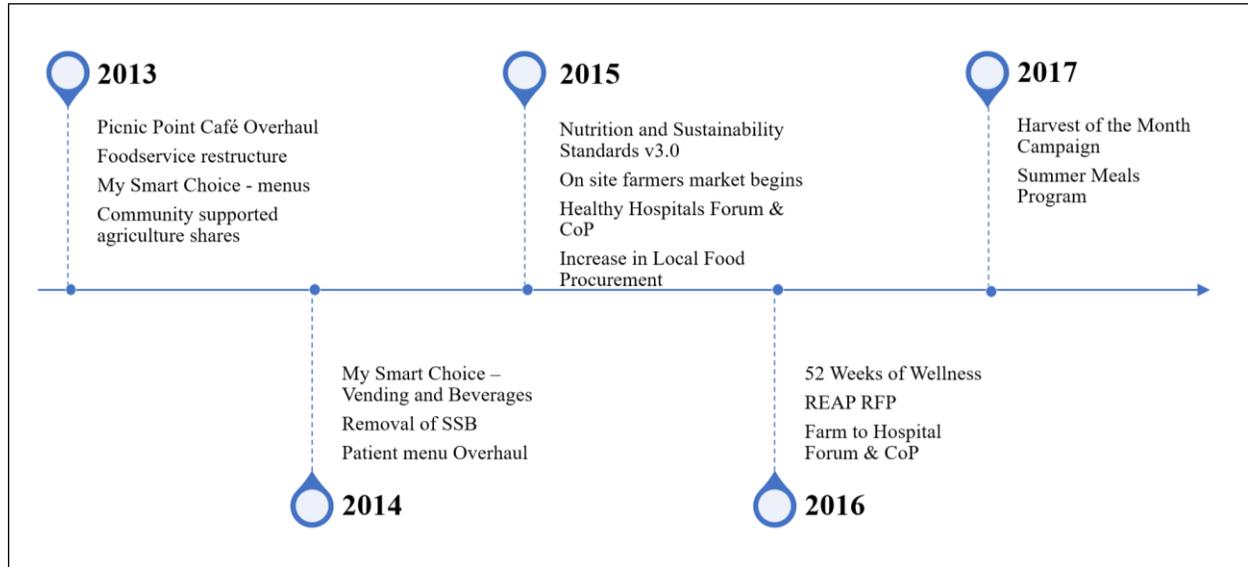
Beginning in 2015, UH-AFCH started to increase its procurement of local food as part of its long-term strategy to improve the nutritional environment of its foodservice operations. During the 2014-2015 fiscal year, the clinic spent approximately 6% of its food budget on local products and increased that spending to 21% in 2016-2017, or US\$1.9M of its US\$8.1M budget. These purchasing decisions were merged into nutritional interven-

tions through promotional strategies simultaneously highlighting both healthy eating habits and the benefits of eating locally, such as the 2017 Harvest of the Month campaign. This campaign featured one Wisconsin-grown produce item in the clinic's cafeteria in various promotional events, including recipes, informational messaging providing tips for at-home preparation, and demos and meet-and-greet with local farmers.

Table 1. List of PSE Interventions at UWHC from 2008–2017

PSE Category	Intervention Name	Description
Policy	My Smart Choice	Tiered rating system for food products (green, yellow, red) based on nutritive quality; 60% of food served must meet the green or yellow criteria
	Nutrition and Sustainability Standards v 3.0	Updated purchasing guidelines for food products which mandated 20% of food purchases must meet either 'sustainable' or 'locally sourced' criteria
System	Foodservice restructuring	Culinary Service and Clinical Nutrition Departments combined into Clinical and Culinary Services
	We Are Health Committee	Interdisciplinary committee formed to design and implement nutrition-related interventions
	Healthy Hospitals Forum	Multi-day forum of 11 Wisconsin Hospitals to discuss best practices for hospital nutrition
	Healthy Hospitals Community of Practice	Commitment by Healthy Hospital Forum participants to implement at least one nutritional intervention in their clinics within a year
	Farm to Hospital Forum	Forum of 13 Wisconsin hospitals to discuss best practices for local food procurement
	Farm to Hospital Community of Practice	Commitment by Farm to Hospital Forum participants to increase local food procurement in a year
	On-Site Farmers Market	Farmers market run outside of UH campus. Products sold at market occasionally used in retail spaces
	Summer Meals Program	Free meals offered to families on free and reduced lunch during the summer
	REAP RFP	Request for partnership with local vendors
	Increased Local Food Procurement	UH-AFCH begins to increase their local food procurement
Environment	Community Supported Agriculture	UH-AFCH organizes a CSA share program with pickup at their clinic
	Picnic Point Overhaul	Deep fryers and unhealthy food options removed from AFCH cafeteria. Replaced with fresh produce, some sourced locally. Renamed Farmers Market Cafe
	My Smart Choice	Tiered rating system for food products (green, yellow, red) based on nutritive quality. 60% of food served must meet the green or yellow criteria
	Removal of Sugar Sweetened Beverages	Beverages containing added sweeteners are removed from beverage cases across the clinic
	52 Weeks of Wellness	One nutrition-based intervention (pricing, product placement, product availability) made a week
	Harvest of the Month Campaign	Each month, one Wisconsin-grown produce item is featured throughout UH-AFCH retail spaces via recipes, meet and greets, etc.

Figure 1. Timeline of Major PSE Interventions



By December 2017, an updated assessment of retail and catering operations found 100% compliance with the 60/40 objective. This assessment was complemented by additional internal indicators of improved public health outcomes, such as increased purchases of fresh produce and water by consumers in retail spaces (Warsaw & Morales, 2020). For these collective efforts, UH-AFCH was one of 11 hospitals recognized nationally by Practice Greenhealth as a ‘Healthy Food Circle’ honoree in 2017.

Applied Research Methods

Semi-Structured Interviews

We conducted semi-structured interviews with key decision-makers using snowball sampling (Polkinghorne, 2005). Initially, UH-AFCH foodservice and nutritional leadership were targeted, ultimately extending to other actors directly involved in creating or executing these policies. Eleven interviews were conducted with eight individuals, including food preparation staff, clinical nutritionists, department leads, and vendors. Interviews were conducted between June-July 2017. For each interview, one of three interview protocols were used; one for vendors, one for hospital staff involved in foodservice decisions during the Focus on a Fitter Future Pilot, and one for staff who joined after the end of

that program. Interviews covered the participants’ motivations for implementing various nutritional interventions, changes in organizational roles and structures in support of those interventions, the rationale and value of local food procurement in pursuing their nutritional goals, their experience with the process of purchasing food locally, and the perceived efficacy of local food procurement within the interventions. We use pseudonyms in place of proper names to protect confidentiality, listed in Table 2.

Analysis

The interviews were transcribed manually by one member of the project team, then checked for accuracy by a second team member. After completing and transcribing the interviews, an initial codebook was developed by one team member using four of the 11 interviews, drawing from the relevant literature and secondary data obtained by the project team. Secondary data included promotional materials related to various interventions, meeting minutes for the WAHC, internal communications detailing new policies, reports written by UH-AFCH team members, and relevant news stories written during the study period. In addition, brief memos were written to further detail each theme. Upon completing the initial codebook, three additional team members analyzed an interview to en-

Table 2. Pseudonyms for Research Participants

Moniker	Identifier	Description
CN1	Clinical Nutrition employee 1	Culinary and Clinical Nutrition Services (formerly clinical nutrition) employee
CN2	Clinical Nutrition employee 2	Culinary and Clinical Nutrition Services (formerly clinical nutrition) employee
CN3	Clinical Nutrition employee 3	Culinary and Clinical Nutrition Services (formerly clinical nutrition) employee
CS1	Culinary Services employee 1	Culinary and Clinical Nutrition Services (formerly culinary services) employee
CS2	Culinary Services employee 2	Culinary and Clinical Nutrition Services (formerly culinary services) employee
CS3	Culinary Services employee 3	Culinary and Clinical Nutrition Services (formerly culinary services) employee
VN	Vendor	A Dane County producer selling to UH-AFCH
EX	Executive	A member of the executive board at UH-AFCH

sure intercoder reliability and discuss the codes' validity. A final codebook was developed after these discussions, and the remaining data were coded.

Results

2008–2014: Redefining Hospital Food Service, Restructuring Organizational Systems

In describing the hospital's approach to foodservice before 2008, interviewees frequently referred to an 'old school' mentality of viewing food retail solely as a mechanism for revenue generation. This mentality had two primary impacts on UH-AFCH's procurement strategy. First, the clinics relied nearly universally on their broadline distributor (BD) for food purchases to minimize costs, with marginal concern given to the geographical origins of food products. Administrators did not track local food purchases during this time, though it was generally understood to be low by hospital staff.

Second, their need to drive sales and revenue created an incentive to procure food and beverage items that would appeal to the tastes of potential visitors. Given the well-documented correlation between hospital visits and stress (Hultman et al., 2012; Mitchell, 2003), and between stress and eating habits (Kandiah et al., 2006; Tryon et al., 2013), this resulted in an abundance of comfort foods and sugary beverages available to visitors and patients.

It was viewed as a revenue center, so it was like, what generates profits? People like fried foods so that's what we are going to provide

them and there was a lot of thought that the comfort food, that's really our role was just to provide comfort food and just get people through the crisis at hand. . . . It was really just about being a comfort situation. . . . There was no health associated with it. [CN1]

This gap between the foodservice operations and the hospital's public health mission was partly due to the organizational separation of clinical nutrition and culinary services into different departments. The two departments reported to different leads: Clinical Nutrition, whose role was to provide dietary guidance to patients, reported to Nursing and Patient Care Services, while Culinary Services, including retail, vending, catering, and patient meals, reported to Facilities. These 'silos' had different organizing principles: patient well-being for Nursing and Patient Care Services and revenue generation for Facilities. However, the decision-making power was held solely by Culinary Services; Clinical Nutrition had no formal responsibilities or organizational connection to food preparation within the clinics. This resulted in purchasing decisions made without the perspectives of staff working directly with patients in medical care, leading to frustrations among the clinical nutritionists. They felt that their patients were not given an adequate chance to acclimate to the dietary recommendations prescribed while in the clinic.

This dynamic began to shift with the release of the American Association of Pediatrics report, Expert Committee Recommendations Regarding the Prevention, Assessment and Treatment of

Child and Adolescent Overweight and Obesity, in October 2007 (Barlow, 2007), which pushed AFCH to participate in the Focus on a Fitter Future pilot. AFCH had an existing program of outreach and advocacy related to childhood nutrition, but the report drew attention to its retail food practices. Stakeholders across the clinics believed that the primary food retail space in AFCH, then called Picnic Point Café, did not adequately demonstrate the nutritional behaviors they wanted families to practice at home. This perception is summarized by EX:

We wanted to reflect and model that great nutrition behavior and when the children's hospital was built 10 years ago. . . . The planners thought, "let's have a very whimsical kind of cafe and let's serve food that kids like to eat." . . . We served pizza, and there was a hotdog wheel, roasted hotdogs, and we sold soda and all kinds of, you know, we weren't modeling great nutrition behavior.

The pilot project provided pediatric and nutritional health specialists an opportunity to get directly involved in the clinic's foodservice operations, where they had not been before. Picnic Point Café received both an aesthetic and product overhaul, and the space reopened in 2013 as the Farmers Market Café. The name change was intended to reflect the change in atmosphere and the products sold in the new storefront, which now emphasized fresh produce, including locally sourced produce. EX continues:

The children's hospital leadership found some like-minded people in culinary services and the clinical nutrition department and we were going to be a pilot within UW Health to pilot healthier food choices and so we kind of went on that journey. . . . We started by getting rid of all of the high fat, the high cholesterol, the high sugar content food. . . . We really embraced this local is better and more sustainable . . . more nutritious and healthier and locally produced, and so we became the first pilot experiment to source more food locally. So, we had the clinical nutritionist [and] the

dieticians involved with us, we had people in foodservice working with us, and we were able to totally transform the menu and also the supply of food.

Participation in this pilot created cross-departmental relationships that would enable broader changes across the clinic. This desire for change was accelerated into action with the promotion of a new director of clinical nutrition in 2012. The new director, who had previously worked in oncology patient care, saw an intimate connection between the food being consumed by patients and their general well-being. CN1 described the importance of this perspective when considering the divide between culinary services and clinical nutrition:

You get sickle cell patients who have these pain crises, and they would come in through the ED, and we would allow them to order whatever they wanted, so they were ordering 12 packs of soda up to their room. . . . And it was just like wait a minute, what are we doing, you're coming in with a pain crisis, why are we—we don't allow people to go smoke. . . . We used to, but we really put our foot down about that, so why—would we allow a drug addict to continue to use drugs if they come in? But a lot of people don't put food in that category because everybody has access to food, so it felt like that was just not a priority. . . . So my primary goal was to change this thought process, that food is what nourishes people, it is the essence of clinical nutrition, it is how people get stronger, it is how their muscles regenerate.

Despite the growing consensus about the limitation of a revenue-centric foodservice operation, the fact that food preparation and nutrition were in different parts of the organization, with different goals and motivations, was more than a simple logistical hurdle. Rather, they manifested into different and even conflicting behavior, expectations, and practices, creating tension within the organization which further entrenched the status quo. Even within Culinary Services, divisions between the sub-units responsible for various aspects of food

procurement and preparation impacted its ability to perform its responsibilities:

What was happening is retail, the manager there they purchased what they wanted, and patient meal services did what they wanted, and then the chef kind of oversaw some of those elements, but not always, so there wasn't good involvement or good communication across each venue. Retail operated very separately from patient meal services. They didn't cross-train, they were like two different entities, they didn't have lunch together. Didn't play nice together. [CN1]

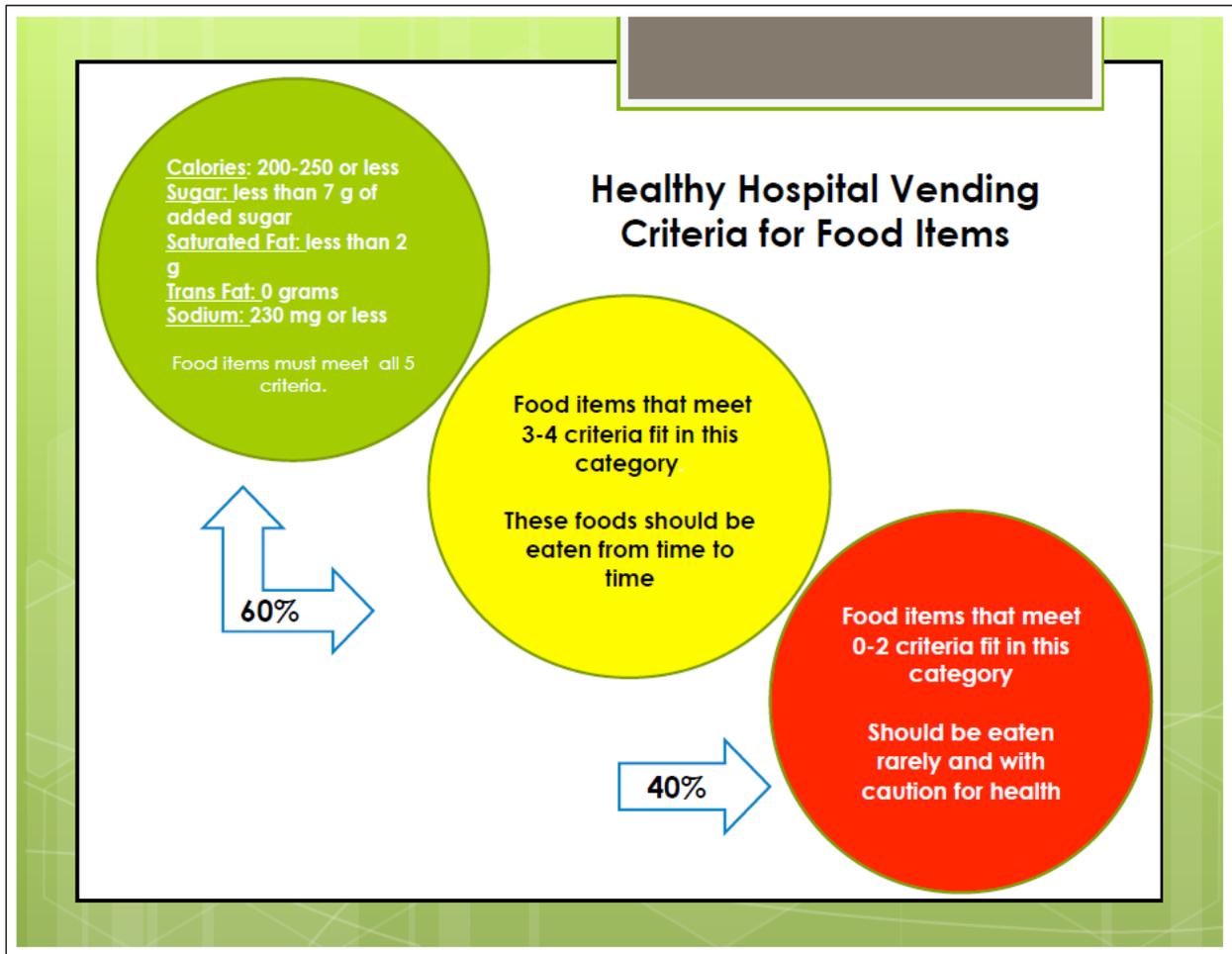
To address this tension, the clinical nutrition director proposed merging the two departments into a new department, Culinary and Clinical Nutrition Services (CCNS), having seen the benefit of cross-departmental collaboration and knowledge sharing during the Focus on a Fitter Future pilot. This merger, the director argued, would allow the new team to build a common language and framework for approaching health and nutrition within the clinic, presenting a united front and empowering employees to drive organizational change. The HFEA assessment of the remaining retail spaces in 2013 was used to initiate this integration and subsequent changes in practices. The results of the study, indicating a poor nutritional environment across retail spaces, except for the newly reopened Farmers Market Café, were then shared with medical professionals across the hospital to increase the pressure for change within the organization. This effort culminated in creating the WAHC, a permanent committee that includes members from the CCNS, the Patient and Family Advisory Committee, the Wellness Committee, and senior executives. The interdisciplinary composition of the committee, as well as the inclusion of senior leadership, served three functions: first, to extend a new shared vision of foodservice and public health across all primary care organizations connected to UH-AFCH; second, including senior leadership provided the committee with the latitude to implement small-scale interventions (such as the My Smart Choice campaign, discussed below), and; third, it gave relevant administrators direct access

to information and relationships necessary for larger initiatives.

