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Surf and Turf

JAFSCD looks at both land and seafood systems

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On the cover: "Kerrera in all its glory" — Isle of Kerrera, Inner Hebrides, Scotland. See the paper *21st Century Crofting: Strengths and Opportunities for Community Development* for more about rural Scotland. *Photo courtesy of Bryan J. Hains (2010)*

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IN THIS ISSUE

DUNCAN HILCHEY

Surf and turf: JAFSCD looks at both land and seafood systems

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Again we run the gamut of food systems issues in this open call issue of JAFSCD, with our first paper focusing exclusively on seafood (I couldn't resist this kitschy title). Despite their fragile state and enormous contribution to the protein intake of people around the world, fisheries are a neglected topic in the food systems literature. We haven't tackled the research gap in this issue, but we may take a crack at it in the future. Please let me know if you think local fisheries and food systems are a good special topic call.

Loring et al.'s *Seafood as Local Food* provides another superlative: our first **JAFSCD Open Choice** publication. JAFSCD Open Choice allows papers to be published as freely accessible (not limited to subscribers). To ensure the broadest distribution of their paper, the authors have paid a fee that allows free access to the public. In addition, we're also sending out a press release promoting the topic and the authors. We hope other authors will consider this option as well. Learn more about JAFSCD Open Choice.

We begin this surf-and-turf issue with our columnists. In her *Digging Deeper* column, **Kate Clancy** applies the concept of feedback loops to food systems work as an efficient method of tracking progress and making program adjustments. And in *Metrics from the Field,* **Ken Meter** looks at a new trend among food banks in working with local farmers (and perhaps even operating a farm!) to promote healthy food, farms, and communities.

Our first papers in the issue focus on food and farming systems in northern climes: *Seafood as Local Food: Food Security and Locally Caught Seafood on Alaska's Kenai Peninsula.* Using data collected in Alaska, **Philip A. Loring, S. Craig Gerlach,** and **Hannah L. Harrison** argue that responsibly managed fisheries can continue to be a sustainable source of food for locally oriented communities.

Meanwhile, on the other side of the continent (but only a slightly lower latitude), **Rebecca Schiff** and **Fern Brunger** identify the factors that have led to the success of food security projects in remote and extreme conditions, in *Northern Food Networks: Building Collaborative Efforts for Food Security in Remote Canadian Aboriginal Communities.*

Shifting even further east we come to Scotland, where **Bryan J. Hains, Ronald Hustedde,** and **Kristina G. Ricketts** have studied island-based small-scale land-holders (crofters) who are managing to maintain and even expand a long-standing way of life despite limited resources and markets, in *21st Century Crofting: Strengths and Opportunities for Community Development.*

Next is a set of quantitative papers that offer new and improved methods for understanding food systems economics. In *An Economic Impact Comparative Analysis of Farmers' Markets in Michigan and Ontario,* **Richard C. Sadler, Michael A. R. Clark,** and **Jason A. Gilliland** use customer surveys and kernel density analysis to explore the special distribution of farmers' market customers in two different marketscapes and to suggest ways of targeting critical new customers, especially in food-insecure neighborhoods.

David Conner, Florence Becot, Doug Hoffer, Ellen Kahler, Scott Sawyer, and **Linda Berlin** follow up with a new and improved methodology for local consumption estimates in *Measuring Current Consumption of Locally Grown Foods in Vermont: Methods for Baselines and Targets.*

In *Toward an Informative and Applied Methodology for Price Comparison Studies of Farmers' Markets and Competing Retailers at the Local Scale* by **Joshua Long, M. Anwar Sounny-Slitine, Katherine Castles, Jillian Curran, Harrison Glaser, Ellen Hoyer, Whitney Moore, Lisa Morse, Molly O'Hara,** and **Ben Parafina** improve upon previous methods of local food price comparisons. They offer their system as a replicable and adaptable method for doing farmers' market customer analysis.

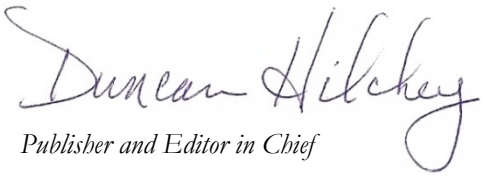
In a nod to our forthcoming summer issue on food systems research priorities, **David C. Campbell, Ildi Carlisle-Cummins,** and **Gail Feenstra** demonstrate how bibliographic research can help guide future research and practice in *Community Food Systems: Strengthening the Research-to-Practice Continuum.* We will be making the paper open access for two months this summer to encourage use by researchers and practitioners and will be spreading the word about it through a press release.

In *Strengthening Informal Seed Systems To Enhance Food Security in Southeast Asia,* **Thomas B. Gill, Ricky Bates, Abram Bicksler, Rick Burnette, Vincent Ricciardi,** and **Laura Yoder** present the two-step approach they used for strengthening such systems as a food security strategy in rural Cambodia and Thailand.

Sheila R. Castillo, Curtis R. Winkle, Stephen Krauss, Amalia Turkewitz, Cristina Silva, and **Edie S. Heinemann** identify seven perceived barriers to urban and peri-urban agriculture in and around Chicago in *Regulatory and Other Barriers to Urban and Peri-urban Agriculture: A Case Study of Urban Planners and Urban Farmers from the Greater Chicago Metropolitan Area.*

Returning us to the seafood system, **Jennifer S. Evans-Cowley** and **Angel Arroyo-Rodríguez** present a case study of an innovative three-step planning process used to engaged stakeholders in assessing food waste through a regional foodshed in *Integrating Food Waste Diversion into Food Systems Planning: A Case Study of the Mississippi Gulf Coast.*

And finally, food systems practitioner and author **Bethann G. Merkle** reviews the Community Food Security Coalition's monograph *Whole Measures for Community Food Systems* (2009), and finds that its companion publication, *Whole Measures for Community Food Systems: Stories from the Field,* published in 2012, fills some of the original's critical gaps.



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DIGGING DEEPER
Bringing a systems approach to food systems
KATE CLANCY

Feedback loops

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http://dx.doi.org/10.5304/jafscd.2013.033.007

Continuing from my first column in JAFSCD's volume 3, issue 1, *feedback loops* are another systems concept with a great deal to offer to food systems projects and activities at any level — local to global. Feedback can be thought of as "an influence or message that conveys information about the outcome of a process or activity back to its source" (Capra, 1996, as cited in Sundkvist, Milestad, & Jansson, 2005, p. 225). Feedback loops act as communication and control devices in both natural and socioeconomic systems.

Most people who have worked on sustainable agriculture are accustomed to thinking about ecosystem feedbacks such as those from eroded land, polluted water, declining biodiversity, and many other resource problems. People who study the phenomenon point out that feedback can be masked (when information can not be detected) or disregarded (when a problem is not addressed even though it is perceived). In the latter situation, often no effective measures are taken to change management practices — which allows disturbances to accumulate and create conditions for large-scale crises later on (Berkes & Folke, 1998, cited by Sundkvist et al., 2005), for example dead zones.

With regard to masked feedback, we can examine the problem of long distances that impede the flow of information in the food system and block ecological feedback along the whole chain (Princen, 1999). We see this as the problem of not knowing how food is produced or where it comes from. Without information, the likelihood of farmers making good decisions on management and consumers good decisions on purchases is reduced. Also, as feedback loops become looser and less effective, the motivation for environmental action is reduced (Levin, 1999).

Kate Clancy *is a food systems consultant, visiting scholar at the Center for a Livable Future, Bloomberg School of Public Health at Johns Hopkins University, and senior fellow at the Minnesota Institute for Sustainable Agriculture. She received her bachelors and Ph.D. degrees in nutrition at the University of Washington and the University of California Berkeley, respectively. She has studied food systems for over 40 years and has held positions in several universities, the federal government and two nonprofit organizations. Her present interests are regional food systems, food security, agriculture of the middle, and policies at all levels to encourage the development of resilient food systems.*

Experts have called for tightening the feedback loops to make it possible for people other than farmers to pick up ecosystem signals. One way is through increased reliance on local ecosystems and food production. A second is to develop systems that provide the kind of information needed for consumers to know where and how their food has been produced (Sundkvist et al., 2005). As I mentioned in my last column, local food systems are limited in their ability to provide significant amounts of food for a population. Therefore there is a need to strengthen feedback mechanisms via labels, standards, and accurate information about national and global food suppliers.

There is another type of feedback that is controlled entirely by people and their organizations, and one for which distance can't be blamed: evaluation. How are we learning whether local food system activities are successful, and how this is being communicated back and forth between the other nested scales in which local functions? What I perceive is that not much of this is occurring — so instead of a problem of disregard or not perceiving outcomes, too often no measurements are being taken at all to supply the information needed. Project directors, including leaders of food policy councils, should be identifying indicators or benchmarks and measuring them frequently; we call this evaluation or, in policy language, oversight. What I see are some good evaluation efforts in some places and few efforts in most other places. This is despite the fact that the critical need for evaluation has been known for a long time. Garrett and Feenstra discussed it in their manual *Growing a Community Food System* in 1999. The Center for an Agricultural Economy (CAE) writes on its website that evaluations are used "to justify certain projects, to know what is working and further successful initiatives, or for other communities to use if they are looking to follow a path" (CAE, n.d., para. 3). There are good examples, e.g., the Marin County and Sacramento, California, comprehensive plans, which include specified methods for evaluating their achievements (Hodgson, 2012).

On the negative side, Seattle Local Food Action acknowledges that its lack of program measures "makes consistent and meaningful evaluation difficult" and "limits the Department's ability to develop plans for improvements, adopt best practices and enhance performance" (Seattle Local Food Action, 2009, p. 3). Hardesty (2010) mentions in her assessment of local policy that she found no studies measuring the impact of government policies that support local food. Evaluation has been discussed in this journal in several of Ken Meter's columns — but not many evaluation studies can be found here. Without such evaluations we don't know either the outcomes or impacts of these activities; we don't know what parts of projects are working; we don't know if a problem has been solved or if it is even solvable; and without evaluation groups can't share their successes and mistakes with others in a useful and replicable way. Furthermore, resources are probably not being used efficiently if everybody is reinventing every wheel everywhere. And perhaps most importantly, feedback is also information transferred between different levels of society; in a systems context, evaluations are critical for the scales, e.g., local and state, to operate together, to be moving in the same direction, and to grasp the fact that they are dependent on each other.

Without evaluations, groups can't share their successes and mistakes with others in a useful and replicable way.

There are many different methods available (too many to list) for conducting small to large evaluations. By "small to large," I don't mean the size of the project; I mean the amount of information wanted about a project. Methods are becoming more sophisticated and systems-oriented as people recognize that food systems are what can be thought of as complex adaptive systems in which individuals act in ways that are not always predictable and whose actions change the context for others (Complex Adaptive System, 2011).

But I don't believe that groups have to do costly, long-term, complicated evaluations to

gather information that will help with planning and make it possible to turn around underperforming activities. It seems to me a set of simple templates could be developed that nonprofessional evaluators can use to get quick and usable feedback. The most important thing is to do *something* — and to not let the lessons learned slip away from all the useful work people are doing. 

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METRICS FROM THE FIELD

Blending insights from research with insights from practice

KEN METER

Addressing hunger by strengthening local foods logistics

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Las Milpitas de Cottonwood Farm in southwest Tucson is an unusual urban farm. On an intensely sandy stretch of land, bright green vegetables flourish in penetrating sunlight. Billowy clouds waft over observant mountain ridges. A straw-hatted farm manager sprints between rows to welcome his guests, avoiding plastic irrigation cable that will soon be buried along the rows.

Las Milpitas is a farm owned by the Community Food Bank (CFB) of Southern Arizona. A working farm that produces food for the hungry, it is also a place where permaculture practices are honed, where an arid landscape is being restored, and where waste is composted into new fertility. Most critically, it is a farm where CFB constituents can learn farming skills.

The farm represents a broad dream held by one of the pioneering food banks in the U.S. While exceptionally efficient at delivering 29 million pounds (13 million kg) of food annually through its five locations and over 300 agencies, the food bank's leaders note with chagrin that the number of clients coming to the food bank has more than doubled since 1997. Rising to the challenge, CFB now delivers almost three times as much food as it did then, yet staff realize that hunger is outpacing their ability to deliver food, as the economy continues to create poverty.

As vice president of the food bank's Community Food Resource Center Robert Ojeda points out, "The solutions for alleviating an ever-growing hunger problem lie not only in serving immediate needs, but in supporting the creation of robust and resilient local food systems." One of the challenges CFB and other food banks have taken on is to serve as a force that fosters both economic

Ken Meter, *president of Crossroads Resource Center, is one of the most experienced food system analysts in the U.S., having produced 95 regional and state food-system assessments in 32 states, focused on local farm and food economies. He has worked with several food banks nationally to bring an economic perspective to their capacity building work. He is currently engaged in a national study to develop alternative ways of measuring economic impacts, and is compiling a statewide food system assessment for the state of South Carolina.*

development and leadership development where it is most needed: among low-income residents.

A cluster of food banks nationally has embraced similar approaches to food security that seek to cultivate capacity among their constituents. To raise awareness of this purpose, CFB will host a national conference running September 18–20, 2013, called "Closing the Hunger Gap" (CFB, 2013). More than 50 food banks and allied organizations from across the U.S. will present innovative strategies for remaining resilient in the face of growing hunger, and for addressing its root causes.

Another innovator, the Oregon Food Bank, expressed its dedication to ending hunger by launching the FEAST (Food, Education, Agriculture Solutions Together) program that engages local residents in community organizing toward food security. Each initiative forms a local steering committee that creates a self-determined plan. The aim is to build solid networks supporting the growth of local food systems, engaging the wider community in issues that affect low-income constituents, and assessing for themselves the opportunities they strive for and the needs they hold. More than 50 FEAST initiatives have flourished in Oregon and Idaho, says Community Food Systems Manager Sharon Thornberry; now she is bringing the model to partners nationally.

The Food Bank of North Alabama (FBNA) in Huntsville reports that it received a wake-up call several years ago after it purchased several palettes of canned peas. Close inspection of the labels revealed that the vegetables had been raised and packed in China. Stunned that they were spending hard-won donations to purchase food from 11,000 miles away when they were located in a fertile farming region, the food bank focused on promoting the growth of local farms. FBNA first collaborated with community partners to set up an investment fund that assists emerging growers. Then, in collaboration with its partners, the food bank concluded that it needed to become an aggregation point for small farms, drawing upon the food bank's logistical expertise and its established facilities including warehouses, packing areas, freezer and cooler space, and refrigerated trucks.

Yet, even holding this logistical reach, FBNA is taking its first steps slowly. For the time being it serves more as a communications hub than an actual aggregation point, says Executive Director Kathryn Strickland. In these early stages, the food bank connects nearby farms with grocers, restaurants, and institutions that purchase locally, adapting a "brokering" model that has been well honed by Red Tomato in New England. FBNA reports that it facilitated the sale of US$99,000 of local products during its first eight months of operation.

Food banks realize that by purchasing food directly from farmers, many of whom are low-income, they are promoting more traditional forms of economic development.

Rochester, New York's, Foodlink has developed a complex array of relief and economic development initiatives centered on food production farms and gardens, a catering business, and value-added food processing, each of which includes workforce development for its constituents. The food bank donates its waste food to a partner firm that converts this organic matter into ethanol. It also partners with another nearby firm that installs green roofs and walls. Now, it is moving to form an aggregation center of its own, drawing upon its three warehouses, a fleet of trucks, and the community partnerships it has formed with 450 agencies serving a 10-county area.

Food banks also realize that by purchasing food directly from farmers, many of whom are low-income, they are promoting more traditional forms of economic development. Researchers from the University of Pennsylvania concluded after surveying food banks across the nation that these purchases may be quite significant. Although only one percent of the food distributed by food banks nationally is grown locally, the researchers said, "We found 17 food banks that produced and sourced over five percent (5%) of their total food

directly from local agriculture. At 13 of those food banks the proportion was above 10%, and at 4 food banks it reached 40% or higher" (Vitiello, Grisso, Fischman & Whiteside, 2013).

This is only a handful of the groups that draw upon the multibillion dollar investment that has already been made by communities nationally to create sophisticated and efficient food banks over the past 40 years. Not only does this transformational work leverage the prior investment, it also draws upon the respect and political capital food banks have garnered over decades of advocacy for the poor. Many food banks have also built exceptional legitimacy among their low-income constituents, which means they are well placed to engage residents in creating their own solutions.

Not only does this transformational work leverage the prior investment, it also draws upon the respect and political capital food banks have garnered over decades of advocacy for the poor.

As the University of Pennsylvania team concluded, "Food banks can play important roles in farmland preservation, regional food distribution, and in training and incubating new farmers, chefs, and food enterprises, contributing to the vitality and sustainability of far more than just the emergency food system" (Vitiello et al., 2013).

No food system can be considered successful unless all people are well fed with the best food available. The growth of these food bank initiatives is not only critical to those whom the food banks serve, it is also stands as a prime indicator of the growth of sustainable local food systems.

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Seafood as local food: Food security and locally caught seafood on Alaska's Kenai Peninsula

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Abstract

In this paper we explore the relationship between food security and access to locally caught seafood for communities of the Kenai Peninsula region of Alaska. Seafood and fisheries are infrequently discussed in the literature on local and small-scale food movements; instead, they are more commonly construed as overexploited components of a global food system and a source of conflict with respect to global food security and fisheries conservation. By way of contrast, we argue here that many fisheries have the potential to be sources of healthy and sustainable "local" food, in support of the many values and goals embraced by local food movement, including conservation. With data collected via a by-mail survey, we show that many people in our Alaskan study region enjoy improved food security because they have access to locally caught seafood, especially those households at the lowest income levels. We also show, however, that access to these resources is still uneven for some, and we discuss strategies for improving the social-justice aspects of this component of the regional food system. Our findings are important not just to the fisheries and food security research communities, but also for contributing to a better understanding of the conditions within which local and regional food movements can achieve the ambitious social and ecological goals they seek.

Keywords

fisheries, food security, foodways, local food, salmon, seafood, social justice, sustainability

Introduction

In this paper we report on a research project designed to explore the role of locally caught seafood in providing for food security in the Kenai Peninsula region of Alaska. Seafood and the seafood industry are well established components

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of Alaska's local economies and cultures, and many people across the state rely on local seafood that they catch themselves for a significant portion of their diet (Hanna, Frazier, Parker, & Ikatova, 2012). Likewise, more Alaskans are employed by fisheries or fisheries-related industries than by any other sector (Northern Economics, 2011). This said, however, food insecurity is a growing problem across Alaska, especially for remote rural communities where people rely heavily on wild fish and game (Caulfield, 2002; Loring & Gerlach, 2009). Given that Alaska's seafood industry enjoys a widespread reputation for sustainability, and as conventional wisdom features seafood so prominently in the lives and livelihoods of Alaskans, the apparent contradiction between a thriving seafood industry and food-insecure fishing-dependent communities provides an informative setting within which to explore the circumstances under which local and purportedly sustainable food resources do or do not contribute to household food security. In other words, which Alaskans enjoy reliable access to locally caught seafood, which do not, and why?

Answers to these questions are important not just to Alaskans, but to anyone who is concerned with how to achieve outcomes of individual health, social justice, and community sustainability through local and regional food movements. Many justifications are made for eating local, not the least of which include the environmental impacts of industrial, chemical-intensive agriculture (Kimbrell, 2002), the decline of rural communities and cultures (Berry, 1982), and persistent worldwide malnutrition (Shiva, 2000). However, as the *de rigeuer* alternative to the dominant system, people too easily assume a variety of positive outcomes from local food movements, including, for example, that they are more environmentally sustainable, that they produce healthier foods, and that they are more amenable to positive food-security and social-justice outcomes. These assumptions are not without justification, but they are often uncritically accepted as fact; it is more accurate, perhaps, to understand food security and environmental sustainability as possible rather than inevitable outcomes of local and small-scale food systems (Born & Purcell, 2006; Tregear, 2011; Trivette, 2012). Thus, reflexive research on both the successes and failures of local food movements is critical if the field is to move forward.

As we discuss below, seafood and fisheries are not commonly discussed in the local and regional food movement literature, although there are a few notable exceptions (e.g., Andreatta, Nash, & Martin, 2011; Brinson, Lee, & Rountree, 2011; Evans-Cowley, 2011; Paolisso, 2007). Given that roughly 44% of the world's population lives on or near the coast (United Nations Environmental Programme, 2010), seafood clearly has the potential to be a major component in the rebuilding of community-based food systems. Below, we review how fisheries have been discussed in food systems and sustainability literatures, including limitations and strengths as we perceive them, and then suggest reasons for featuring seafood more prominently in local food movements. We also briefly scope the concept of food security as it is currently defined and implemented through research in Alaska and the Arctic. This regional tour of the literature is important because northern food systems have some unique characteristics when compared to other regions, such as limited local agricultural production, extremely remote communities that are not on a road system, and a very large segment of the population that relies on locally caught fish and game for a significant portion of its diet. This literature is also of interest because of the emphasis on the social and cultural dimensions of food, specifically with respect to understanding food security as more than just a biophysical or socioeconomic outcome.

Finally, we discuss our study, which took the form of community focus groups and a by-mail survey distributed to residents of the Kenai Peninsula region of Alaska. The lessons learned from the data we present are threefold, and are informative for small-scale food systems challenges globally: (1) local fisheries can play a significant role in the development of community food systems, including for low-income households; (2) individual access rights to locally available seafood resources are necessary but not sufficient to achieve food security for all stakeholders; and, (3) developing local markets that connect consumers to commercial fishers who are able to provide local

products at a fair price is a key design and policy challenge for strengthening coastal community food systems.

Seafood as Local Food

Fisheries and seafood have not figured prominently in the academic discourse on local food, especially in the U.S., where Americans consume a growing but still not a tremendous amount of seafood in comparison to nations in Scandinavia and Asia (Food and Agriculture Organization of the United Nations [FAO], 2011). Just over 4.8 billion pounds (2.2 billion kg), or roughly 16 pounds (7.3 kg) of seafood per person (edible portion) were consumed in the U.S. in 2009, the most recent year for which data are available (National Marine Fisheries Service [NMFS], 2010). Seafood accounted for just 7.6% of the total available animal protein in the U.S. in 2009 (FAO, 2011). Again by comparison, seafood provides 21.3% of the total available protein in China, 22.6% in Japan, and 14.3% in Norway, with proportions that can be even higher in smaller and developing coastal or island nations (FAO, 2011). However, given that 39% of Americans live on or near the coast (National Oceanic and Atmospheric Administration, 2013), and that Americans currently consume only half as much seafood as is recommended in the USDA's latest nutrition guidelines, we argue that there is an opportunity for finding ways to meet goals for community sustainability and food security by incorporating innovative seafood harvesting and marketing strategies into local food movements.

Seafood consumption worldwide is higher than ever, however, with ramifications for the sustainability of the world's fisheries. As such, when fisheries are discussed in the various literatures on food systems and food security, they tend to be cast in a negative light, with the emphasis on concerns such as human population growth, the overallocation and depletion of ocean fisheries, and the impacts of aquaculture on ecosystem health (FAO, 2010; Godfray et al., 2010; Hilborn, Stewart, Branch, & Jensen, 2012; Pauly, Watson, & Alder, 2005). While this is an important body of research in that it highlights the ubiquitous, and perhaps even pernicious, unsustainability of industrial fishing, a shortcoming is the assumption that human needs (e.g., food security) are necessarily at odds with the sustainability of the world's fisheries and marine ecosystems (Loring, 2013; Loring & Gerlach, 2010). In other words, fisheries are more commonly construed as a part of the world's food-security problem rather than as part of its possible solutions.

That said, however, there is some fisheries research that is conducted under the rubric of common pool resources and co-management that offers a compelling case for envisioning seafood systems not as part of a global food security "problem," but rather as a part of effective local solutions (e.g., Cinner et al., 2012; McClanahan & Cinner, 2011). In the work by Cinner and his colleagues, for example, the various challenges posed by climate change to coral reef ecosystems in Madagascar and Papua New Guinea are explored, with the focus on declining coral reef fisheries and the impacts of such declines on artisanal fishing communities. What they find is that local and co-management of small-scale fisheries can foster win-win scenarios, with marine ecosystems conserved and local artisanal livelihoods strengthened (Cinner et al., 2012). While they do not use the language of food security or food systems *per se*, their work nevertheless underscores the potential for using small-scale and artisanal fisheries to support sustainable food systems, coastal community development, and fisheries conservation.

As we discuss below, there is the potential for small-scale community fisheries to be important components of local food movements in the U.S. Currently, half the seafood consumed in the U.S. is produced through industrial aquaculture, and the other half is wild-caught. Virtually all of it, however, comes to U.S. consumers through global markets and large-scale processing and distribution networks dominated by a few large corporations, and in this way the seafood system functions in much the same way as does the industrial agriculture and food system (Anderson & Fong, 1997; Hébert, 2010). As an alternative, local seafood is an avenue by which communities and regions can divest from, or at least reduce their dependence on, the industrial food system by choosing local options (after Kloppenburg, Hendrickson, & Stevenson, 1996). Likewise, seafood also "fits the bill" for many of

the values that are commonly attributed to local food systems. For example, wild-caught seafood is generally healthy, nutritious, and safe, although the problem of industrial pollutants in some waters can be an important caveat (Kris-Etherton, Harris, & Appel, 2002). Pacific salmon, one example that is relevant in Alaska as well as for much of the Pacific Rim, has favorable omega-3 fatty acid and macronutrient profiles that both enhance dietary quality and also buffer against contaminants like methylmercury (Loring, Duffy, & Murray, 2010; USDA, 2011).