An example illustrating the value of this approach was the effort to remove sugar-sweetened beverages (SSB) from vending and retail spaces, the first major goal of the WAHC. Committee members anticipated this intervention would face resistance from customers and administrators due to ingrained preferences for SSB and the likely loss of revenue. The WAHC leveraged its experience and decision-making authority in a two-pronged approach in response to these anticipated roadblocks. First, the committee utilized the expertise of its nutritionist and other medical professionals to identify small-scale but high-impact interventions to build momentum for this change. Second, the authority of executives on the committee was utilized to implement these minor changes quickly. The 'My Smart Choice' policy was one such early intervention. This intervention developed a three-tier color-coded (green, yellow, red) system, and mandated that 60% of the products sold across patient meals, beverages, and vending machines met either the green or yellow criteria. The criteria for vending machines are illustrated in Figure 2. The policy was revenue neutral, making the policy a success in the view of the WAHC. The perceived success of this and other small-scale interventions built the momentum necessary to take on the larger policy of removing SSBs, which was done in 2014. Here, again, the combination of expertise and authority was perceived as vital to implementing the policy, as CS1 describes:

I think because we're a committee that's recognized an administrative level, if we are looking at removing sugar-sweetened beverages, we have [a] physician champion. So, it wasn't just clinical and culinary nutritionists removing beverages, but the organization is removing sugar-sweetened beverages. And I think that just drives that it's not about revenue, it's not about the product, it's about wellness for our community inside the hospital and outside. And it's about practicing what we preach. So, I think as a committee, it's important to have that come from an organizational standpoint.

Figure 2. Illustration of My Smart Choice Criteria for Vending Machines



2015–2016: Leveraging Local Food to Improve Nutrition

As anticipated, the removal of SSBs resulted in pushback from customers, employees, and visitors. One criticism was that these changes were paternalistic. To critics, visitors should have healthy options readily available but not be forced to make a healthy choice. This discontent was reflected in a decline in overall beverage sales at UH-AFCH immediately after the removal of SSBs, though sales recovered over time.

Given this initial pushback when the WAHC and foodservice personnel pivoted to overhauling the food products in retail spaces in 2015, a new strategy was sought for designing interventions. Local food procurement emerged as an approach to improve the nutritional quality of offerings while

mitigating accusations of paternalism by centering the benefits of locally sourced food products. The foundation for this work was laid during the overhaul of the supply chain for the Farmers Market Café when they partnered with REAP Food Group, a Wisconsin-based nonprofit dedicated to assisting institutions and businesses engage in local food purchasing. REAP rebuilt the supply chain to source local food products for the Farmers Market Café. The success of this partnership created the perception that such an approach could be feasible at a larger scale. This perception was amplified by feedback from customers indicating that there was demand for more locally sourced food products within the clinics. CN1 described one memorable example of this feedback from early in their tenure at the newly formed CCNC:

One of the first comments I got . . . was from a farmer, and he said, “I’m a farmer from Wisconsin, why does your milk come from Texas?” and I was like, I’m not sure. So, I went and pulled the milk out, and sure enough, the milk comes from Texas, and that’s where it’s processed. And that’s the perception.

Three key interventions were implemented in 2015 to support this new approach to food procurement within the ongoing PSE strategy. First, new administrative policies were developed in 2015 to officially recognize the evolving goals of the WAHC in its foodservice strategy. This policy, entitled ‘UW Health Nutrition and Sustainability Standards v 3.0,’ mandated multiple new objectives related to local and sustainable food purchasing and promotion in addition to the existing 60/40 goal. The sustainability policies are summarized in Table 3. Second, two new employees, CS1 and CS2, were hired into leadership within CCNS, with the explicit mandate to lead the growth of UH-AFCH’s local food spending. Third, UH-AFCH was one of 11 hospitals to participate in the Healthy Food and Beverages in Wisconsin Hospitals and Clinics Forum in 2015. The participating institutions created the Wisconsin Healthy Hospitals Community of Practice (WHHCoP). As part of the WHHCoP, a memorandum of understanding was drafted which committed the institutions to

implement additional PSE interventions according to the “7 P’s of Creating a Healthy Hospital Nutrition Environment”: pricing, promotion, policy, product, preparation, purchasing practices, and placement (Lucile Packard Children’s Hospital Stanford, n.d.).

These policies and personnel decisions converged with the development of the 52 Weeks of Wellness campaign in 2016. The campaign implemented one new PSE intervention aligned with one of the 7 Ps weekly throughout the calendar year. Interventions featuring new local food vendors or promotions were prominent within the campaign. Promotional blurbs for 21 of the 52 changes promoted during the 52 Weeks of Wellness campaign referred to local food, such as switching to Wisconsin vendors for all milk and cheese products. Notably, many of these posts did not directly tie local food procurement to health; only six of the 21 local food interventions directly mentioned nutrition in their promotional materials. On a few occasions, the interventions even featured locally produced desserts such as cookies, candies, and other baked goods that would not contribute to the 60/40 goal:

We are now partnering with Tummy Yummies, a local business who produces hand-made wheat free cookies, candies, granola, and use 100% gluten free ingredients. Tummy Yummies proudly contributes back to our community, with at least 10% of all

Table 3. Summary of Nutritional and Sustainability Purchasing Standards

UW Health Nutrition and Sustainability Standards—Food Policies	
<ol style="list-style-type: none"> 1. Quarterly purchasing assessments to ensure that: <ol style="list-style-type: none"> a. 20% of purchases are sustainable and/or local b. Three supplemental promotion and education activities will occur on a regular basis 2. All prepared products will have nutritional and ingredient labels 3. At least 60% of food products sold will meet My Smart Choice guidelines 	
Sustainability Standards	Local Definition
Products must meet at least one of the following criteria: <ol style="list-style-type: none"> 1. Antibiotic and hormone-free 2. Pesticide and chemical-free 3. Locally produced 4. Third-party certifications (e.g., USDA Organic) 5. Vendor business practices (e.g., worker protection, on-farm energy efficiency) 	<i>Tier 1:</i> Items produced within Dane County <i>Tier 2:</i> Items grown or produced in the state of Wisconsin * 50% of ingredients used to produce a food product must meet the local definition

profits going to local nonprofits and another 10% of going toward local scholarships (UH Culinary Services Facebook; August 22, 2016).

The use of local food in this way allowed the WAHC to frame its interventions as enhancing consumer choices, rather than taking them away, overcoming a barrier identified not only by UH-AFCH after its SSB intervention but also the other hospitals participating in the WHHCOP. This approach also appealed to the desire of consumers to support local agriculture, stimulating the demand for the food products decision-makers wanted to nudge customers towards. The interplay between appealing to local food procurement and other PSE strategies is best seen in the series of interventions targeting the salad bar in Four Lakes Café, the largest cafeteria in UH-AFCH. The first promotion of the 52 Weeks of Wellness campaign was a price reduction at the salad bar, from US\$8/lb. to US\$4.99/lb. Later interventions targeting the salad bar included color-coded labeling to indicate the nutritional value of various ingredients, as well as introducing new offerings at the salad bar, such as specialty salads (e.g., Southwest Salad) and locally sourced ingredients and dressings. These changes resulted in a significant increase in salad bar sales (Warsaw & Morales, 2020) and were regularly touted as one of the biggest successes of the PSE interventions, both across participant interviews and secondary data, including internal and external presentations given by WAHC members and promotional materials. This shift in consumer behavior was attributed to the change in pricing and the inclusion of locally sourced produce.

But I think the fascinating part of it was the behavior shift from that first three months where you knew there weren't more customers coming in, but there [was] so much more volume at the salad bar. Where were those customers? Were they in the grill line before? Were they ordering a burger, and now they're getting a salad because it's less expensive and you get more food and amazing, local, beautiful produce?

EX connected the value of local food procurement to the Wisconsin Idea, the explicit mission of the University of Wisconsin-Madison, and by association UH-AFCH, to ensure that the institution's knowledge, resources, and activities should benefit all residents of the state. Framing these PSE interventions not just to improve consumer health but as a way for the hospital to leverage its resources to help its community economically helped to sell the idea to customers:

I think we could've [just] retooled our menu to make it healthier, but then a real hook was the grow local, buy local, eat local, which, when I think about the Wisconsin Idea and all things Wisconsin and how embedded we are with that type of thinking, it just made it more special . . . it's like "oh I could come to the farmer's market café, and I'm getting local Wisconsin produce, meats, cheeses you know whatever, milk." Yea, it made it more special, I think it could've happened without it, but it wouldn't have been as unique or special, and I think in this crowded market of messages that people get about food, it was a hook for us.

The emphasis on local food also proved beneficial in winning over foodservice staff, who were initially resistant to the changes, having seen similar efforts to improve food quality fail in the past. Food preparation staff and cashiers were empowered to serve as ambassadors for the interventions, specifically giving customers context for the locally sourced products now featured on the menu. In so doing, the staff themselves were introduced to products they might not have been exposed to before, creating new experiences which generated excitement about the initiatives and translated to their eating habits at home.

Well, I think the biggest thing is when they try something new. Like we've been bringing in kohlrabi, and a lot of our staff had never tasted a kohlrabi. So that or they're introduced to new experiences that they haven't had before. I had a conversation with someone about kohlrabi from the new staff the other day. And

she's like, "Yes. I just tried for the first time." She loves it now. . . . To me, that's a real bonus of having locally sourced products, is being able to try something new and figuring out how to use it or introducing it then to your family. [CS2]

These employees were also motivated by seeing consumers have a similar experience, accelerating support for the ongoing changes. CS2 continues:

What's really been great is some of them, you can see that they're really responsive and really positive about the changes that we've been making. And then others, I think you're also going to have some staff that just comes in, and this is just a job for them. . . . But it's great to see certain staff take the time to learn about something or to try something new or to see something good and come to one of us and say, "Hey, guess what I saw the other day? A customer said she had never had baby carrots, you know, like the beautiful baby carrots with the tops on. Never had those before and never had lavender honey carrots, and she will eat them every day now when we have them." [CS2]

The perceived value of local food within the 52 Weeks of Wellness campaign, as well as other local food interventions, such as the operation of an on-site farmers market in 2015-16, was evidenced by the creation of a second community of practice (CoP) in 2016, called the Farm to Hospital Community of Practice (FTHCoP), with funding from the Wisconsin Department of Agriculture, Trade and Consumer Protection. The creation of this CoP was followed by a second Wisconsin Healthy Hospitals Forum, where farm-to-hospital was one of four tracks discussed during the meetings. The CoP and forum created the conditions for future local food procurement efforts in two ways. First, having the space to interact with like-minded institutions helped stimulate new ideas and interventions that the WAHC could pursue, including the Harvest of the Month campaign, which would be rolled out in 2017:

I think there are pieces that we learned from our small rural hospitals about communication, staff education, making the local partnerships both from those small rural kind of community hospitals as well as some of the larger partners. So I think the communication component was part of it. . . . Like the harvest of the month is one idea that we garnered from (another hospital) [CN2]

Second, the accountability created by entering a CoP pushed the WAHC to advance its foodservice operation ambitions. This can be seen in UH-AFCH's pursuit of the Partner for Change award from Practice Greenhealth, which also emerged from UH-AFCH's participation in the FTHCoP. These awards are given to clinics for engaging in a wide variety of 'sustainable' food system activities, such as increasing local food purchasing or offering healthier food and beverage options to customers. UH-AFCH would be recognized for their efforts in 2017, and participants acknowledged the role of comparing themselves to other hospitals in the rapid expansion of their local food procurement, including 28% of their Q3 2016 food budget following the creation of the FTHCoP:

So, maybe the competitive part of me, but I think it's just good to know; I mean, people from outside would be like, "Wow, you guys are leaders. Wow, you guys are doing all these amazing things." Are we? [If] there's somebody out there doing it better, I want to know. And if they are, is there a way to network with them and see like how did they accomplish this, how did they remove this roadblock? Who are they sourcing from? Who are they using? . . . So, I just think it's an amazing opportunity to see where we stand and to see like how much more we can do . . . You know, one of the things that struck me on the benchmarking report is the high—the 90th percentile for local spend[ing] was 38%. I just want to talk to those people; where are you in the country that 38% like comes to your door in the local definition?

2016–2017: Extending Influence into the Local Food System

As its share of local food purchases began to increase in 2015, so did the WAHC's vision of how its foodservice operations could positively affect the local community. This expansion came partly due to the interactions with local vendors that emerged due to this new procurement strategy. Before 2015, most sales came through BD, save for a portion of direct local sales from the Farmers Market Café. However, in 2015, UH-AFCH stakeholders began to work with REAP to identify local farms and businesses that it could purchase food products from directly, first switching to procuring eggs and milk from local farmers. Then, in 2016, a request for partnership was developed to solicit vendors within 150 miles of Madison, Wisconsin, ultimately resulting in over 60 partnerships with local businesses. As part of selecting new vendors, CS1 and CS2 conducted site visits to learn about potential vendors' products and growing practices. This not only served to verify the practices of its prospective partners but also gave the WAHC direct insight into the impact its purchases had on local businesses.

As an example of this impact, several respondents referred to VN, a coffee vendor with whom UH-AFCH had recently established a purchasing relationship. VN had a small but growing business, including another contract with one of the largest employers in the region. However, before selling to UH-AFCH, VN had been unable to distribute its products through BD, the largest distributor in the area. Once VN established its relationship with UH-AFCH, leadership in the culinary staff told BD they had a steady demand for and interest in VN's product, allowing VN to meet with BD and develop a business relationship. VN explains:

This gets me talking about BD; they were happy to work with us, only because CS1 and CS2 said ok we want these cases here—what BD needed was how much are you going to be buying 'cause...we are only gonna only bring in what you guys need, we don't have any other place to bring this. So [CS1 and CS2] say here's our velocity, here's what we've been going through every week so bring in two,

three weeks' worth and then keep reordering every three weeks—BD places their order, they put it into their warehouse and then it provides, it provides a big convenience for us that now BD consolidated with their other deliveries and payments.

Arrangements such as these provided multiple benefits to the hospital and its local vendors. First, receiving products from a distributor was much easier logistically for UH-AFCH than arranging separate drop-off times to pick up a single product from a business. This allowed UH-AFCH to overcome a common logistical challenge for farm-to-institution programs, as many institutions lack the resources to be available for multiple drop-off times with local businesses (Sachs & Feenstra, 2008). Second, the steady revenue for vendors, such as VN, not only provided stability and a livelihood for its owner and employees, it also created opportunities to expand its operation and thus establish multiple and diversified streams of revenue. In the case of VN, its operations remained local even as its business expanded, resulting in additional local employment and spending, providing an intimate example to the foodservice staff at UH-AFCH of the 'multiplier effect' frequently discussed in documenting the economic impacts of farm to institution programs (Becot et al., 2016).

Participants described several stories like these when discussing the impact of their local food initiatives. Seeing the impact of their local purchasing decisions firsthand and the willingness of their broadline distributor to accommodate those changes had a transformational effect on the relationship UH-AFCH had with BD. Before the study period, foodservice personnel rarely challenged the purchasing decisions made by BD, as both UH-AFCH's and BD's priority was revenue maximization. However, when UH-AFCH first began to shift its approach to foodservice, specifically with its new policy on SSB's, BD responded negatively, revealing a perceived power dynamic wherein UH-AFCH was reliant on BD and the large agribusinesses supplying it to succeed financially as a unit.

When we first wanted to remove the regular soda, we met with Coke and Pepsi and Dr.

Pepper and 7UP, and they were like, this is going to fail. People have tried this before. Have you talked to your senior leadership because you are going to lose all this money. And they were rude. They were blatantly rude. They were hostile towards me. [CN1]

Previous research has also found that this power dynamic is reinforced by structural factors included in standard distribution contracts, such as a limit on outside food and beverage purchases made by the institution under contract (Sachs and Feenstra, 2008), leaving institutions reliant on the product offerings made available by their distributor. However, as UH-AFCH began to work with vendors and businesses individually, approaching its limit for outside purchases with the credible threat that it could continue to expand local spending if it ended the relationship with BD, this dynamic flipped. Now, UH-AFCH stakeholders recognized their relationship with BD as a two-way street, with their distributor in need of UH-AFCH's business just as UH-AFCH was reliant on BD's distribution infrastructure. As such, this gave UH-AFCH the leverage to further increase its share of locally sourced food products, even if they were not purchased directly from the vendor.

I was involved in our contract negotiation. And the bottom line is they want our business. And I think sharing the policy with them, our sustainability policy, was critical because they understood the direction we were going in, and it wasn't a choice. We're not deciding that maybe we'll do this, maybe we won't. No, this is what we're doing. And they've—I mean, [BD]'s demonstrated to us that they want to be a partner in that local and sustainable purchasing. I mean, they partnered with Wisconsin Food Hub. They partnered with Fifth Season Cooperative. They have become distributors of some of the small family businesses. [CS1]

This leverage extended beyond the goal to purchase more local food products. UH-AFCH's insistence on changing its product mix, including SSB's, its willingness to stick with the desired

changes, even after initial pushback, and its demonstrated ability to maintain long-term revenue levels again created leverage in its relationship with BD. This leverage was then used to force BD to adapt and make various products available to meet its needs. This was best seen in the evolution of non-sweetened beverages available to UH-AFCH in the wake of its new SSB policy. At the time of the SSB removal, UH-AFCH had to rely on diet beverages as one of the major replacements in its cafeterias, in addition to water and locally sourced milk. However, this changed with time, as BD sought to ensure its long-term sales with UH-AFCH.

I would say we saw that same shift with beverages, when we removed sugar-sweetened beverages. When we first met with Coke and Pepsi, it was like, don't just scoff you're gonna lose money blah blah blah and then you come back and now the difference of what's available on the market that doesn't contain sugar is far greater than it was when we first started down that avenue. [CN1]

Discussion and Conclusion

In this study, we documented the development and implementation of a series of PSE interventions at UH-AFCH between 2008-2017 and how the organization's structure and subsequent expectations and practices were altered to facilitate these changes. We found that the desire to reorient foodservice to center public health required significant change in the organizational roles and structures at UH-AFCH, as the existing structures supported a revenue-centric mission at the expense of public health. Leveraging local food procurement as a strategy helped facilitate wider-reaching interventions by appealing to customer preferences for local food while mitigating concerns about paternalism. Further, building an internal infrastructure capable of facilitating increased local food spending expanded the vision of UH-AFCH stakeholders of the role their foodservice could play within their community. These results align with previous research suggesting that organizing approaches that emphasize shared community values and

relationships between administrators and producers are valuable approaches to restructuring institutional food purchasing (Heiss et al., 2015)

One implication of this work is the value of external entities, such as nonprofits and governmental organizations, in supporting hospitals in leveraging their foodservice to support the economic well-being and public health of their communities. The PSE interventions implemented by UH-AFCH were initiated by a national pilot organized by the Mattel Children's Foundation and expanded with support from tools provided by the CDC. Later efforts to expand local food spending were supported by organizations, such as REAP, Practice Greenhealth, and other hospitals through their participation in two CoPs. These external supports mitigated the challenge of generating internal support and momentum for significant change, which has stymied farm to hospital efforts in the past (Sachs & Feenstra, 2008).