Development of a local seafood industry can also be consistent with the goals of improved environmental conservation and sustainability. The assumption is that locally oriented food systems connect participants more closely to their environments, enabling them to be better stewards (Sundkvist, Milestad, & Jansson, 2005). Pacific salmon, again a relevant example, is at the center of multiple environmental debates and reforms in the U.S., including the Pacific Northwest region where salmon are a motivating force behind the removal of dams and the restoration of riverine habitats (Hawley, 2011; Klingle, 2007; Wolf, & Zuckerman, 2003). Likewise, in Alaska salmon are powerful symbols in ongoing debates over logging in the Tongass National Forest and gold and copper mining in the Bristol Bay watershed (Lempinen, 2011).

Finally, when describing local food systems, opportunities, and options, Trivette (2012) emphasizes the important element of intentionality: that local food should be "intended for consumption within the same area that it is produced…rather than simply incorporating food that is available in a particular area" (p. 5). Admittedly, seafood as most Americans currently procure it does not necessarily meet this requirement; commercial seafood is not produced locally in the same sense that agricultural products are, but rather is caught in the open ocean, often far away from shore. However, the concept of locality, for example through regional branding, is already a powerful symbol in many seafood markets (Andreatta, Nash, & Martin, 2011; Knapp, Roheim, & Anderson, 2007). Likewise, fisheries are important and key frames of reference for the cultural identity of many coastal communities; the entire Pacific Northwest region of the U.S. has been dubbed "Salmon Nation" in acknowledgement of the multifaceted role that various salmon species play in place-based cultures and traditions there (Wolf and Zuckerman, 2003). Other U.S. coastal areas also relate closely with their fishing activities and traditions, and marketing strategies for seafood products commonly feature the specific communities where the products are landed, as with Maryland blue crab, Maine lobster, and Copper River Red salmon (Acheson, 1997; Mccay, 1981; Paolisso, 2007). And, as we describe in more detail below, intentional participation in fisheries in Alaska by individuals for the sake of self-sufficiency and eating locally is also quite common.

Food Security and Food Systems in the North

We were specifically interested with this research in exploring the conditions under which access to locally caught seafood contributes to household food security in Alaska. Food security is most commonly defined as whether or not people have equitable physical and economic access to sufficient and safe foods (e.g., World Food Summit, 1996). In the context that we use it here, food security describes more than merely whether sufficient food is being produced, or a one-size-fits-all food-nutrition relationship, and incorporates all of the various ways in which a food system supports health in its various biophysical, social, and ecological dimensions (Loring & Gerlach, 2009). These include matters such as the importance of certain foods, food choice, local perceptions of hunger, uncertainty and worry about food safety or shortages, and any other psychosocial, sociocultural, or environmental stresses that result from the process of putting food on the table (S. Maxwell, 2001). In rural, predominately Alaska Native communities, for example, wild fish and game are important for food security, not just because they are readily available, but also because they are important to the preservation and transmission of traditions and cultural practices, for the maintenance of social networks and interpersonal relationships, and for supporting individuals' sense

of self-worth and identity (Fienup-Riordan, 2000; Loring & Gerlach, 2009).

Yet food insecurity in Alaska and the North American Arctic is a rising challenge (Caulfield, 2002; Egeland, Pacey, Cao, & Sobol, 2010; Ford, 2009; Loring & Gerlach, 2010). According to the United States Department of Agriculture (USDA), Alaska currently has a food-insecurity rate of 14.5%, which is lower than the nationwide average of 16% (Coleman-Jensen, Nord, Andrews, & Carlson, 2011). However, rates are much higher for rural communities, and the nonprofit group Feeding America (2011) estimates that some rural parts of the state presently experience food insecurity rates as high as 30%, with children among those most affected. People in many rural Alaskan communities are experiencing a "nutrition transition," whereby the use of traditional country foods is declining and is being replaced with market foods that, while readily available, are both expensive and generally poor in nutritional quality by comparison (H. V. Kuhnlein, Receveur, Soueida, & Egeland, 2004). Consistent with this transition, Alaskans are increasingly experiencing a host of diet-related health problems, including but not limited to higher incidences of colorectal cancer, obesity, and diabetes (Fenaughty, Fink, Peck, Wells, Utermohle, & Peterson, 2010; McLaughlin, Middaugh, Utermohle, Asay, Fenaughty, & Eberhardt-Phillips, 2004), as well as a variety of chronic psychological and psychosocial problems such as domestic violence, alcoholism, depression, and drug abuse (Alaska Department of Health and Social Services [AKDHSS], 2011a). While direct causality among one or more of these dietary changes and health trends is difficult to pin down, the consensus among health researchers, practitioners, and local people is that the solution to these problems is best situated in local food system reform and revitalization (Arnold & Middaugh, 2004; Hassel, 2006; H. Kuhnlein et al., 2007; Nabhan, 1990).

Part of the challenge with respect to food security in Alaska relates to the limited nature of the state's food system. Despite active local food movements in many parts of the state (Garcia, 2012), only an estimated 3% to 5% of agricultural products consumed in Alaska are produced in Alaska. Agricultural production is limited by a variety of factors, not least of which is a paucity of farms, farmers, and in-state infrastructure for food processing and distribution (Hanna et al., 2012; Paragi, Gerlach, & Meadow, 2010). Similarly, while the commercial seafood industry is robust and thriving, providing 50% of U.S. wild landings (NMFS, 2010), very little of this commercial catch is marketed in Alaska, and is instead fed into national and global seafood markets. Specifics are rare regarding the quantity and origin of seafood that is actually consumed directly by Alaskans (Hanna et al., 2012), but even in the iconic fishing communities featured in this research, most grocers do not offer a fresh seafood counter. Recently, noticeable disparities in who benefits from Alaska's commercial fisheries has led some to question the social-justice implications of their widespread reputation of sustainability (Loring, 2013; Richmond, 2013).

Other, noncommercial fisheries in Alaska include sport fisheries and personal use (subsistence) fisheries.[1] The former are managed as recreational in nature, allow only a limited daily catch, and are open to any participant; the latter are open only to state residents and are generally defined as for personal consumption and not for sale, barter, or trade. These noncommercial fisheries are highly valued by Alaskans, yet their overall contribution to the statewide food system and the extent to which all Alaskans enjoy equal ability to participate in these fisheries remain unclear.

Research Area and Methods

During the winter of 2011 we were approached by representatives of two community groups in the study region (figure 1), the Kachemak Bay Research Reserve (KBRR) and MAPP of the Southern Kenai Peninsula (MAPP-SKP, formerly the Southern Kenai Peninsula Communities Project), and asked to give a public presentation on food security. Food security emerged as a priority for these groups as a result of a multiyear strategic

[1] In Alaska, the word "subsistence" is legally defined and commonly attributed to uses of fish and game by Alaska Natives, although the state constitution ensures equal access to fish and game on state land for all state residents.

Figure 1. Map of the Kenai Peninsula Region of Alaska.
Major communities referred to in text are shown.

planning project that utilized the Mobilizing for Action through Planning and Partnerships (MAPP) framework.[2] During our visit, we also participated in two informal focus groups with representatives from KBRR and MAPP-SKP, as well as with other interested community members that included nurses and other community health practitioners, commercial fishermen, and representatives from the group Sustainable Homer. From these discussions one specific theme emerged: frustration with a lack of access to locally caught seafood. Participants described how if one does not fish for him- or herself, or does not know someone who fishes, it is extremely difficult to procure affordable, locally caught fish such as salmon and halibut. One important outcome of these meetings is unanimous support for research that evaluates access to local seafood and its role in food security, in order to identify both barriers to and opportunities for strengthening this component of the local food system.

[2] For more information on the MAPP process, which is not discussed here, see the National Association of County and City Health Officials' website at http://www.naccho.org/topics/infrastructure/mapp/index.cfm

The Kenai Peninsula is well known among Alaskans and tourists from outside the state for its productive salmon and halibut fisheries. Cook Inlet is a stretch of ocean that reaches 180 miles north from the Gulf of Alaska, along the west coast of the Kenai Peninsula, to the city of Anchorage. The associated watershed covers approximately 47,000 square miles (122,729 square kilometers) of the south-central portion of the state. It is home to all five species of Pacific salmon as well as over 400,000 Alaskans, more than half the population of the state. About 50,000 people live on the Kenai Peninsula itself, a land mass about 16,000 square miles (41,440 square kilometers), or half the size of Maine. Communities include the iconic fishing ports of Homer, Seward, Kenai, and Soldotna, as well as smaller, predominately Alaska Native and Russian communities, including Port Graham, Nanwalek, and Seldovia, which are not accessible by road in spite of their relative proximity to large urban centers.

In addition to local support for this research, the Kenai Peninsula provides an effective and strategic case study location because many of the sociocultural, economic, ecological, and geo-political circumstances and challenges found here are arguably representative of those found statewide. Though the region suffers from something of a reputation for affluence among many Alaskans, there are nevertheless many similarities in vital statistics among this region and the state as a whole (table 1). Per capita income, percent of the population below the poverty level, and food security rates, for example, all match statewide numbers. Additional parallels between the Kenai Peninsula and the state as a whole also exist: the region is home to communities that are on and off of the road system; renewable-resource industries such as fishing and tourism are hugely important, as are

Table 1. Comparative Details for the Kenai Peninsula and the State of Alaska

Vital Statistics [a]	*Kenai Peninsula*	*Alaska*
Population	56,293	722,718
Demography		
Caucasian	85.0%	67.9%
African American	0.6%	3.6%
Alaska Native/American Indian	7.5%	14.9%
Asian	1.2%	5.6%
Native Hawaiian	0.3%	1.1%
2+ Races	5.4%	7.0%
Unemployment [b]	9.3%	7.6%
Food Insecurity [c]	14.7%	14.6%
Children	20.4%	19.9%
Per Capita Income	US$29,127	US$30,726
Below Poverty Level	9.5%	9.5%

[a] Data presented here are for 2011 from the U.S. Cenus Bureau's QuickFacts website unless otherwise noted, http://quickfacts.census.gov/qfd/index.html, retrieved 09/12/2012.
[b] Unemployment data from the State of Alaska Department of Labor and Workforce Development Research and Analysis website, http://laborstats.alaska.gov/, retrieved 09/12/2012.
[c] Food insecurity rates are from Feeding America's Map the Meal Gap model, http://feedingamerica.org/hunger-in-america/hunger-studies/map-the-meal-gap.aspx, retrieved 07/12/2011.

contentiously debated extractive resource industries such as coal and offshore oil and now natural gas developments; and finally, more than 70% of the land on the Kenai Peninsula is federally managed, a proportion that approximates land jurisdiction for the state as a whole.

Methods

In order to better understand the state of household food security in the region, including the role of locally caught seafood, we distributed a survey via the U.S. Postal Service to 1,500 households randomly selected[3] from a list all 24,500 residential addresses on the Kenai Peninsula. Given the population of the region, we require a sample of least 381 responses to make strong inferences about the peninsula at large (Krejcie & Morgan, 1970), and we anticipated that response rate could be between 40% and 70% (AKDHSS, 2011b). Surveys were distributed following a modified version of the Tailored Design Method (Dillman, 2007). To improve response rates, we sent postcards notifying recipients that their address had been randomly selected and that they should expect a survey soon. With the survey we also included a one dollar bill as a token of appreciation. To further raise awareness of the study, we also arranged interviews on Kenai Peninsula public radio stations.

Respondents were asked to report if someone in their household fishes, and if so, to specify whether this includes fishing commercially, fishing for sport, fishing as a guide or charter, and/or fishing for personal use or subsistence. Next, they were asked to report if they consume locally caught fish or other seafood; for those with a positive response, several questions followed regarding how and where they obtain the seafood, that is, whether they fish for it themselves, purchase it at a local retailer, barter or trade for it, or receive it as a gift. We also asked about seafood consumption rates during the fishing season (defined as late May through September) and outside the fishing season (October through May), with options including: frequently (almost every day), sometimes (2–5 times per week), rarely (once or fewer times per week), and never. We also asked about fish waste, querying households whether at the beginning of the fishing season they had any seafood from the previous year, and if so, what they did with it (e.g., smoke or can it, feed it to dogs, give it away, throw it away, etc.).

To measure food security, the survey also included six questions about "coping strategies" (after D. G. Maxwell 1996; D. G. Maxwell, Ahiadeke, Levin, Armar-Klemesu, Zakariah, & Lamptey, 1999), which ask respondents to report how often in the last month they have taken actions such as reducing meal size or skipping meals because there is not enough food and/or so that someone else in their household can eat

[3] A random number generator was written in the statistical software package R (R Development Core Team, 2011) to select addresses from the list.

Table 2. Coping Strategies Questions
These six questions are intended to get at a range of possible coping strategies among respondents. The weights indicate relative severity of the strategy and are used as part of the calculation of the final score. Maxwell et al. (1999) recommends using focus groups to determine the most appropriate weighting, but funding limitations required us to set weightings based on the relative severity of dietary pattern disruption. Note that we do include a question on food preference (Q1), and weigh borrowing money for food (Q3), a strategy often associated with significant psychological stress, more than a modest portion reduction (Q2).

Question	*Weight*
1. In the last month, how often have you and your household eaten foods that are less preferred in order to make sure that everyone in the household could eat?	1
2. In the last month, how often has someone in your household had to limit their portion size in order to make sure everyone in the household could eat?	1
3. In the last month, how often have you had to borrow food, or borrow money to buy food, so that everyone in the household could eat?	2
4. In the last month, how often have you or another adult in your household limited their portion size specifically so that a child could eat?	2
5. In the last month, how often have you or anyone else in your household had to skip a meal because there was not enough food?	2
6. In the last month, how often have you or anyone else in your household gone an entire day without eating because there was not enough food?	3

(table 2). Frequencies allowed were: never (worth 4 points), rarely (once or fewer times per week, worth 3 points), sometimes (2–5 times per week, worth 2 points), and frequently (almost every day, worth 1 point). The monthly recall duration was chosen to in order to gauge food security at the time during the year that locally caught seafood is most likely being utilized; surveys were distributed at the end of September, and major salmon fishing activities in the region end in August.

One of the reasons we selected this coping strategies protocol is because it does not rely on prescriptive definitions of food security or insecurity, and as such is more accommodating to the less quantifiable social and cultural dimensions of food security (D. G. Maxwell 1996; D. G. Maxwell et al. 1999). Multiple variations of this protocol have been implemented and validated in different settings (e.g., Coleman-Jensen et al., 2011; USDA 2001b), although their appropriateness for Alaskan settings, and especially remote communities, is questionable. For example, the USDA (2011b) food insecurity protocol focuses on the availability of money to buy food, but in Alaska subsistence foods play an important role for households in both rural and urban settings (Bersamin, Sidenberg-Cherr, Stern, & Luick, 2007; Fazzino & Loring, 2009). Likewise, the USDA protocol also invokes the concept of a "balanced" diet, but this could be confusing to many in Alaska since foodways here are traditionally flexible and highly seasonal in nature (Wolfe & Bosworth, 1990). Likewise, use of the word "balanced" could lead some respondents to self-assess against their perceptions of government standards for nutrition, rather than in terms of their own traditions, preferences, and conceptions of health. As such, our six chosen questions focus primarily on food preference and disruption of meal patterns as cross-culturally relevant domains of food insecurity (after Coates, Frongillo, Rogers, Webb, Wilde, & Houser, 2006).

Responses to these six questions are tallied in such a way as to create a single, unit-less score in the range of 11 to 44, with 11 being food insecure and 44 being completely food secure. The formula for calculating food security is shown below:

$$Score = Q1\times1 + Q2\times1 + Q3\times2 + Q4\times2 + Q5\times2 + Q6\times3$$

We loosely define food insecurity as a score falling below 40, as this score indicates that respondents are enacting at least two of the lowest-weighted coping strategies, and or one or more of the more disruptive strategies. Note also that this scale is

intentionally not adjusted to begin at zero out of recognition that more severe forms of food insecurity and hunger are possible than can be captured by this instrument.

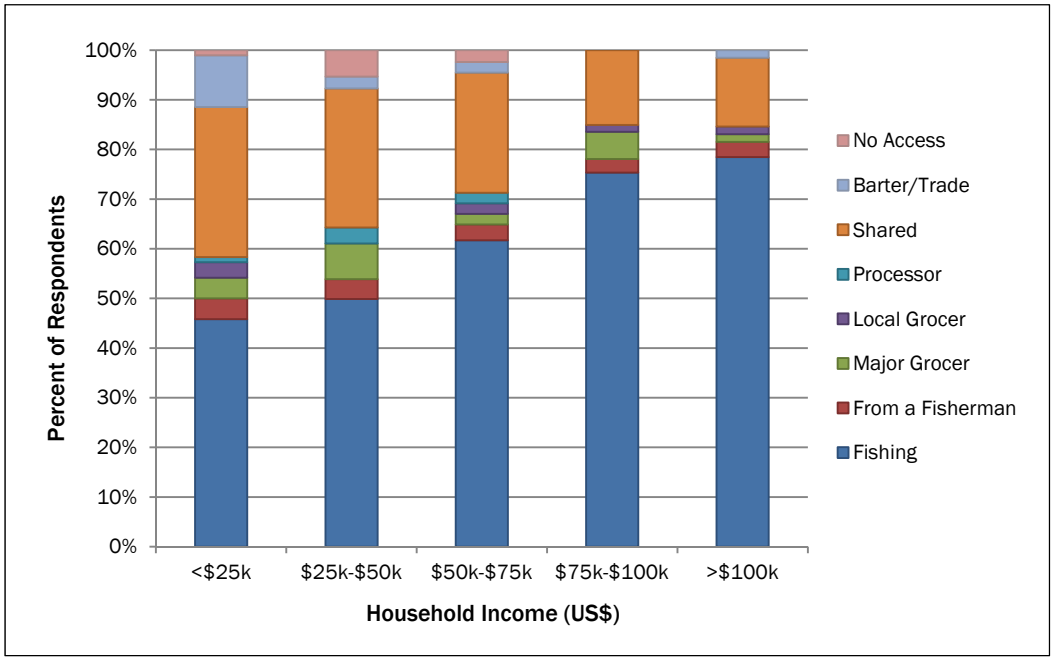
Other questions on the survey addressed household composition, income level, opinions regarding the sustainability of local fisheries, and whether respondents rely on some form of nutritional assistance such as the Alaska Food Stamp Program or the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).

Results

Of the 1,500 surveys mailed, 490 responses were received and 75 were returned as undeliverable, for an adjusted response rate of 34.38% and a confidence level greater than 95% that the sampled population is representative of the population of the Kenai Peninsula at large (Krejcie & Morgan, 1970). While the response rate for our survey (34.38%) is modest, and just below the Center for Disease Control and Prevention's low target of 40% for Alaska (AKDHSS, 2011b), our data for vital statistics such as household income distribution and food assistance rates match known statistics for the region, suggesting that our sample does not have a reporting bias (Dey, 1997). For example, median household income in 2010 in the Kenai Peninsula Borough according to the state of Alaska was US$57,000, and in our study, the median response fell in the US$50,000–US$75,000 range. Likewise, 11.8% of our respondents report receiving food assistance, which is on par with the state reported rate in 2011 of 11.2% (USDA, 2013).

We find that fishing and the consumption of seafood are both extremely common in the Kenai Peninsula. Nearly 95% of respondents report at least some access to local seafood, and 80% of survey takers report that someone in their household fishes, the majority of whom (66.5%) describe their primary fishing activities as for personal use and subsistence. Sport fishing is the next most common kind of fishing (42%), followed by a much smaller group of commercial fishers (7%) and guide/charter operators (2%). When asked to describe the role of salmon in their household, 67% report that it is an important part of their diet, 24% respond that it is an important part of their financial security, and 55% report that salmon are important to their community and/or culture.

Figure 2. Primary Method of Seafood Procurement, by Income (*N* = 490)
For those households with access to local fish, the primary method of procurement varies significantly with income level. Lower-income households share more and fish less than higher-income households. Noteworthy is that 10% of households at the lowest income level rely on barter and trade.



Fishing is not the only way that Kenai Peninsula residents obtain local

Table 3. Comparison of Food-Security Scores Among Households With and Without Access to Locally Caught Seafood

Household Income	*Food Security Score, With Fish*	*Food Security Score, Without Fish*	*Difference*	p
>US$25,000	39.19	36.32	**2.87***	**<0.01**
US$25,000–US$50,000	39.42	38.23	1.19	0.16
US$50,000–US$75,000	42.15	42.93	–0.78	0.26
US$75,000–US$100,000	43.32	43.42	–0.10	0.77
>US$100k	43.53	42.75	0.78	0.38
All	41.30	39.31	1.99	
ANOVA	F = 25.9	F = 16.02		
Correlation	0.50	0.71		

seafood, however. While 62% of respondents describe fishing as their primary method of obtaining local seafood, 23% report that sharing is the most common way they procure it. Very few of those with access to local seafood, between 2% and 5%, obtain this through one of the other means, such as purchasing local fish direct from a commercial fisher or purchasing from major or local grocers. This aligns with our observations and local complaints regarding the lack of local venues for purchasing locally caught seafood. Regarding the 5% of households without any access to local seafood, just over half (54%) are households in the US$25,000–US$50,000 income bracket, while 29% are in the US$50,000–US$75,000 bracket, and 17% are in the lowest (<US$25,000) bracket. No households at higher income levels report not having access to local seafood.

We also explored how procurement strategies vary by the respondent's socioeconomic details, and found a compelling, if not terribly surprising pattern (figure 2). Two-way ANOVA shows that household income has a statistically significant influence on the means by which survey takers report procuring local seafood ($p < 0.01$). Fishing, sharing, and barter/trade are found to be the primary sources of this variance. In other words, more low-income households rely on sharing as their primary source of locally caught seafood than do households at higher income levels, and conversely, more high-income households rely on fishing as their primary source of locally caught seafood than do lower-income households. We also find that barter and trade of local seafood, which is different from sharing in that it describes an explicit component of fair exchange of goods and services, is the primary method by which 10% of respondents at the lowest income level procure local seafood. This is notably higher than reported by respondents at all other income levels.

Food Security and Local Seafood

We find that 27% of respondents have a food security score lower than 40, and only 39% of respondents achieve a perfect score of 44. One specific hypothesis that we aim to test with this research is that there is a positive relationship between food security and access to locally caught seafood. In other words, we propose that households with access to locally caught seafood have greater food security than do those households that do not. To test this hypothesis, we first used a two-tailed Students T-test (table 3), and find a statistically significant increase in the mean food security score for those with access to locally caught seafood, but only at the lowest income bracket. Research shows, however, that household income and food security are likely to share a positive relationship (e.g., Kent, 1997), meaning that households with higher incomes also are likely to be more food secure. Indeed, our data show a weak ($r = 0.50$) overall correlation in the population between food-security score and income. To test access to local seafood as an intervening variable,

we also temporarily removed from the sample population those low-income households who report having access to local fish,[4] and then tested again for a correlation between food-security score and household income for this adjusted sample. Our hypothesis is that if access to locally caught fish has no intervening effect on the food-security score for low-income households, the strength of the overall correlation between food security and income should not change. We do find that the correlation coefficient between food-security score and household income increases ($r = 0.71$) when the low-income households with access to local seafood are excluded from analysis.

We also looked at how food-security scores vary by reported local seafood consumption frequencies during and outside of the fishing season. No statistically significant difference from the mean food-security score is found for those responding that they eat seafood frequently, sometimes, or rarely, but those who report never eating local seafood had an average score of 36, which is significantly lower than the mean for the Kenai Peninsula as a whole.

Regarding fish waste, 65.4% of respondents report having some fish left over from the previous year when the new fishing season begins. Of those, 30% smoke, can, or otherwise preserve it; 28.1% give it away; 17.6% use it for dog food; 11.9% donate it; 6.7% throw it away; 4% compost it; and 1.7% trade or barter with it.

Regarding the sustainability of Cook Inlet salmon fisheries, respondents are largely divided, with 35.02% responding 'Yes,' 18.57% responding 'No,' and 46.41% responding 'Not Sure.' Handwritten comments made by many survey takers in association with this question provide additional details regarding people's answers. A total of 125 respondents provided comments spanning a variety of topics, including mistrust of management, political influence on management, ecological observations, overallocation, and concerns regarding social justice. The two most common concerns are a mistrust of the management process (31 mentions), and concerns about the status of King salmon (30 mentions). Also noteworthy is a group of comments (35 mentions) that identify a specific group of fishers — commercial, personal use, or sport — as receiving an unfair allocation of the catch, and/or being specifically responsible for problems with the sustainability of the fisheries.

[4] We cannot test for a correlation between food-security score and household income for just those households without access to local seafood because this accounts for only 5% of our sample, and almost exclusively households at the two lowest income levels.

Discussion

The data described above confirm that there is a robust local seafood component in the Kenai Peninsula food system, and also suggests that access to local seafood improves food security in the Kenai Peninsula, most notably for low-income households. The latter finding is more encouraging than it is surprising; as we discussed earlier, the notion that local food systems can provide better food security outcomes is often an explicit objective of local food movements. Still, to our knowledge this research is among the first to provide empirical evidence in support of such an argument. Also noteworthy is our finding that the widespread use of local seafood does not appear to contribute significantly to food waste, which is an emerging and important issue for food systems and security research (Abdulla, Martin, Gooch, & Jovel, 2013).