Another possible implication of this work, and area for future study, is the importance of building organizational structures and goals in creating sustainable change. Previous work in FTI has often discussed the importance of organizational 'champions' in sparking and driving change (Bagdonis et al., 2009). However, overreliance on organizational champions can make change precarious and subject to the bandwidth and tenure of said champions. While UH-AFCH also relied on the efforts of

committed individuals, a cornerstone of its approach was to build structures and procedures to ensure the long-term viability of its work, regardless of who is employed at the clinics. The creation of the CCNS and WAHC, as well as benchmarking tools from the CDC and Practice Greenhealth, were designed to ensure that the normal operation of foodservice was oriented towards public health and local economic development, rather than dependent on the efforts of a given manager to direct resources in those directions.

The primary limitation of this study is the sample size. While the sample represents the key decision-makers involved in developing the studied PSE interventions, their proximity to the changes also introduces the possibility of bias in their assessments. We attempted to address this bias by verifying our findings using secondary data sources, but these were also likely to be influenced by the perspectives of our participants; thus, we could not eliminate the possibility of bias. Including the perspectives of other employees or visitors would have provided a more robust assessment of the PSE interventions presented here. As presented, these findings are best understood as representative of the views of key decision-makers and how local food procurement and other organizational strategies affected the development of these interventions, rather than a causal description of their success.

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Developing a community-based local food system in Will County, Illinois: Insights from stakeholders' viewpoints

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Abstract

The interest in and enthusiasm for shifting food systems to community-based and local trajectories have increased exponentially over the past decade. Part of the appeal of community-based local food systems is their potential to secure access to healthy food for local communities, expand sustainable farming practices, promote local food economies, and advance environmental and food justice. Interactions and collaborations within the spectrum of the food system's stakeholders—from farmers to local officials and organizations to local businesses

and residents—are the cornerstone for effective food systems tailored to their community's needs. An increasing number of food system studies have applied stakeholder assessment approaches to map out complex situations among multiple stakeholder groups with different values and viewpoints regarding food system change. However, despite being an essential and influential political unit to target, counties have received very little attention in food system studies, as researchers and practitioners often focus on the federal and state levels of intervention to design food policies.

This study examined the food system in Will County, Illinois, by applying the advocacy coalition framework and using a qualitative, semi-structured survey to engage a diverse set of stakeholders. The answers to the survey questions offered insights into three overlapping and divergent Will County stakeholder viewpoints (Pragmatic, Environmental and Food Justice Advocate, and Visionary), with the intent of informing and enacting food system

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transformation at the county level. The discussion within this paper focuses on coalition-building and collaboration between formal and informal groups to empower local communities to develop a distinctive food system identity that promotes community support, collaborative networks, and food justice at the county level.

Keywords

Advocacy Coalition Framework, Food Justice, County Food Planning, Stakeholders Assessment, Community Building, Urban Agriculture

Introduction

Driven by economic globalization and managed by highly concentrated corporations structurally and spatially, conventional food systems are increasingly criticized for their harmful environmental impact (Fan, 2021) and the economic and social problems they create in rural America (Cleveland et al., 2015). In this context, local food movements, networks, and enterprises are emerging as a “second generation” of food movements that promote reintegrating sustainable modes of production, securing community access to healthy food, and developing viable local food economies (Chojnacki & Creamer, 2019; Feenstra, 1997; Gupta et al., 2018; Sonnino et al., 2019). Across the United States, an increasing number of stakeholders (e.g., farmers, food security advocates, public health departments, planning departments, economic development officials, community groups, educators, local businesses, county managers, nongovernmental associations, and schools) have developed a common language about agri-food issues and are working together to implement and develop local food systems geared towards their community’s needs (Bloom et al., 2020; Cleveland et al., 2015; Low et al., 2015; Soper, 2021).

Establishing an effective local and community-based food system does not depend solely on the availability of farmers who grow local produce to meet consumer demands. Many rural and urban farmers believe that their contributions go beyond securing access to healthy food and encompass the much-needed community and economic development, as well as ecological and environmental protection. Unfortunately, their call for support from

local government and community-development corporations can go unheard (Kaufman, 2007). There are three reasons why most local policies are not oriented more explicitly towards community-based local food systems. First, the conceptualization of a local food system consisting of complex chains of activities from production to consumption (farm to table)—including processing, retailing, food waste management, and other numerous food changes (Ericksen, 2008)—is very complex in its scope, scale, stakeholders, and goals, and therefore, challenging to manage. Second, for local food systems to evolve and expand into community-based food systems, coalition networks and multi-stakeholder governance formed by concerted actions are crucial (Chojnacki & Creamer, 2019) but challenging to establish in a background full of ambiguity and differences. Finally, the tensions and conflicts, based on differences in scale, power, values, or conflicting value frames, still characterize the stakeholders in the dominant, industrialized agri-food system and continuously create a disconnect between community interests and local government policies (Lobao & Stofferahn, 2008). Shifting conventional food systems, which are inherently global and connected by complex webs of information, goods, services, and capital, to local trajectories is primarily a challenge for governance (Garcia-Gonzalez & Eakin, 2019). As Ostrom (2011) puts it, governance can be defined by stakeholders (e.g., actors and organizations) who manage resources and establish clear guidelines and management rules before putting them into practice. Governance not only relies on institutions with their rules and standards but includes all the involved stakeholders, along with their values, actions, and viewpoints.

Many authors cite the efficacy of stakeholder assessments in mapping complex situations with multiple stakeholder groups to provide insights into the stakeholders’ values and viewpoints (Campbell & Rampold, 2021; Garcia-Gonzalez & Eakin, 2019; O’Brien & Denckla Cobb, 2012; Saint Ville et al., 2017; Sanyé-Mengual et al., 2016; van den Hove, 2006). This approach explains the responsibilities of organizations and individuals who play significant roles within the system (Reed et al., 2009). It also enhances participation and clar-

ity in terms of visions and priorities and brings to light potential areas of conflict that may hinder policy implementation (Timotijevic et al., 2019). Furthermore, for many, a stakeholder assessment approach plays a significant role in encouraging food policy change (Aligica, 2006; Bryson, 2004; Saint Ville et al., 2017) and overcoming the obstacles faced by collaborative governance arrangements and local food networks (Benson et al., 2012).

As it may be observed in the United States, stakeholder assessments help frame winning coalitions that address local, regional, and state food systems priorities through structures, such as food policy councils (FPCs) (Gibbons et al., 2020). These councils reflect the significant role of partnerships and collaborations by backing initiatives for local food processes supported by grassroots efforts, commercial actors in the food chains, and local or state governments (Koski et al., 2016). A growing body of studies highlights the role of these councils in promoting many values related to local food systems, such as securing community access to nutritious food, promoting healthy eating, and preventing diet-related chronic diseases (Harper et al., 2009; Lange et al., 2020).

Despite the increasing use of stakeholder assessments in studies on the transition towards localism in food systems (Bassarab et al., 2019; Benson et al., 2012; Cumming et al., 2019; Freedgood et al., 2011; Garcia-Gonzalez & Eakin, 2019; Gupta et al., 2018; Hammelman et al., 2020; Kaufman, 2007), there are few detailed studies on specific programs or policies developed at the county level (Low et al., 2015; Walsh et al., 2015). This paper aims to bridge this gap by examining the perspectives and viewpoints of stakeholders about establishing a local food system in Will County (Illinois), which is located in the vicinity of the third-largest city in the United States, Chicago, with agriculture and the food industry being the primary local economic development drivers in the area.

Will County is a relevant choice for a case study because even if the demand for sustainable food systems is widespread throughout Illinois, the county faces several specific divergent food system challenges, such as rapid urbanization leading to a

decline in farmland, increased residential demand for local produce, and a pressing need to address food insecurity and disparities in food access.

This paper is a collaboration with Lewis University, which is in Will County. It seeks to strengthen the research framework on stakeholder participation in establishing a sustainable, community-based local food system by engaging Will County stakeholders collaboratively. There were no established formal processes around these issues when this research was performed. Still, a small group within the food system has emerged (e.g., environmental educators, activists, local farmers, and food bank managers) and sought support to change the current food policy and organization by engaging local communities.

This research aims to identify which stakeholders are involved in Will County's food system and assess their engagement, opinions, and interests in promoting a shift to a more localized and community-based food system. To this end, we built upon Paul Sabatier's (1988) advocacy coalition framework (ACF), an evidence-based framework focusing on stakeholder values, beliefs, and positions to understand their viewpoints and involvement. The methodology is based on semi-structured, in-depth interviews to understand and deconstruct stakeholder viewpoints concerning their positions and responsibilities in the current food system. This approach will identify who should participate in achieving Will County's food system transformation and inform collaborative actions among them. The discussion within this paper focuses on coalition building and collaboration between formal and informal groups to empower local communities to develop a distinctive identity for a community-based local food system that promotes sustainability, viable local food economies, social equity, and food justice in Will County.

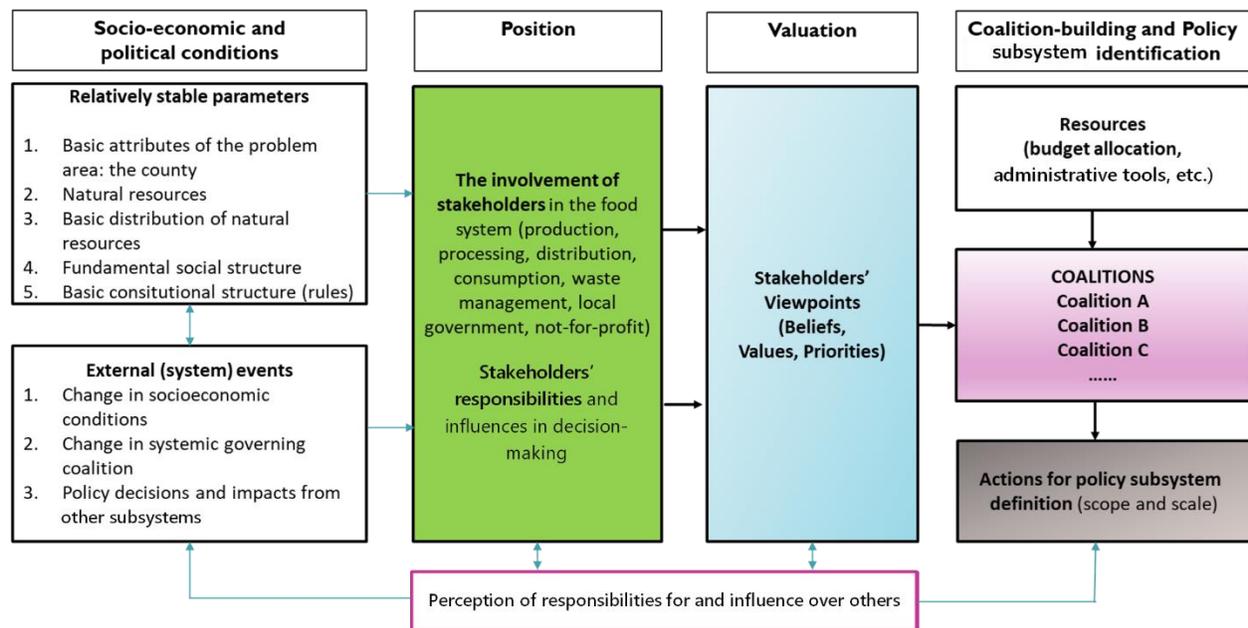
Conceptual Framework: The Advocacy Coalition Framework

A growing body of stakeholder assessment studies has used frameworks drawn from earlier works of policy scientists concerned with the distribution of power and the role of interest groups in the decision-making and policy processes (Dowding, 2019; Ostrom, 2011). In particular, Sabatier (1988) made

an essential contribution to this field through the Advocacy Coalition Framework (ACF), which was initially developed to address “wicked” problems (e.g., economic, environmental, and political). These problems have the peculiarity of being the subject of substantial conflicts that require multiple actors from several levels of government to change their mindsets and behaviors to find solutions (Pierce et al., 2017; Weible et al., 2011; Weible & Sabatier, 2009). The ACF suggests that stakeholders form partnerships to influence policy processes through belief systems, which translate into values and viewpoints (Weible et al., 2011) influenced by their positions and responsibilities (Pierce et al., 2017). Weible and Sabatier (2009) underscore that although stakeholder viewpoints are affected by external factors, such as socioeconomic and political conditions (see Figure 1), possible coalitions will tend to evolve into an ongoing process of search and adaptation motivated by a desire to achieve policy goals. Hence, the framework tends to identify stakeholders who share a specific set of viewpoints guiding their actions (Dowding, 2019)

and are most likely to be key players in specific policy subsystems¹. Environmental, energy, water, and food policies exemplify policy subsystems that include interactive networks of interest groups, beneficiaries, and agencies involving many levels of government and nongovernment policy actors. By focusing on shared actions and institutional development, the ACF is useful to study stakeholder viewpoints towards developing local and community-based food systems. It informs more coordinated efforts (e.g., food policy coalitions) that support food system initiatives to address the connections between human and ecological systems, social justice, community health, and democracy enhancing initiatives, particularly when these systems emerge via grassroots initiatives that may have connections with the government. Garcia-Gonzalez and Eakin (2019) emphasized the usefulness of the ACF framework in allowing stakeholders to reflect on their interests and capacities within the food system before planning any efforts to build consensus and take collective actions in the Phoenix Metropolitan area food system. Moreover, Clark (2018)

Figure 1. An Adaptation of the Diagram of the Advocacy Coalition Framework



Adapted from Weible and Sabatier, 2009, and Garnett, 2014.

¹ These actors may include those from the private sector, nonprofits, academia, consulting firms, the news media, engaged citizens, and possibly others (Weible & Sabatier, 2009).

provided evidence about the relevance of the ACF by showing how a civically oriented group in Franklin County, Ohio, transitioned into an advocacy coalition that shaped the county Food Council's mission, objectives, and political tasks, which resulted in a food policy agenda.

Method

Survey Design

The ACF was used as a theoretical framework in the questionnaire's design to understand stakeholder viewpoints comprehensively. Hence, the questionnaire asked stakeholders: (a) how do they define a community-based food system, (b) what roadblocks do they perceive in the current food system, (c) what are the essential values, in their opinion, of the current food system that need to be sustained, and (d) what are the critical first steps and actions to transition towards a community-based local food system in Will County.

The questions were followed by a mapping exercise consisting of open-ended questions about stakeholder perspectives on the essential steps to achieving a community-based local food system. Stakeholders were asked to share their opinions on the required changes in organizational conditions to build coalitions to coordinate interests not yet present in food policymaking at the county level. Participants answered questions such as, "According to you, who are the key decision-makers primarily responsible for enacting change in the food system of Will County?" and "In your opinion, who are the most important, or the key organizations to maintain a community-based local food system in Will County?" Additional conversations beyond the survey questions also informed the analysis and reporting within this study.

Stakeholders' Selection and Recruitment

The stakeholders recruited for this study were selected based on two theoretical considerations. The first is grounded in the policy sciences (Maxwell & Slater, 2003; Pelletier et al., 1999) and

emphasizes the need to give equal attention to the process as the product of any political change resulting from coalition-building between stakeholders. The second is rooted in community development studies (Bolles, 2019; Cumming et al., 2019; Kaufman, 2007; Mendes et al., 2011; Thilmann McFadden et al., 2016). It attempts to analyze food system stakeholders at a granular level and go beyond the binary vision of categorizing them as (a) those controlled by globalized industrial food systems or (b) those embodying the sustainable, alternative, and local food system. Overall, examining the effect of stakeholders' values, responsibilities, and sources of power related to food planning and policy formation is what these works have in common. The Will County Regional Sustainability Network, the Will County Habitat for Humanity, and the Will County Land Use Department² offered their assistance to identify 42 stakeholders actively operating within the food system with as many varied positions and responsibilities as possible. Not only did this provide a diverse sample, but it overcame some barriers to entry that can threaten qualitative research. A supplementary list was also generated from internet research. It included other actors who were deemed critical players in the process of community-based local food system planning and policy decision-making in Will County (e.g., the state health department, food banks, not-for-profit organizations, researchers, community garden leaders, etc.).

All the survey participants were categorized into groups based on their positions and areas of intervention within the food system (Table 1). Participants were contacted by email or phone, informed of the survey's purpose, and invited to participate. In the end, 33 face-to-face interviews of stakeholders were conducted from the summer of 2019 into early 2020 due to time constraints and resource limitations.

Data Analysis

The answers to the questionnaire were coded according to recurring themes emerging from the

² Specific actors within the same stakeholders' group (e.g., government offices) were identified as potentially having opposite perceptions. For instance, different offices can support or hinder the transition towards a local food system within agricultural service providers: a natural resource conservation service *versus* a farm service agency.

Table 1. Activities and Responsibilities of Survey Participants

Category	Number of Participants
Academics/Researchers	3
Health department representatives	2
Community building	3
Production/local farmers	6
Distribution	2
Processing	1
Waste management specialist	1
Food services - retailers	2
Nongovernmental organizations	3
Food Bank	1
Local administration representatives	3
Policy development specialists	3
Land conservation specialist	1
Economic development specialist	1
Farm Bureau representative	1
Total	33

data (Aspers & Corte, 2019). Through content analysis (Lune & Berg, 2017), a codebook of themes and subthemes was created based on the questionnaire. The 33 completed questionnaires revealed themes and statements related to five main dimensions of a community-based local food system, as discussed in the literature: (a) social justice, (b) environmental sustainability, (c) economic viability, (d) food supply healthiness, and (e) collaborative actions and networks. These dimensions reflect values that stakeholders routinely hold and typically correlate with their positions and responsibilities in the food system.

The stakeholder viewpoints were sorted into three main categories: (a) the **Pragmatic** viewpoint, which values the contributions of local food activities to Will County residents and focuses on the economic activities that the local food system must include (e.g., local food hubs, viable wages for food workers, and the requirements of adjusting existing regulatory instruments); (b) the **Environmental and Food Justice Advocate** viewpoint, which is concerned both with achieving environmental sustainability and improving fresh food availability, accessibility, and affordability in local communities (e.g., alleviate the food insecurity and food access disparities spreading throughout the county), and (c) the **Visionary** viewpoint, which is not only concerned about environmental,

social and economic contributions of the local food system to Will County's communities, but strongly emphasizes the role of partnership and cooperation among stakeholders and local communities as an engine to foster food system transformation.

Results

This section includes a narrative description of stakeholder viewpoints revealed by the data analysis. Figure 2 offers a visual representation of stakeholders categorized according to their positions and responsibilities in the food system and in relation to the three viewpoints. We share additional information to show how stakeholders align their values and viewpoints with the goal of creating a community-based local food system in Will County. First, we review stakeholder definitions of a community-based local food system. Then, we share the perceived obstacles and central values that must be maintained in the current food system. Finally, we highlight comments related to the first actions to implement and the stakeholders to engage collaboratively to catalyze the transformation of Will County's food system into a community-based local one.

Stakeholder Definitions of a Community-Based Local Food System

According to the respondents' positions and responsibilities, a community-based local food system concept had different meanings. First, respondents with a pragmatic viewpoint ($n=12$, including local farmers, food distributors, processors and retailers, and a waste management specialist) frequently defined this system in terms of economic activities by listing the spectrum of food supply chain activities. Very few, except the waste management specialist and some local farmers, expressed concerns about the environment or referred to the local food system's potential to achieve social justice goals as part of its definition.

A local food system is a group of tasks or actions that involve producing, moving, purchasing, and discarding food. It includes farmers, transportation, stores, farmers markets,

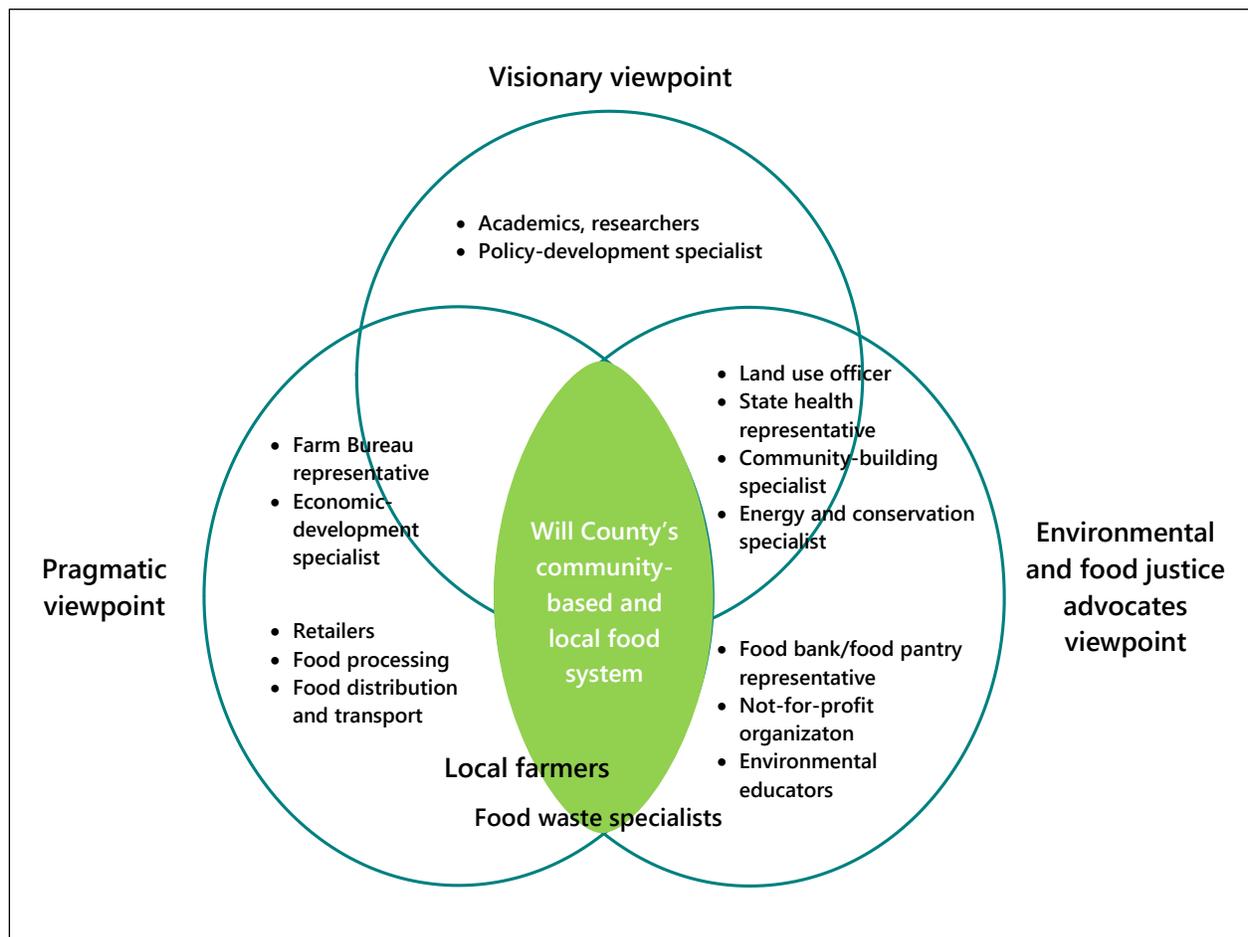
consumers, composting, and waste disposal.
 (Waste management specialist)

A local food system promotes food as an individual and community right. (Activist)

Second, stakeholders with an environmental and food justice advocate viewpoint ($n=7$, including activists, environmental educators, community-building specialists, and food bank managers) tended to characterize a community-based local food system mainly through its contribution to securing healthy and fresh food access for all. Activists underscored equity and justice in their definitions and called attention to the numerous ways in which socioeconomically disadvantaged groups are affected across Will County. According to these respondents, a community-based local food system primarily will help overcome poverty and racial disparities in the county and solve many inequalities throughout the food system.

Finally, in many ways, the idea of regional food systems correlates with community-based local food systems for respondents with a visionary viewpoint. Most of the respondents in this group ($n=15$, including academics, policy development officers, land use officers, health officers, a land conservation specialist, researchers, an economic development specialist, and community-building specialists) stressed the importance of networks and fostering collaboration between formal and informal groups to empower local communities in Will County. Thus, the food system is expected to play a prominent role in developing a county's distinctive identity by promoting sustainability,

Figure 2. Stakeholders Categorized According to their Viewpoints



healthy eating, viable economic activities, and social and food justice.

A community-based local food system is a desirable, functional, and progressive process that would develop distinctive food identities for local places. (Academic)

Other characteristics, such as edible landscapes, comprehensive planning strategies, creating space for alternative agriculture (e.g., organic agriculture, regenerative agriculture, and urban agriculture), securing wages for food workers, and reducing food miles, were frequently underscored in the visionaries' definitions of a community-based food system (Figure 3).

Perceived Roadblocks to Achieving a Community-Based Local Food System in Will County

It is not only the definition of a food system that matters but also how potential actors perceive the obstacles to overcome to enact a change. A prominent topic in the stakeholders' discourse (19 out of 33) was a shared concern about the impact of the industrialized history of agriculture in Illinois. Like most people in the United States, Will County residents obtain food from the mainstream food system (e.g., supermarkets, grocery stores, and restau-

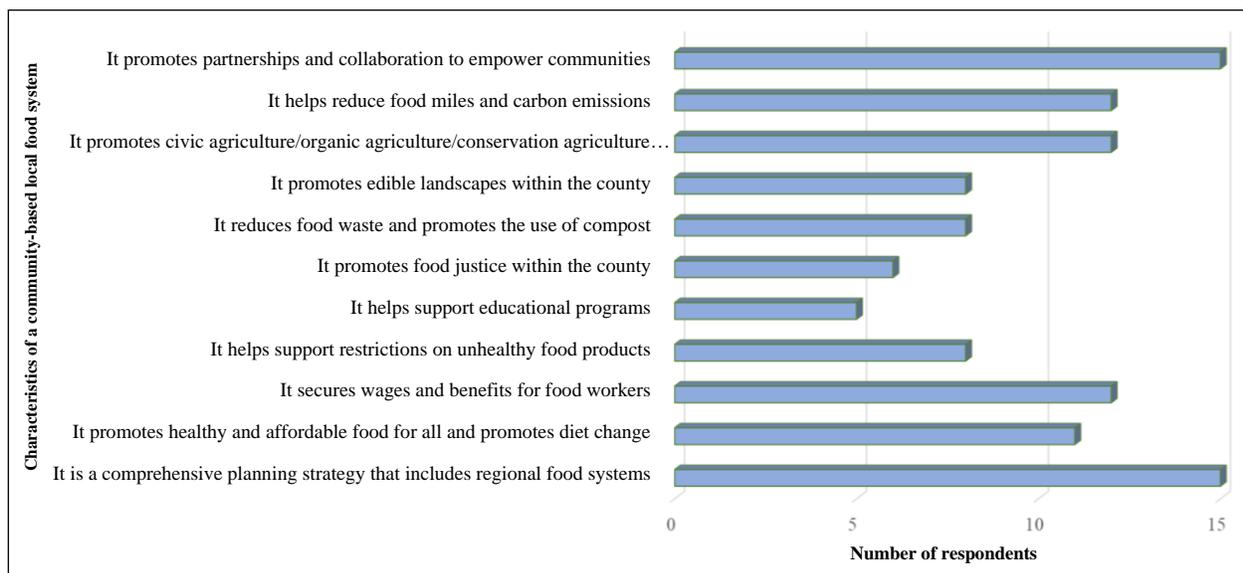
rants), typically from centralized and global distributors who buy from large-scale producers. This has resulted in production-oriented landscapes that neglect the cultural and ecological functions that agricultural activities have supported for a long time, leading to persistent environmental pollution issues. Overcoming a long history of industrialized farming practices is a must for Will County to build a sustainable community-based local food system.

Farmers are encouraged to specialize, not to diversify, which has led to the loss of the ecological diversity of farms and soil degradation. (Community building specialist)

Land use policy and the overall agricultural policy in Illinois favor large producers and processors promoting an export-oriented agri-food system. (Local farmer)

Other structural roadblocks emerged from conversations with small-scale, local farmers (n=6) who struggled to make a living in the conventional market. According to these farmers, scale issues, limited production capacities, profitability, the competitiveness of small-scale farms, and decreasing farmland acres in Will County were critical issues to address.

Figure 3. Community-Based Local Food System Characteristics According to Visionary Stakeholders



We are facing the dilemma of providing the right quantity and quality of products, and at the same time, maintaining decent living and wages, how could we match supply with large-scale demand? (Local farmer)

Local farmers also commented on the lack of knowledge of direct marketing, including direct sales to consumers through farmers markets, community-supported agriculture (CSA), and intermediated marketing channels, such as grocery sales, restaurants, and food hubs. Overall, they considered that “long-term viability hubs” have received very little attention from public policy.

In Will County, direct marketing approaches suffer from a lack of capacity both in terms of the volume of available products but also the required infrastructure to meet the growing demand for local and sustainable food. The most important obstacle to the local food system is the lack of economic, administrative, and physical arrangements of the most suitable scale for relocating locally grown food to local eaters. (Local farmer)

Another area of concern, according to local farmers, is the inflexibility of safety regulations. Indeed, the Good Agricultural Practices (GAP) standards profoundly impede the development of local food production and add further restrictions for growers in terms of possible pathways to consumers, trapping them in a “vicious cycle” (Figure 4).

We can apply for certifications to access new markets, but the process can be expensive and time-consuming. (Local farmer)

Urban agriculture emerged as a shared area of concern between stakeholders with an environmental and food justice advocate viewpoint (mainly activists, community-building specialists, environmental educators, and food bank managers) and those with a visionary viewpoint (land-use officials, energy, and land conservation specialists). Both acknowledge urban agriculture as part of the solution to the frequent shortages of fresh fruits

and vegetables in Will County. These shortages are caused and even exacerbated by the geographic position of the county near Chicago, one of the largest cities in the U.S., and Naperville, one of the Midwest’s wealthiest cities. Indeed, most of the fresh food produced in the county is transported to be sold in these cities. Although interstate highways contribute to manufacturing and distribution costs in the domestic market, they serve as essential socio-economic boundaries in Will County.

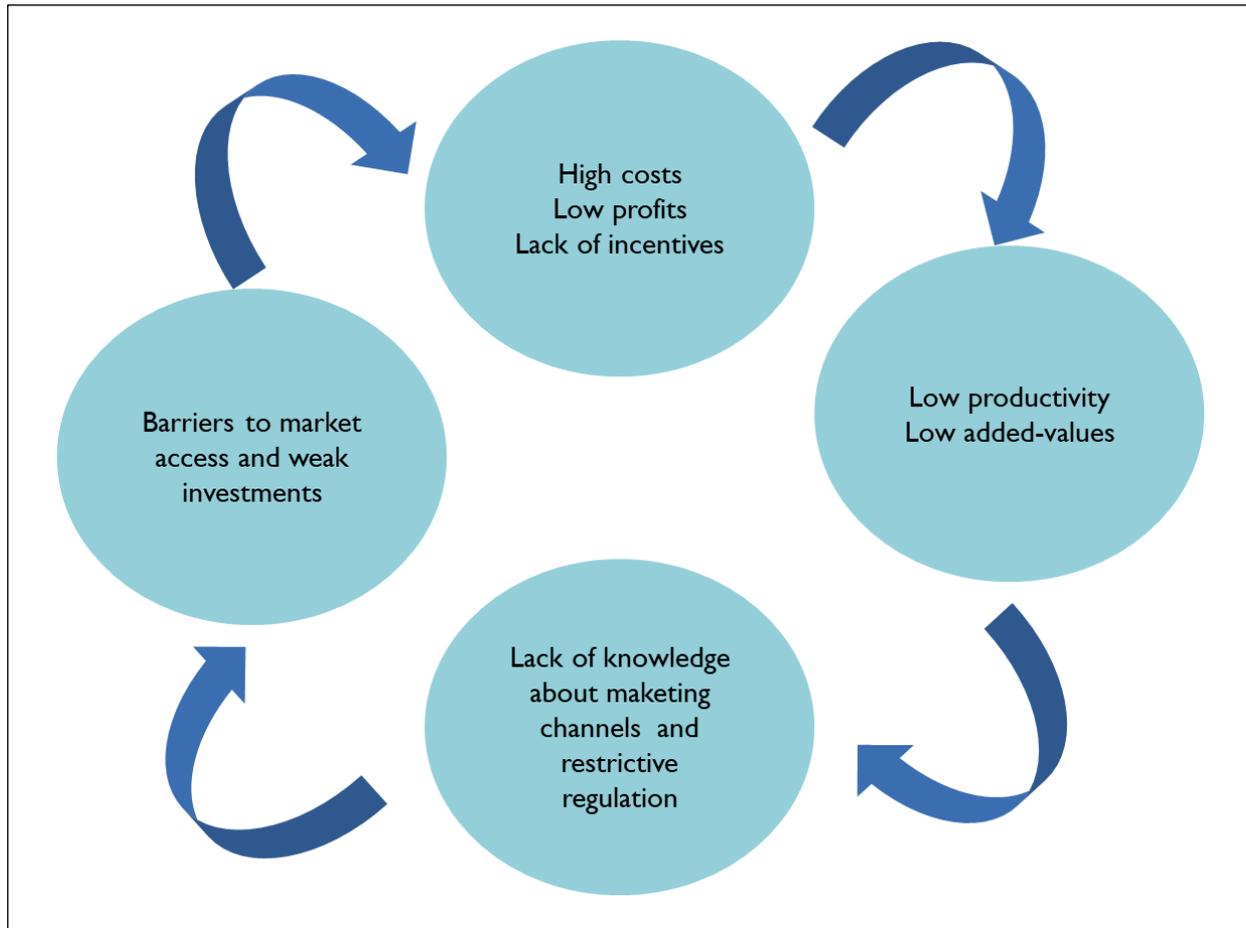
Will County is set up preferably to meet the demand of two large markets for locally grown food, Chicago and Naperville. Eastern Will County, where currently a large percentage of farms is located, has access to I-55. Western-Southern Will County has access to I-80. (Land use officer)

Will County is ill-equipped to integrate urban farming into its plans, and these activities are still to date overlooked. Land-use regulation and urban planning sought to separate incompatible land use in Will County, proactively eliminating the nuisances or negative externalities of agriculture from residential land to protect the population’s health and safety. Unfortunately, this accentuated the lack of secure tenure for urban growers and hindered urban agriculture development on a larger scale.

To date, the current land use policy tended to bypass or even ignore food that is grown within the county’s boundaries. (Community-building specialist)

Current land management authority has limited ordinances regarding growing the food outside of agriculturally zoned areas and did not anticipate how food access can impact on local economies as well as on the residents’ health. (Health department representative)

The opposition of urban planners to integrating urban farming further limits farmland availability, as food production functions compete with other more lucrative projects that provide higher profits for landowners, such as commercial development.

Figure 4. The “Vicious Cycle” of Will County’s Local Farmers

It is crucial to bring practical solutions to the land use issues that are imposed or perpetuated by the urban planning policy context. (Land use officer)

Finally, visionary stakeholders have pointed to the absence of collaborative spaces to deal with food issues and emphasized the pressing need to create a collaborative supply chain to market local food. The lack of intercounty partnerships was also cited as an obstacle by land-use and health department representatives and an economic development specialist. There are no established or emerging initiatives to foster local food system advancement across counties, despite several initiatives to build local food systems in nearby Cook County.

The food issue is such a compartmented issue while none of this should exist. Counties should find a way to work together. (Economic development specialist)

In other counties, individuals representing diverse sectors of the food system such as education, conventional and sustainable agriculture, health department, political and legal system representative are all together already at the table. (Land use representative)

Critical Values of the Current Food System in Will County

Even if the challenge of achieving a community-based food system in Will County may seem daunting, stakeholders acknowledged some current food system values that must be sustained and even

strengthened. Pragmatic stakeholders (e.g., local farmers, food retailers, processors, and transporters) underscored rising awareness of community-supported agriculture (CSA) initiatives as an option for accessing short supply chains. Furthermore, retailers and food transporters highlighted the current food system's capacity to provide year-round access to fresh vegetables and fruits and seasonal local produce as essential value to maintain.