However, we also find that a majority of local Kenai Peninsula residents, especially those at higher income levels, are harvesting local seafood themselves, while many households at lower income levels rely on alternative means, including but not limited to sharing, barter, and trade. This is noteworthy because it is illegal in Alaska to barter or trade with seafood obtained in sport and personal-use fisheries, implying that at least part of the local population has to resort to illicit means to achieve food security. Thus, the frustrations communicated to us by our local partners are neither isolated nor anecdotal, but rather are representative of a systemic shortcoming of the Kenai Peninsula's food system: while many rely on local seafood, some must do so creatively while others simply cannot.

It is noteworthy that there appears to be a gap in access to local seafood not at the lowest income bracket, but for those in the US$25,000–US$50,000 range, a bracket which has a lower than

average food-security score, but for which we do not find a significant effect of access to local fish on food security. A possible explanation involves food stamp eligibility; recipients of food stamps in Alaska are allowed to use these for the purchase of fishing equipment and supplies. It is possible that some of the households at that income level either do not qualify for food stamps despite their need, or they have negative or ambivalent perceptions of food assistance programs that keep them from taking advantage of the support (Daponte, Sanders, & Taylor, 1999).

What is missing from the Kenai Peninsula food system, we further argue, is a system of distribution and marketing that brings local seafood to local consumers at an affordable price, an assertion that refers back to the Trivette (2012) comment noted earlier: that "local food" entails more than simply eating food that is locally available, but rather must also involve a system through which local foods are produced and marketed with the intention that they reach local consumers. Alaskans take great pride in having a reputation for independence and self-reliance, but the case of the Kenai Peninsula shows that the regulatory framework for supporting this independence is designed around people feeding themselves, and as such, people without the ability, time, resources, or inclination to do so are left out. There are some inroads in the region for the development of local and regional seafood markets that are more accessible to people who currently lack the means to procure seafood. Locally caught fish are sporadically available at the Homer Farmers' market, for example, and this venue accepts both WIC and food stamps. Charter business operators sometimes donate seafood that has been left unclaimed or unwanted by their clients to regional food banks as well (L. Swarner, personal communication, June 21, 2011), but this obviously does not provide a reliable or predictable source of food. We have also heard reports of some local commercial fishers experimenting with direct and local marketing, for example, community supported fishing or "CS-Fish."[5]

A question remains, however, as to why more robust local markets for local seafood do not already exist if there is indeed a large but as yet unmet demand. Unlike agriculture in Alaska, the development of which is stalled in part by a lack of infrastructure (Gerlach & Loring, 2012), the Kenai Peninsula is already home to a number of small, seasonally operated businesses oriented around processing, packaging, and shipping seafood, although these are geared toward providing services to individual customers such as tourists rather than commercial markets. Anecdotally, fishers have provided us with a number of possible explanations for the lack of local marketing: some do not perceive demand as being sufficient because so many Alaskans fish for themselves; others explain that commercial fishing is a labor-intensive occupation that involves long days and little free time, such that fishers would need dedicated business partners to make such activities manageable and profitable; and others still cite difficult and expensive food-safety regulations and permitting requirements by the state of Alaska.

This is an issue of food policy and one that bears additional discussion and research, as working within the confines of one-size-fits-all food-safety policies has been a challenge for small-scale producers throughout the U.S. (Salatin, 2007). In Alaska, relevant policies address permitting and inspection of processing facilities and waste management practices by Alaska's Department of Environmental Conservation (Alaska Code 18 AAC 34), even when only minimal processing, such as removing the head and viscera ("heading and gutting"), is involved. Similarly, grocery store owners and managers across the state have reported to us that record-keeping requirements for traceability of fresh fish related to the U.S. Bioterrorism Act of 2002 and the U.S. Food Safety Modernization Act of 2010 are too burdensome for them to consider sourcing and selling local fish. Whether these and other relevant policies and regulations are indeed unnecessarily onerous — designed for large-scale industrial operations and as such prohibitively cumbersome or expensive for small-scale entrepreneurs — or whether these perceptions can be addressed with proper training remains to be evaluated, although some training and guidance materials on these policies is already available (e.g., Johnson, 2007).

[5] For example, see http://thealaskatrust.org/alaskans-own.php

An argument can be made, however, that policies could do more to support local food security and sovereignty through formal and informal local seafood markets, evidenced by the fact that so many respondents report obtaining fish through barter and trade, which as we note above, is currently illegal if these fish are obtained via personal use or sport fisheries. We speculate that the administrative categories that define (and delineate) personal use, sport, and commercial fisheries may be too inflexibly or indelibly drawn to allow for innovative solutions. For example, state and federal management agencies currently recognize only one class of commercial fishing, and the majority of these fisheries in Alaska are managed with tradable quotas or permits or some other such system for limited entry that are designed around large-scale, industrial fishing activities. Thus entry into these fisheries can be cost-prohibitive for new small-scale operators, and as such market forces arguably favor participation in global over local markets, especially for highly valued food fisheries such as those common in Cook Inlet. This is a challenge facing rural food systems across the world (Rosset, 2008), and policy solutions that instead favor food sovereignty continue to be elusive. One possible solution that might be explored is the creation of an artisanal class of commercial fishing that could be regulated independently from large-scale commercial fishing as a way to reduce the cost of entry and promote profitable small-scale fishing for local markets. If food sovereignty is the goal, creation of such a fishery would be an effective policy action in that direction.

On Sustainability

One final point of interest regarding the survey findings is that survey respondents were divided on the matter of the sustainability of Cook Inlet salmon fisheries. While perhaps not surprising to Alaskans who are quite aware of the region's reputation for conflict over fisheries, the findings are somewhat surprising with respect to the purported goals of local food movements. As stated earlier, one of the many assumptions made about local food systems is that they more closely connect people with the resources on which they depend, resulting in more sustainable outcomes. However, while participation in and reliance on local seafood are extensive across the Kenai Peninsula, confidence and expertise regarding the status of these resources is not. We speculate that this is related to ongoing political issues surrounding how local salmon fisheries are presently managed and allocated, but suggest also that this might be related to the individualistic nature of the current seafood harvesting regime. Commercial fishers often possess high quality ecological information about the status of fisheries, but personal-use fishers, by comparison, do not necessarily have the same opportunities for, and/or level of engagement with, fisheries, and therefore have less opportunity to develop informed ecological opinions (Loring, Harrison, and Gerlach, in press).

Concerned consumers, too, have limited access to information about ecosystem conditions and the sustainability of fishing practices, which accounts for the emergence of eco-labeling initiatives by groups such as the Marine Stewardship Council and the Alaska Seafood Marketing Institute. These programs are valuable, but their motivations are not always transparent and their standards do not necessarily align with the values sought out by consumers (Hébert, 2010; Loring, 2013). Improved local markets may also serve as an important mechanism for facilitating greater social engagement with and communication among commercial fishers and consumers, with the anticipated outcome being that consensus and awareness regarding environmental sustainability issues will improve. This notion is similar to the rationale behind the "know your farmer" movements,[6] situating local artisanal fishers not just as harvesters of local seafood, but also as respected observers and sentinels of marine ecosystems who can be held responsible for unsustainable or unsafe practices by their neighbors. We currently have ongoing ethnographic research with participants in these and other area fisheries to better understand how locals are informing their perceptions regarding sustainability.

[6] For example, see the USDA's Know Your Farmer, Know Your Food program at http://www.usda.gov/wps/portal/usda/knowyourfarmer?navid=KNOWYOURFARMER

Limitations of the Study

We recognize that food insecurity and other socio-economic circumstances may be clustered in certain communities, and that the by-mail survey method may result in underreporting for some the peninsula's smaller cultural groups such as the Russian Old Believers, for whom fishing is a hugely important livelihood strategy. Lack of funding precluded us from implementing a more aggressive survey distribution that would have provided more powerful data at the community or neighborhood level. As noted earlier, our response rate was slightly lower than hoped, but our results nevertheless suggest that we do not have a small sample bias. This being said, we are also aware that this research may not adequately represent the challenges faced by Alaska's homeless, itinerant, or otherwise dispossessed peoples.

Regarding the discussion of fish waste, there may be a self-reporting bias in our data, but the pattern of fish use is likely accurate. Also, Maxwell et al. (1999) note that the coping strategies protocol may overestimate the number of food-insecure households. As noted, however, the survey was distributed in the early fall with a one month recall period, the time of year that food security for those who rely on fisheries is arguably at its highest. Finally, due to limited resources we did not engage formal focus groups to determine the most appropriate weightings for the six coping strategies question. Instead, we selected questions that focused primarily on dietary disruption and selected conservative weightings when calculating food-security scores.

Conclusions

At the core of all local food movements is a desire among people to take control of their food systems, whether done under the heading of health, food security, food sovereignty, sustainability, or some other ideal. Many Alaskans already enjoy a fair amount of control over their diets, thanks in part to the liberal opportunities in the state for the personal-use harvest of wild fish and game, and in part to a frontier mentality that emphasizes self-reliance and libertarian values. Yet some in Alaska do not enjoy these same opportunities, among whom are the many people experiencing the nutrition transition described earlier. Our data for the Kenai Peninsula provide evidence that the individualistic strategy for food procurement common in Alaska contributes to food security for some, but shortcomings for many remain. The widespread uncertainty among locals about the status of Cook Inlet fisheries and the widespread reliance on ostensibly illegal barter and trade for the lowest income levels are two caveats to the self-reliance purported by so many. More disconcerting, however, are the social-justice concerns related to those who do not share in the benefits of these fisheries. As discussed above, our working assumption is that this problem can be addressed through local and regional marketing and policy innovations designed with the explicit intent of bringing commercially caught local seafood to local consumers. The challenges for commercial fishers so inclined to contribute to such an experiment are likely no different than their agricultural counterparts: how to escape the "lock-in trap" of global food commodity markets and regulatory systems that favor industrial business models and economies of scale, while still making a fair living for themselves and their families. What we hope this work has contributed to the discussion of local and small-scale food movements is evidence that, while many around the world are works in progress, their aims and objectives appear both realistic and worthwhile.

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Northern food networks: Building collaborative efforts for food security in remote Canadian Aboriginal communities

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Abstract

Canada's northern and remote regions experience high rates of food insecurity, exceptionally high food costs, environmental concerns related to contamination and climate change, and a diversity of other uniquely northern challenges related to food production, acquisition, and consumption. As such, there is a need to understand and develop strategies to address food-related concerns in the North. The diversity of communities across the North demands the tailoring of specific, local-level responses to meet diverse needs. Over the past decade, local networks have emerged as a powerful method for developing localized responses, promoting food security and the development of more sustainable food systems across Canada and North America. Despite this, there is a paucity of research examining challenges and effective approaches utilized by these local networks or their potential applicability for building food security in rural, remote, and northern communities. This research utilized participant observation as a method to examine the experiences of a Northern Canadian food security network. The experience of this network points to strategies that can lead to successful collaborative approaches aimed at implementing programs to address food security in northern and remote communities.

Keywords

collaboration, community food assessment, industrial development, network, northern, remote

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Introduction

Canada's northern and remote regions experience high rates of food insecurity, exceptionally high food costs, environmental concerns related to contamination and climate change, and a diversity of other uniquely northern food-related challenges. The diversity of communities across the North demands the tailoring of specific, local-level responses to meet diverse needs. Over the past decade, local networks have emerged as a powerful method for developing localized responses and promoting food security and the development of more sustainable food systems across Canada and North America. Despite this, there is a paucity of research examining challenges and effective approaches utilized by these local networks or their potential applicability for building food security in rural, remote, and northern communities. This article examines the experiences of a Northern Canadian food security network in an attempt to understand strategies that can lead to successful collaborative approaches to address food security in northern and remote communities.[1]

To contextualize the unique experiences of remote communities, we begin this article with an examination of existing evidence of food security issues in Northern Canada. This leads to examination of a community-led food assessment (CLFA) process[2] utilized in a northern community to assess food security concerns and create an action plan. We then describe the application of non-ethnographic participant observation as a method to examine the approach utilized by a Northern Canadian food security network to implement the action plan defined in the CLFA process. The experience of this network points to strategies that might lead to successful collaborative approaches aimed at implementing programs to address food security in northern and remote communities.

Food Security in Northern Canada[3]

Northern and remote Aboriginal communities in Canada experience numerous unique factors limiting their ability to achieve food security. Many northern communities utilize a combination of store-bought foods, foods grown within or near communities, and "country foods"[4] to meet nutritional needs (Ferguson, 2011). Limiting factors on food security are related to all of these food acquisition methods.

Long-distance transportation to remote areas has a significant impact on the availability, quality, and cost of store-bought foods. Fuel and other costs associated with food transportation contribute to food costs that are significantly higher than those found in Canada's urban centers (Aboriginal and Northern Affairs Canada, 2008; Boult, 2004; Myers, Powell, & Duhaime, 2004). While food costs are higher in all of these communities when compared to their southern counterparts, costs in less accessible northern communities are even higher than costs in northern "service centers." Increased food costs are not consistent across the North such that more remote communities (such as Old Crow and Pangnirtung) experience much higher costs than those found in remote service centers such as Yellowknife, Inuvik, and Happy Valley–Goose Bay.[5] Issues related to the high costs of retail foods are further complicated for the significant number of low-income households who

[1] For the purpose of this research we define success of a food network or coalition as the accomplishment of tasks and goals which the collaborative has set for itself

[2] The Community Food Security Coalition (n.d.) defined the basic concept of a "community food assessment" as "a participatory and collaborative process that examines a broad range of food-related issues and resources in order to inform actions to improve the community's food system." (Community Food Security Coalition, 2012). In Canada, several provincial level initiatives, including the Food Security Network of Newfoundland and Labrador, elaborated on this concept to define community-led food assessments as community food assessments that are primarily designed, implemented, and authored ("led") by residents of the community.

[3] For the purposes of this research we define "Northern Canada" according to Statistics Canada's delineation of the North; see (McNiven & Puderer, 2000).

[4] Many northern, rural, and remote communities use the term "country food" to refer to foods acquired through hunting, fishing, and gathering.

[5] Examination of the data provided by Aboriginal and Northern Affairs Canada indicates a trend when comparing "service centers" with smaller and more isolated communities; see (Aboriginal and Northern Affairs Canada, 2008).

face additional economic pressures in accessing healthy foods in the North (Boult, 2004; Myers et al., 2004).

In addition to the high cost of food, quality and availability are also concerns (Boult, 2004; Myers, et al., 2004). A survey of food quality and availability conducted in Labrador in 2001 revealed significant concerns related to the quality of perishable foods found in local stores (Ladouceur & Hill, 2001). Ladouceur and Hill (2001) indicate that 80% of respondents also reported poor availability, indicating that there was never or only sometimes enough variety of fresh fruits and vegetables available for purchase. Additional cultural and socioeconomic factors complicate issues of cost and availability. These include knowledge about how to prepare different foods, a limited range of choices for different foods, and the ability to prepare and consume healthy foods (Beaumier & Ford, 2010; Myers, et al., 2004).

A variety of factors limit the ability to produce or acquire food through gardening, farming, and fishing in northern communities. Short to non-existent growing seasons, light levels, permafrost, and poor soil quality impact the capacity to grow food (Jóhannesson, 2012; Juday et al., 2010; Leahey, 1954). Some communities experience difficulty in accessing safe water for irrigation due to a variety of issues such as the impact of industrial development, mining, and hydroelectric projects on water quality (Airhart, Janes, & Jamieson, 2011; Jóhannesson, 2012; Myers, et al., 2004; Thompson, 2005). Access to agricultural and fishing supplies is also limited, in terms of cost and selection, due to transportation issues which are similar to those that impact the cost and availability of store-bought foods (Airhart, et al., 2011; Jóhannesson, 2012)

The ability to access country foods is also coming under increased pressure. Traditional food access provides significant nutritional and social benefits (Boult, 2004; Chan et al., 2006; J. Ford et al., 2007; J. D. Ford, Pearce, Duerden, Furgal, & Smit, 2010; Myers, et al., 2004; Thompson, 2005). Impacts of climate change and environmental pollutants are affecting plants and wildlife as well as access to traditional hunting, gathering, and fishing grounds (Boult, 2004; Meakins & Kurvits, 2009; Myers, et al., 2004; Thompson, 2005). Socio-economic issues also affect access to country foods due to challenges such as the: costs of hunting, fishing, gathering supplies; ability to adapt work and school hours to seasonal harvesting periods; and loss of traditional knowledge about acquiring and preparing country foods (Boult, 2004; Chan, et al., 2006; Myers, et al., 2004).

Store-bought, "locally" produced, and country foods are the three main sources of food for northern communities. However, due to interrelated cost, quality, and availability barriers, northern communities do not have adequate access to these primary food sources. Despite the interrelationships, there has been fairly little examination of northern food issues from a "food systems" perspective.[6] A few examples of northern food systems studies are beginning to emerge. However, there exists little in terms of studies that document collaborative approaches used to formulate and implement food systems approaches in the North. With the exception of a handful of articles in the scholarly literature, there is also a paucity of information on local-level food collaboratives in general, or in the varied forms of food coalitions, networks, councils, or committees.

Addressing the Delivery of Essential Services through Collaborative System-level Governance

As a basic and essential human need, access to healthy, affordable food is critical to creating healthy and sustainable communities in the North. However, government oversight of food-related issues is often fragmented, having little cohesive oversight at municipal, regional, and provincial levels.

An examination of food-related governance structures provides some insight into issues of fragmentation. Today when we think of food production and consumption we are assailed by a multitude of industries. We have food production with separate agriculture and fishery sectors, food industry with a multitude of processing and packaging sectors, food sales with marketing, retail,

[6] "Food systems" perspectives are defined as approaches that recognize the interrelatedeness of all aspects of food issues.

wholesale, and hospitality sectors, and finally waste-management sectors that deal with disposal or recycling of food wastes. There are sectors that each deal separately with labor, the various types of agriculture (fruit, vegetables, grains, dairy), food transportation, food safety, food culture (food TV, food magazines, food websites), school food, and diet-related health issues. Understanding the connections among all of these sectors has become a complex and daunting task.

Added to this breakdown, division, and separation of food activities is the fragmentation of the political and decision-making structures surrounding food issues. This fragmentation is apparent when we look at the number of regulatory institutions made solely and independently responsible for different food-related activities. There are departments of agriculture, trade, waste management, labor, communications, tourism, transportation, and health, to name a few. All of the various food-related government and industry bodies create policy and regulations to govern their own sectors of these critical systems.

Fragmented governance and industry oversight creates policy vacuums, where the absence of collaborative planning for food leaves gaps, duplication, and inadequacies in decision-making processes (Pothukuchi & Kaufman, 1999, 2000). This occurs among decision-making bodies at all geopolitical levels: municipal, regional, state (or provincial), federal, and international. For communities in Canada's north, inadequate funding and capacity at municipal levels to plan for and coordinate food services exacerbates the situation.

What becomes apparent is that, despite the significance of food to healthy development in Canada's north, current governance structures are not able to provide coordinated oversight for growth, changing needs, and circumstances. As such, there is a need to develop collaborative governance structures that can provide flexibility to adapt to the changing needs and circumstances of diverse and rapidly changing northern communities.

There is some promising evidence to suggest that collaborative, systems-level approaches, in the form of food councils, networks, and coalitions, can help to facilitate the development of healthy food systems (Dahlberg, 1994; Dahlberg, Clancy, Wilson, O'Donnell, & Hemingway, 1997; Harper, Shattuck, Holt-Giménez, Alkon, & Lambrick, 2009; McNiven & Puderer, 2000; Schiff, 2007; Yeatman, 1994, 1997, 2003). The applicability, however, of such approaches in northern or remote communities remains largely unexplored. This research examines the experiences of a food security network in Happy Valley–Goose Bay, a remote community in Central Labrador. This network employed a food systems perspective to develop a community food assessment and implement its recommendations. The experiences of Happy Valley–Goose Bay illustrate the nature of food security–related stress in northern and remote communities. This paper aims to analyze the strategies that were used to develop community-based collaborative approaches to reduce food insecurity, as well as programs implemented to address the identified priorities.

Research approach and methodology

This research utilized non-ethnographic participant observation as a primary method. Participant observation is a valuable approach when a researcher is interested in gaining access to a "backstage culture" (DeMunck & Sobo, 1998, p. 43). Kawulich (2005) explains five reasons for use of participant observation, as described in LeCompte and Schensul (2010, p. 91):

- to identify and guide relationships with informants;
- to help the researcher get the feel for how things are organized and prioritized, how people interrelate, and what are the cultural parameters;
- to show the researcher what the cultural members deem to be important in manners, leadership, politics, social interaction, and taboos;
- to help the researcher become known to the cultural members, thereby easing facilitation of the research process; and
- to provide the researcher with a source of questions to be addressed with participants.

Use of participant observation as a research method, according to those rationales, allows researchers a closer and more in-depth understanding of group dynamics. For that reason, and in the case of non-ethnographic applications, this method is particularly favored in organizational research (Iacono, Brown, & Holtham, 2009). Iancono et al. (2009) indicate that "sometimes participant observation arises from an ongoing work situation" (p. 42) as was the situation with our research. The researchers were members of this particular food network prior to and following this research. This situation is not uncommon in participant observation research. Iancono et al. (2009) describe typical situations and the value of this methodology in such situations in which members of organizations:

> are called upon to manage problematic situations characterised by indeterminacy, uniqueness and instability. Schon (1991, quoting Ackoff, 1979) appropriately terms such situations *'messes.'* The best professionals are able to make sense of these *'messes,'* discern patterns, identify deviations from a norm, recognise phenomena and adjust their performance. Such processes may be intuitive, tacit, unconscious. The author terms this *'reflection-in-action.'* (p.42)

As such, this paper presents a "reflection-in-action" arising out of a year of participant observation with a food network in a northern, remote community. The food network is an unincorporated organization that was formed during a CLFA process. Membership includes representatives of a variety of sectors (such as housing, health, and education) as well as members of the general public who are interested in food security issues.[7] Dr. Schiff is part of this informal network as a community activist and academic engaged in food security concerns through project-based activism.

Dr. Schiff, a long-time food security activist, became involved with the network when she moved to the region, shortly after the CLFA process and report were completed. The importance of research *on* the innovative and important work of the network was immediately obvious. With the knowledge and support of fellow network members, Dr. Schiff began the participant observation research early on during her engagement with the network. Dr. Brunger, an anthropologist and experienced participant-observation researcher working with communities in the area, was brought in to contribute to the research by explicitly engaging Dr. Schiff in self-reflective scrutiny of the work of the network and of her dual role as community member/activist and researcher.

Methodologically this research engages the community in participatory action research, but in this case, the community engagement preceded the intent to conduct research. Research Ethics Board (REB) review was not required for this participant observation research, and in keeping with the 2nd edition of the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS 2) (Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, and Social Sciences and Humanities Research Council of Canada , 2010), Canadian Institutes of Health Research (CIHR) (2008), and National Aboriginal Health Organisation (NAHO) (2003) guidelines, Aboriginal community consent was not sought, as the research was not conducted specifically with Aboriginal communities. However, informal consultation and support from Aboriginal community members of the network was ongoing (in keeping with Brunger & Bull, 2011). This research, like the activism itself, is grounded in an explicit critique of historical relations of power within the region. Constituencies are not represented within the network, but food security issues affect those communities that have

[7] The network is not incorporated and has no legal structure and (at the time of writing this article) had no formal relationships with any incorporated organizations. The network identifies a project and a potential funding source, then identifies an organization with which to partner in a funding application. The partner organization holds the funding, but the network directs how the funding is used. For example, funding for the network coordinator position is distributed directly from the partnering nonprofit organization to the coordinator.

Figure 1. Transportation Map of Labrador

Map provided courtesy of R. Sparkes.

been most negatively impacted by a long history of colonialist economic and social policies at various levels of government. Therefore, while the research was not "with" any given Aboriginal community, food security issues are more deeply felt in some communities than others.

Appreciation of the need for ongoing negotiation of the collective risks of research was a key feature of the participant observation research. In particular we paid attention to moments when possible changes to risks and benefits of the research in relation to particular communities might shift whether and how collective consent should take place (as described in Burgess & Brunger, 2000; F. Brunger & Weijer, 2007). The authors, through their work with the Labrador Aboriginal Health Research Committee,[8] are constantly engaged in the process of discussing the implications of this and other research for Aboriginal communities specifically and generally: There is an explicit understanding that if results implicate particular Aboriginal communities or groups, those results would be discussed with those communities and disseminated with the support of community leadership.

Community Description

Happy Valley–Goose Bay (HVGB) is a remote, northern town located in the Lake Melville region of central Labrador. With a population of approximately 7,500, it is the largest community in Labrador and serves as the administrative center for the region. HVGB is the only community with a direct link to all communities in Labrador by sea,

[8] The Labrador Aboriginal Health Research Committee (LAHRC) is a group composed of representatives of all the Aboriginal communities in Labrador to support research activities designed to assist Labrador Aboriginal communities and organizations in their efforts to promote healing, wellness, and improve health services in their communities. The authors are each invited non-Aboriginal members of the LAHRC.

air, or (unpaved) road. As such, it is a hub for those traveling within Labrador and between Labrador and Canada's major urban centers. Figure 1 illustrates the town's situation within Labrador as a hub for transportation and service delivery.