Values expressed by environmental and food justice advocate stakeholders join those expressed by visionary stakeholders. Both pointed to the overall historical culture of farming in the United States as an essential value to maintain while widely expanding sustainable farming practices. Moreover, the growing enthusiasm for local food movements, and the connections created by the county's dynamic farmers market, are also perceived as crucial in linking consumers and producers through business and social relationships in Will County.

America is the land of opportunities and abundance with many food outlets, and business is delivering food via internet shopping. (Health department representative)

We are an agriculture-based country; we can keep the tradition of farming alive but go back to our roots versus big agriculture. (Activist)

Visionary stakeholders demonstrated a robust agricultural consciousness by acknowledging the significance of farmers in the local economy and communities. They perceived the farmland assessment in Illinois and lower-taxed farmland in Will County positively, in addition to being a value to sustain and an opportunity to seize.

Taxes are nice to pay for things like roads/bridges, needed government services, and employees' wages and benefits, but lower-taxed farmland makes Will County a unique place to live. We need to develop a sustainable local food system to help them understand why and how a local food system can and will be for the way for Will County to become a vibrant and diversified county instead of a county with more warehouses for Chinese

product distribution. (Economic development specialist)

First Steps to Initiate Planning a Community-Based Local Food System in Will County

Creating organizational and physical structures at appropriate scales for the local aggregation and distribution of food emerged from visionary (e.g., a land-use specialist and an economic development specialist) and pragmatic (e.g., local farmers and retailers) stakeholder responses as an immediate action to overcome the roadblocks of pooling food products from many small farms and delivering them to grocery stores, restaurants, hospitals, and schools throughout the county. In addition, environmental and food justice advocate stakeholders reinforced this argument. They stressed the importance of consolidating the local food production-consumption nexus by rebuilding and expanding existing farmers markets and developing viable markets in underserved neighborhoods. Mainly, activists and environmental educators advocated that the markets could tackle the food desert problem and empower people who live in those areas to create a more just place.

Many food deserts already exist in Will County; the primary challenge of the local food system is to feed those who are living in these areas. (Environmental educator)

Responses reflected a consensus among environmental and food justice advocates and visionary stakeholders on two significant steps to start planning in Will County. First, both emphasized the need to develop urban agriculture initiatives throughout the county, apart from existing school gardens. These initiatives enact structural change in building community food resources and developing "food citizens." Thus, urban agriculture is not only understood as a mere way of growing vegetables, but it also has potential for citizenship, learning, creativity, community, and social responsibility. Second, both acknowledged the importance of shifting responsibility to the regional level as a first step in planning a local food system. This would engage communities differently because the excitement and connections through

community engagement in the food system have to spill over to the regional level. Will County has to articulate a clear role for itself to achieve food system goals grounded in establishing strategic collaborative actions, promoting a combined agenda of food-access justice, and catalyzing sustainable agriculture.

Visionary stakeholders (a health department representative and a land-use officer) prioritized developing fruitful collaborations between not-for-profit and local government agencies, especially when such initiatives strengthened urban communities in other surrounding counties like Cook County.³ While local government agencies have responsibilities for nutrition, education, and school lunch programs, not-for-profit organizations, such as churches and food pantries, exemplify organizations that keep the emergency food network operating. Furthermore, most visionary stakeholders acknowledged the role of government support in creating new projects that link individual community members and businesses directly with local farmers to improve the local food economy. Others emphasized the necessity of addressing land availability, access, and usability by urban farmers. Finally, visionary and environmental and food justice advocate stakeholders and local farmers pointed to the importance of supporting the food system's social component through communication (e.g., campaigns to encourage the county's residents to buy local) and educational programs.

It is essential to educate the youth and strengthen their knowledge from where the food is coming from and the ways it affects their health. (Community building specialist)

The Most Important Organizations to Involve in a Will County Community-Based Local Food System

At this stage, the questionnaire aimed to understand the complex problems of governance, policy, and food system changes in Will County and identify the main actors involved. Most respondents

($n=18$) underscored the significant influence of political and corporate actors in triggering a fundamental change, as financial interests and corporate power dominate the current food system. These respondents shared a common belief that national politics must support new dynamics that resist corporate food-system control.

Although the Farm Bureau's historical role in promoting local farms and securing residents' access to safe and abundant fresh food was emphasized by a slim majority of pragmatic stakeholders (e.g., local farmers, retailers, food transport), Will County's residents were also cited as crucial players in the local food system for their role as consumers.

We hope that consumers can be empowered to create change. (Local Farmer)

Even if local farmers and gardening groups remain the most visible part of the local food system, it is essential to find ways "to bring new farmers to the table" according to visionary and environmental and food justice advocate stakeholders. The Will County Land Use Department, Joliet Junior College Horticulture Sciences Department, Will County Health Department, Will County Board, and several Community Green Groups are actively spreading sustainability within the county. Stakeholders mentioned that these groups should be included in the "incubator" mechanism for Will County's community-based local food system (Figure 5). Furthermore, not-for-profit organizations were perceived as growing forces within the county and, therefore, were expected to play a pivotal role in increasing democratic, participatory decision-making about food system issues and improving food justice. In particular, not-for-profits and local governmental agencies were stressed as an ideal pathway to overcoming the differences in wealth, power, and privilege that have long shaped Illinois' food system. Respondents also advocated engaging with faith-motivated grassroots movements to positively

³ Cook County is the most populous county in Illinois and the second-most populous county in the U.S. after Los Angeles County, California. More than 40% of all Illinois residents live in Cook County.

influence Will County’s future course. One interviewee explained that “a more bottom-up process might even make urban agriculture project settings look different from what it has been planned initially. Not-for-profit are already key players in the county as they support low and moderate-income individuals to obtain opportunities to prepare themselves for self-sufficiency.” Not-for-profit organizations also work closely with the Northern Illinois Food Bank and many local food pantries, feeding programs, food producers and retailers, corporations, foundations, churches, and entities to accomplish the goal of “no individual left hungry in Northern Illinois” (Activist). Moreover, Will County Governmental Leagues (including 33 municipalities) were identified as partners to provide technical assistance and services and serve as a forum for cities to discuss mutual concerns and resolve community food issues.

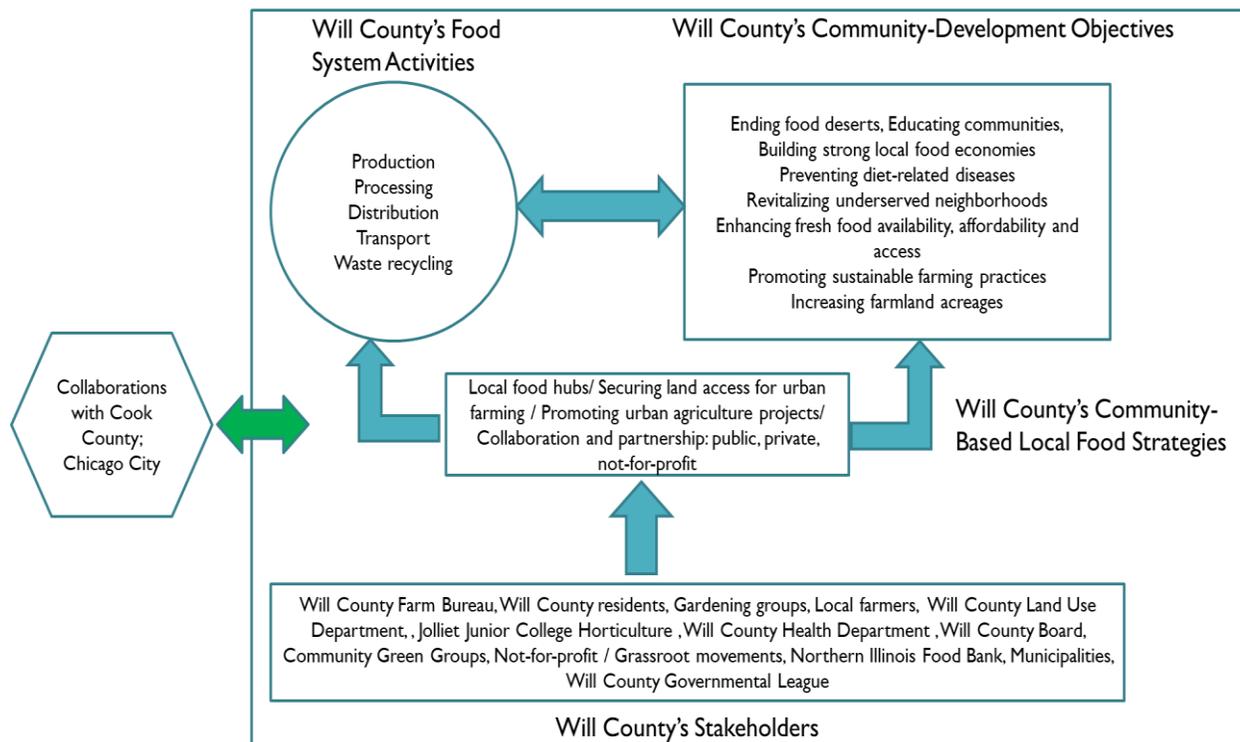
Will the Will County Center for Community Concerns and those in Will County Office of Education as well as the offices’ holders of the

surrounding towns and cities which support unincorporated communities have a role to play? (Community building specialist)

Finally, municipalities are perceived to play a role in placing the food system on the urban agenda by increasing the amount of land available for urban agriculture, securing its access, and developing meaningful ways to hear the three viewpoints expressed by stakeholders. Local farmers and activists, along with a land-use officer, emphasized municipalities for their role in scaling-up food systems and catalyzing innovation. They associated municipalities with redesigning local food governance by working closely with not-for-profit organizations and local communities. It is worth noting that municipalities have influenced recent municipal policy changes and increased support for new urban agriculture projects, such as community gardens.

Food is not just an agricultural or another rural issue anymore, and municipalities must make it

Figure 5. Will County’s Stakeholders and Food System’s Community Development Objectives and Strategies



visible and connect it to other networks such as transportation, employment, housing, and economic development systems. (Academic)

Discussion and Concluding Remarks

The premise of this paper is that the first step in transforming the food system at the county level is to understand dominant stakeholder values and viewpoints. Our findings indicated that Will County stakeholders hold diverse food system values and a diverse understanding of food system governance. Identifying and understanding these viewpoints inform coalition-building strategies to create spaces for collective actions supporting community-based local food systems.

A food system's governance and policy span many areas and involve interplay between different levels of government that have varying degrees to which they can act. In the United States, food policy has primarily targeted the federal and state levels, which are the dominant divisions of power and control⁴. Some progressive change has been established in coordinated food policymaking actions in several states through state food system assessments, state food plans or charters⁵, and state food policy councils. At the local level, food system initiatives in cities such as Boston, Madison, New Haven, and Baltimore demonstrate the local government's efforts to shift the food system towards localism and sustainability. Despite this, it does not appear that counties received the same encouragement or support as cities to establish food policies and programs that focus on their communities' needs. We should, however, be aware that counties differ from cities in terms of scale, resources, the scope of services and programming, and governance.

In this study, Will County offered an opportunity to research the emergence of new actions within food policy and governance geared towards the county level. The survey was a valuable tool in identifying key players to work collaboratively towards building local food capacities and engaging

Will County's communities in a meaningful way. However, this paper is by no means comprehensive in our discussion of how stakeholders can work together in Will County.

Values and Viewpoints to Craft Community-Based Food Systems

This study demonstrates the push and pull that stakeholders face in expressing their viewpoints about community-based food systems while dealing with the constraints of their positions. According to their values and interests, stakeholders were categorized into three main viewpoints: pragmatic, environmental and food justice advocate, and visionary. We do not suggest that all, or even most, stakeholders fit neatly into one of these viewpoints or endorse all the elements of a particular viewpoint. Instead, the viewpoints are ideal types, or constructs, that clarify converging and opposing positions in the stakeholders' discourse. Although these viewpoints may, at some point, diverge from the current food political process and current stakeholders' engagement in Will County, the narratives suggested that a community-based local food system can bring many values, interests, and visions into the conversation, creating a plurality conducive to collaborative actions involving stakeholders beyond the current mainstream players in the food system.

The results indicated that the visionary viewpoint spans sustainability, food justice, value-added, and community building approaches of local food systems, overlapping with many of the values and interests expressed by pragmatic and environmental and food justice advocate viewpoints. According to visionary and pragmatic stakeholders, perhaps the most common area of concern was establishing food hubs as a cornerstone for a long-lasting change in Will County's food system. Visionary stakeholders emphasized food hubs as spaces for creating collaborations to align with alternative food networks and social movements (Levkoe et al., 2018) and food democ-

⁴ Federal government has authority over foods sold across state lines and the state government can regulate food sold within states lines.

⁵ For example, since 2013, Minnesota Food Charter serves as a policy roadmap to provide Minnesotans with access to affordable, safe, and healthy food regardless of where they live in the state.

racy goals (Perrett & Jackson, 2015). Visionary stakeholders also saw food hubs as a new organizational model to achieve economies of scale (Blay-Palmer et al., 2013; Matson et al., 2013). Visionary stakeholders exhibited a more comprehensive view of food hubs by including social and environmental values (LeBlanc et al., 2014), which goes beyond the narrow focus on market efficiency as expressed by pragmatic stakeholders. We argue that, for visionary stakeholders, food hubs represent what is described in the literature as Community-Based Organizations (CBOs) (Matson et al., 2013; Matson & Thayer, 2013). In the United States, CBOs have made a long-term commitment to empower local producers by supporting and developing infrastructure that sustains market access and continuously ensuring a leading role for them in food justice movements (Porter, 2018).

The acknowledgments of urban agriculture's prominent role in building community capacities (Stofferahn, 2012), enhancing geographic access to healthy food, and achieving distributive food justice (Horst et al., 2017) were other areas of agreement between stakeholders with environmental and food justice advocate and visionary viewpoints. For the former, these projects provide solutions for food availability and access issues faced by low-income communities, whereas, for the latter, they are opportunities for something more. Visionary stakeholders strongly emphasized urban agriculture as a value-added economic enabler. Many respondents to our survey reflected on the substantial support it has provided for creating alternative economic spaces, which reframed local economies by achieving alternatives to the mainstream food supply chain in Chicago and Cook County. Attaining similar goals in Will County requires a specific model for entrepreneurial urban agriculture that would attract population groups, mainly those in underserved and low-income areas. This vision of urban agriculture resonates with "the ripple effect" or "entrance economic development" effect of entrepreneurial urban agriculture identified by Fenestra et al. (1999). These effects translate into many benefits for local communities, such as retaining local control of new enterprises and activities, creating jobs, recirculating money in the local community, and making communities less

dependent on external organizations and agencies.

Some visionary respondents highlighted how urban agriculture is impacted by contradictory policy goals (land use department representative versus conservation specialist). Will County planning and zoning strategies are not adapted to integrate urban agriculture projects at a larger scale and need to be revised. The effort towards establishing a community-based local food system in Will County requires a comprehensive treatment of the values and viewpoints expressed by stakeholders. To date, these efforts are incomplete, and no local governmental organization has strongly advocated better economic conditions for local farmers while advancing food justice.

Most participants in this study shared the criterion that the government does not—and should not—act alone in making decisions and setting the goals of a food system. While conventional and corporate agriculture can still dominate the food system, Will County's local groups (activists, not-for-profit, public health, environmental conservation, educators, etc.) are increasingly employing a variety of efforts to meet the needs of all community members and support food security. This corroborates research describing community effort to challenge agribusiness and corporate farming practices (Lobao & Stofferahn, 2008) and characterizing communities as diverse social groups who coalesce through a shared spatial consciousness and collective determination to protect the lived environment (Haywood, 2014).

Coalition-Building Toward Community-Based Local Food System Planning

The Advocacy Coalition Framework applied in this study identified some degree of consensus around the need for a significant agri-food system policy and governance change. Critical areas where coalitions need to be built or improved upon between formal and informal organizations, associations, and Will County residents were determined to achieve a community-based food system in Will County. Stakeholders demonstrated a willingness and a strong commitment to translating their values and viewpoints into collective actions and policy solutions. These observations are, to some degree, consistent with previous agri-food stake-

holder behavior analyses (Benson et al., 2012; Garcia-Gonzalez & Eakin, 2019) and alternative and transformative food future studies (Balvanera et al., 2017; Sellberg et al., 2020). These studies stressed the importance of understanding the policy's local context complexity and accounting for the socioecological conditions in which food systems are embedded before transforming them.

The findings highlighted a consensus among stakeholders on the criterion that good food system governance and policy should be decentralized. It is, therefore, fundamental for policymaking at the county level to address specific challenges and support the values of Will County's local communities. Visionary stakeholders, environmental and food justice advocate stakeholders, and local farmers see local progress on food system issues as possible and incremental, without immediate changes on a larger scale. This implies that it is essential to allow local governments at the county level to create requirements and provide incentives or funding for food systems to deliver their inherent values even if the federal and state policies⁶ would still serve as baselines.

Will County's food system illustrates the importance of the partnership between civic capital and local authority to advance a community-based food system and offers another opportunity to study food's convening power as a policy topic (Clark, 2018; Sambell et al., 2019). The results underscored the work stakeholders, who represent different power dynamics, need to accomplish by cultivating relationships to achieve long-lasting and fruitful collaborations and partnerships.

In summer 2019, we presented the earliest responses from our questionnaire to the Will County Board and other stakeholders involved in the food system, including some of the respondents to our survey. Although the presentation facilitated sharing the stakeholders' vision about Will County's local and community-based food system, many participants pointed out that enacting a profound transformation will require local government to see itself as an agent of radical social and political change, rather than constrained to

land-use regulation and program implementation at the county level. This is challenging because, despite the rising political discourse on food issues at the national level in the United States (DePhelps et al., 2019; Hilchey et al., 2006; Gibbons et al., 2020; Low et al., 2015; Martinez, 2016; Okrent et al., 2018), the ongoing food strategy processes at the county level have only recently entered the public debate.

Our results reinforced those obtained by Ingold et al. (2017) in their study of drivers that shape actors' agreement in nascent policy subsystems (i.e., issues that recently entered the political agenda). According to the authors, collaborations between actors in political decision-making processes is crucial from both an actor and a process perspective. Along the same line of thought, López & Gugerell (2021) stress that institutional, social, and resource collaboration are crucial to fostering food democracy at the niche level within the food system. Hence, relevant stakeholders in the food system need to be represented at the beginning of the dialogue in order to evolve into a coalition that is an empowering mechanism for groups or individuals, which is critical for local food system initiatives to function effectively.