Due to the town's strategic role as a service center, people from other communities within Labrador come to HVGB for varying periods of time to access services. HVGB is a primary location for residents of Labrador to access health and dental care; make court appearances; visit relatives who are located in the HVGB area; commute to jobsites; access retail and banking services; and access other provincial, federal, and Aboriginal government services. Inuit and many Inuit-descendent communities along Labrador's Atlantic Coast, as well as the Innu First Nation communities of Sheshatshiu and Natuashish, rely on HVGB for essential services. It is a primary location for private- and public-sector regional or headquarter offices, including those of the provincial government, Aboriginal governments (Nunatsiavut government, NunatuKavut Community Council), and Labrador-Grenfell Regional Health Authority.

While many food security issues are generalizable across the North, a diversity of communities and cultures also points to unique issues for individual regions and municipalities. A 2011 report on food security in HVGB details some specific evidence of their effect in the Central Labrador region (Airhart, et al., 2011). The report details high food costs, poor quality of perishable food items, limitations on agricultural production and fishing, and decreased access to country foods as significant limiting factors to food security in the region. These issues are described in more detail below to provide an understanding of the ways in which that community experiences food insecurity. It also provides context for the development of a collaborative entity to address these concerns.

Upper Lake Melville Community Led Food Assessment[9]

Similar to most other northern and remote communities, HVGB experiences challenges related to food accessibility, adequacy, and affordability. In 2010 the Food Security Network of Newfoundland and Labrador (FSN-NL), a nonprofit umbrella organization for food security initiatives in the province, received funding from the provincial government to support an investigation of food issues in the Upper Lake Melville[10] region. A CLFA was conducted during 2010–2011. The year-long process, which commenced in July 2010, was designed to be a community-driven process, whereby community opinions, priorities, and solutions to food security issues informed the resulting projects. In staying consistent with the values of "community-led" food assessments, a resident of the Lake Melville region who had experience and knowledge regarding food issues was hired as project coordinator. The coordinator was supported by the regional health authority, the FSN-NL, and a local steering committee that was formed to advise and oversee the research. The steering committee was composed of a cross-section of food system representatives, including producers, consumers, and various government and nonprofit agencies. Prior to the CLFA no similar committee, composed of a cross-section of food systems representatives, had ever existed in the region.

The coordinator utilized several types of information-gathering techniques. These included an environmental scan, surveys, focus group discussions, media interviews, and public information sessions, as well as interviews with a diverse range of stakeholders (health workers, dieticians, food producers, food retailers, health promotion workers, school board officials, teachers, college students, parents, clergy, community workers, food bank operators, rural development workers, town council members, fishers and hunters, gardeners, and residents of government housing neighborhoods).

A report was produced on the outcomes of the CLFA (Airhart, et al., 2011). It provides a general overview of the geography of the region as well as

[9] This section is based heavily on Airhart et al., 2011.

[10] The Upper Lake Melville region encompasses the communities of HVGB, Mud Lake, Sheshatshiu Innu First Nation, and North West River. HVGB is, by significant measure, the largest of these communities and acts as the service hub for those other small communities in the region.

demographic, economic, and select health indicators for each community and for the region as a whole. This section includes some description of food-related health indicators providing evidence to suggest poor nutrition among residents, high obesity rates, and well above-average prevalence of diabetes.[11] These findings suggest food insecurity issues similar to those found elsewhere across the North. The report also provides an overview of the food system in the Lake Melville region, including an assets and gaps analysis of the regional food system, a "community action plan," and a process for evaluating implementation of the plan.

There are three primary sections of the report that contribute to an overall description of the regional food system. These sections focus on "the cost of healthy eating"; "community food production"; and "community food access and distribution." The cost of healthy eating section of the report identifies food costs as a primary concern. Although costs are lower than those in more remote communities, retail food prices are still higher than those in "southern" and more accessible regions of Canada. High food costs are identified as especially concerning for those living on low incomes who might have to make choices between paying rent and buying groceries or for parents who skip meals to ensure that their children will have enough to eat.

The report indicates that the Lake Melville region experiences a variety of challenges and strengths related to community food production. Climate, natural soil quality, watershed condition, and availability of land present a variety of barriers. These are further complicated by water and soil quality concerns due to contamination from industrial development and former waste disposal practices at the Goose Bay Canadian Forces Base. Despite the existence of several farms in the area, producers are challenged by environmental conditions as well as government policies that restrict the ability to develop land for agriculture.

The report also discusses strengths and challenges with regard to fishing and traditional food access. Many Innu, Inuit, and Inuit-Métis residents in the region identify access to country foods and use of traditional hunting and gathering practices as being significant to their physical and emotional health. Primary concerns identified in the report focus on loss of traditional knowledge. These activities are also limited due to issues related to climate change and concerns about environmental contaminants resulting from industrial development activities.

A few challenges are identified in relation to what the report refers to as "community food access and distribution." One of the primary challenges faced by low-income earners is the distance between low-income housing areas and grocery stores. Much of the social (often government-supported) housing in the Upper Lake Melville region is not within walking distance of grocery stores, meaning that many residents depend on convenience stores for their food purchases. Another challenge relates to the range of food items available for purchase at grocery stores and other food outlets. The report indicates that freight costs are a limiting factor in the ability of the two major retailers to provide a diverse range of products.

Initial data-gathering techniques for the CLFA were followed by a community-based priority-setting process. A list of community priorities was compiled based on the information that came from the earlier data collection. Community members were then brought together in various settings to discuss these priorities and to decide which ones they considered most important, which were achievable, and how to implement action plans to address these priorities. The report indicates that six priorities were identified by the community through the research:

1. Development of a community farmers' market;
2. Incorporating food-growing and nutritious food preparation skills into the education system;
3. Creation of community gardens (particularly in low-income neighborhoods);

[11] The report provides a detailed and lengthy discussion of food-related health indicators and their impact on individual and community health and well-being.

4. Supporting and teaching wild food harvesting and preserving skills;
5. Increasing community capacity for growing, preserving, and cooking; and
6. Creating a gleaning and good food box program.

Following identification of these priorities, the report lays out a community food action plan that describes each priority in further detail. An additional priority, "barriers to farming and new farmers," was also added in this section of the report. The action plan also identified inputs, activities, outputs, and expected short- and long-term outcomes for each priority. The report concludes with a process to evaluate implementation of the plan according to key indicators and evaluation methods for each of the expected short- and long-term outcomes.

Lake Melville Food Security Network

Following the launch of the report, the cross-sectoral steering committee that had been formed to oversee the CLFA remained in place to become the Lake Melville Food Security Network and to work on implementation of the priorities. Funding for the CLFA process also extended for several months after the launch of the report so that the CLFA project coordinator was able to stay in a paid position to drive implementation of the priorities. Extension of the paid coordinator into the implementation phase was critical in terms of bridging from research to action, carrying through critical knowledge and relationships built during the CLFA process. During the first year, the food security network was able to fully or partially implement five of the six CLFA priorities.

The first priority, a community farmers' market, was established during the final stages of the CLFA in June 2011, after it had been identified as a top priority. The market grossed CDN$28,629 in sales during the nine-week period that it ran, with local food producers generating 42% of the sales and 2,195 participants attending the market over the course of the nine weeks. The market also provided a venue for canning and preserving workshops with community residents, which helped to address the fifth CLFA priority. For the second year of market operation, the food security network received additional funding to expand market hours and include a café. A significant portion of this funding came from government (a crown corporation) and businesses which had been investing in the community in anticipation of an upcoming hydroelectric project in the region.

The second priority, which focused on food growing and nutritious food preparation in schools, also met with immediate success. A children's community garden was established on centrally located town property provided by the municipality of Happy Valley–Goose Bay. Approximately 150 children from the elementary and middle schools took part in the community garden project, where they received instruction on planting seeds, tending the garden, and harvesting. This was followed by a harvest celebration where the children used the produce from their garden to create a nutritious school lunch. The principals of both schools expressed support and enthusiasm for continuation of the project in future years. Funding was secured to build on the project in the second year through incorporation of a greenhouse facility and additional growing stations in the schools. The food security network was also approached by the principal of the middle school to investigate possibilities for nutritious food preparation programs. This resulted in after-school programming involving a variety of food-related workshops in the middle school and expansion to the elementary school.

The third priority, creation of community gardens, also met with success. In addition to the children's garden, in 2012 Newfoundland and Labrador Housing Corporation provided the food security network with a vacant block of land in a low-income area of Happy Valley–Goose Bay. This opportunity was facilitated by the corporation's representative on the food security network. Funding provided through a "Wellness Grant" from the provincial health ministry provided support for involvement of low-income seniors in the garden project. Two community kitchens were established in the same low-income neighborhood, further supporting the fifth priority. The kitchens attracted several hundred participants in the first year. They were run collaboratively by the CLFA coordinator and a Health Canada nutritionist. Operation of the

kitchens was also supported through food donations from local food retailers and provincial funding from the Newfoundland and Labrador Housing Corporation.

Challenges and Future Directions

While the network met with considerable success, it experienced a few questions and concerns that are critical to consider when understanding the scope and capacity of its work. A variety of challenges were subsumed by what appeared to be one most significant challenge, which arose only after the network had implemented most of its priorities. This was the broader question of determining what type of organization it wanted to be, based on options available to the group at the time: unincorporated association, incorporated nonprofit, subcommittee of an incorporated organization, or subcommittee of a government department. This question arose primarily due to questions of funding and project implementation. Throughout its existence, the organization had worked to develop project plans and acquire funding, which would then be passed over to another organization that would administer the program or activity. This approach had worked quite successfully and contributed to its success. There was an interest, however, among some members for the network to acquire its own funding and implement projects independently. The network had also run into obstacles, on occasion, where it was unable to avail itself of opportunities or funding due to its inability to identify a suitable and willing incorporated body to take on a particular project.

Despite these obstacles, the network had concerns about changing its status. On one hand, members felt that "joining" an existing organization, in the current governance context, would impact its ability to maintain autonomy and a food systems approach. The network also felt that the reasons for incorporation were not yet strong enough and that, despite the lack of incorporation, it had still been able to maintain a degree of formality and carry out most of its objectives. Ultimately, the network decided to maintain its existing form. It did, however, draft an application for incorporation, including constitution and bylaws, in the case that it ever needed to swiftly incorporate to take advantage of a significant funding opportunity.

Another related challenge was the lack of secure funding for the coordinator position. Concern over stability of funding to ensure paid staff support is common and a primary concern among many food coalitions, networks, and councils (Harper et al., 2009; Schiff, 2007). In this case, the network was fortunate in that the coordinator was a key "champion" of food security initiatives and continued to provide volunteer (unpaid) support through times when there was no funding for a paid position. In the absence of such a champion or in the event that a champion was not able to provide unpaid support, it is doubtful that the network could have implemented as many projects within such a short timeframe. Another fortunate funding circumstance for the network was the presence of a key member representing a nonprofit, community development organization. Through that member's interest in and support of food security initiatives, the network was able to garner in-kind and monetary support that was key in the implementation of several priorities. The network would not have ceased to function without these valuable community champions, but its ability to implement priorities would have been hindered and delayed.

A final challenge related to the ability of the network to engage outside of HVGB, with the broader Upper Lake Melville region. While the CLFA report indicated engagement with the whole of the Upper Lake Melville region, much of the network's initial project activities occurred within the municipal limits of HVGB. Although the network consciously sought opportunities to implement projects in the other communities in the region, few arose outside of the HVGB municipal area. This might have been due to a few factors. Programs in HVGB reached a broad range of Upper Lake Melville residents, reducing the need, for example, to implement a second community market in one of the other communities. There might also have been interest in establishing success in certain programs in HVGB, such as community gardens and food education in schools, before attempting implementation in the region's smaller communities.

Despite these challenges, the success of the Lake Melville Food Security Network in implementing most of the CLFA priorities within one year is noteworthy. It is the process and factors involved in the success of this collaborative effort that are particularly notable in providing guidance and strategies that might be utilized in other northern or remote regions for building successful CLFA processes and community food security networks.

Lessons Learned: Strategies for Success in the Development of Northern Food Networks

Food systems networks, councils, and working groups often encounter a variety of organizational, procedural, and external factors that can support or hinder success. Many of these factors are documented in existing scholarly literature (Clancy, Hammer, & Lippoldt, 2007; Dahlberg, 1994; Dahlberg et al., 1997; Hawe & Stickney, 1997; Lang, Rayner, Rayner, Barling, & Millstone, 2005; Schiff, 2005, 2007; Webb, Pelletier, Maretzki, & Wilkins, 1998; Yeatman, 1994, 1997) and reports found in the grey literature (Boron, 2003; Harper et al., 2009). These works are mutually reinforcing and have created a theoretical basis for understanding the ways in which local food councils and networks operate. The experiences of the Lake Melville Food Security Network are particularly noteworthy, however, as they point to additional factors not yet covered in existing literature, particularly with respect to success and the viability of such organizations in northern, remote, and Aboriginal communities.

The experiences of this network warrant attention particularly due to its success with addressing priorities and actions set forth in the community plan. The priorities and action items identified in the plan were not insignificant tasks for a northern community (such as starting a famers' market and school gardening program), yet the group was able to address most priorities within a year of implementation. This is a remarkable feat when compared with the documented experiences of food policy councils, which can struggle for years to gain structure and implement priorities (Schiff, 2007; Yeatman, 1994). It is the processes and factors involved in the success of this collaborative effort that are particularly noteworthy in providing potential guidance and strategies which might be utilized in other northern and remote regions for building successful approaches for food networks, councils, coalitions, or other collaborative efforts for community food security.

The experiences of the Lake Melville Food Security Network point to four critical factors in building capable, resilient, and effective collaborative structures: cross-sectoral membership with private-sector engagement; "tilling the ground"; flexibility and working with opportunity; and utilizing quick wins to build political capital. It should be noted that this analysis posits that all of these factors were critical to the work of this group, and that no factor takes precedence or importance over any other. What follows is a brief description of these approaches and their benefits for building successful collaboratives.

Cross-sectoral membership with private-sector engagement

The food security network took an intentionally cross-sectoral approach, engaging partners from a multitude of sectors and from various levels of government and nonprofit organizations. The diversity of membership brought through a cross-sectoral approach allowed members to learn about an issue, challenges, and potential solutions from a diversity of perspectives, stimulating innovation and new solutions. Engagement across sectors is a common or standard approach in food councils and food networks. What makes the approach of Lake Melville Food Security Network noteworthy is that, although formal membership in the organization was essentially limited to the public sector, there was conscious and targeted engagement with the private sector.

The network formed a variety of partnerships with private-sector interests, two of which are particularly noteworthy. The first was a partnership with the regional economic development board. Although the economic development board was a government-funded nonprofit organization, it provided a bridging role, assisting the network in building partnerships with private-sector entities.

The other noteworthy approach to private-sector engagement was in direct relationship to major development projects, specifically a major hydroelectric project and renewed interest in uranium exploration in the region. Private-sector entities that were embarking on these major development projects[12] were searching for opportunities to invest in public welfare and community health. The food security network identified opportunities to utilize this interest to obtain funding, resources, and other forms of support for implementing priorities in community plans. Most importantly, the network was able to take advantage of such resources while maintaining autonomy in its decision-making processes. Engaging with businesses and developers in ways that maintain public ownership and autonomy of the group may be a useful approach for other northern communities undergoing rapid economic growth and experiencing the pressures associated with large-scale industrial development.

Tilling the ground through CLFAs

The CLFA process contributed significantly to the capacity of the food security network to implement its priorities. The activity surrounding the CLFA raised awareness throughout the community and created an environment of heightened interest in food issues, a critical approach in isolated communities where knowledge of the discourses of (community) food security is still limited. Essentially, the CLFA process was "tilling the ground" for the cultivation of partnerships, community concern, understanding of the issues, and investment in solutions. It clearly laid out a variety of community assets, gaps, and priority issues to focus the group's activities. The action plan produced through the CLFA process also allowed for flexibility in how and when priorities would be implemented. The significance of flexibility in plans should not be underestimated: creating definite timelines and structure for interpreting and implementing priorities can lead to disillusionment, disengagement, and disbanding of collaboratives when they are unable to meet the exact goals set by a plan.

Flexibility and working with opportunity

Flexible plans paved the way for another critically useful approach in the context of rapid economic change: working with opportunity. The food security network moulded its activities to adapt to any opportunities as they arose; for example, opportunities for funding, other resources, and current events as opportunities for public outreach and education. The greatest degree of success in this approach came when group members were able to drop an activity that was proving unproductive at a particular point and move on to new opportunities and ideas. A final aspect of the approach involved the willingness and capacity of the groups to encourage, utilize, and celebrate the opportunities presented by "champions" for various initiatives and projects. Yeatman's (1994, 1997) early work on food councils pointed to the significance of champions. The Lake Melville food security network was especially successful with this approach. The group consistently utilized a combination of champions, existing resources, and external opportunities or interest to decide whether to pursue a particular initiative, or store away the idea in the event of future, improved opportunities for implementation.

Quick wins and political capital

A final aspect of this group's capacity to achieve its goals could be attributed to "quick wins." Although the food security network was not deliberately focused on quick wins, working with opportunity led to the implementation of some immediately successful projects. The group was able to identify projects that could be implemented fairly quickly (due either to relative simplicity or support from an external partner or champion) and that had the potential to draw widespread public attention. An additional benefit of quick wins is their capacity to create broader public support for a collaborative. Allowing private-sector, political, or other external partners to take credit can quickly build valuable political capital. Public and political recognition and support then allows for a shift

[12] These entities included, for example, those directly linked to a major hydroelectric project in the region and other major industrial and land developments associated with that project.

from programmatic to higher-level policy-oriented solutions.

These aspects of success should be considered in the context of the challenges, concerns, and questions the organization faced regarding its status as an unincorporated entity. The capacity to remain flexible and work with opportunity, two critical components of the group's success, might in fact have been facilitated by the organization remaining unincorporated. Concerns over the network's status, however, were significant and should not be minimized. They present a critical area for consideration in the development and growth of northern food networks. Food networks, coalitions, and councils should continue to reflect critically on their own activities, needs, and opportunities, and respond to the unique governance situations presented in their municipalities or local government areas.

Conclusion: Toward Flexible and Collaborative Governance for Northern Food Networks

Canada's northern and Arctic regions experience high rates of food insecurity, high food costs, environmental concerns related to food shipping and climate change, and a diversity of other challenges related to food production, acquisition, and consumption. Despite the significance of food to healthy development in Canada's north, current governance structures are not able to provide coordinated oversight for changing needs and circumstances. Critical issues associated with food are often fragmented, having little cohesive oversight at municipal, regional, and provincial levels. As such, there is a need for development of governance structures that can provide flexibility to adapt to the changing needs and circumstances of diverse and rapidly changing northern communities.

The experiences of the Lake Melville Food Security Network provide some promising evidence to suggest that collaborative, systems-level approaches can help to address food concerns in northern, remote communities. However, HVGB's role as a service center, and relatively large population base compared to some other northern settlements, suggest that further investigation may be warranted to determine the applicability of such models in smaller, more remote, or non–service center communities. These experiences also point to some approaches to food systems collaboration, as grounded in existing theory on the subject, that might increase capacity to implement solutions for food coalitions across diverse geographies. This research contributes to that existing literature through the addition of information as to how northern and remote communities can utilize community food assessment and food coalition models. In particular, we point to and elaborate on certain factors that might contribute to success and viability of such approaches in northern, remote, and Aboriginal communities. This research suggests approaches for other communities, in particular that collaborative efforts should consider the values of cross-sectoral membership, private-sector engagement, creation of flexible community plans, and utilization of quick wins to build political capital. One of the most productive approaches suggested by this research is for collaboratives to consider working with opportunity. The willingness and capacity of groups to encourage, utilize, and celebrate opportunities and successful outcomes is critical to maintaining a healthy organizational culture and environment for collaboration.

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21st century crofting: Strengths and opportunities for community development

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Abstract

Scotland has one of the most uneven land ownership patterns in the world. In a country of 5.2 million people, about 969 people control 60% of the land. Over 20% of privately owned land in Scotland is held in some form of offshore or beneficial ownership (Committee on the Inquiry of Crofting, 2008). This land ownership pattern has a unique expression in the northern and western parts of the Scottish Highlands and Islands with a 300-year-old system of tenant farmers known as crofters. Unlike other tenant farmers across the world, crofters have gained legal rights to stay on the land if they are productive. While crofting has managed to survive, there are competing resources for land in rural Scotland; urbanites from England and Glasgow view rural Scotland as sites for holiday homes, thus raising land prices. Further, as with other places around the world, market forces in Scotland are merging small parcels of land into larger tracts for agriculture. This qualitative case study examines crofting on an island off the western coast of Scotland. Our primary research question is: *Is there a sense of solidarity among residents about crofting for the island's economic vitality and its role in sustaining or preserving local culture?*

Keywords

community development, crofting, farming systems, Scotland

Introduction

Historically, crofting emerged in Scotland as part of the Highland Clearances during the 18th and 19th centuries, when Highland landlords evicted people to make way for sheep ranching (Hunter, 1999; 2000). Consequently, tens of thousands of tenants were moved to North America and Australia. Others were moved to cities such as Glasgow to

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work in the growing industrial sector. However, other families were sent to poor or marginal land along the Scottish coasts. Small amounts of land (crofts) were assigned with the understanding that each family would become self-sufficient. Initially, crofting focused on livestock management, but the infertile soils made it difficult to survive on agriculture alone. Hence, crofters diversified and become astute fishermen or learned a trade to support their families. Crofting communities shared both place and customs to forge communal relationships which have secured the longevity of a rural Scottish culture (Hunter, 2000).

However, contemporary agricultural communities have met several challenges as a result of global change (Mascarenhas, 2001). Advancements in technology, increased mobility, and societal changes have caused various rural communities to question their viability as they transition to the future. This is especially true for today's Scottish crofting communities. Specific concerns include enhancing economic vitality, increasing population diversification, retaining population, enhancing local landscape and biodiversity, and maintaining cultural heritage — interconnected key elements of "sustainable communities" (Committee on the Inquiry of Crofting, 2008).

According to the Committee on the Inquiry of Crofting (2008), crofting itself could provide a platform for community viability and economic stability within rural Scotland:

> Our survey provided strong evidence that crofters today see the need to assist new entrants and the succession of younger crofters as top priorities for thriving crofting communities. A strong demand for crofts should be helpful to the sustainability of crofting communities, contributing to increases in population, bringing in new ideas, energy and a commitment to manage the land well. It is also apparent that attracting population itself contributes to the prosperity of rural economies. (p. 5)

There are about 17,700 registered crofter holdings that account for 17% of the land across crofting counties. Eighty percent of the land in these counties consists of large estates owned by noncrofters. On the average, crofters receive 20% of their income from agriculture.

But what makes crofting important? How does crofting work from a community-development perspective? What does crofting mean for the larger community? These questions and several others will be addressed throughout this paper.

Crofting: A Contemporary Definition

Governances perception of crofting has evolved over the past decade. The Committee of Inquiry of Crofting final report (2008) has contributed to this evolution. More commonly known as the "Shucksmith Report," it challenged traditional perspectives toward crofting and spurred passionate discussion. Based on their analysis, the committee suggested crofters could positively impact the following areas: land and environment management and preservation; rural economic development; equitable and affordable housing; crofting governance, regulation and enforcement; and young/new entrants (Committee of Inquiry on Crofting, 2008).

The Scottish Government took heed of the suggestions of the committee. As early as October 2008, the government began shifting responsibilities associated with the development of crofting communities to Highlands and Islands Enterprise, a public entity that fosters economic and community development in rural Scotland, based on its commitment to rural community development (Highlands & Islands Enterprise, 2008). However, the broader influence of the Shucksmith Report was recognized in the Crofting Reform (Scotland) Act of 2010, which mandated that crofters cultivate their land. Cultivation was defined as "use of a croft for horticulture or for any purpose of husbandry, including the keeping or breeding of livestock, poultry or bees, fruit and vegetable growing, and the planting of trees and use of the land as woodlands" (Scottish Parliament, 2010, 5.C.2.a.i).

While the act seemed quite traditional, one subsection provided a broader approach to the use of the croft. This section highlighted a unique alternative: crofters were either to cultivate their land or "put it to another purposeful use" (Scottish

Parliament, 2010, 5.C.2.a.ii). Within this legislation, "another purposeful use" was defined as a meaningful business, proposed by the crofter, which needed consent from the landlord or the Crofting Commission (Scottish Parliament, 2010, 5.C.4.a.b). This clause allowed crofters to diversify their practices and enhance their financial stability. This was critical, as most crofters subsidize household income by expanding their professional ventures due to limited land resources. Examples of diversification include fishing, manufacturing, trade business, artistry, and technological business. This vocational duality is often referred to as "occupational pluralism" (Crofters Commission, 2009).

Croft Residency and Occupation

Previous acts such as the Land Reform (Scotland) Act of 2003 stimulated population growth in rural Scotland, providing crofters with the "right to buy." Under this act, crofting communities who struggled with land negotiation could have a right to buy land from landlords for a fair market price (Scottish Government, 2003). Additionally, the Highlands and Islands Croft Entrants Scheme (2006) allowed elderly or inactive crofters to subdivide their crofts to younger crofters, reversing the population decline and age gap (The Highland Council Land and Environment Select Committee, 2006). However, it was the reform act of 2012 that secured crofters to their land. It required crofters to "reside on, or within 32 kilometres [20 miles] of, that croftee's croft" (Scottish Parliament, 2010, 33.5AA). This restricted absentee ownership and limited the use of crofts for holiday housing.