As of this writing, the job loss and other economic crises associated with the coronavirus pandemic have increased the rate of food insecurity in Will County. In 2021, Will County stakeholders assembled and began coordinating a project to reduce household food insecurity and increase education of healthy food options. The project has the working title of "Food For All, For A Healthier Community" (Figure 6). Local government (e.g., Will County, Farm Bureau, Health Department), not-for-profits (United Way of Will County, We Will Grow, Partner In Hope, Holstein Capital Development, National Hook-Up of Black Women, Joliet), and higher education (Lewis University, Governors State University) are working collaboratively as a food team. This coalition set specific objectives for 2022 to establish a sustainable, community-based local food system in Will County. Examining the

⁶ Along with their respective department of agriculture, department of public health, department of education, department of human services, and department of environmental protection.

Figure 6. Food For All—Building Food Community Empowerment in Will County



coalition members reveals that all three viewpoints identified by the authors are present. Not-for-profit organizations represent the Environmental and Food Justice Advocate. The Visionary is represented by both higher education institutions and local government, while the Pragmatic is represented by, once again, local government in addition to local food growers.

In our view, this is a positive step toward food system transformation in Will County and can lead to significant changes in the current sociotechnical system. Indeed, following O'Brien and Sygna (2013), transformations towards sustainability do not involve only individuals (stakeholders' values and viewpoints). It also requires a change in two other spheres: (1) the practical sphere, including technologies and institutional changes, and (2) the political sphere (including systems and subsystems levels). This reinforces a point made earlier when introducing this study—coordinating thriving

collaborative resources to set up a food policy council that allows Will County to support its community food system initiatives. Observations from this study illustrate the change that can be achieved through cross-sector (not-for-profit, private, and public), civically oriented coalitions and their potential in providing fresh momentum for food policy change at the county level.

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“What we raise ourselves”: Growing food sovereignty in the Mississippi Delta

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Abstract

This paper employs the concept of food sovereignty, as conceived by La Via Campesina and developed by First Nations in North America and peasant farmer groups around the world, as a lens to assess the level of local control over the production, distribution, and consumption of food in the Mississippi Delta. We present research conducted through site visits, participant observation, focus groups, and surveys of communities affiliated with

the Delta EATS public school garden program currently operating in three Mississippi public elementary schools. Our findings demonstrate low levels of food sovereignty but high levels of agency and ingenuity in accessing and obtaining desired foods, along with abundant interest in preserving and passing on traditional foodways. Community members express the desire to exert greater local control over food production, distribution, and consumption through community gardens, farmers markets, and cooking and food preservation classes. While food sovereignty is constrained by the current agri-

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Disclosures

Emily Holmes and Mary Campbell were contracted through their university by Delta Health Alliance to conduct program evaluation, including of the Delta EATS program. Ryan Betz was program manager of Delta EATS from 2015-2021.

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food system of the Delta, programs such as Delta EATS and farmers cooperatives are enhancing local food sovereignty through farm-to-school programs that strengthen relationships between farmers and the community.

Keywords

Food Sovereignty, Mississippi Delta, School Gardens, Food Justice, Farm-to-School, Community Food System

Introduction

The concept of food sovereignty has emerged in recent years as a critique of globalization in agriculture and food distribution. Like the movements for political recognition and sovereignty among indigenous communities with which it is closely associated, food sovereignty is a response to the history of settler colonialism, structural racism, and exploitation that underlie the global food system. In brief, food sovereignty means that a community of people (defined nationally, culturally, and/or geographically) should control the mechanisms of food production, distribution, and consumption, along with policies related to food, rather than corporations (La Via Campesina, 2009). It is closely related to the right of self-determination and economic autonomy in post-colonial movements and emphasizes the right not just to access culturally appropriate and affordable nutritious foods, but to control their production and preparation, often through traditional means. As reaction and resistance to globalization in the agri-food sector, movements for food sovereignty can now be found all over the world (Ayres, 2013; Patel, 2012). What these movements share is the aim “to institutionalize equity in and control over the food system . . . by people who have been marginalized by mainstream agri-food regimes” (Cadieux & Slocum, 2015, p. 3). Food sovereignty “prioritizes local production of food” through which “members of the community themselves are leaders in shaping the local food system” (Ayres, 2013, p. 104).

Food sovereignty is closely related to movements for food justice, a term used more frequently in North America to critique how the agri-food system is structured to disempower and exploit

economically disadvantaged and historically marginalized communities, whether as labor (farmworkers, food processors, grocery workers) or as consumers whose access to food is largely determined by neighborhood (Alkon & Agyeman, 2011; Broad, 2016; Gottlieb & Joshi, 2010; Institute of Medicine & National Research Council, 2009; New York Law School Racial Justice Project, 2012; Sbicca, 2018). While food justice and food sovereignty have distinct origins and histories (Cadieux & Slocum, 2015), each is invoked by advocates to contest the way power is unequally distributed in our food system and to develop stakeholder input and local control. In practice, both food sovereignty and food justice movements work to increase local or regional control over the production, distribution, and consumption of food by prioritizing the most marginalized members of those communities. As such, food sovereignty and food justice movements are also political efforts to build collective power and agency within a community that has been historically disempowered by settler colonialism, as in the case of First Nations, or by white supremacy and the legacy of plantation-style agriculture, as in the case of Black Americans in the U.S. South.

Our research employs the theoretical framework of food sovereignty, as conceived by La Via Campesina and developed by First Nations in North America and peasant farmer groups around the world, as a lens to assess the level of local control over the production, distribution, and consumption of food in the Mississippi Delta. Our primary focus is on the communities affiliated with the Delta EATS (Edible Agriculture Teaching Students) school garden program, a curriculum that connects fifth grade students with an on-site school garden used as an outdoor classroom for gardening and cooking lessons (Holmes et al., 2020). This school garden program is situated in the historical and geographical context of the Delta region. In order to assess the level of food sovereignty in these communities, we conducted site visits and carried out participant observation, focus groups, surveys, and interviews to determine the degree to which residents of these Delta communities are able to find and afford healthy, desirable, and culturally appropriate foods. Our research

findings give insight into the ways that people access food in the Delta, their food traditions and food preferences, and the new food projects that they would like to see implemented. What emerges from our research is a picture of communities with little control over their current food sources but high levels of agency in procuring food in spite of numerous barriers. Moreover, we found strong desire for innovative food projects that would enhance food sovereignty in the Delta region. New food projects such as farmers markets, food preservation workshops, and community gardens will complement the school gardens and farmers cooperatives that are already present in the region.

Food Sovereignty in the Mississippi Delta

The Mississippi Delta has long been a site of power struggles around access to food and food sovereignty, what Bobby Smith calls “food power” (Smith, 2019a, 2019b). Although the Delta region is one of the largest crop producers in the country, residents today often struggle to access healthy food (Haggard et al., 2017; Meter, 2012).

The Delta is a diamond-shaped geographical region between the Mississippi and Yazoo rivers, stretching 200 miles from Memphis to Vicksburg (Saikku, 2005). The area was first settled by mound-builders and their descendants, the Quapaw, Tunica, Chickasaw, and Choctaw, whose population was decimated by European contact. White settler occupation of the land began in earnest in the 19th century, using the labor of enslaved Africans and their descendants to clear the alluvial forests for the purposes of large-scale plantation-style agriculture, primarily to meet the growing demand for cotton (Baptist, 2014; Cobb, 1994). After the Civil War, the rich soil of the Delta attracted newly emancipated African-Americans who hoped to work their way into land ownership but instead became trapped in systems of sharecropping and peonage (Hinson & Robinson, 2008). Attempts by African-Americans to assert political and economic agency during Reconstruction and under Jim Crow segregation were met with violent repression by the white planter class and their allies (Cobb, 1994; Irons, 2010; Woods, 2017).

In the Civil Rights era, this repression took the form of economic coercion by local White Citizens

Councils and the legal authority of the Mississippi State Sovereignty Commission (MSSC), which used intelligence gathering and surveillance of citizens in order to resist federal desegregation directives (Irons, 2010). Bobby Smith has described how Mississippi’s segregationist Senators Stennis and Eastland and Representative Jamie Whitten collaborated with the MSSC in order to manipulate President Johnson’s anti-poverty programs, such as food assistance, to favor white grocers in the Delta, while directing substantial agricultural subsidies to the white planter class (Smith, 2019b). This “war against the war on poverty” succeeded in undermining the civil rights activist leadership of federal programs such as Head Start and in reinforcing the racialized divisions of Delta society that persist today (Irons, 2010; Smith, 2019b). As one informant told us, “we live in a divided society” (personal communication, November 30, 2018).

At the same time, the Delta has been the site of some of the most innovative attempts to secure food sovereignty, what Smith calls “emancipatory food power” (Smith, 2019a, p. 35). While independent Black farmers throughout the U.S. have faced discrimination by the USDA and in their local markets and have suffered extensive land loss (Gilbert et al., 2002), Black farmers in the Delta have continued rich agrarian traditions along with sustained economic models of cooperative development and support. Fannie Lou Hamer’s Freedom Farm Cooperative (FFC) in Ruleville is perhaps the best-known example of efforts to reclaim agriculture as a site of freedom and self-determination. Hamer’s cooperative farming project, which lasted from 1969 until her death in 1977, prioritized growing food for people to eat (through a pig bank and vegetable gardens), decent housing for former sharecroppers, education, social services, and skills training (Smith, 2019a; White, 2019). Hamer considered cooperative ownership of land the foundation for survival and freedom through food production and political self-determination (Smith, 2019a). Although FFC came to an end after a series of droughts and floods, and the death of Hamer impacted the cooperative’s ability to fundraise, FFC remains a model of food sovereignty: the cooperative was the means through which the people most affected by food insecurity

rity—displaced sharecroppers and farmworkers—built the collective power to meet their own food needs (Smith, 2019a; White, 2019).

Similar projects in the Delta also use the model of cooperative self-determination to secure food sovereignty. For instance, during the 1960s residents of Bolivar County built on a legacy of Black independence in Mound Bayou to organize the North Bolivar County Farm Cooperative (NBCFC) in response to farmworker displacement by mechanization (White, 2019). NBCFC was part of a larger movement of Black farmer cooperatives organizing across the south in the 1960s and 1970s that joined together under the Federation of Southern Cooperatives (FSC) umbrella organization (Bethell, 1982). Today, the FSC continues its movement building for collective agency through economic cooperation, protection of the landholdings of Black family farmers, skills training, and advocacy (Federation of Southern Cooperatives, 2020; White, 2019). Among the farming cooperatives active in the Delta today, the Mileston Cooperative Association traces its origins to a New Deal Resettlement Administration program for displaced sharecroppers. The Mileston farmers grow commodities as well as produce for their community, operate a farmers market, and lead a youth training program (Alcindor, 2009; Hossfeld & Mendez, 2018).

These projects shape the wider Delta context of our food sovereignty study, which is more narrowly focused on three communities (Shaw, Leland, and Hollandale) associated with the Delta EATS school gardens program. Although residents of the Delta live with the legacy of segregationist manipulation of food power and the constraints of the current agri-food system, they also share a heritage of cooperation, resilience, and participation in transformative food projects that can enhance food sovereignty.

Applied Research Methods

Our research was undertaken to assess the level of food sovereignty in communities associated with the Delta EATS school garden program (Holmes

et al., 2020). In the fall of 2018, Holmes and Campbell contracted with Betz and the Delta Health Alliance to carry out a food sovereignty study as part of USDA-NIFA CFP Grant Award # 2018-33800-28450, the Delta EATS Community Foods Planning Project. The aim of our study was to measure the degree to which Delta residents affiliated with school garden communities have control over the production, distribution, and consumption of food in their communities. The results of the study were used to inform culturally appropriate next-steps for Delta communities, researchers, and advocates who aim to alleviate food insecurity, hunger, and malnutrition, while increasing food knowledge, food choices, and community control over their food systems.

Our study used a modified version of the Food Sovereignty Assessment Tool developed by the First Nations Development Institute (First Nations Development Institute, 2015) and it was guided by the framework of food sovereignty presented in the paper “Towards Food Sovereignty” by Michel Pimbert (2009). We are deeply indebted to the First Nations Development Institute for their work connecting the right to self-determination of tribal communities in North America with movements for food sovereignty in post-colonial, indigenous, and peasant communities around the world. While this approach does not map directly onto majority Black communities in the Mississippi Delta without modification—for instance, these communities do not have the same ceremonial connections to the land, nor do they, with some exceptions,¹ have the right to self-determination on their sovereign land—the need to assess community access to and control over food is similar. Both communities have been disempowered and deprived of land access by white supremacist power structures. As white people committed to dismantling these structures, including in our own research, we looked to the First Nations Food Sovereignty Assessment Tool for inspiration in designing our study. We gratefully acknowledge that our research was carried out on the traditional land of the Tunica, Choctaw, and Quapaw Nations, and that our uni-

¹ See the history of Mound Bayou, founded as an autonomous Black community by former enslaved persons in 1887, and the New Deal Resettlement community of Mileston (Alcindor, 2009; Cobb, 1994; White, 2019).

versity, and therefore our writing and teaching, is situated on the traditional territory of the Chickasaw Nation. As white researchers, we are aware of the risks of cultural appropriation in adapting this assessment tool. Our aim, however, is to honor the resilience of First Nations communities, including in the area of food sovereignty, as we work to promote justice in the Mississippi Delta.

The research team consisted of Campbell, an applied anthropologist and an associate professor of anthropology in the Department of Behavioral Sciences at Christian Brothers University, and Holmes, a theologian and professor in the Department of Religion and Philosophy, also at Christian Brothers University, with four years of experience conducting ethnography of food research in the Delta. Betz is a 16-year resident of the Mississippi Delta, with a public administration and social entrepreneurship background, who served as the program manager of Delta EATS 2015–2021 and contributed to the study design, recruited participants for focus groups, and distributed surveys.

We conducted four focus groups with 28 participants and administered 43 semi-structured surveys to Delta residents between November 30, 2018, and February 13, 2019, all with informed consent. Participants were recruited from school communities affiliated with the Delta EATS school garden program with flyers and announcements from the schools. We held focus groups in three public elementary schools that have existing school gardens and at a local conference center; we administered the surveys after each focus group as well as through distribution to parents of children who attended the schools we visited, with permission from the schools. The survey was used to collect demographic information, food preferences, and attitudes towards food procurement, traditional foodways, and food practices such as sharing, barter, and hunting as well as community food needs. In addition, we conducted two in-depth interviews with Delta residents after the focus groups, and we spent time in participant observation to better understand the context of food in the Delta, purchasing and eating food from grocery stores, gas stations, and restaurants, and visiting

agricultural sites such as farms and school gardens.

We used IBM SPSS to analyze the quantitative data, Microsoft Word to build tables, and text analysis for qualitative data. The research was approved by the Christian Brothers University Institutional Review Board. All participants are adults and signed informed consent forms. Focus group participants were given a \$10² Walmart gift card. Surveys completed outside the focus groups were not compensated.

While there is a demographic range of participants, the majority were African American females, aged 40 or above, employed, and residing with two, three, or four others. Because our population sample was limited to school communities affiliated with the Delta EATS school garden program, the majority of our focus group and survey participants are parents of schoolchildren or employees of the schools. All are residents of Delta communities with active school gardens.

Results: Focus Group Findings

In the focus groups we asked eight open-ended questions, with follow up questions as needed. The first question was, *What do people typically eat?* Frequently mentioned items include baked chicken, fried chicken, pork chops, turkey, and fish, as well as rice and gravy, potatoes, spaghetti, vegetables such as green beans, lima beans, lettuce, greens, squash, okra, corn, tomatoes, and Brussels sprouts, along with grits and eggs, bacon, and sausage. Children were thought to prefer burgers, hot dogs, pizza, wings, French fries, rice and gravy, chicken strips, and fried foods, although some participants said their children preferred home-cooked foods. Several people described the typical Delta diet as “soul food” or “old folks’ food,” which they explained includes foods such as pig’s feet, neck bones, and chitterlings in addition to items such as greens, rice and gravy, and sweet potatoes.

The second question was, *Where do people get their food?* Nearly everyone described driving to a different town for shopping at a full-service grocery store with an average of 20 to 30 minutes of travel time, with a range from ten minutes to an hour. Participants decide where to shop and what

² All currency in this paper is U.S. dollars.

to buy based on weekly sales, prioritizing frozen and shelf-stable items, but they weigh the savings against the cost of gasoline to drive. Some will drive an hour to buy items on sale, or they combine grocery shopping with other trips: “It depends on how far it is to drive, I’ll go to Spain’s for chicken wings on sale, but it’s an hour from here, I’m not fooling with you. If I’m in Jackson, then I’ll shop in Jackson.” People frequently rideshare or pay for rides—for example, \$20 roundtrip—because there is no public transportation.

Participants also described how people purchase prepared foods (“highway food”) at gas stations and convenience stores, considered a major food source in the region. They said that hot foods such as fried chicken, baked chicken, hot wings, mashed potatoes, rice and gravy, and side vegetables are available at most gas stations. These are convenient and affordable foods for people working on farms to obtain a quick breakfast or lunch.

The third question was, *Where does food come from? How far does the food travel to get to the grocery store?* Most participants were unsure, unless it was a question of food safety: “I only know it comes from a grocery store, unless it’s a recall. Not where it’s produced. But then I would know.” They said that food arrives on trucks from distribution centers in Jackson, and prior to Jackson from around the world. Some people said that bread is stocked more frequently, and that certain distributors bring meat or produce on different days.

Regional large farms were recognized as sources of jobs but not as sources of food: “A lot of things are grown in the Delta but the majority is being shipped out. The majority is not food, it is biofuel, corn, soy.” Participants lamented the closing of a nearby catfish processing plant, which increased the price of locally raised catfish. No one expected to find locally grown fruits or vegetables in their grocery store. Walmart was singled out as not being supportive of local farmers because of their power to set their own prices and to sell produce grown locally to other regions. While many people would like to see farmers markets, there was also the recognition that there may not be enough supply from local farmers to meet community demand.