Theoretical Framework

Community

The definition of community can be complex and elusive; some have even called it a contested concept (Gallie, 1968). Contested concepts tend to be concurrently ambiguous and genuinely appealing, which emphasizes the need to specify how community is operationalized within this study. Wilkinson (1986, 1991) defined community as a specific type of terrestrial or social environment. Three elements provide the basis by which the presence of a community can be measured: (a) a local social ecology, (b) sufficient structures to meet the needs and common interests of the people, and (c) a field of community actions (Kaufman, 1959; Wilkinson, 1986). While each element is important to defining community, of particular interest to the researchers was the presence of community actions. Viable communities should include a domain of community actions — or "collective efforts to solve local problems and collective expressions of local identity and solidarity" (Wilkinson, 1986, p. 3). All these elements came together to form the phenomena of community as defined within this study.

Community Development

This study examined crofting within a community-development context. It can be argued that a definition of community development must satisfy two conditions: it must be distinctive, and it should be universal. Simply translated, community development must be easy to distinguish from daily community activities as well as contributing to other fields such as social welfare and applicable to diverse societies. Bhattacharyya (2004) asserted that community development is rooted in two concepts, solidarity and agency. Solidarity is the deeply shared identity and code of conduct held by the community (Bhattacharyya, 1995). Linking solidarity to community makes it possible to distinguish community from all other types of social interactions. Solidarity can be achieved in a variety of ways: (1) a shared vision or shared definition of a problem or issue, or (2) a priority for collective action.

Agency, on the other hand, is defined as the capacity to make order within one's own world. More specifically, agency is the ability to create, change, or live according to a people's own meaning systems (Giddens, 1984). It is the opposite of dependency, because community members can shape their own communities and futures.

Both agency and solidarity make up the overall theory of community development, as it is applied within this paper. In essence, solidarity occurs because people are affected significantly by those around them; living together in close physical proximity requires social structures and functions that sustain life and provide satisfaction. In com-

munity, individuals share common interests in local institutions, schools, stores, sources of employment, and other services. The intertwining of people's lives is an important social reality, and one that plays an integral role within this study.

Methods

Our literature analysis highlighted the impact crofters historically had on rural Scottish island communities. However, in light of more recent government acts, little is known regarding the influence that contemporary crofters have on these communities. Moreover, there is a lack of literature addressing the identity and practice of the contemporary crofter. To gain deeper insight, therefore, researchers first examined the perception of the agrarian community (that is, community members who participate in agricultural production and/or land and natural resource management) of crofting identity and practice. This allowed the researchers to gain a contemporary perspective on crofting identity and practice from the community itself, thus limiting cultural and historical bias. Once the researchers were able to provide a context for the contemporary crofter within the agrarian community, they were then able to posit the broader research question, *Is there a sense of solidarity among residents about crofting regarding the island's economic vitality and cultural preservation?*

Research Context

During the spring of 2010, a research team from an American land-grant university traveled to the Isle of Tarbert — a pseudonym used to maintain anonymity — in Scotland for an in-depth community analysis focusing on crofting communities. The team consisted of one professor, one graduate student, and one undergraduate student. Prior to their arrival, the research team participated in a semester-long course designed to assist researchers in becoming culturally aware as well as to develop the necessary skills to complete the community analysis. This course covered topics such as historical and contemporary Scottish culture, rural community-development practices, and qualitative research methods. Upon arrival, the researchers immersed themselves in the community for a three-week term.

Case Selection

The Isle of Tarbert was selected because it had recently seen an influx in population, and it was speculated that this increase was related to new development or subdivision of established crofts (Highlands & Islands Enterprise, 2010). Tarbert is located in the Inner Hebrides off the west coast of Scotland. It has a population of 200 inhabitants on 142 square miles of land; there are seven estate owners on the island. Most of the population lives in the southern and eastern parts of the island. There are two crofting communities on the island, Puirt and Cnuic (pseudonyms), located on two different estates. Tarbert's sparse population resembles other highlands and islands communities with crofting groups.

The northern part of the island has relatively few inhabitants. There are over 6,000 deer on the island. Other wildlife includes otters, buzzards, and hen harriers. There is a frequent ferry service between the neighboring isle and Tarbert, but direct ferry service to the mainland was discontinued in the 1970s. There is no airport on the island except for a landing strip in the northern part, which is used for emergencies. A single-lane road connects the island.

Community Stakeholders

To fully understand the crofting community and its influence on the overall Tarbert community, several stakeholders were independently interviewed. Within this context, individual perspectives were considered to be nested case studies (Patton, 2002). Nested case studies utilize individual cases to represent the overall unit of analysis, in this case the crofting community. Opinions and perceptions of each stakeholder assisted in framing the community's "overall perception of crofting influence."

Local community development officers chose stakeholders prior to the research team's arrival. Interview participants were selected based upon their diverse roles within the community as well as individual time availability. In addition, the research team interviewed several community members to provide a holistic community perspective. The demographics of interviewed stakeholders are listed in table 1.

Table 1: Stakeholder Roles and Corresponding Definitions

Estate Owners	Individuals who own large estates, often incorporating rural communities
Estate Managers	Individuals who manage the daily enterprises associated with the estates
Crofters	Individuals who own or have tenure use of small land plots on larger estates
Business Representatives	Business owners within the Tarbert community (i. e., restaurants, hotels, and a general store)
Community Development Officers	Individuals who work with the community to establish common priorities and who assist with community sustainability
Stalkers	Individuals who guide hunts on estates
Crofting Commission	Individuals who monitor crofting practices on the Isle of Tarbert

Qualitative Methodology

Ethnographic case study was chosen as our methodology, in order to preserve the native voice and cultural uniqueness of the participants, while allowing for detailed description and analysis (Gone & Alcántara, 2010; McMillan & Schumacher, 2001). More specifically, the ethnographic case study method maintains cultural perspectives by:

> merging one source of data (single-participant responses to open-ended interviews) with another source of data (cultural history and community artifacts) in the effort to facilitate more efficient and contextually grounded inquiry on the interrelationships between cultural and psychological processes. (Gone & Alcántara, 2010, p.161)

Data-Collection Interviews

Prior to the interview process, a formal interview protocol consisting of 20 questions was developed from established literature (Committee of Inquiry on Crofting Report, 2008; Scottish Government, 2003; Scottish Parliament, 2010). Then members of the research team pilot-tested the protocol with Tarbert community-development officers prior to data collection. Resulting critiques and edits were incorporated, further enhancing question clarity and delivery.

In-depth interviews were conducted with 24 people: one land owner, two estate managers, five crofters, five community business representatives, four local development officers, two crofting commission representatives, and five community members. Stakeholder responses were video recorded at an agreed-upon location; interviews lasted approximately one hour.

It is important to note that while a formal interview protocol existed, application of the protocol varied due to cultural variance. As noted by Patton, "cross-cultural inquiries add layers of complexity to the already-complex interactions of an interview" (2002, p. 391). To account for this variance, researchers implemented an ethnographic interview protocol founded on the researcher's ability to build relationships with participants (Patton, 2002). Within this framework, interviewers are consistently seen as active participants, and interviews are seen as negotiated accomplishments of both the interviewer and respondent, shaped by the context of the research and situations in which they take place (Denzin & Lincoln, 2005). That is, rapport was established through personal discourse and individual expression by both the interviewer and the respondent. This process enhanced cultural understanding, and created a platform that allowed for deeper personal expression for all parties.

Members of the investigative team varied in age and gender. The professor and graduate student were both males in their early thirties and mid-twenties, respectively. The undergraduate investigator was a female in her early twenties. Investigator diversity was critical in order to establish rapport with a cross section of the community.

Researcher Journals

Members of the research team maintained individual journals prior to, during, and after community analysis. Journaling assisted the

investigators as active participants in delineating initial perceptions, individual bias, cultural misconceptions, and cultural similarities and differences throughout the study. Furthermore, researcher journals were used to document informal community interactions and to define community context. Finally, journals allowed researchers to implement practices associated with reflexive ethnography, a methodology that assists researchers in explaining cultural differences through shared discourse and individual transparency (Denzin & Lincoln, 2005).

Community Artifacts

In order to better understand Tarbert's cultural complexity, investigators collected several community artifacts. Photographs of historical agricultural people and practices were examined within the community museum, including maps, which situated the locations of historical crofts. Menus from local restaurants were collected to examine local culinary preferences and types of agricultural produce. Brochures promoting agricultural and eco-tourism were obtained, to better understand community perceptions and practices regarding the topic of inquiry. Finally, artifacts from the local press were collected to assist with explanation of research content.

Data Analysis

Data analysis began once interviews were completed and community artifacts were collected. Researcher journals were continuously referred to in order to review raw data and enhance reflective analysis. This also assisted in maintaining data credibility. The first cycle of analysis began with an in-depth review of primary data. The next step included initial or attribute coding. Attribute coding assists in examining basic descriptive information, such as research setting, participant characteristics, time frame and other descriptive variables unique to the study (Saldaña, 2009). The second form of initial coding consisted of in vivo coding. In vivo coding draws from participant culture and language to develop first cycle codes (Saldaña, 2009). In other words, in vivo coding assisted in preserving the meaning and intent of participant responses by using the participant's voice. Finally, initial in vivo codes were confirmed with each participant prior to second cycle analysis.

The second cycle of analysis consisted of focused coding, which examines the most frequent initial codes to develop master codes or assertions (Saldaña, 2009). Investigators involved with the data collection and community immersion independently coded data during each analysis cycle. Inter-rater reliability enhanced data trustworthiness. They then compared findings, establishing inter-rater reliability. Resulting themes were substantiated through continuous review of the initial data and cross-checked with journal documentation.

Limitations

It is worth noting that the results from this inquiry are time specific, meaning that views expressed by the community pertain only to the time when members were interviewed. Additionally, it is understood that results were derived from a small population on one rural Scottish island, and do not represent the broader population of crofters and rural communities. Furthermore, it is important to remember that this study provides an external interpretation by representatives from a southern U.S. land-grant institution over a three-week period; results cannot be generalized to other populations or times, but can inform the understanding of similar populations and practices. It is recognized that while the researchers took steps to limit cultural misconception, cultural bias still may exist (Hains, Ricketts & Tubbs, 2012).

Results

Stakeholder roles were assigned to direct quotes to maintain their anonymity. Representative quotes were chosen to best characterize the perspectives of each group.

Research Objective One

The first objective was to examine the agrarian community's internal perception of contemporary crofting identity and practice. Stakeholders associated with agricultural production and/or land management were purposely selected, as the recent government acts maintained an agrarian link to croft establishment. The perspectives of

stakeholders associated with this community are expressed below.

Agricultural lifestyle vs. career

Several common characteristics among agrarian stakeholders were identified throughout the study. Participant ties to both the island and community were evident. Most participants identified their roles in production agriculture as a lifestyle rather than a career. This was noteworthy, as all participants defined themself as being connected to the island and its people rather than being defined by their occupational role.

> *It's a lifestyle and that's the way it should be. You have to be in touch with nature in order to do this. It has to be part of your whole way of living.* (Estate Manager/Stalker – 1)
>
> ***
>
> *It's a funny place. I mean it's been in my family for generations obviously but it gets under your skin. You get consumed by it [lifestyle].* (Estate Owner – 1)
>
> ***
>
> *This is more of a lifestyle than a career. We used to live in [urban city] and this is so different. There is the great outdoors; there is a whole social thing that you don't see in the cities. When you live in a small island community like this there is great respect for your elders, for each other, and for each other's space; we are part of the environment and my job is a part of that. I can't imagine doing anything else.* (Crofter – 1)

Neighborly behavior

The concept of "agricultural lifestyle" was enhanced by the concept that crofters had about being "neighborly." Crofters regarded neighborly behavior as being woven into all social interactions; this included assisting others, sharing resources with one another, and serving on community committees.

> *The croft township will buy the machines and then everyone chips in and everyone gets to use the machines. So that each crofter doesn't have a tractor or power washer they have one for everyone, minimizing the costs; this is true with our bull as well. You just have to schedule your time.* (Crofter – 2)
>
> ***
>
> *That's just something on Tarbert, you like to help folk out and you would like to believe you will be helped out in return.* (Crofter – 1)

While these were agreed-upon tenets among crofters, the sharing of resources seemed to differ between crofters and estate owners.

> *There is a perception issue. We are seen as the landowners. There is a 'them' and 'us.' So when we go get our hands dirty they become sort of guarded I think. You have to earn your stripes. However, there is some sharing among estate owners, especially when counting stags.* (Estate Owner – 1)

We suggest this may be due to one estate owner's decision to permanently reside on Tarbert, which historically was atypical.

Occupational pluralism and economic diversity

Crofters stressed the necessity for occupational pluralism, as reliance solely on agricultural production did not produce sustainable profit. Most crofts on Tarbert encompassed small acreages located on relatively poor agricultural land; therefore, it was critical for crofters to have two or sometimes three separate occupations.

> *This is not the crofting of yesteryear; this is the crofting of contemporary Scotland. The new watchword is diversification...the new crofting increases options for diversification for external agricultural produce, which then increases our financial sustainability. For example I got this croft so that I could run my bus company; however, I also have a polytunnel and greenhouse for herbs and personal consumption. It will be sometime before we can produce vegetables commercially. Fortunately, the bus company allows us to build our agricultural side over time.* (Crofter – 1)

***

> *In order to sustain our income I work in the school with the K-5 children and my husband worked at the distillery and the fire brigade; we also sell herbs locally from our polytunnel and greenhouse.* (Crofter – 2)

This was true for many new crofters. Several took advantage of the Crofting Entrants Scheme (2006) and the Crofting Reform (Scotland) Act (2010) to gain residence on the island. It was evident that this new generation of crofters used the definition of "another purposeful use" quite literally. Several new community services were established, including a full-service bus system for the Tarbert School and community, graphic design companies, excavation services, and an additional public school educator. These occupations were in addition to the agricultural produce associated with their crofts.

Stakeholder variance and agrarian limitations

While there were several commonalities among agrarian participants, there were also general discrepancies regarding professional agricultural identity. The researchers first discovered the discrepancies when inquiring about crofter identity. Several stakeholders identified themselves as farmers, indicating professional differences between themselves and crofters. However, the complexities of defining "farmer" increased, as estate owners, stalkers, and land managers identified themselves as farmers yet varied in their definitions. Farmers generally owned or leased larger land parcels, allowing a larger portion of their income to be associated with selling of animal production. Most often, farmers considered themselves to be more independent and less reliant on landlords and government subsidy.

In contrast, crofters seemed to manage or own much smaller plots of land. They relied more heavily on government policy and subsidy in addition to vocational diversity to sustain their income. However, when reviewing government grants pertaining to agricultural practice, the government seemed to favor individuals associated with crofting.

Market diversification

Estate owners, farmers, and crofters expressed differences regarding economic growth and market exploration. Generally, farmers, estate managers, and stalkers envisioned their economic growth to be associated with traditional markets: stalking, venison, and cattle and sheep production. However, this was not the case with the residing estate owner, who also identified himself as a farmer. The estate owner professed exploring new and innovative ways to enhance his income, including agricultural and natural resource–‐based tourism, parceling land to make new crofts, and investigating niche agricultural markets.

In contrast, crofters believed market diversification could include community services, artistry, technology, and agricultural products.

> *I think there is an opportunity for crofters on Tarbert to not barter, but have some sort of cooperative. Especially once everyone has their polytunnels up we can diversify vegetables to a broader market.* (Crofter – 3)

Another crofter spoke of hiring an advocate for marketing crofters' products.

> *All of the crofters have their own special trade if you like, but there may be an opportunity for one person to work within a marketing position so that all the crofts on Tarbert could work together to market their products, agricultural and non-agricultural, establishing a Tarbert brand. The toughest part is our isolation and transport costs.* (Crofter – 2)

While both farmers and crofters spoke of collaborative efforts, at the time of this study there did not seem to be momentum toward initiating a collaborative group.

Government influence: A "double-edged sword"

Government regulations were deemed as a primary limitation for all participants. A dominant perspective revolved around European Union (EU) regulations associated with land management, flora and fauna conservation, and agricultural practices. Agriculturalists affirmed that the combination of

universal regulations, reliance on government subsidy, and time allocated to securing grants limited entrepreneurial exploration:

> *Another barrier would probably be the usual red tape that's now forced on us and it's getting worse and worse and worse.* (Estate Owner – 1)

Government grants allowed estate owners and managers to enhance wildlife habitat, and in turn, conserve protected species. However, while grants subsidized initial costs, responsibilities pertaining to habitat maintenance were left to estate owners.

It is important to note that stakeholders believed government influence to be both positive and negative. This was highlighted during our interview with a local crofter:

> *It's kind of a double-edged sword. On one hand they [government bodies] want to keep crofting, promote crofting, and preserve crofting but they [government bodies] want to cut back on the grants and the help. Also, most of the crofting grants are based on agricultural production, not diversification. But then there is more opportunity for people today than ever before; finally people are able to utilize the land and build their house.* (Crofter – 1)

From a positive perspective, the Scottish government allowed crofters to subdivide, to purchase and establish or revitalize crofting communities.

> *[Government grants] provided £3.000 to start up your business plan. You also get 50% off your facilities and amenities and any fencing. It's absolutely fantastic.* (Crofter – 3)

Limited communication among agrarian stakeholders

While reduced communication was not seen as a limitation, stakeholders did admit there was little or no communication between groups. The primary communication between agriculturalists on Tarbert pertained to social committees and community events, with relatively few venues to discuss the role of agriculture on the isle. In addition, the crofting communities of Puirt and Cnuic had limited communication due to their land belonging to two separate estate owners. We suggest that this gap in dialogue may be due to agriculturalists' identifying themselves as members of the Tarbert community, leaving agricultural production — both farming and crofting — as an individual lifestyle.

Crofting: Cooperative education

We found that while individual expertise existed within the crofting communities, little knowledge was shared within the community. Socially, there was a neighborly spirit among crofters, yet little peer education occurred regarding agricultural practice. We identified this phenomenon early in our analysis and questioned crofters regarding this gap in cooperative education.

> *Any kind of knowledge available prior to crofting would be good!* (Crofter – 1)
>
> ***
>
> *While crofters seem to be in tune with nature, it would be good to teach them how to be more environmentally friendly. They all buy fertilizer rather than using the dung on the fields.* (Crofter – 3)
>
> ***
>
> *There is little education regarding diversified crofting and crofting reform. It's all kind of self-taught. It would be good to have someone who could read between the lines and break it down for you.* (Crofter – 1)

Crofters seemed committed to responsibilities associated with their occupational and community obligations, leaving little time for professional discussion among each other. The general response regarding the gap in shared knowledge was that it was due to the lack of time availability.

Research Objective Two

The second objective examined, "Is there a sense of solidarity among residents about crofting regarding the island's economic vitality and cultural preservation?" Our literature review outlined the historical contributions that crofters have made to

communities within the highlands and islands. We believe this to be true of the crofting communities on Tarbert as well. Crofters expressed strong commitment to the overall Tarbert community.

Contribution to island demographics

While other Scottish island communities seem to have declined in population, Tarbert continues to thrive. In fact, the overall population of Tarbert increased by 8% due to the development of new crofts (Macniven, 2010). In light of this population growth, we asked a new crofter how he received his croft:

> *The Crofter's Commission throughout Scotland identified dormant crofts for various reasons. So there were loads of crofts sitting vacant for years. The Crofter's Commission saw a great opportunity to put new people into the crofts so they identified three crofts in this township. We applied to the advertisement and we were told there were about nine people who applied for the crofts. So we had to put in a business plan including our diversification plan. The township looked over the application and they and the landowner decided who they wanted to come in. Fortunately for us we got the croft. We just couldn't believe it when they said we got it. We just came up here and looked around at our croft as said, "Oh my God! This is perfect!* (Crofter – 1)

***

> *We couldn't have had all of this. This was our chance to have a home of our own where we would have never had this opportunity. This finally gave us our roots back in my home.* (Crofter – 3)

***

> *I don't think I would have moved here if I hadn't had the opportunity with the Croft Entrants Scheme because there was no affordable housing.* (Crofter – 2)

Tarbert's population growth was limited by available affordable housing. For example, in May 2010, the number of holiday and rental homes (64) was greater than those that were owner occupied (51). While housing is still a primary concern, a more stable population has been established due to new croft development.

One of the primary concerns regarding population stability in fragile areas is the lack of age diversification. New Tarbert crofters have substantially enhanced the age variance, specifically those who took advantage of the Croft Entrants Scheme, which allowed seasoned crofters to divide their land for the next generation of younger crofters. This has allowed opportunities for new families to reside on Tarbert, further sustaining its population.

Contribution to community infrastructure

Community capacity can be enhanced through involvement within the social fields that make up any community (Bhattacharyya, 2004). Within this study, we identified two social fields that provide strong illustrations regarding the potential for a healthy and vibrant community: economic and community engagement.

Production-distribution-consumption (Economic)

As previously stated, occupational pluralism was seen by crofters and the resident estate owner as crucial for economic sustainability. New crofts have not only enhanced community services, they also increased available intellectual expertise. During the interview process we found that crofters had a broad range of expert knowledge. Areas of expertise included marketing, engineering, technology, artistry, craftsmanship, renewable energies, and horticultural and green practices. Tarbert crofters often have diverse skills, contributing to the overall good of the community:

> *My husband is a jack of all trades. He does a bit of mechanics, builds houses, and makes furniture. Everyone does lots of different jobs on Tarbert. That is kind of the life here on Tarbert, you have to have different skills because there is no one to do it for you.* (Crofter – 3)

Many Tarbert crofters established "another purposeful use" for their crofts, which led to several entrepreneurial ventures, thus supporting the Tarbert community and subsidizing household income.

Social participation (Community engagement)
Two aspects of social participation were perceived to have a noted effect upon community: relationships developed within the community, and service to the community. Many crofters took the role of community service seriously. Interviews revealed many crofters were members of one or more community committees, transitioning from occupational pluralism to community pluralism, or dual roles within a community.

> *I think I have been one of the longest serving members on the Community Council. I've been on it over 19 years now. I do it because I get so much from Tarbert and I want to give back. I want to do what's right for the island.* (Crofter – 3)

Social participation also manifested itself through the value of relationships developed across the community. Crofters made a strong connection between crofting and their social life, making crofting more a lifestyle than merely a career choice. What's more, crofters often characterized their community according to the strong relationships built there, ultimately contributing toward the sense of community felt by crofters.

> *I would say that it's more of a lifestyle. Because [crofting] plays a part in our social life....I'd say 75% of our social life is crofting.* (Crofter – 2)
>
> ***
>
> *First and foremost, the most important community hat [I wear] is the parent council....That's where it all starts in the islands is with the youngsters... there is a sense of community.* (Estate Owner – 1)

Community perception
The Tarbert community provided mixed perspectives regarding the contributions of crofters and the crofting communities. The larger community found crofters to be imperative for population sustainability on Tarbert. Additionally, they found the demographic diversity refreshing and enhancing of the established culture, especially with the younger crofters. Furthermore, community members stated they benefitted substantially from the nonagricultural services provided by crofters and their diverse occupational roles. Based on informal oral feedback, there was also the perception that crofters, by the nature of their small-scale farming, complemented the natural habitat, environment, and culture of the island.

From an agricultural point of view, however, community members found little economic or community benefit in crofting. Local business owners who use or sell agricultural products voiced several concerns regarding the ability of local crofts to supply produce.

> *They [crofters] want to supply us with herbs. That's great; however, no one is large enough to supply us with our demand. That's the problem; we can't get enough fruit and veg[etables]. In fact we ran out of lettuce today.* (Business Representative – 1)
>
> ***
>
> *We have given people who are crofting the opportunity to make a living by using their products from time to time. Crofting per se, there is not a lot of it that we can benefit from as of yet. Maybe in the future.* (Business Representative – 1)
>
> ***
>
> *The crofters are all independent. They are very, very independent. That limits their marketability as we deal with them individually.* (Business Representative – 2)

Additionally, there were projected concerns regarding competition from potential crofter markets. Therefore, business owners had limited interaction with crofters regarding agricultural produce.

> *Crofting couldn't benefit me at all. People have tried it. Usually what happens is they become in direct competition with me. They won't sell their produce to me because they have to sell to me at wholesale prices.* (Business Representative – 3)

Owner concerns included inability to meet seasonal demands, shortage of available growing days on

Tarbert, limited longevity of fresh produce, limited storage, lack of processing facilities, and difficulty in establishing contracts with individual crofters.

Entrepreneurial Limitations

Some of the crofters were working as graphic artists, editors, media specialists, and web designers as a second occupation. They not only worked for external firms, but also used their skills to promote Tarbert. However, their occupational pluralism and entrepreneurial practices were hindered by the lack of high-speed Internet bandwidth. While other rural Scottish communities have such access, it was not clear why the citizens of Tarbert do not have such technology available. Finally, while occupational pluralism was admired and valued in Tarbert, it was not clear if there was a cohesive sense of direction as to how these diverse entrepreneurial activities need to complement each other to enhance the quality of life and culture, or economic prosperity.

Varying Degrees of Solidarity

While there was clearly a sense of community on Tarbert, there were varying degrees of solidarity. This was evident in the two crofting communities of Puirt and Cnuic. While they often communicated socially, they did not share ideas about production practices or sustainability with others outside their individual crofting community. Additionally, little was physically shared between the communities, such as equipment, technical expertise, labor, or external resources. While there was an upbeat sense of community life, the interviews and other data we collected suggest that there does not seem to be a collective sense of purpose or a shared vision for the future regarding crofting and other aspects of life on Tarbert, such as culture, economics, civic life, and communication patterns.

Summary

Our analysis revealed that the modern crofters have ties to, but have evolved from, their historic ancestors. On the Isle of Tarbert, the contemporary crofter generally identifies with the larger community rather than his or her occupation or agricultural practice. This may be a result of contemporary government acts assisting crofters to become active members of rural island communities by implementing the clause "another purposeful use." Crofters have changed Tarbert's demographics by providing housing for a sustainable yet diverse population. Furthermore, crofters supply several community services through their occupational and community pluralism.

While crofters seemed to identify with the larger island community, they were often solitary in nature. This may be due to their commitment to multiple occupational and societal roles. As a result, communication regarding professional practice was limited among the crofting community. Moreover, there seemed to be two components of the agrarian community, those considered to be farmers and those considered to be crofters. Lastly, while the greater Tarbert community deemed crofters as crucial for a robust community, they had mixed reviews regarding crofters' agricultural impact.

Conclusions and Implications

One of the purposes of our research was to examine whether there was a sense of solidarity among residents regarding crofting, its impact on economic vitality, and its role in sustaining or preserving local culture. Our analysis implies there was moderate impact. The following conclusions and implications intend to provide a grounded discussion of the impact that crofting can have on communities moving into the 21st century.

Solidarity, as described earlier by Bhattacharyya (1995), is one of two key principles when detailing the effect of community development upon a community. While it appears that solidarity is beginning to surface within specific social fields in the community, it is by no means established in professional practice. Part of this may stem from how community members define themselves. When viewed as a community of place — the Isle of Tarbert and individual crofting communities — crofters exhibited much more solidarity than when discussing their community as one of interest — crofting practices. This becomes more complex when evaluating the variance in agrarian identities and correlating relationships such as farmer/crofter or landowner/crofter.

It is therefore recommended that crofters explore identities that are associated with commu-

nities of interest in addition to place. Communities are not as constrained by locale as they once were; should this be any different for crofting communities? Establishing a new definition of a crofting community as a community of interest may broaden the definition and include a more cooperative approach with other local crofting communities. Moreover, there is the potential to extend these collaborative networks to other crofting-type arrangements worldwide. Overall, agrarian stakeholders described several areas where they shared commonalities both socially and professionally.

To encourage the resilience and development of crofting communities, grassroots community structures, such as agricultural cooperatives or conservation entities, could be developed to enhance political strength, marketability, and community influence. Development agencies could link from the overall Tarbert agricultural community to other agricultural communities on the island. In addition, agencies such as these could assist with both securing government grants while also limiting their need.

Discussing the possibility of cooperative grassroots agencies brings us to the question, "*Do crofts have the potential to become economically self-sustaining*?" While this question fundamentally appears to address finances, it also addresses culture and the need for a local paradigm shift. Local crofters are accustomed to (and possibly even enjoy) diversifying, so much so that it may lead to overcommitment. To make crofting financially viable would change the crofting lifestyle more than by just providing a suitable wage; it would also change the crofting way of life.

Building on the idea of crofting sustainability, a final aspect for consideration could be exploring local outlets for crofted products and finding new ways to brand their uniqueness. Our analysis indicates that most crofted products are only seasonally available or only available in limited quantities to make an impact on the local economy. How would this differ if crofters were able to produce on a larger, more consistent scale? By providing products to local restaurants, hotels, or nearby islands, not only could crofters create a supply-and-demand chain that would benefit crofters, but it could lead to expanding product production and creating a stronger sense of community identity and solidarity, and potentially enhancing the local economy.

Further research could include measuring the effect entrepreneurial assistance programs have on the creation of agricultural cooperatives, joint crofting partnerships, and other small businesses. This could include analysis of current social, industry, and technological infrastructures as well as analysis of potential clienteles, both local and global. Further research could also include evaluating the process of developing educational and professional venues for crofters to share business ideas and best practices.

In regard to the broader Tarbert community, most members viewed modern crofting as a community asset, specifically the increase in population, population diversity, and vocational trades and services. However, feelings about its contribution to agricultural goods and services were mixed. A venue can be provided to the community to envision how trades and services as well as agricultural goods can be linked into something more holistic rather than the current fragmented approach. We assert that community leaders should initiate a visioning process for community stakeholders by addressing such questions as: *What is the shared vision for Tarbert in the next 10 to 20 years? What are the goals that can further unite the island? How can we prosper and address our social needs and issues? How can we accomplish our goals through strategic action?*

The best community-visioning approaches are highly participatory and lead to action-oriented strategic plans that yield results (Walzer & Hamm, 2012). If implemented, a community-widening vision could move Tarbert's citizens toward a greater sense of agency, one of the fundamental goals of community development, defined as the capacity of people to order their world (Bhattacharyya, 2004). The ability to act with agency allows a community to define itself and to undertake desired actions and activities that seek to improve local quality of life. Ultimately, opening up communication channels would be a first step toward developing solidarity and agency within the Tarbert crofting and larger communities.

While we have established that the Tarbert community has received several benefits from crofting reform and the establishment of new crofts, the longevity and economic vitality of Tarbert's crofts is to be determined. The opportunities to build solidarity and agency between the two crofting communities and among the various stakeholders on the island are numerous. It is our hope that the conclusions and implications generated by our analysis will facilitate the solidarity and viability of Tarbert and of similar rural agricultural communities.

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An economic impact comparative analysis of farmers' markets in Michigan and Ontario

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Abstract

Farmers' markets play a vital role in local economic development by providing a site for local and small business incubation, creating an economic multiplier effect to neighboring businesses, and recycling customer dollars within the community. While several studies have evaluated characteristics of farmers' markets within single metropolitan areas, few have compared the impact of multiple markets in socioeconomically contrasting regions.

This research compares shopping habits and economic impacts of customers at farmers' markets in two North American cities: Flint, Michigan, and London, Ontario. Overall, 895 market visitors completed surveys. We conducted statistical and spatial analyses to identify differences between these markets. Though geographically proximate and similar in metropolitan size, the two cities differ greatly in recent economic development, social vitality, and public health indicators. The objectives of this article are to quantify the impact that each market has on its local economy and contextualize these impacts in light of the place-specific attributes of each market.

Results indicate that customers come from a mix of urban and suburban locations, but that key urban areas do not draw a substantial share of

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customers. Marketing efforts in nearby disadvantaged neighborhoods, therefore, might yield new customers and increase multiplier effects within the neighborhoods. The London market drew slightly younger customers who shopped less frequently, while the Flint market drew an older crowd that attended more regularly. This may be attributable to the relative age of the markets, and certainly reflects the marketing push of each market's managers. Given the opportunity to compare similarities and differences, much can be learned from each market in terms of opportunities for marketing, local economic development, and increased community vitality.

Keywords
customer survey, farmers' markets, food systems planning, kernel-density analysis, local economic development, multipliers

Introduction

Farmers' markets are becoming increasingly popular destinations among food shoppers in North America (Kaufman, 2004), yet few studies have documented the impact of these markets on local economies. Through the sale of local food, farmers' markets can help ameliorate issues of food security, create community focal points for building social capital, serve as an alternative to the conventional food system, and strengthen local economies.

The United States federal government has been keen to support farmers' markets; US$10 million was recently set aside through the 2008 farm bill to support a Farmers Market Promotion Program (Wisconsin Ag Connection, 2011). Despite attention from the federal government, however, there has been a lack of recognition of the importance of local food systems by municipal governments. Limited attention and support has been directed to the development of farmers' markets in particular, and food system planning in general (Pothukuchi & Kaufman, 2000).

While the benefits of farmers' markets are evident, work must continue to identify ways to improve their profitability, as well as to accomplish various social goals such as increasing food security and building the economy. Survey research has been conducted on consumer food shopping behavior at the population level in the United States and Canada to assess large-scale trends (Zepeda & Li, 2006). One study indicated a strong trend toward more local food consumption (Adams & Salois, 2010), supporting the need for research to assess farmers' markets and other integral parts of local food systems. On a smaller scale, there are likely many locally focused, unpublished studies of consumer spending habits at farmers' markets that are designed to inform their management and growth (Brown & Miller, 2008).

Few studies exist, however, which examine the similarities and differences among the customer shopping and spending habits at different markets (as noted by Brown & Miller, 2008). Such a comparative approach will inform the development of each market, help to better meet customer expectations and thus improve market viability. The objective of this article is to evaluate customer shopping and spending habits and quantify the economic impact of farmers' markets in two very different North American cities. This evaluation demonstrates and compares the impact of each market on its respective community, and ultimately provides justification for local or municipal government bodies to be involved in the food system.

Literature Review

Evaluating farmers' markets is important because of the close links among access to healthy food, food consumption, and food security, as well as the opportunity to elucidate the role that markets can play in providing healthy food and fostering health promotion and economic development. Currently, 12.6% of American households and 7.0% of Canadian households are food insecure (Nord & Hopwood, 2008, p. iii), contributing to an increase in nutrition-related ailments such as obesity and compromised psychosocial functioning (Olson, 1999). Farmers' markets located in low-income or minority neighborhoods can help these populations procure a healthy diet by improving access to nutritious foods (Larsen & Gilliland, 2009; Neff, Palmer, McKenzie, & Lawrence, 2008). Social benefits are also offered by farmers' markets by

creating community gathering places where people can congregate, socialize, and develop a sense of neighborhood security and pride (Blank, 1996; Feenstra, 2002).

Farmers' markets convey various economic benefits, including opportunities for small family farms to maintain profitability (Hinrichs, 2000). The economic effects of food system globalization have garnered significant criticism (Morgan, Marsden, & Murdoch, 2006; Murdoch, Marsden, & Banks, 2000). Many farmers who work under contract to large agri-business conglomerates retain a lower percentage of the food dollar (Kaufman, 2004). Agri-businesses, aided by current agricultural subsidies, often promote value-added products which are high in sugar and fat, and for which farmers will receive even less of the food dollar (Nestle, 2003; Niles & Roff, 2008). But farmers' markets facilitate the direct farmer-to-consumer sale of farm goods, doubling farmers' gross return by eliminating steps between producer and consumer (Kaufman, 2004).

Markets bring together small and medium-sized farmers, producers, and brokers who can exchange operating and marketing strategies (Econsult Corporation, 2007). Vendors are able to interact directly with their customers to determine the variety of products most demanded by local consumers and educate consumers about different types of healthy foods. Farmers' markets also serve as low-risk, low-cost incubators for small entrepreneurs to grow existing or test new businesses before expanding to permanent locations (Cameron, 2007; Guthrie, Guthrie, Lawson, & Cameron, 2006; Hinrichs, Gillespie, & Feenstra, 2004).

The increased popularity among conventional food retailers to emulate farmers' markets by expanding their offerings of local foods demonstrates the innovative role that farmers' markets play in capturing and nurturing local food networks (Abatekassa & Peterson, 2011). Yet farmers' markets remain distinct from the conventional food production and distribution system in many ways. In contrast to the ownership model of conventional food retailers, many farmers' markets are driven by municipalities, local economic development corporations, or grassroots movements by local farmers to create a direct-to-consumer avenue for food sales. These organizations have a clear stake in helping strengthen the local food system in their communities and subsequently in helping with the revitalization and development of well-functioning, healthy and sustainable communities (Pothukuchi, 2009). Given the need for farmers' markets to be engaged in their local communities and the multiple benefits they provide, farmers' markets play an important leadership role in delivering new and alternative products to consumers, in re-forming the food system, and in local food system planning (Brown & Miller, 2008).

Food system planning merits inclusion in the agenda of local governments because it impacts many aspects of society, including public health, social justice, economic development, and water and land use (Morgan, 2009). An increased awareness of the food system by planners and public health practitioners has contributed to the creation of many food policy councils (Morgan, 2009). Yet despite this growth, food system planning is not often included in community planning documents (Pothukuchi & Kaufman, 2000). One recent exception was initiated by a public health department in Waterloo, Ontario, Canada, which worked with planners to include food systems in the master planning process by citing the various health, social, economic, and environmental benefits to building a stronger local food economy (Desjardins, Lubczynski, & Xuereb, 2011).

To quantify the impact of farmers' markets, and thus suggest reasons for their inclusion in local food and economic development planning, we conducted surveys at two farmers' markets in Michigan and Ontario. Numerous studies have evaluated customer characteristics at farmers' markets in North America; sample sizes in these studies range between 200 and 450 responses. Most of these surveys collect demographic and behavioral data such as average money and time spent at the market and products purchased. Some of these studies have also collected opinions about the importance of various attributes of markets (Elepu & Mazzocco, 2010; Kezis, Gwebu, Peavey, & Cheng, 1998), as well as expectations of the type and quality of goods available (Bond & Feagan,

2013; Govindasamy, Zurbriggen, Italia, Adelaja, Nitzsche, & VanVranken, 1998; Onianwa, Mojica, & Wheelock, 2006).

This study differs in several key elements: first, a large sample size (N=895) provides greater statistical certainty in significance testing; second, the study uses a modified economic impact multiplier to estimate the impact of two markets in their local regions; third, advanced spatial analysis is presented to pinpoint "hot spots" regarding geographic patterns of customer spending characteristics; and finally, the study offers a comparison of two markets situated across the U.S./Canada border from each other. These characteristics and differences can be used by other communities and planners interested in quantifying the impact of markets and justifying the inclusion of local food systems in community development plans. The spatial analysis is a valuable tool for customer survey analyses since it addresses questions on consumer point of origin and spending patterns.

Research Context

Flint, Michigan, U.S., and London, Ontario, Canada, are two midsized urban areas in the Great Lakes region of North America. Although they are relatively close in proximity (130 miles or 209 km apart) and have similar metropolitan populations (around 450,000 inhabitants), their presence in two different countries with varying social and economic contexts has created two very different cities.

London's urban form is relatively compact for a North American city, with little "leapfrogging" of development, whereby new construction is encouraged within an existing growth boundary and at allowable development densities of up to 12 housing units per acre (City of London, 2006). Many municipalities were amalgamated in the 1990s as a result of provincial legislation that centralized development approvals and incentivized compact development (Vojnovic & Poel, 2000). Further intensification has been aided by historically low crime and unemployment rates, which help create a favorable environment for compact development (Hayek, Arku, & Gilliland, 2010; Ontario Court of Justice, 2011). As a result, public transportation operates relatively effectively (bus service is available in every neighborhood) and basic goods and services are available in most neighborhoods.

Flint's urban form, conversely, is a classic model of a declining post-industrial city. The city has lost 41% of its total employment base since 1980, having suffered considerably from the exodus of the automotive industry (Jacobs, 2009). Consistent with research findings by Palumbo, Sacks, and Wasylenko (1990), the presence of higher crime rates within the city of Flint during the 1970s and 1980s facilitated the process of extreme leapfrog development and central-city abandonment. This has had the effect of creating a highly dispersed urban area. Municipal governance is fragmented into several dozen cities, townships, and villages, each in competition with one another for economic development (Zheng, 2009). This pattern of decentralization has been exacerbated by continuing social issues related to unemployment, drug use, and gang violence (Federal Bureau of Investigation, n.d.). The result is a low-density city where those without access to an automobile can have great difficulties in accessing basic goods, services, and employment.

Both of the case study regions support several farmers' markets. In Flint, most farmers' markets are in suburban municipalities. In London, two permanent markets in the urban core are surrounded by temporary markets within the urban area, and several more in the metropolitan area. The specific markets examined in this article are the Flint Farmers' Market and the Western Fair Farmers' and Artisans' Market in London, selected for their location in socioeconomically distressed urban neighborhoods and their reputations as markets inclusive of the local population (personal communications, market managers, 2012).

The Flint Farmers' Market is the main market for the city of Flint. It has run continuously in the same location near downtown since 1940 (personal communication, market manager, 2012), and is open three days a week (as of 2012). According to market officials, the early summer months see the highest local attendance. Vendors include local and organic produce sellers (including farmers from inside the city limits), as well as nonlocal vendors and artisans. The primary stated vision of the Flint Farmers' Market is to help rebuild Flint by serving

as a hub for the growing local food system and thereby encouraging the consumption of healthy foods (personal communication, market manager, 2012). Reflecting the growth of local food in the area, seven suburban municipalities now have their own independently run farmers' markets, and two satellite markets operated in Flint during the summer of 2012 (personal communication, market manager, 2012).

London's Western Fair Market, by contrast, has only been open since 2006 (personal communication, market manager, 2012). It is located in London's Old East Village, a low-income neighborhood immediately east of the downtown core. The market is fully open on Saturdays year-round, but some vendors operate every day. According to market officials, the late winter months see the highest local attendance. While the mix of vendors is similar to the Flint Farmers' Market, the primary goal of this market is to foster a sense of community, as well as to generate local economic development by serving as a business incubator for small agricultural and artisanal businesses. This is part of a larger goal to increase the quality of life of neighborhood residents by providing greater access to healthy food, supporting local businesses, and generating local employment (personal communication, market manager, 2012). This economic development model is evident in the market's success at establishing two seasonal satellite markets in other parts of the city, as well as the expansion of a number of vendors to retail locations outside the market.

Despite differences in regional context, market age, and vendor make-up, the markets are similar in several ways. They are both located in, and fulfill the basic needs of, residents in disadvantaged neighborhoods while attracting customers from across their respective urban areas. In London, the Old East Village has been a historical center for industry, but has since fallen on hard times due to deindustrialization. In Flint's situation, the entire city was heavily reliant on industry for its success throughout the 20th century. Thus, the area surrounding each market is primarily composed of working-class neighborhoods and former industrial properties. Each market serves as a community focal point for its neighborhood, where residents congregate and hold community events, and both exist to make their communities better by providing residents with an option for healthy food. In light of these differences and similarities and to better understand the characteristics of the markets, a customer survey was run at each market during 2011.

Methods

Customer surveys were administered at each market once per week for 3 weeks (on Saturdays) in London in February 2011 and in Flint in June 2011. For London, the market is busiest during the Christmas season and least busy in the summer, due to the proliferation of outdoor markets elsewhere in the urban area. In Flint, the market is slowest in the winter and busiest at harvest time in the late summer. Based on these characteristics and on consultation with the market managers, February (for London) and June (for Flint) are considered "average" months in terms of sales. Throughout each survey day, market customers were asked randomly to participate in the survey, following sampling methods of past farmers' market studies (Elepu, 2005; Govindasamy et al., 1998; Onianwa, Mojica, & Wheelock, 2006; Smithers, Lamarche, & Joseph, 2008). Customers were excluded from participation if they were under 19 years of age. Surveyors asked that only one survey be completed per family or group, typically by the primary shopper in the household. The refusal rate was below 50% at each market, and did not vary substantially from the customer profile of survey participants. All customer data for each market was compiled into a single database and analyzed using SPSS statistical software and geographical information system (GIS) software.

Pretested questions from *Estimating the Economic Impact of Public Markets* (Econsult Corporation, 2007) were adapted to develop a questionnaire to understand the customer profile and shopping behaviors at each market. Supplementary questions were developed in consultation with farmers' market officials (see questions in the appendix). Customer counts were conducted by positioning two observers at every entrance to record the overall number of visitors entering the market. By combining these counts with data

gathered on purchasing patterns, it is possible to estimate the overall economic impact of each market using the pretested evaluation methodology (Econsult Corporation, 2007). Compared to previous work, this research collected a much larger sample size: over 400 participants each from the two different markets (N=895).

The customer survey tool and analytical procedures in this study employ methods used in a California farmers' market study (Wolf & Berrenson, 2003). This research employed chi-squared tests to determine if significant differences existed between subgroups attending the same market, and between customers attending either the Flint or London market. Market segments were defined from this analysis, which will be useful for each market in planning for expansion and marketing campaigns.

The economic impact of the markets was measured using a modified economic impact multiplier developed by the Project for Public Spaces (Econsult Corporation, 2007), itself derived from the Regional Input/Output Multiplier (U.S. Bureau of Economic Analysis, 1997). This previously validated approach assumes multipliers of 1.6 for producers, 1.31 for nonproducers, 1.65 for prepared food vendors, and 0.66 for other vendors. This means, for instance, that for every dollar spent at a local producer's booth at a farmers' market, an additional $0.60 will be recycled within the community. These values were used to calculate the relative impact of each market by quantifying how much money is spent or recycled within the community based on shopping characteristics at the markets.

This study also advances knowledge on consumer behavior for farmers' markets through the novel application of advanced spatial analysis in a GIS to determine the existence of geographic clusters in purchasing patterns. For each customer, purchasing habits were classified by one of the 8 categories included in the survey (e.g. coffee and drinks, fruits and vegetables, etc.). The total dollar value spent was also included as a key variable for "weighting." Then the corresponding dollar value spent on each category (or overall) was used to weight features in a type of spatial analysis in GIS called "kernel density." Spatial analysis was possible because survey data for each respondent could be located in geographic space (either by the respondent's nearest street intersection [USA] or six-digit postal code [Canada]). By combining the amount spent on various items with the home location of the respondent, relative hot spots were identified from which customers of a particular type are more likely to originate. The result is a rasterized (or pixelated) surface with predicted values for any region on the map in GIS (Environmental Systems Research Institute [ESRI], 2011). Past studies have used kernel density to estimate the density of grocery stores or homicides per square mile (Bader, Purciel, Yousefzadeh, & Neckerman, 2010), but did not use the weighting function to determine densities based on specific characteristics of locational variables. The use of kernel-density analysis to model spending patterns in geographic space is a novel application for studies using customer surveys as a primary data source.

Questions regarding individual socioeconomic characteristics were deliberately omitted from the survey to enhance response rates. To account for socioeconomic characteristics, a GIS was used to geocode and overlay individual respondent addresses on a map of neighborhood-level socioeconomic distress that was calculated for each city. The socioeconomic distress index, which considers four variables from the U.S. and Canadian censuses (unemployment, lone parenthood, low educational attainment, and low income), is used to predict areas of relatively high disadvantage by adding together an unweighted sum of z-scores for each of the four variables. Using this data and the spatial join function in ArcGIS, respondents can be classified by level of the socioeconomic distress within their neighborhood to determine whether the customer profiles at each market are inclusive of disadvantaged populations. Indices for Flint and London compiled for past research (Larsen & Gilliland, 2009; Sadler et al., 2012) have been recreated for this research.

Results

A total of 405 surveys were completed by adults at the Flint market, while patron counts estimated that 9,197 people (defined as children old enough

to walk and older) visited the market over the 3 weeks of data collection. Meanwhile, 490 surveys were collected in London, and patron counts estimated that 7,211 people visited the market over the 3 weeks of data collection.

Consumer Characteristics

Table 1 reveals descriptive customer characteristics by gender, age, frequency of visits, distance between home and market, and mode of transportation to market. Flint tended to draw a greater percentage of women (77% versus 63%), respondents 45 or older (70% versus 55%), and a higher proportion or weekly visitors (51% versus 33%) when compared to London. Nevertheless, well over half of customers in both Flint and London (69% and 65%, respectively) patronize their markets most if not every week. These results are overall fairly consistent with past farmers' market studies.

The statistical chi-squared test was used to determine if significant differences existed between customer characteristics when broken down into subgroups. Discrete variables for time spent at the market, money spent at the market, products purchased, reasons for coming to the market, and how the respondent heard about the market were evaluated by gender, age group, frequency of customer visits, and distance from the market. The results are shown in table 2, while the names of variable categories are shown in italics in the appendix. The only column division for which none of the differences was statistically significant was gender, in contrast to other farmers' market studies, which have found that female shoppers have different characteristics than male shoppers.

Table 1. Customer Characteristics by Market

	Flint		London	
Gender	*Total*	*Percent*	*Total*	*Percent*
Female	313	77%	308	63%
Male	92	23%	181	37%
Total	405		489	
Age				
Under 24	26	6%	4	1%
24-44	93	23%	216	44%
45-64	220	55%	210	43%
65+	64	16%	57	12%
Total	403		487	
Frequency of Visits				
Weekly	206	51%	163	33%
Most Weeks	72	18%	158	32%
Occasionally	103	25%	132	27%
First Time	24	6%	36	7%
Total	405		489	
Distance from Market				
0-1.9 km	38	10%	83	18%
2-4.9 km	80	21%	175	37%
5-9.9 km	97	25%	142	30%
10-19.9 km	113	29%	35	7%
20+ km	56	15%	35	7%
Total	384		470	
Mode of Transportation				
Walk/Bike	17	4%	62	13%
Bus	1	0%	22	4%
Personal Vehicle	365	91%	392	80%
Other	18	4%	14	3%
Total	401		490	

The variables "time spent at market" and "money spent at market" in table 2 compare the Flint and London markets to one another. Overall, there are no broad relationships for which differences between the markets are significant. Within each market, however, there are statistically significant differences among time or money spent at the market and products purchased, reasons for coming, or how the customers heard about the market. Some of these highlights are discussed below.

Products Purchased

Table 3 breaks down the products purchased by customers visiting the market. In Flint, a greater proportion of customers purchased fruits

and vegetables (87% versus 73%); meanwhile in London, significantly more customers purchased coffee and meats (50% each versus 15% and 35% in Flint, respectively). Reflecting back on table 2, age group was responsible for the most significant overall differences in shopping characteristics. In Flint, young people (<24 years old) are between two and four times more likely to purchase coffee, prepared foods, and baked goods than older population subgroups (45–64 and 65+). In London, young people are twice as likely to purchase prepared foods, while older residents are nearly 50% more likely to purchase fruits and vegetables and three times as likely to purchase crafts. These profiles will benefit future market planning.