The fourth question was, *How much does food cost? Do you know how much money people in your community spend on food?* Participants reported that costs depend on family size. They noted the high costs of feeding children, especially over the summer months and when kids are out of school. A couple might spend \$40 per week, while at the upper end, a family of four might spend as much as \$150 per week. Others spend considerably less, around \$200–\$300 per month for a family of four, or as low as \$50–\$60 per month for a single person who raises her own garden. One participant said that for a large household of seven to eight people, cost affects the quality of food: “\$100 to eat healthy per week, or it’s less healthy, and you are cutting corners.” Many participants described enjoying cooking. A few mentioned relying on convenience foods such as ramen noodles, hot dogs, and pizza for children. Many use coupons and savings apps, along with weekly promotional flyers, to maximize savings at each store. One participant gave a detailed account of her shopping habits: “One week I buy meat, the next I get canned goods, if I’m out in Greenwood, I visit the dollar aisle. I find blueberry muffin mix and spent \$30. I hide it from the kids, I don’t give them all their snacks at once or they’ll eat them all. When they go over to Granny’s or Auntie’s during the week, they get Gatorade or chips. At Stop-n-Shop, I just get meat. The side stuff is expensive. I spend more at Walmart.” Participants said that many people pay for their food with SNAP benefits, “that plus a little extra.”

Participants described buying fruit in a mixed bag on sale and discounted vegetables to save money. They recognized that vegetables and fruits in particular are expensive in the Delta because they are mostly imported: “Vegetables and fruits get expensive. All of it’s trucked in, lettuce is \$3. There are no vegetable farms or fruit here, it doesn’t grow in this area.” Others noted that even if vegetables can be grown in the region at a large scale, there is an additional problem of labor: “They can’t get it harvested, the problem is labor, it has to be hand-picked.” Participants said that the price of produce depends on the season, and fruit in particular varies dramatically in price. Some described eating more frozen or canned vegetables than fresh during winter.

In question five, we asked about food insecurity and hunger relief programs, *Do you know or think people in your community are hungry? Are there existing programs to assist people who experience hunger?* Participants overwhelmingly agreed that hunger is a problem in their communities: “Yes, there is. I have seen people. They have knocked on my door. A man said he was hungry, asked for a sandwich, I fed him. Yes, in every town.” They also described the shame that surrounds hunger and the problem of food waste: “I have seen it, it truly broke my heart. There was a boy scooping up all the snacks and taking food home. People are secretive about it, they don’t want people to know. He was taking snacks to his brothers and sisters. I said, let them take plates of food home. . . . I don’t want to make a judgment call that there is a hungry child and we threw food away.” Others worried that people kept their hunger secret out of shame: “What goes on in the house, it stays in the house. That includes hunger, food insecurity.”

One participant was familiar with food insecurity statistics for Shaw but noted the difference in perspectives as to what counts as food: “It’s one in three in the county, 32 or 31 percent. But none of the kids think they are food insecure. If they have a pack of ramen at home, they think they have food. The definition isn’t relatable to kids and families.” The reality of food insecurity in the communities was heartbreaking for participants to describe: “During the bad weather days, we only closed the school for one, because at home kids don’t have heat, they don’t have food, they need to be able to come to school. We stayed open all day for the kids, the school is the only hub for hot food for students.” Another participant said, “Those kids are the healthiest in the household, who eat in the cafeteria, but their meal still comes out of a big processed can.” When asked which groups are more at risk for hunger, participants named people who live in the smaller towns in the Delta, “older people who choose between medicine and food and high utility costs” and “kids who live with grandparents who can’t afford to feed them the way they should be fed.”

Participants mentioned a few hunger relief programs in the Delta, including the Mississippi Food Network, which distributes through food

pantries in churches, but noted that access to food pantries can be difficult, depending on the county of residence. Other programs are the USDA-funded summer feeding programs and supper programs for children, in addition to school breakfast and lunch. Participants also mentioned the Alcorn Experiment Station, which gives out sweet potatoes and greens, as an occasional source of free food. Participants described the close connection between hunger and the inability to concentrate in school, and poor health outcomes in the region such as obesity, diabetes, high blood pressure, and malnutrition. They recognized the stress on families from not knowing where to get food, and the stress on children not knowing when they are going to eat.

Our sixth question asked about alternative food sources such as hunting, fishing, and home gardens. None of our participants reported hunting or fishing for themselves, but they all know people who do. The overwhelming perception, however, is that people in the Delta primarily hunt and fish for recreation, rather than for food. Hunting was associated with white people and high socioeconomic status and identity, with people who go to hunting cabins for sport. Those who do hunt primarily target deer and rabbit, although raccoon, fox, turtle, and alligator were also mentioned. Many participants knew of nearby deer-processing facilities.

When asked about fishing, participants immediately raised concerns about the quality of the water. They are concerned about agricultural runoff and high mercury and DDT levels. There was deep suspicion about the safety of the water as a source of food: “I wouldn’t trust it.”

We asked how many people have home gardens; only one participant said that they supplement their groceries with “what we raise ourselves, and have in our deep freezer,” foods such as greens, okra, tomatoes, beans, and squash. Another participant named the best foods to grow in the Delta as “okra, tomatoes, greens, peas, butterbeans, cucumbers, squash, and watermelon.” Even if the majority of our participants did not grow food themselves, almost all knew of community members who raised gardens and shared their produce: “There aren’t too many now, but one man in Shaw

does, and anybody who wants to come get greens, he shares with the community”; this was described as a “sharing garden” rather than a community garden. There was agreement that the practice of keeping a home garden or kitchen garden is not as common as it used to be, and gardening is only continued by older people who own their homes and have access to land: “Not a lot anymore, just a handful, you used to see a lot. Older people have them. Mostly older people raised gardens.” Some lamented the quality of soil and the challenges of growing vegetables in the Delta climate. Others expressed interest in raising chickens or hogs, but expressed discomfort with killing animals. All participants were interested in the concept of community gardens, however, and mentioned the local school gardens as an important new resource.

In our seventh question, participants were asked to describe traditional Delta foods. They named “soul food,” chicken, rice, greens, sweet potatoes, spaghetti, catfish, cornbread, black-eyed peas, smoked neck bones, ham hocks, turkey necks, hot tamales, and cabbage greens. We asked about food traditions that are no longer commonly practiced. Several mentioned gardening, and some of our participants spoke of hog killing: “My father and grandfather raised hogs, we used to watch them slaughter the hogs, we would salt the meat, preserve for months at a time, I miss that. There were parts of the pig that you can’t get any more. There is a store in Oktibbeha county that has the stomach, which is so good. . . . My aunt can take a hog head and make souse. My family is big on food. My grandparents taught me how to cook. They had to raise animals, not go to stores. Now people buy food from convenience stores, which is not healthy, fresh food. And sometimes you get to the store and it is already gone.”

Despite the demise of community-based food practices like hog killing, participants were proud of the community support found in the Delta, the fact that people take care of each other, and if someone is hungry, they will be fed: “The Delta is the place that has the most community support. It’s related to the people, we have a strong sense of community, and the churches are very involved. If they know someone doesn’t have food, the pastor will drop off food.” This experience of community

includes access to fresh foods shared from home gardens and greens grown in publicly accessible places for anyone to pick. Participants thought that for parents in particular to have access to gardens and local food would be better for their children.

Question eight asked about ownership of and access to land, which participants described as a barrier: “A lot of older generations own their land, some young people have their own land, or are buying a house, but a lot of people rent, and wouldn’t be able to raise a garden if they’re renting. We have to do more community gardens, because we don’t have access to land.” In the abstract, there was recognition that “We have the land, there is the land, and vacant space” on which to grow food; but when pressed, the people we spoke with shared the belief that the land did not belong to them: “It’s hard for anything new to come into Leland because the farmers own all the land around Leland, and they won’t sell.” Asked how land is used, participants said it is used to grow commodity crops that are exported from the region. Asked if they know people working on the big commodity farms, one participant said, “Everybody. People are working in the fish plant, processing farmed fish, driving tractors. We used to be out there in the field with a hoe. Chopping cotton.”

To our last focus group question, if people have control over their food system, responses were mixed. A participant said, “I don’t think they have control, like in Tchula, they have to travel, Mr. Head is over the co-op, but they still have to travel 35 miles to get food. They only have a gas station, convenience store. A lot of people have to travel to a grocery store. If they don’t have transportation, they cannot control what they eat. Some communities are trying to do a small farmers market on weekends, they are trying to give more options.” Farmers markets in Moorhead and Cleveland were mentioned as examples. Participants said many people in the Delta, however, exercise control over what they eat by shopping around, comparing prices, and travelling to get the best deals. They felt that they had a great deal of control over their diets but acknowledged that others in their community lacked transportation to grocery stores and were left with gas stations as

their primary food source. Participants recognized that as a result some people in their communities were going hungry.

In addition, some participants suggested that “you don’t need a terrible amount of space to grow fruits and vegetables. There are nooks and crannies to be able to do something, especially on school land.” They expressed interest in using the land available to them, in small yards or at schools, to grow food: “If only we can get more gardens; you know about the new school garden in Hollandale?” They suggested that the extension program could help the school gardens to teach people how to grow their own food; whether they were referring to the Mississippi State University Extension in Greenville or the Delta Research and Extension Center in Stoneville was not specified. They also suggested more inter-generational programs as a way to pass on food traditions: “The only reason children don’t eat vegetables is because they haven’t been introduced to it. I love it when grandparents and aunts come with kids to the garden in the summer, because they get everything.” One participant’s son was inspired by his school garden to plant a home garden with his father to grow his own vegetables.

Results: Survey Findings

Forty-three respondents completed a survey adapted from the Food Sovereignty Assessment Tool that consisted of open-ended and closed-ended questions, a Likert scale, and a series of multiple response questions or statements, such as *Identify three traditional foods*. As with the focus group participants, all survey respondents reside in the Delta and are affiliated with schools, as parents or employees, that have active Delta EATS school gardens.

The survey data was consistent with the focus group responses. First, participants rated the importance of fifteen social structures, organizations, or shopping options for food procurement in their specific communities (not necessarily for themselves) using a five-point Likert scale of Very Important, Somewhat Important, Not Very Important, Not at All Important, and Does Not Exist in My Community. They were asked, *How important are the following sources of food for people in your*

community, region, or neighborhood? That is, how much does your community rely on them as a main source of food? The highest percentages of “Very Important” food sources are churches, grocery stores, gas stations, and SNAP (Table 1).

The choice “Does Not Exist in My Community” was also an option for the question, and people chose it for grocery stores (4 participants), family garden or farm (4), farmers market (9), food co-op (12), community garden (9), school garden (1), hunting and fishing (3), trade/barter (5), food sharing (2), food pantry (6), SNAP (1), and food banks (5). Consistent with focus group data, this data demonstrates that some communities have a grocery store while others require travel for 15–60 minutes to a grocery store.

When asked, *Who do you consider to be the leaders in solving food problems in your community, region, or neighborhood?* participants could choose as many options as they liked. Of the seven choices, local government scored the highest, followed by community non-profit groups, federal state or health agency staff, volunteers, schools and universities, religious groups, and federal or state cooperative extension staff. Next, participants were asked, *Which of the following equipment or methods for food preparation and stor-*

Table 1. Percentages of Food Procurement Type by Very Important, n=43

Type	%
Churches	86.0%
Grocery Stores	83.0%
Gas Stations	83.0%
SNAP	83.0%
Convenience Stores	68.0%
Food Sharing	63.0%
Food Pantry	63.0%
School Garden	59.0%
Food Bank	56.0%
Community Garden	45.0%
Family Garden	45.0%
Farmers Market	33.0%
Food Co-op	32.5%
Hunting and Fishing	29.0%
Trade or Barter	29.0%

age do you use in your home? Gas or electric stoves, microwaves, refrigerators, and freezers each scored the highest. People reported that people in the community used a grill or barbeque, with a few people reporting use of canning, hotplates, or a food dehydrator.

We also asked participants, *Please circle any activities or projects that you would like to see in your community.* Of a list of 32 options, participants are most interested in having farmers markets and community gardens in their communities (Table 2). While many of the other options had at least a 20% score, participant comments help explain the choices. For example, hunting and fishing classes scored only 16%, but one person commented that the costs of firearms, fishing poles, and licenses might be prohibitive. Focus group data suggests that some people already know these skills, thus not needing a class, some are not comfortable fishing in local waters because of concerns over water quality, and some do not have access to hunting land or to processing services.

Some participants reported having used food assistance programs in the last month: 28% used SNAP, 12% used WIC, 33% used the National School Lunch Program, 23% used School Break-

fast programs, 7% used Meals on Wheels, and 5% used a food pantry or food bank. Some people use multiple programs, while 42% reported not using any food assistance. For those who do use assistance, 25% report using it 12 or more days a month. These numbers are consistent with the fact that most participants are employed, and many have children enrolled in the local schools.

We asked several questions about food traditions, practices, skills, and passing on food knowledge. Asked, *How many people do you know in your community who are skilled in traditional farming, hunting, and/or the uses of traditional foods?*, 39% reported not knowing anyone who participates in these activities. Asked if the community is interested in learning traditional food practices, 64% answered yes; however, many expressed concerns that people, especially young people, will not take the time to learn. Participants are concerned that these skills are not taught in the home because parents and grandparents have been disconnected from the practice of food traditions in the Delta. Asked for suggestions about how to get young people involved in learning about traditional foods, the overwhelming response was to use school curriculum, social activities, and school gardens.

Table 2. Activities or Projects that You Would Like to See in Your Community, n=43

Activity	%	Activity	%
Farmers Markets	67.0%	Weekly Traditional Meals	27.0%
Community Gardens	61.0%	Fishing Classes	27.0%
Traditional Food Cooking Classes	56.0%	Natural Poultry Production	27.0%
Greenhouses	49.0%	Healthy Alternatives	26.0%
Nutrition Classes	49.0%	Seed Donations	26.0%
Fruit Tree Donations	47.0%	Natural Beef Production	23.0%
Vegetable Growing Classes	47.0%	History Culture Classes	21.0%
Youth/Elder Workshops	42.0%	Fish Farming	21.0%
Organic Gardening Classes	37.0%	Container Gardening Classes	19.0%
Food Co-op	37.0%	Garden Tilling Service	16.0%
Food Preservation Classes	35.0%	Hunting Classes	16.0%
Traditional Cookbook	32.0%	Community Compost	16.0%
Monthly Traditional Meals	32.0%	Natural Pork Production	16.0%
Food Fair	30.0%	Container Gardening	14.0%
Gardening Food Library	30.0%	Compost Classes	14.0%
Seed Saver Exchange	27.0%	Wild and Edible Food	9.0%

Participants also listed traditional agriculture or food related practices used today; canning, home gardens, kitchen gardens, and raising hogs and chickens are still common but are not being passed down to the next generations. We asked from whom respondents learned to prepare food, and the overwhelming majority (97%) learned from a relative. Participants told us that learning about food in the home is essential for passing on food knowledge, yet people may not have access to the foods they want to prepare, the money to buy them, or to youth who are interested in learning.

We asked about food preferences, through a series of open-ended questions. Asked to state three staple foods, vegetables, chicken, and fruit were the most common. Asked to list three traditional Delta foods, chicken, greens, and rice were the most listed. The following foods were also listed at least once: baked chicken, beans, catfish, chicken tenders, chitterlings, cornbread, dinner rolls, fish, fried chicken, fried okra, fried pork chops, fried vegetables, fruit, hot chicken wings, hot dogs, Kool-Aid pickles, mac and cheese, mashed potatoes, neck bones, peas, pinto beans, pork, spaghetti, sweet potatoes, tamales, turnip greens, and vegetables.

Participants also listed a wide range of foods that they would like to include more in their diets (Table 3). The list shows an emphasis on foods

that are fresh, organic, more expensive, local, and healthy.

The last question was open-ended and asked participants what they would like the government to know about food and hunger issues in their community. Themes in the answers include concern with feeding the “hungry” people in their communities. Several respondents said that families and the elderly struggle to meet food needs; according to one participant, “Hunger issues in Mississippi look different from the hunger issues among third-world countries. We don’t have the pictures of starving children, but hunger issues still exist but aren’t as visible.” A second theme is the need for nutrition and food preparation education. A participant said about food choices, “The people in my community need more than one option. They don’t know they are killing themselves.” Respondents would like to see programming about cooking healthy meals, teaching young people how to cook and how to make healthy food choices at an early age, and SNAP recipients educated about buying healthy foods on a budget. Participants would also like access to food pantries, community gardens, and better food choices: “Fresh fruits and vegetables and lean meat are expensive,” “Our grocery stores here have lower quality produce and food choices,” “Not many options for shopping for quality foods.”

Economic development for local farmers and food producers in the Delta is also important. Participants would like to see investment in growing new farmers, including direct financial and cash incentives to local farmers, as well as equitable land reforms which would allow families to compete with large agribusiness. Participants were deeply concerned with poverty and economic struggles in the Delta, involving low wages and the high costs of foods in grocery stores: “It is unacceptable that families live in poverty and hunger.”

Discussion

The people of the Mississippi Delta are acutely aware of their lack of food sovereignty in terms of access to food; the variety, quality, cost, and distance to food; locally produced and distributed food; and influence on food policy. While agriculture is seen as a source of jobs in the region, most

Table 3. Foods Wanted in Diet, n=40

Avocados	Local Eggs
Beef Ribs	Local Meats
Carrots	No GMOs
Catfish	Pacific Cod
Cherries	Parsnips
Domestic Seafood	Salad
Fresh Fruit	Roast
Fresh Vegetables	Shrimp
Green Beans	Spinach
Greens	Starfruit
Japanese Wagyu Steak	Sweet Potatoes
Lean beef	Turkey
Lean meat	Vegetarian
Lobster	Whole Wheat Breads

local agriculture is not a source of food. Commodity crops such as the field corn and soy that dominate the landscape are harvested for export, and while catfish and rice are consumed locally and considered traditional foods of the Delta, they are also primarily for export. Land ownership remains largely in the hands of the white planter class, inhibiting large-scale food production by the Black residents of the Delta.

However, Delta residents exercise agency within the constraints of the larger food system. Residents employ pragmatic decision making through combinations of comparison shopping, using SNAP and other benefits such as WIC, and using the school lunch and breakfast programs. Participants identified churches, gas stations, grocery stores, and SNAP benefits as very important sources of food, along with convenience stores, food sharing, food pantries, school gardens, and food banks. During the site visits, the research team observed several gas stations that sell hot meals made on site, as well as convenience stores stocked with shelf-stable meals; gas stations have a long history as a safe source of food for Black communities in the rural south (Ganaway, 2021). But we did not anticipate that churches would be as important a source of food to the community as gas stations and grocery stores, so there were no follow-up questions about the role of faith-based organizations. We recommend further investigation into how religious institutions might contribute to community food sovereignty.