Table 2. Chi-Squared Significance Values for Customer Characteristics

	Gender	*Age Group*	*Frequency*	*Distance*
Products Purchased, Flint	0.740	***0.000	**0.022	***0.004
Products Purchased, London	0.695	***0.000	***0.000	*0.093
Reasons for Coming, Flint	0.504	***0.000	***0.007	0.146
Reasons for Coming, London	0.793	***0.000	*0.057	***0.005
Heard about Market, Flint	0.823	***0.000	***0.000	0.103
Heard about Market, London	0.923	***0.000	0.107	**0.050
Time Spent at Market	0.270	0.950	0.667	0.759
Money Spent at Market	0.274	0.191	0.474	0.982

*** = 99% confidence interval
** = 95% confidence interval
* = 90% confidence interval

The frequency of visiting the markets is also associated with the types of products purchased in each market (table 2). In London, frequent customers are twice as likely as occasional customers to purchase fruits and vegetables. Frequent customers are also two and three times more likely to purchase cheeses and meats, respectively. Occasional customers are also more likely to purchase prepared food and baked goods. These patterns do not apply for Flint.

Reasons for Attending

Table 3 reports the reasons customers gave for visiting and how customers learned about the market. Regarding reasons for coming to the market, local/fresh food is the major reason people attend the markets, accounting for over 80% of customers at both locations. More people visit the London market for the ambiance (28% versus 18% for Flint).

The reasons for attending the market differed by age group. In Flint, young people are between two and four times more likely to attend for general groceries, to meet with friends, and to spend time with family, while older people are more likely to attend for local/fresh food. In London, young people are somewhat more likely to meet with friends, while older groups are more

Table 3. Customer Purchasing and Motivations by Market (percent)

	Flint	*London*
Products Purchased		
Coffee	15.3%	50.4%
Fruits and Vegetables	87.4%	73.3%
Meat	34.5%	50.0%
Cheese	28.3%	26.9%
Crafts	10.6%	6.7%
Prepared Foods	13.3%	29.8%
Baked Goods	42.4%	46.7%
Other	27.0%	19.8%
Reasons for Coming		
Local/Fresh Food	83.5%	82.4%
General Groceries	14.3%	14.5%
Specific Vendor	29.3%	30.2%
Meet with Friends	15.8%	20.6%
Family Activity	15.0%	16.5%
Ambiance	18.0%	27.6%
Other	6.4%	7.6%
Heard about Market		
Word of Mouth	39.9%	58.6%
Vendor	2.0%	3.3%
Drove by	8.4%	12.7%
Advertisement	14.0%	13.3%
Other	35.2%	11.0%

likely to attend to spend time with family.

The frequency with which respondents visit the market is also correlated with the reasons for coming to the market and how the customers heard about the market. In both markets, customers who attend more frequently are more likely to attend for the ambiance. In Flint, frequent customers are also more likely to visit for general groceries. Those attending less frequently are more likely to visit as a family occasion. This trend is somewhat reversed in London, with customers who attend frequently coming to visit with family.

Respondents indicated that they originally heard about the markets in significantly different ways. In Flint, 40% marked "word of mouth," and 35% marked "other" and indicated that they had known about the market all their lives. In London, 59% marked "word of mouth." In Flint, many first-time visitors responded that they came because they noticed the market when they drove by. This is not the case in London, as most first-time visitors were more likely to come due to word of mouth.

Age group is also a predictor of the means by which residents initially heard about their market. Many young people discovered the market by driving by, while the majority of older people responded that they had known about the market their whole lives. In London, it appears that advertising is more influential among the older populations, while young people are attracted by word of mouth.

Geographic Analysis

Although basic marketing data broken down by demographics can be of great benefit to the market operations, it is equally important for each market to understand where customer dollars originate and determine which neighborhoods are not represented by the data. Survey information for each respondent was geocoded to the corresponding postal code or nearest street intersection location to determine where customers originated.

The spatial distribution of customers to the Flint and London farmers' markets can be seen in figures 1 and 2. In general, customers in Flint travel greater distances to reach the market. More customers live within 3.1 miles (5 km) of the London market than the Flint market (55% versus 31%). Additionally, more than 85% of London visitors live within 6.2 miles (10 km) of the market, while only 56% of Flint visitors do.

This difference in geographical distribution is reflected in the means of transportation used to reach the market: approximately 91% of customers arrived at the Flint market by personally owned vehicle, while only 80% of customers drove in London. Whereas many customers to the London market live in nearby neighborhoods, there is a considerable gap in some Flint neighborhoods. For instance, there is a lack of respondents from the areas northwest of the Flint market, despite being among the highest-density neighborhoods in the region.

Those living nearer to their markets are more likely to purchase meat. In London, residents living nearer to the market are also more likely to purchase fruits and vegetables, while no such pattern exists in Flint. In both regions, people who live nearer to the markets tend to utilize them more for general groceries. Flint residents who travel greater distances tend to spend more time at the market, though this does not translate into increased spending. No such pattern between time spent at the market and distance travelled exists in London.

Beyond merely mapping respondent locations, two types of spatial analysis were performed: kernel density of customers and dollars spent on various items, and a spatial join of customers and their corresponding neighborhood socioeconomic distress level (specifically, neighborhoods above the mean distress score, as shown in figures 1 and 2).

Kernel-density analysis was run for the sample overall, and for individual binary shopping characteristics (e.g., whether the customer purchased fruits and vegetables, coffee, baked goods; the reasons the customer listed for coming to the market; etc.). For each city, geographic layers of data were created that pinpointed hot spots for each individual characteristic. Figures 3 and 4 show the kernel density of farmers' market shoppers by dollars spent. These maps highlight neighborhoods from which many shoppers originate weighted by dollars spent (darker shading).

In figure 3 (Flint), a noticeable trend is that while an ellipsoidal figure emanates from the

Figure 1. Spatial Distribution of Customers at the Flint Farmers' Market by Level of Urbanization and Presence of Above-Average Neighborhood Socioeconomic Distress

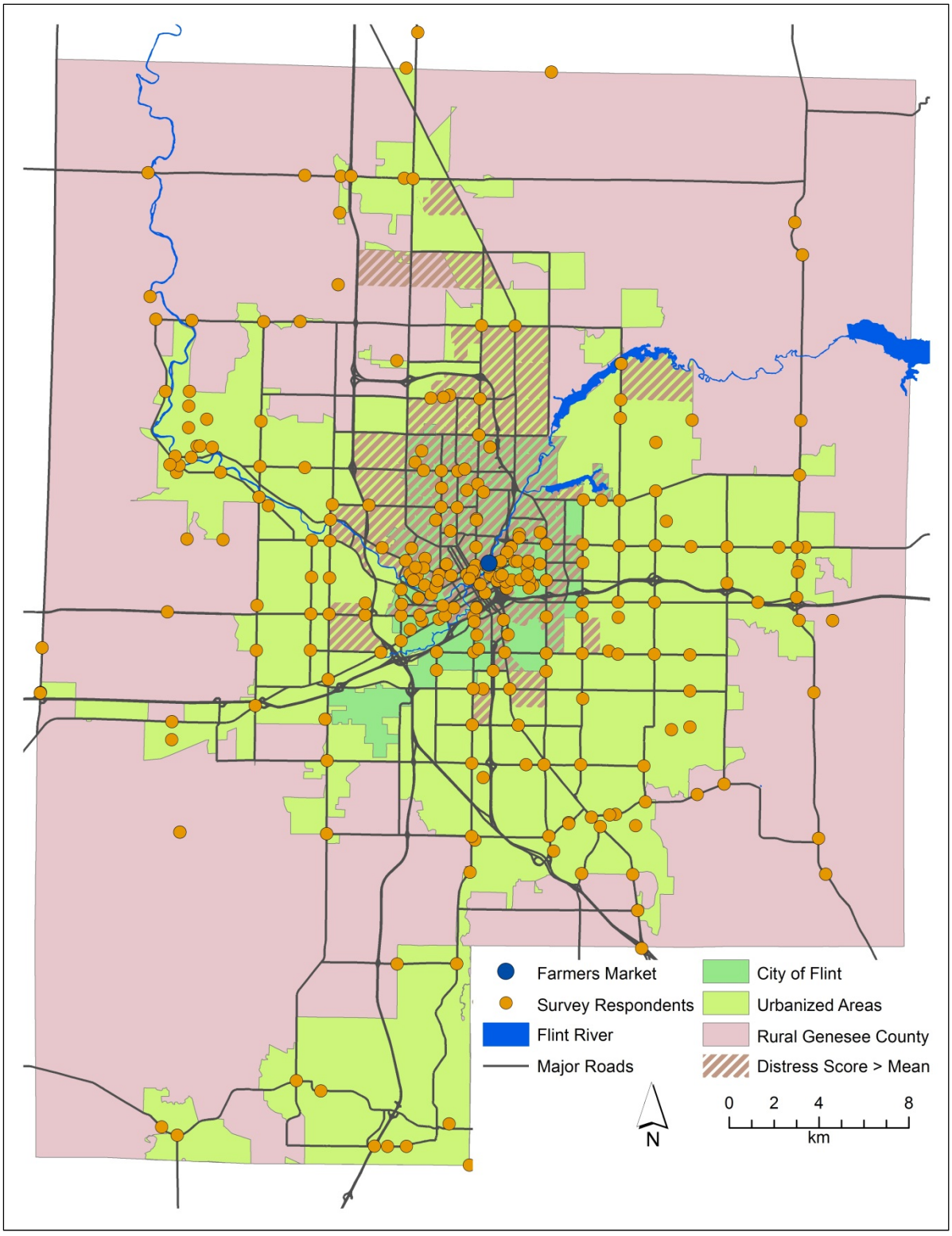


Figure 2. Spatial Distribution of Customers at the Western Fair Farmers' and Artisans' Market by Level of Urbanization and Presence of Above-Average Neighborhood Socioeconomic Distress

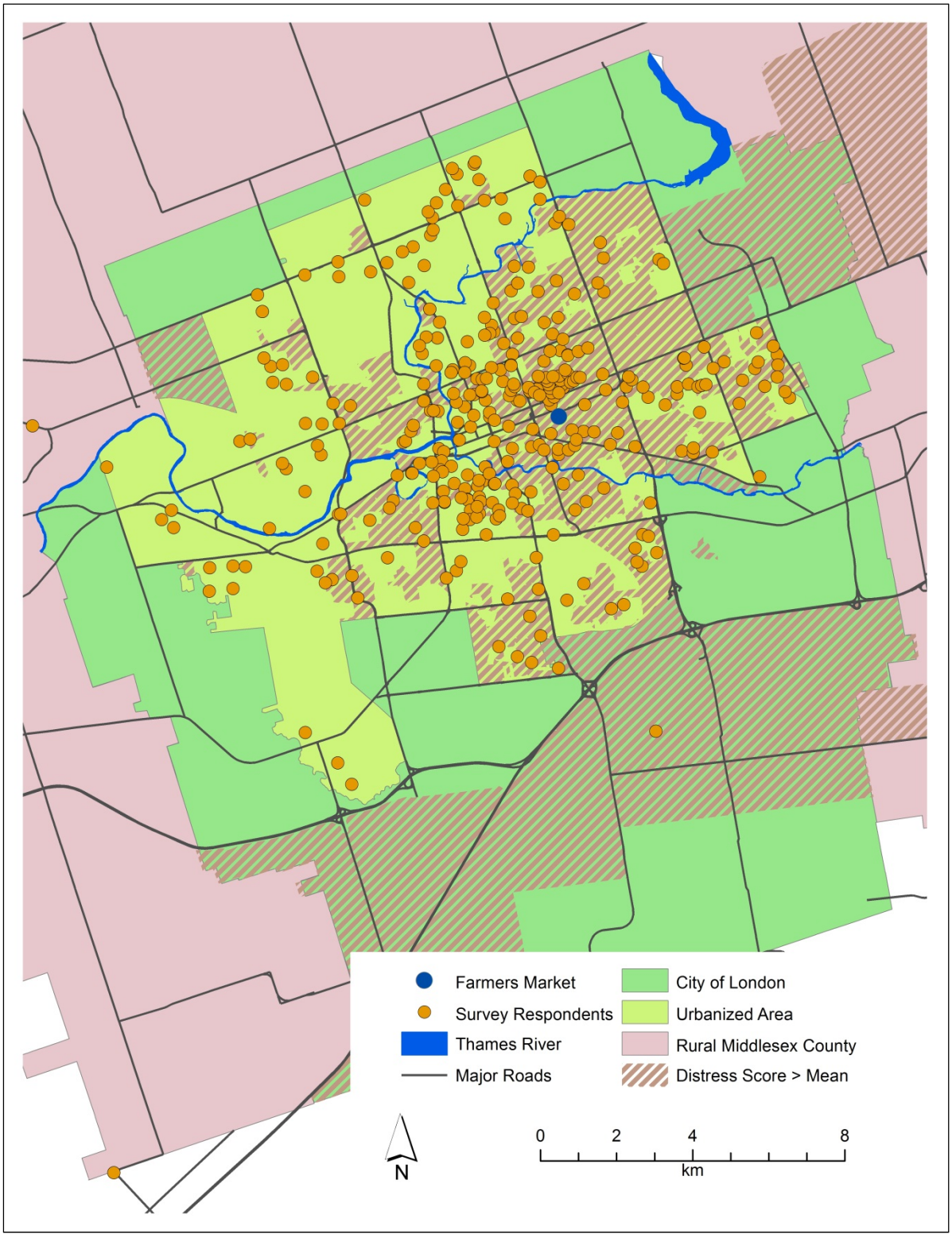


Figure 3. Kernel Density of Flint Farmers' Market Customers Weighted by Dollars Spent

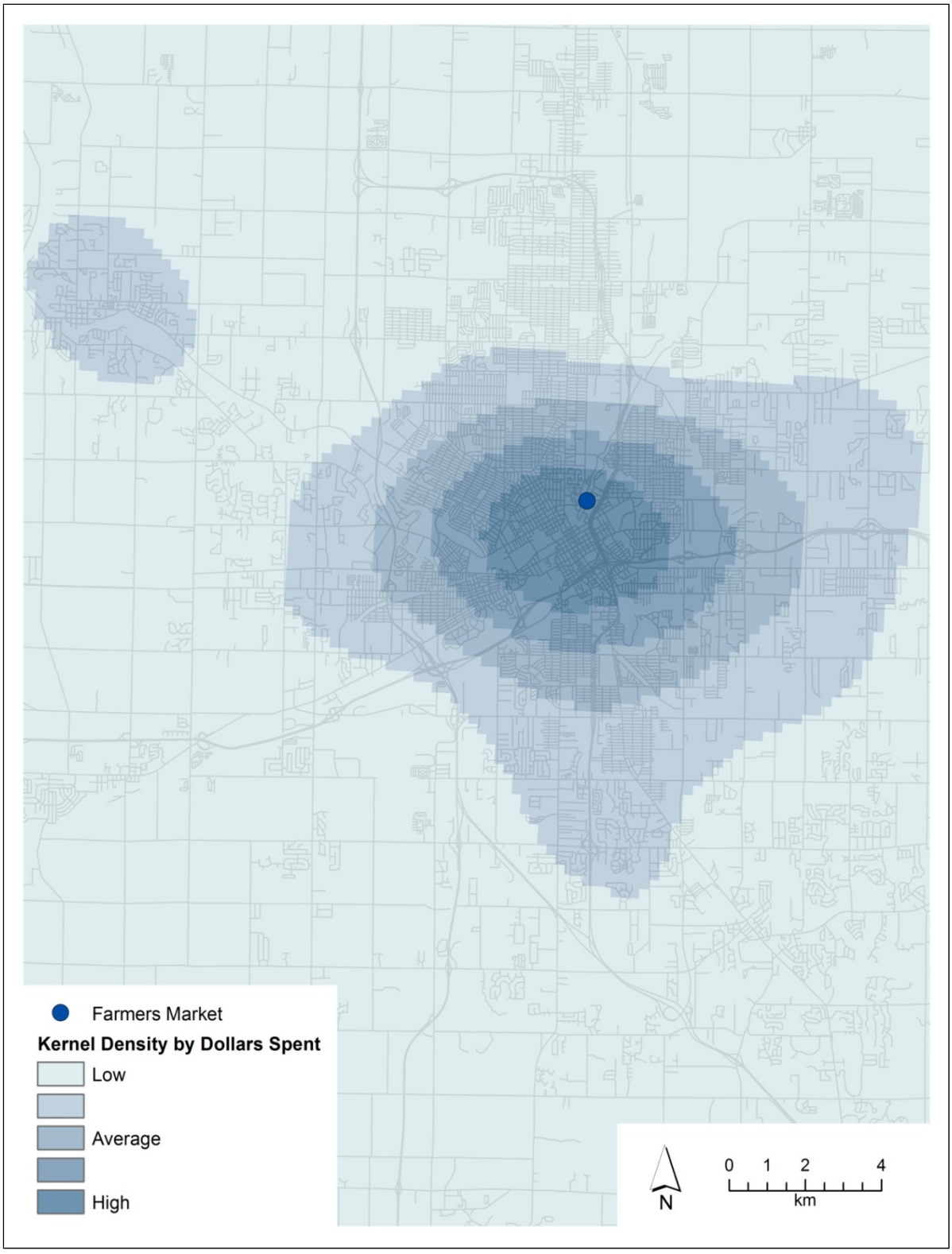
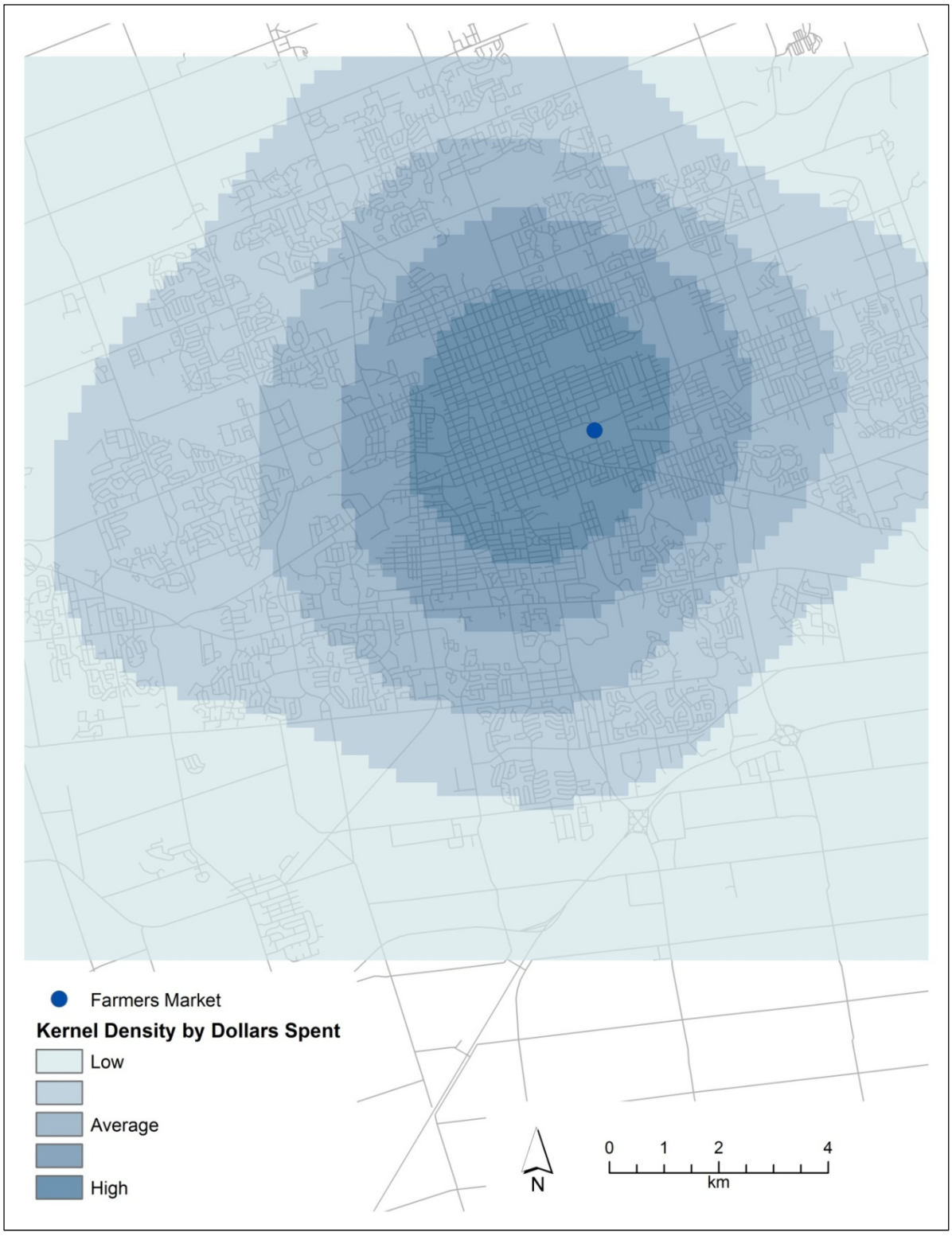


Figure 4. Kernel Density of Western Fair Farmers' and Artisans' Market Customers Weighted by Dollars Spent



farmers' market, an additional peak in customer dollars is spent by residents of Flushing, a nearby city to the west. In figure 4, in contrast, London does not have any distant suburban settlements with a noticeably high level of customer dollars spent. The pattern in London is simply an ellipsoid around the location of the farmers' market, reflecting the denser settlement pattern in London than in Flint.

Respondents' home locations were connected with the socioeconomic distress score for each neighborhood (as shown in figures 1 and 2). In London, 197 of 441 regional respondents (45%) lived in neighborhoods worse than the regional mean for socioeconomic distress. In Flint, 108 of 384 regional respondents (28%) lived in such neighborhoods. The farmers' market in London was located in a neighborhood where the mean distress score was more than 1 standard deviation above the mean, while in Flint the market was located in a neighborhood that was 2 standard deviations above the mean distress score. In each case, many respondents originated from these neighborhoods. This means that each market geographically serves a neighborhood that is in a poorer state socioeconomically than the average neighborhood in the region. This information alone cannot suggest whether farmers' market customers are actually distressed, but the socioeconomic homogeneity of many of these neighborhoods suggest that at least some low-income residents are attending the markets.

Economic Impact

The average amount of money spent among all respondents (US$31 in Flint and CDN$38 in London) was multiplied by the estimated total attendance at the markets each week (3,066 in Flint and 2,404 in London). This value was then extrapolated across the entire year, giving estimates for the money spent at each market. In London, the estimated direct economic impact of the market was CDN$4.8 million. For Flint, the estimated direct economic impact of the market was US$4.9 million. A market-specific multiplier was created for the markets in London and Flint using the economic impact multiplier as a basis (Econsult Corporation, 2007). For London, this value is 1.47, while for Flint the value is 1.39. The resulting multipliers vary for London and Flint because the percentage of products sold is different for each market. Thus the annual impact of the London farmers' market is CDN$7.0 million, while the impact of the Flint farmers' market is US$6.8 million annually. These values include the financial impact directly on the market vendors, the impact of money recycled by those vendors in the local economic region, and the impact of spending by market visitors in the surrounding community.

Discussion

Besides describing the characteristics of farmers' market shoppers, another primary intention of this article is to discuss similarities and differences between two markets on either side of the U.S./Canada border. The Flint and London communities can use these "customer inventories" to learn about their customers and learn from one another. Results indicate that the two markets are statistically similar, for instance in the time each customer spent at the market, the amount of money they spent, and the origin of customers in urban and suburban areas; however, in many other ways the markets are decidedly different.

In each city, the distribution of the origin of customers somewhat aligns with the urbanized area. Both markets draw customers from almost all the neighborhoods within their respective cities. In Flint, there are higher respondent concentrations in neighborhoods just east and west of the market. Few customers are drawn from the neighborhoods directly north of the market, despite their dense populations. These neighborhoods tend to be characterized by higher socioeconomic distress. Higher-distress suburban neighborhoods just south and north of the city limits are also not well represented in the customer profile. Customers come from all over the region, including many rural areas around the county. Many customers originally discovered the Flint market by simply driving by, suggesting that the higher visibility of the market (between the freeway and the downtown core) plays a role in drawing prospective visitors.

In London, higher concentrations of customers come from the neighborhood where the market is located, and a neighborhood in the near

south side of the city, both of which are high-distress neighborhoods. The market does not draw many customers from affluent neighborhoods northwest of downtown. As well, few customers come from outlying rural areas of London. The concentration of customers is likely due to the relatively denser settlement pattern in London.

In terms of variations between markets, customers at the Flint market who traveled greater distances spent more time at the market (distance and time spent are significantly correlated), while a similar relationship does not exist for the London market. Thus in Flint, marketing efforts to retain these distant customers will ensure their spending dollars continue to reach the market. In London, efforts to retain customers for extended periods do not necessarily need to consider the distance traveled.

This is especially important because in both regions, people who live nearer to the markets use them more for general groceries. Additionally, because London attracts a greater number of visitors from the neighborhood, they have a considerable economic impact. The general result that proximity to the market increases the likelihood of shopping for general groceries suggests that for each community, its market serves a primary function as a supplement to grocery stores rather than a "boutique market," particularly for residents within walking distance. This is important because in each community, the distressed neighborhoods immediately adjacent to the markets do not have grocery stores and have otherwise been classified as "food deserts" (Larsen & Gilliland, 2009; Sadler et al., 2012).