Many informants worry about people in the community experiencing hunger and would like to see relief efforts. They expressed confidence in the strength of community ties but recognize the widespread problem of food insecurity, particularly among the elderly. Many participants were concerned about the high costs of fresh vegetables and fruits in particular, and due to having to travel long distances to shop might not be able to afford fresh produce as often as they would like. They would like to see more full-service grocery stores in their region. They would also like to see more community and school gardens that make the most of limited access to land.

Residents would like local government to take the lead in solving food problems in the commu-

nity, followed by non-profit organizations and federal, state, and health agency staff. They would also like to be part of the planning process. The projects and activities that most people would like to see in the community are farmers markets, community gardens, and classes on cooking traditional foods. Residents want access to locally grown fruits and vegetables and reasonable prices for all foods. They also want foods that are consistent with their preferred diets, such as chicken, greens, rice, fruit, fish and more expensive items like seafood, imported fruits and vegetables, and food that is organically grown. They would like farmers to benefit more from local food production as well as to provide more choices for consumers by selling at local markets or through institutional buying programs such as farm-to-school.

Delta residents are proud of their food traditions. Participants acknowledge and lament that food traditions are being lost, and overwhelmingly rely on local school curriculum and teachers to engage younger generations in Delta foodways. School gardens were mentioned as not only an important source of food but as a transgenerational learning opportunity as well. This observation indicates the importance of schools as stable community institutions in rural regions like the Delta, as well as the success of the Delta EATS program in promoting school gardens as incubators of food sovereignty.

These findings are supported by other recent research documenting increased interest in local foods throughout Mississippi. For instance, the Mississippi Food Policy council has surveyed development officials statewide to assess the potential economic impact of a more robust local food system. Researchers cite rising consumer demand for locally produced and sustainably grown foods and the economic opportunity that this demand presents for the state, which currently imports 90% of its food (Johnstone & Woodruff, 2016). They argue that the time is ripe to pursue local food initiatives as an economic development strategy. Hossfeld and Mendez (2018) reach a similar conclusion from the perspective of those suffering from food insecurity. Highlighting community-based food projects, they recommend strengthening local food systems to improve the food envi-

ronment. Our research contributes to these economic, policy, and public health recommendations by amplifying the voices of Delta residents in the development of local food projects.

Limitations and Recommendations for Further Research

Obvious limitations to our research include our small sample size and its affiliation with existing school garden programs. While we believe it is important to situate these communities within the larger cultural context and history of the Mississippi Delta, this population may not be representative of other Delta communities in their food preferences, food access, and interest in local food projects. Future research might fruitfully survey other Delta communities, both those with ties to historic food sovereignty projects (such as the cooperatives discussed above) and those without, to assess their current level of food sovereignty.

There is also need for additional research into the ways the Delta EATS school garden program includes the larger historical and cultural context of food sovereignty in the Delta region in their curriculum. For instance, what are the effects of school field trips to the Mileston Cooperative Association in Tchula or to the site of Fannie Lou Hamer's Freedom Farm Cooperative in Ruleville on student perception of their own work growing food in school gardens? How do students understand their connection to these food projects in nearby Delta communities and to the land, ecology, and climate of the Delta? How does the school garden curriculum incorporate the history and food culture of the Choctaw, Chickasaw, Tunica, and Quapaw in their curriculum? What relationships currently exist or might be forged between the Delta EATS school garden program and the Mississippi Band of Choctaw Indians? How might researchers facilitate and amplify these relationships in order to contribute to greater food sovereignty across the entire Delta region? These questions deserve further attention but lie outside the scope of our initial research.

Conclusion

Our initial results were shared with the Delta EATS USDA Community Foods Project Planning Committee, a group formed to plan expansion of

school garden–related activities and to strengthen the farm-to-school network in the Delta. This committee was organized in the Delta EATS school communities and included stakeholders in the Delta food system such as farmers, school cafeteria workers, FoodCorps members, nonprofit leaders, local government officials, and USDA employees. To examine and respond to our initial research findings, planning committee members engaged in a “data walk” activity (Murray et al., 2015). Display stations were organized according to the four pillars of food security—availability, access, use, and stability—with posters showing tables and charts from our survey and focus group results. As committee members examined the data around the room, they considered questions such as, What sticks out to you and why? Is this what you expected, and why or why not? Is any other data needed, and if so, what? Participants wrote their responses on sticky notes and engaged in discussion at each station. The walk was followed by an open discussion with the full group.

Planning committee members were struck just as the researchers had been by the importance of gas stations and convenience stores relative to grocery stores as food sources. They recognized the traditional Delta foods named, along with the desire for more fresh fruits and vegetables, and they were not surprised by the problems of food insecurity or the distances Delta residents have to travel to procure food. They recognized the massive importance of the school lunch and breakfast programs and the role that school gardens can play in meeting community food needs. Most of all, they were intrigued by the widespread interest in innovative food projects such as cooking and food preservation classes, farmers markets, and community gardens, and they were inspired to see that “a lot of what people want can be done at the local level.”

Over the next year, 2019–2020, the community-led planning group identified four strategies to strengthen their local food system: build the farm-to-school network to support cafeteria contracts with local farmers, organize school-led family cooking nights to pass on skills and traditions, add chicken coops to the established school gardens to enhance garden education, and create a coalition of

school and community garden boosters. Before the COVID-19 pandemic, implementation began of the first three strategies. Because our research demonstrated the need and desire for greater food sovereignty in the Delta, the planning committee was able to coalesce around these specific food projects. Project implementation meant that our survey and focus group participants had a direct impact on the local food system in which they are embedded. Through this process of partnership, feedback, and implementation, we hope that this research provides a model of community-engaged scholarship that partners with practitioners in the field to effect change in our food system.

Although sovereignty was a concept histori-

cally invoked by white supremacists in Mississippi in order to uphold racist policies of segregation, this concept can be reclaimed to apply to local food initiatives, such as Delta EATS³ school gardens and farmers cooperatives, that are being implemented in majority Black Delta counties. By applying the concept of food sovereignty to these food justice initiatives, we are working to redefine sovereignty in Mississippi in light of democratic values of equity, justice, and the right to self-determination of all people. Food sovereignty asserts that community members most impacted by the inequities of our current agri-food system are the ones best equipped to advocate for and to meet their own food needs. 

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³ As this article was being prepared for publication, the authors received word that the Delta Health Alliance has terminated the Delta EATS school garden program, effective December 2021.

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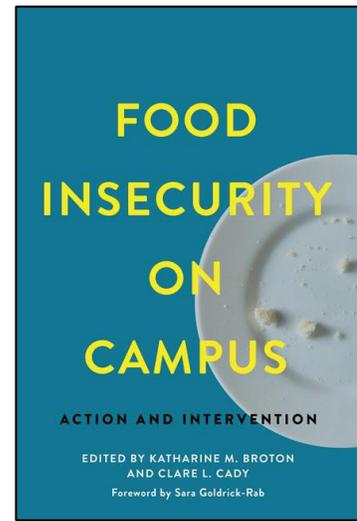
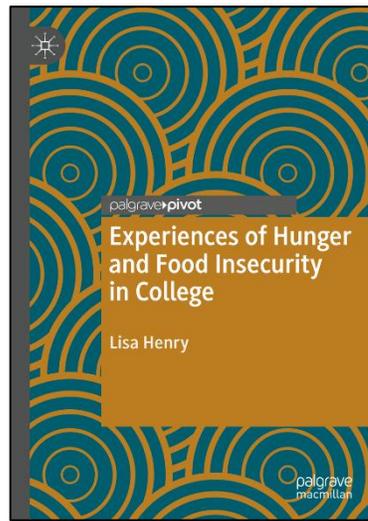
Food insecurity on the college campus

Reviews by Mark B. Lapping *
 University of Southern Maine

Reviews of:

Experiences of Hunger and Food Insecurity in College, by Lisa Henry. (2020). Palgrave Pivot. Available as hardcover and ebook;

148 pages. Publisher's website: <https://doi.org/10.1007/978-3-030-31818-5>



Food Insecurity on Campus: Action and Intervention, edited by Katherine M. Broton & Clare L. Cady. (2020). Johns Hopkins University Press. Available as paperback and ebook; 312 pages. Publisher's website: <https://jhupbooks.press.jhu.edu/title/food-insecurity-campus>

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It is often said that one's college years are “the best years of your life.” For a growing number of students facing food insecurity, these years may be anything but. These two very different books provide useful counterpoints on campus food insecurity, a growing phenomenon only made worse by the COVID-19 pandemic. Henry's volume uses an ethnographic approach of interviewing over 90

students who use the food pantry at her university, the University of North Texas, Denton. Broton and Cady focus on essays and case studies of what a number of institutions are doing to address the issue of campus food insecurity. Together they provide both a balanced treatment of the subject and some remarkably interesting insights and strategies that other college communities can utilize.

Estimates vary, but approximately a third of all students at four-year institutions are food insecure, while the percentage is even higher at community colleges. Perhaps not surprisingly, there is a gulf between white students and students of color, with the latter evidencing substantially higher rates of insecurity. As Broton and Cady note, students “of color, LGBTQ+ students, former foster youth, first-generation college students, those from low-

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 Lapping served the University of Southern Maine twice as its Provost/VPAA (1994–2000 and 2006–2009) and as executive director of the Edmund S. Muskie School of Public Service, where he taught courses in community planning and development, food policy and planning, and rural development. He founded the Maine Food Strategy and is the author, co-author, or editor of nine books.

income families, and those with prior experiences of food insecurity are more likely to report food insecurity challenges during college than their more advantaged peers” (p. 18). As a group these students tend to be tenacious in pursuit of their educations, pursue employment while going to school—though many of the jobs that sustained them have vanished during the pandemic—to make ends meet, and often will sacrifice food for other necessities, like housing. To meet their hunger needs all too many substitute poor-quality fast foods for healthy eating to satiate their hunger. They all appear to juggle competing life demands, and many fail to avail themselves of campus food pantries and other institutional supports out of a sense of shame. It is also not uncommon for food-insecure college students to have been homeless at some point in their lives, faced eviction, and struggled with ever-increasing school costs.

With the support and encouragement of the university’s student affairs division, funding from the university, and participation of both undergraduate and graduate students, Henry conducted over 90 interviews with students who used the University of North Texas food pantry. What comes across in her assessments is the grit and determination of these students to succeed in their studies. Facing numerous obstacles, including feelings of shame, marginality, and both mental and physical stresses, the drive of these students is nothing short of amazing. The willingness on the part of

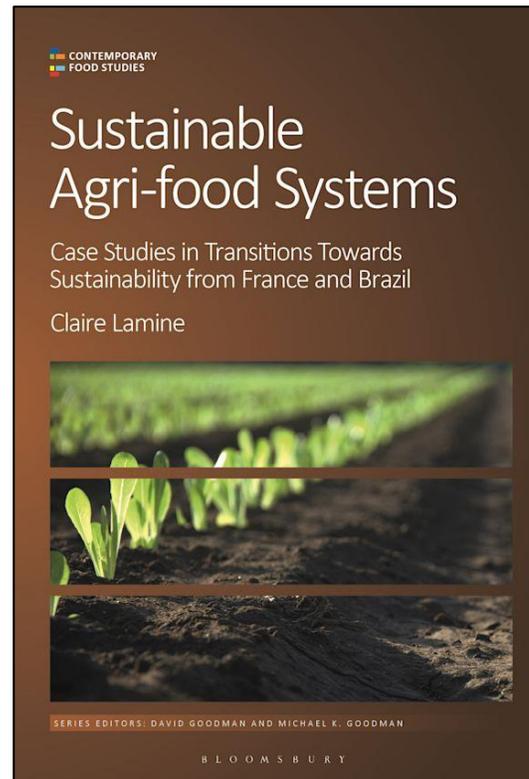
the university to openly and broadly discuss and take action on student food insecurity went a long way toward destigmatizing and addressing some of these problems. Although the context and demographics of students at the University of North Texas no doubt differs from those at other institutions, her findings suggest a universality of experience and is consistent, too, with much of the literature that exists. We learn, too, just how effective the university’s efforts have been to take on this problem.

I know of no other book as comprehensive as the Broton and Cady volume. Many of the essays, some of which discuss in detail the most effective strategies to address campus food insecurity, are penned by national leaders in the field. The chapter on the Milwaukee Area Technical College system and its response constitutes one of the more intriguing and effective approaches. If one could sum up what makes for an effective approach, it seems that research on the local situation coupled with an institutional leadership that stimulates open discussion of the problem, harnessing student activism together with institutional tangibles such as program space, the willingness to marshal resources from on- and off-campus entities—including federal programs like SNAP, and a commitment to destigmatize those who are food insecure, are essential. If one seeks any one volume on this growing problem, *Food Insecurity on Campus* should likely be it. 

Social mechanisms to facilitate the agroecological transition of agri-food systems

Review by Philippe Jeanneaux *
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Review of: *Sustainable Agri-Food Systems: Case Studies in Transitions Towards Sustainability From France and Brazil*, by Claire Lamine. (2020). Bloomsbury. Available as hardcover, paperback, and ebook (PDF, Epub, and Mobi); 224 pages. Publisher's website: <https://www.bloomsbury.com/us/sustainable-agri-food-systems-9781350101128/>



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This book is built on 15 years of scholarship in sociology, which gave Claire Lamine the opportunity to get her accreditation to supervise Ph.D. students. For an experienced academic in France, this kind of manuscript is like writing a second doctoral dissertation. That explains why this 224-page book is dense and mixes a strong

theoretical basis and original empirical research. The book relates in-depth case studies from France and Brazil at different scales and provides a critical survey of social science approaches to sustainability transitions in agri-food systems. Lamine presents an original sociological approach to address the diverse pathways of transition encountered across multiple levels, from the farm through farmers' networks and food chains, to the territorial scale of regions and states. She presents experiences carried out by stakeholders involved in agri-food systems to explore new possible connections between agriculture, food, environment, and health, while also considering social equity issues.

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I recommend this book because by combining theoretical and conceptual elements borrowed from different sociological schools, Lamine outlines in seven chapters a comprehensive approach for understanding the complex issue of agri-food system transitions toward sustainability. Lamine's work adopts a comparative perspective to explore the transition of agroecology and the specific modes of governance involved in France and Brazil—two countries that have a strong agriculture and pioneer the implementation of ecological approaches in agriculture, but that differ both in vision and context. Although Lamine is a sociologist, her book addresses agri-food systems transitions through the study of geography, sociology, politics, farming, and food systems. I would especially recommend reading the introduction, which gives a very clear understanding of the content of this book.

In the first chapter, Lamine provides an overview of the theoretical approaches that have been used in the social sciences to study transitions toward sustainability in agri-food systems. Three main approaches are presented: First, the North American theory of food regimes (Friedmann & McMichael, 1989), which is rooted in the Marxist political economy, adopts a critical stance on power relations within agri-food systems, and analyzes the changes produced over long periods of time and on macro scales. Secondly, Lamine focuses on the theories of transitions and, based on the multi level perspective approach (Geels, 2010), takes a macroscopic view of transition processes, considering that these processes are the result of interactions between socio-technical context and regime, as well as niches of innovation that develop and influence the dominant system. Thirdly, Lamine presents the French pragmatic sociology approach to highlight the ordinary changes of actors and the cognitive and moral aspects of their arguments in ordinary situations of coordination and conflict. Lamine thus puts into perspective different concepts of these three approaches to build an original approach to analyze and understand the transition of agri-food systems toward greater sustainability.

In the book, the concept of “agri-food system” highlights the interactions between agri-food

dynamics and practices, including the production, processing, distribution, and consumption of food. In particular, it is defined as a system of actors and institutions with different visions and objectives, where conflicts and bargaining power are common but which are embedded in interdependent dynamics. Lamine can then argue that debates, controversies, and conflicts are necessary to unravel the complexity of argumentative processes and understand why and how some visions and models become more influential and dominant while others are marginalized. This theoretical framework could then be used to analyze several transition situations and not only for agri-food systems. This is one of the major outcomes of this research program.

Lamine builds on and strengthens this framework by articulating three methodological approaches: systemic, dynamic, and pragmatist. The first principle (systemic) aims to take into account interdependencies that exist between the different components of the agri-food system: the actors, institutions, rules, and instruments involved in the production, processing, distribution, and consumption of food. The second principle (dynamic) recommends studying the transformation process that, over time, redefines (or not) the interdependencies that hinder or encourage the processes of ecologization. The third principle (pragmatist) postulates that agri-food systems are systems of actors and institutions guided by different ideas, visions, and goals that may be confronted by controversies and conflicts.

The following six chapters illustrate the application of this approach to several empirical cases in France and Brazil, at different scales of analysis. Chapter 2 studies ecologization processes at the farm level. It shows that it is difficult for a farmer—faced with greater uncertainty—to change, because the ecological transition has effects on their values and changes both their identity and their conception of their work. But this process is also an opportunity for farmers to learn more about autonomy and resilience as crucial components of their contribution to the sustainable development of their community. Chapter 3 discusses the role of farm extension services and the collective dynamics around farmers that are critical to facilitate ecological transition. Chapter 4 illustrates socio-technical

interlocks or triggering events that play a role in the ecological transition at the scale of the agri-food chain by considering the diversity of linkages and stakeholders. Chapter 5 adopts a territorial scale to argue that the territory is the relevant scale for analyzing transitions in agri-food systems because it is the scale where ecological, social, economic, and health processes interact directly. It is also because this scale makes it easier to bring together academic research and the actors at the heart of transformative action of agri-food systems.

The last two chapters, 6 and 7, deal with the political building of agroecological projects in France and Brazil over the last decade. Lamine draws lessons from different experiences that could be taken into account in future agro-ecology policies at the national level to accelerate the reconnection between agriculture, environment, food, and

health within sustainable agri-food systems. Thus, Lamine shows that sustainable agri-food systems and social justice are completely linked because food (nutritional security) is the outcome of the convergence of social movements (actions, claims, and conflicts). There is no food security without social justice.

This book makes a valuable contribution to the reflection on social science analytical frameworks that apprehend the transition toward the sustainability of agri-food systems, by considering this transition's complexity and identifying the mechanisms that facilitate or hinder it. I recommend this book to undergraduate classes and graduate seminars, academic libraries, and individuals interested in social mechanisms to facilitate the agroecological transition. 

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