The "reasons for coming" to each market were virtually identical for Flint and London customers. More than four out of five visitors in Flint and London stated "local/fresh food" as a key reason for patronizing the market. While fruits and vegetables are the most common purchase at either market, some general differences exist in purchasing patterns between Flint and London market-goers. More customers in Flint purchase fruits and vegetables than in London (87% versus 73%), whereas more customers in London versus Flint purchase coffee (50% versus 15%), meats (50% versus 34%), and prepared foods (30% versus 13%). These differences likely reflect differences in vendor make-up at each market. For example, the notably higher percentage of London customers purchasing coffee is undoubtedly related to the fact that the roasting facilities and café of a popular fair-trade coffee brand in Ontario are based in the market and serve as a major draw.

In contrast to Flint, which has a highly utilitarian style in that many customers shop for general groceries, more people visit the London market for its ambiance. This difference may be because the London market provides more seating and a café for customers, allowing them the opportunity to casually enjoy the market. The Flint market has fewer spaces for casual relaxation and is arranged along one linear boulevard, which creates a busy atmosphere. Discussion with Flint's market manager confirmed that additional seating is desired.

The existing marketing efforts of each farmers' market can be seen in the way respondents indicated that they originally heard about the markets. Flint residents tend to indicate that they had "always known" about the market, while a majority in London heard about the market through word of mouth. This is attributable to the age of each market; the London market opened in 2006, while the Flint market has been in operation at its current site since 1940. The presence of many long-time shoppers in Flint might create a different marketing strategy from that in London, which continues to build its customer base.

In terms of economic impact, both markets play an important role in the movement and recycling of money within and through their communities. The markets attract spending from outside the neighborhoods and serve as sources of affordable, nutritious food. The economic impact values will be of great use to overall food system planning in these communities, but their relatively low numbers in comparison to the total amount of money spent in the regional food system suggests great room for growth among local food entrepreneurs.

The geographic analysis presented in this study is useful for future marketing efforts, since the results show not only where market customers originate, but also significant gaps where substan-

tial populations reside but few market customers originate. This has implications for potential marketing strategies at each market, as well as customer information for enterprising businesses within the market seeking to expand operations closer to their customer base. It could also be used by community groups to determine whether or where barriers exist for people to access the farmers' market or other healthy food options.

Conclusions

This research — a collection of detailed customer inventories for two markets and a comparative analysis of their characteristics — is useful to Flint and London as a tool for policy advocacy for local food systems and local economic development. Jacobsen (2001) has noted the importance of farmers' markets in community development, but notes the need for local governments to support this type of development. In the community surveyed in that study, food policy councils promoted the importance of local food and farmers' markets to municipal planners (Jacobsen, 2001). Both Flint and London have similar advocacy groups: in Flint, the *edible flint* Collaborative; in London, the London Food Charter Working Group. Each of these groups has the opportunity to make use of these data to advocate for policy changes that encourage local economic development through support of their farmers' markets.

Research of this nature promotes the economic benefits of farmers' markets and provides an opportunity for knowledge translation to the public sector. Jacobsen (2001) indicated broader support for farmers' markets after community officials were apprised of their economic benefits. These markets both retain nearly $7 million per year in their respective communities. Since each community spends over $1 billion on food annually, this represents an important opportunity for growth. The average Ontario household spends CDN$7,284 per year on food (Statistics Canada, 2006a). London, with 184,950 households, spends CDN$1.34 billion on food each year (Statistics Canada, 2006b). By comparison, Flint spends US$1.1 billion per year on food, US$900 million of which leaves the county (personal communication, Michigan State University Extension representative, 2012). These figures represent huge growth potential in farmers' markets and other local or alternative food networks.

This research also provides evidence that the two markets surveyed are somewhat different from those surveyed in past research. Women made up a greater percentage of respondents, though shopping characteristics did not vary statistically by gender. Differences in customer characteristics by age suggest that each market has opportunities to expand marketing to attract more of the dominant age category. In both cities, a substantial university population exists within walking or public-transportation distance, which could be tapped for customers. Defining the differences *between* the two markets is useful to demonstrate the wide appeal that markets can play in different cities (i.e., not every market serves the same segment of the population).

Perhaps most compelling, this research shows that the markets provide the surrounding community with a source of nutritious food; they are not merely "boutique" establishments frequented by upper middle class, suburban residents (as found in Elepu & Mazzocco, 2010). In London, previous research showed that the Old East Village neighborhood was a food desert (Larsen & Gilliland, 2008). A follow-up, "natural experiment" study revealed that the opening of the farmers' market alleviated inequalities in the availability and price of nutritious food in the neighborhood such that it was no longer a food desert (Larsen & Gilliland, 2009). In Flint, a downtown grocery store recently closed, leaving the equivalent of a food desert in the absence of the market. The importance of the farmers' markets to these communities is demonstrated empirically by these results, suggesting that residents who live close to the farmers' markets rely on them for general groceries and tend to buy more fresh fruits, vegetables, and meats. Furthermore, a substantial portion of each market's customers was shown to be living in neighborhoods with socioeconomic distress levels above the mean for the region, and each market is located in a neighborhood with exceptionally high socioeconomic distress. The presence of both markets in distressed neighborhoods, and the fact that many customers come to the markets from

distressed neighborhoods, reflect research showing a concern among market managers to balance economic motives with improving food security and serving as a source of nutritious food for local residents (Guthman, Morris, & Allen, 2006).

There are still opportunities for each farmers' market to grow within its respective business market. At present, neither market is strongly linked to a vibrant business community in the immediate vicinity. In London, only 25% of market visitors also visited other stores or arts groups in the area on the same trip. Despite this, new commercial and residential development is on the rise owing to a general increase in infill construction in the neighborhood, successful municipal incentive programs for redevelopment of existing buildings, and ongoing efforts of active community developers associated with the Old East Village Business Improvement Area (OEVBIA), thereby creating more opportunities for linkages between the market and surrounding businesses. These linkages will both help grow the market as well as help the local business community. The OEVBIA is currently working on a local economic development plan for the neighborhood that involves the creation of an "agri-food district," and considers building stronger linkages between the farmers' market and the neighboring commercial corridor as a central objective. In Flint, a renaissance of the downtown core has been emphasized by public funding (in the form of higher education) and private ventures. In London, a number of food vendors have already expanded from the market to open additional locations along the commercial corridor outside the market.

As businesses develop and expand, the link between the surrounding shopping district and the markets is likely to strengthen, thereby increasing the local economic impact of the markets even further. The role as a small business incubator is one of the most important that many farmers' markets play (Cameron, 2007; Guthrie et al., 2006). Small businesses are one of the largest drivers of employment, and any facility that can offer assistance is of great value to a city. Markets provide a low-risk, supportive environment for small businesses to establish themselves. Yet farmers' markets are also characterized by vendors with diverse economic and political backgrounds, which can create some conflict (Oths & Groves, 2012). The consumer profiles presented in this article will be instructive for local economic developers and the managers of each market as they work with these diverse vendors to build markets that are inclusive of many socioeconomic subgroups and their purchasing habits, as well as profitable economically.

This research is necessary to provide a better understanding of customer bases at different markets and demonstrate their effect on the local economy. The geospatial techniques used to track customer spending patterns can be replicated to aid small businesses in incubation at other farmers' markets. The results of this research and similar future research will benefit farmers' market managers and vendors, small business owners, and local economic development officers with a need to quantify the impact of a local economic development project like a farmers' market. Research of this nature may also help demonstrate the shortcomings of farmers' markets within growing alternative food networks and offer insight into how to become more socially inclusive to all populations. Although farmers' markets cannot resolve food system issues on their own, they can serve as an important starting point for improving accessibility to food, providing farmers and other vendors with a local point of sale and entrepreneurial opportunities, and increasing the dialogue around food systems at the community level.

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Appendix: List of Questions for Customer Surveys

What street intersection is nearest to your home? (U.S.)
OR
What is your postal code? (Canada)

What is your gender?

What is your age (in years)?
0–24, 25–44, 45–64, 65+

How often do you visit the market?
Every Week, Most Weeks, Occasionally, First Time

How do you usually get to the market?
Walk/Bicycle, Bus/Public Transportation, Personal Vehicle, Other

About how much money did you spend at the market today?

What kinds of things did you buy at the market? *(Check all that apply)*

Coffee / Drinks	*Fruits or Vegetables*
Meat / Poultry	*Cheese*
Crafts	*Prepared Food*
Baked Goods	*Other*

Approximately how much time did you spend at the market today?

What other kinds of vendors would you like to see in the farmers' market?

What are the most important reasons for you coming to the market today? *(Check all that apply)*
Local / Fresh Food
General Groceries
Specific Vendor
Meet with Friends
Family Activity
Ambiance
Other

How did you hear about the market?
Word of Mouth
Vendor
Drove by
Advertisement
Media
Other

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Measuring current consumption of locally grown foods in Vermont: Methods for baselines and targets

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Abstract

Numerous studies have measured the economic impact of increased consumption of locally grown foods, and many advocates have set goals for increasing consumption of locally grown foods to a given percentage. In this paper, we first apply previously developed methods to the state of Vermont, to measure the quantity and value of food that would be consumed if the USDA Dietary Guidelines were followed. We also assess the potential of locally grown foods to meet these

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guidelines, finding that meeting dietary guidelines with a local, seasonal diet would bring economic benefit, in this case, US$148 million in income for Vermont farmers. A missing piece of information has been: what is the *current* percentage of locally grown food being consumed in a given city, state, or region? The Farm to Plate Strategic Plan, a 10-year plan for strengthening Vermont's food system, attempted to answer this question. To date, we know of no credible set of methods to precisely measure the percentage of food consumed that is locally grown. We collect data from a variety of sources to estimate current local consumption of food. We were able to measure and account for about US$52 million in local food expenditures, equal to about 2.5% of all food expenditures in Vermont. We then discuss limitations and suggestions for improving measurement methods moving forward.

Keywords
consumption, economic benefits, local food, measuring methods

Introduction and Literature Review

Eating locally grown food has become quite popular in recent years. In 2007, the word "locavore" was named the "Oxford Word of the Year" (Oxford University Press, 2007). The cause of eating locally is championed by well-known authors in the popular press (Kingsolver, 2007; Pollan, 2008). Scholars have also expressed interest in the potential benefits of eating locally as part of a sustainable or community-based food system (Feenstra, 2002; Hinrichs, 2003). Among the purported benefits of increasing consumption of locally grown foods are improved farm profitability and viability, farmland conservation, improved public health, and closer social ties between farmers and consumers (Andreatta & Wickliffe, 2002; Conner, Colasanti, Ross, & Smalley, 2010; Conner & Levine, 2006; Lyson, 2004). Selling locally grown food is a strategy that allows small and medium-sized farms to differentiate their products in the marketplace. These same farms also contribute to a broad array of indicators of social, economic and environmental well-being (Kirschenmann, Stevenson, Buttel, Lyson, & Duffy, 2008; Lobao, 1990; Lyson & Welsh, 2005). Community-based food systems can engage diverse stakeholders with many different motivations, although some scholars caution against associating "local" with all things virtuous (Bellows & Hamm, 2001; Born & Purcell, 2006; Conner, Cocciarelli, Mutch, & Hamm, 2008; Oglethorpe, 2008; Wright, Score, & Conner, 2008).

As interest in the social, health, environmental, and, in particular, farm- and community-based economic benefits of local food consumption has grown, the state of Vermont passed legislation to create the Farm to Plate Strategic Plan, a 10-year plan for strengthening Vermont's food system. Vermont's food system (with elements including nutrient management, farm inputs, production, processing, distribution, wholesaling, and retailing) is an important driver of economic prosperity and job creation in the state, estimated to include 57,089 jobs (16% of all private-sector jobs) at 6,984 farms and 4,104 other food-related businesses (13% of all private-sector establishments) (Vermont Sustainable Jobs Fund, 2012). Total output from food production in the state is estimated at US$2.7 billion (Vermont Sustainable Jobs Fund, 2011). The Farm to Plate Strategic Plan contracted with a consultant to conduct an economic impact analysis using the economic forecasting software REMI. The model estimated that increasing instate production by 5% (over an assumed 5% baseline) over 10 years would result in the creation of about 1,700 new private-sector jobs in the food system, along with an additional US$213 million in economic output annually (Vermont Sustainable Jobs Fund, 2012).

This study attempts to create baseline measures for the Farm to Plate Initiative. Specifically, it measures current consumption and upper bounds for consumption under specific dietary scenarios. To be clear, it does not advocate for Vermont farmers growing exclusively for local markets. Rather, it attempts to understand the current situation around local food consumption in Vermont and to estimate how much local food could be consumed, with an eye toward informing efforts to foster more local food consumption and its concomitant community and economic benefits. We begin by asking the following questions: what

quantities of foods do Vermonters eat (under two dietary scenarios); and what volumes (in dollar value and acreage) are needed to meet these diets with a locally grown, seasonal diet? Following this, we present methods and results for actual current consumption.

Many Vermonters are interested in the extent to which the state can feed itself through local food production. Many advocates have set goals for increasing consumption of locally grown foods to a given percentage. Unfortunately, no comprehensive data exist to indicate exactly how much and what types of food Vermonters are currently consuming. We lack methods for determining the *current* percentage of locally grown food being consumed in a given city, state, or region. One objective of this study is to quantify the amount of locally produced food that has been consumed by Vermonters, using the best available data sources.

Previous Assessments of Local Demand

Many studies of local food have focused on the demand side of the equation, identifying drivers of demand, and demographic, psychographic, and behavioral attributes of local food consumers (Bean Smith & Sharp, 2008; Brown, 2003; Conner, Colasanti, et al., 2010; Ostrom, 2005; Thilmany, Bond, & Bond, 2008; Zepeda & Leviten-Reid, 2004; Zepeda & Li, 2006). Key drivers of demand include geographic proximity, relationships with farmers, and support for local economies.

Assessments of Production

Given the magnitude of the global agri-food system, some observers, such as Meter and Rosales, (2001), bemoan the lost opportunity for community economic development when food production and consumption are disconnected. In light of this, a number of studies have looked at the capacity of a given region or state to supply its own food and the potential economic impacts of increased consumption of local food under different dietary scenarios. A series of studies from Cornell University finds that New York state could provide 34% of its total food needs (with rural upstate regions predictably being more self-sufficient than New York City), and that dietary intake influences the acreage needed to meet human consumption needs (Peters, Bills, Lembo, Wilkins, & Fick, 2009; Peters, Wilkins, & Fick, 2007).

Import Substitution and Dietary Scenario Measurements

Other studies look at the economic impact of meeting local food consumption targets. Using the Impact Analysis for Planning economic impact modeling system (IMPLAN) input-output model, an Iowa State University researcher modeled the impact of meeting United States Department of Agriculture (USDA) dietary guidelines with Iowa-grown fresh produce for one-quarter of the calendar year, finding that this change would sustain, either directly or indirectly, US$462.7 million in total economic output, US$170 million in total labor income, and 6,046 total jobs in Iowa (Swenson, 2006). A similar study, which looked at potential impacts of increased fruit and vegetable production for local consumption in a six-state region of the upper Midwest, found that more than a billion dollars in income and nearly 10,000 jobs would result (Swenson, 2010). A study in Michigan used the IMPLAN model to measure job and income impacts of meeting public health dietary recommendations with locally grown fruits and vegetables (Conner, Knudson, Hamm, & Peterson, 2008). In all cases, the models suggest large increases in income to farmers and in job creation, even accounting for the opportunity costs of transitioning field crop acreage into produce production.

A key limitation of the above studies (Meter & Rosales, 2001; Peters, Bills, et al., 2009; Peters, Wilkins, et al., 2007; Conner, Knudson, et al., 2008; Swenson, 2006; 2010) is that they all measure the outcome or impact of hypothetical changes: what would happen if some consumption pattern were to change. An obvious gap in the literature is how much locally grown food is actually being consumed. One place to start this calculation is with upper and lower bounds.

Upper and Lower Bounds

Timmons, Wang, and Lass (2008) demonstrated a method for calculating the upper bound for the proportion of locally grown food in a given state or region. Their research measured the ratio of per

capita consumption (i.e., disappearance) of a given crop or crop category divided by per capita consumption. Their results for Vermont show that for some crops and products, most notably dairy, production far exceeds consumption, while for fruits and vegetables, Vermont can only produce a fraction (25% and 36%, respectively) of what is consumed instate. Their calculations did not take into consideration dietary requirements or seasonality. This figure also omits the proportion of food that is grown in Vermont and consumed elsewhere (likely to be relatively small for produce, but very large for dairy). By comparison, using data from the Consumer Expenditure Survey and Vermont Department of Taxes, we estimate that US$2.7 billion is spent on food annually in Vermont by residents and nonresident tourists, including both at-home and away-from-home consumption, (United States Department of Labor, 2010; Vermont Department of Taxes, 2010).

A possible lower bound for the proportion of local food is the USDA National Agricultural Statistics Service (NASS) figure of food sold directly to consumers, which is available in the Census of Agriculture (USDA, 2007). This figure does not distinguish between direct sales made to Vermont residents and out-of-state residents. Also, at least one study suggests that NASS undercounts the true value of direct food purchases (Conner, Smalley, Colasanti, & Ross, 2010). Similar undercounting was found in another study. The 2008 Organic Production Survey (OPS) reported sales at a higher level than the 2007 Census, while the OPS survey reported data from fewer farms (Hunt & Matteson, 2012). Furthermore, Lev and Gwin (2010) argue that the counting of direct-marketing sales is difficult and not well understood.

Methods and Results

Estimation of Current and Target Consumption Patterns in Vermont

This estimate uses methods developed by Conner, Knudson, et al. (2008) and Abate, Conner, Hamm, Smalley, Thomas, and Wright (2009) to measure the current consumption of fruits, vegetables, dairy, and proteins in Vermont (regardless of source), as well as the levels of consumption if USDA dietary guidelines were followed. We chose these as a dietary benchmark as they are well known and permit relatively easy replication of our methods. We recognize the dietary guidelines' contested and politicized nature and therefore make no claim, for or against, that they truly guide optimal consumption. For products that can be grown in Vermont, yield and price data (primarily from USDA, as used by Conner et al., 2008, and Abate et al., 2009) are used to calculate the number of acres that would be needed and the revenue farmers would receive. The basic questions leading the analysis are as follows:

1. How many servings of fruits, vegetables, proteins and dairy should Vermonters consume according to USDA dietary guidelines? This is subsequently called the "Recommended" diet.
2. Assuming Vermonters' consumption patterns mirror those of the United States as a whole (according to USDA consumption data), how many servings of each do they actually eat? This is subsequently called the "Average" diet.
3. If Vermonters met these two diets with locally grown foods, as much as is practical given climate and land availability, how many acres would be required to produce them at current yield levels and, given prevailing prices, how much revenue would this generate for Vermont farmers?

Estimating the Average Vermont Diet

To calculate consumption patterns under the Average diet, we multiplied daily per capita consumption figures for vegetables, fruits, dairy, and proteins compiled by the USDA Economic Research Service (ERS) by Vermont's population (from the US Census) and 365 days to calculate the state annual consumption, using US Census data (USDA, 2011). The key assumption was that Vermonters' consumption patterns mirror those of the nation as a whole. At least one study (United Health Foundation, 2011) suggests that Vermonters eat more fruits and vegetables than any other states' residents, so the figures for the Average diet may be considered a lower bound. Then, using age-sex population figures and the recommended amount of food in each category for

Table 1. Annual Consumption for Vermont: Average and Recommended

Food category	USDA recommended consumption per day per person (Recommended diet)	Estimated consumption per day per person (Average diet)	USDA recommended consumption per year for Vermont (Recommended diet)	Estimated Vermont consumption per year (Average diet)	Ratio of Recommended to Average diet	Net change between Average and Recommended diets
Fruit (cups)	2	0.84	425,576,008	190,416,042	2.23	+235,159,966
Vegetables (cups)	3	1.67	606,848,270	379,790,725	1.60	+227,057,545
Protein (oz. equivalent)	6	6.6	1,259,701,809	1,498,126,462	0.84	–238,424,653
Dairy (cups)	3	1.68	656,543,993	382,372,493	1.72	+274,171,500

Table 2. Revenue and Acreage Required for Current and Recommended Diets

Food category	2007 total sales[a] in US$	Recommended diet revenue in US$	Average diet revenue, in US$	Change between Recommended diet revenue and total sales, %	2007 total acres[a b]	Recommended diet acres needed[b]	Average diet acres needed[b]	Change between Recommended diet acreage and total current acres, in %
Fruit	15,875,000	6,074,743	2,718,031	-61.7	4,252	2,083	932	-51.0
Vegetables	13,192,000	16,782,605	10,503,248	+27.2	2,855	3,677	2,301	+28.8
Protein	73,125,000	87,341,045	103,872,147	+19.4	153,132	292,950	348,397	+91.3
Dairy	493,926,000	38,244,347	22,273,582	-92.2	539,371	123,816	72,111	-77.0
Total	596,118,000	148,442,741	139,367,007	-75.1	708,239	422,526	423,741	-40.3

[a] USDA Census of Agriculture (USDA, 2009). [b] 1 acre = 0.40 hectare

each age-sex group, we calculated the recommended amount of food per year (table 1). It is assumed that two-thirds of Vermonters are sedentary and one-third are active, according to the USDA definition, an assumption previously used by Conner, Knudson, et al. (2008). Finally, we calculated the ratios of the Recommended to Average diets by dividing Recommended by Average diet figures. Consistent with previous research (Abate et al., 2009), Vermonters should eat roughly twice as much fruits, half again as much vegetables, and about 16% less proteins than they currently do. The net change at the state level is found in table 1.

Next, we calculated current annual consumption of individual fruit, vegetable, proteins, and dairy products (per capita consumption times state populations) for the Average diet. These figures were multiplied by the Recommended to Average ratio in table 1 for the figures listed in the Recommended diet. We assumed that all meat (beef, pork and chicken), 20 vegetables, and 12 fruits can be grown in Vermont. Following methods developed by Conner, Knudson, et al. (2008) and Abate et al. (2009), the seasonal availability of fruits and vegetables was taken from a Michigan State University Extension (2004) publication. We assumed that locally grown fruits and vegetables are only available at these times. Given Vermont's short growing season, we assume Vermont's seasonal availability of vegetables is 80% that of Michigan's.[1] We used price data and yield data from Conner, Knudson, et al. (2008) and Abate et al. (2009), primarily based on USDA NASS and ERS data, to calculate the revenue generated and acres needed if current and recommended consumption levels were met, when available, with Vermont-grown foods (table 2). Note that these are *total* acres needed, not additional acres of production. Note also that, as assumed in Conner, Knudson, et al., 2008, if fruit

[1] As of 2012, Vermont is in Agricultural Hardiness Zones 3a-4b, while Michigan is in zones 4b to 6b. See http://planthardiness.ars.usda.gov/PHZMWeb/

and vegetable consumption were increased to Recommended levels, Vermonters would increase consumption proportionally. Specifically, for the example of fruit, in aggregate Vermonters eat 2.23 times as many items that grow in Vermont — like apples — as well as items, which do not — like bananas. This assumes that consumer tastes remain consistent: people who like apples eat more apples, and so on. Last, comparing total sales data with revenue from the Recommended diet, we find that currently Vermont is producing more fruits and dairy than the state population needs for the Recommended diet, while it does not produce enough vegetables and protein. This finding has potential economic and political implications that we will address in the discussion section.

Methods and Results for Estimating Actual Current Consumption of Local Food

We utilized secondary data from two government sources. We used U.S. Census non-employer data (United States Department of Commerce, 2009) for food manufactured in Vermont by small-scale businesses, and USDA NASS (USDA, 2007) figures measuring food sales direct to consumers. We also made direct inquiries to several types of stakeholders to fill data gaps:

- Institutional food service operations that purchase and serve locally grown foods, including K-12 schools, colleges and universities and hospitals. This was done in a number of ways, including by direct inquiry to the food service director, via local food hubs, statewide nonprofits, and school-led buying cooperatives;
- Statewide nonprofit organizations that conduct surveys on sales to farmers' markets, community supported agriculture (CSA) operations, and restaurants;
- Produce distributors and food hubs;
- Retailers (mainstream grocery, food cooperatives and natural food stores); and
- State government.

In each case, members of the research team asked for their total 2010 sales of locally grown foods. The data were then analyzed by the team for credibility and to detect and eliminate double counting. For example, we looked at purchase figures from a hospital and subtracted out certain purchases that were characterized as "local" but had no local content (e.g., soda). In addition, we avoided double counting by looking at both reports from institutional buyers and wholesalers known to sell to them, subtracting out those figures as well, crediting these figures only to the hospital rather than the distributor.

We received no data from several key sources, including Vermont's three major retail grocery store chains. It is not clear whether these sources are unwilling (they believe the data is proprietary and confidential) or unable (they do not track local products in a way which makes reporting possible) to provide such data. In 2013, efforts will be made to collect additional data from locally owned, independent grocers, and food service companies operating in Vermont's colleges and universities.

Table 3: Summary of Results

Category	Total (US$)	Source
Direct Sales	**24,739,273**	**Census of Agriculture**
Small Food Manufacturers	9,825,340	U.S. Census Bureau non-employer statistics
Chefs / Restaurants	8,483,475	Vermont Fresh Network
Coop Grocers	6,100,000	Multiple sources
Higher Education	1,448,915	Response from buyers
Hospitals	800,000	Response from buyers
Farm to School	180,860	Vermont Farm to School Network
State Government	172,327	Response from suppliers
TOTAL	**51,750,190**	

The early protocols and a report of preliminary findings were shared with the project advisory committee, consisting of scholars and practitioners well-known for their interest and expertise in this area, namely Mike Hamm and Rich Pirog of Michigan State University, Christian Peters of Tufts University, and Ken Meter of the Crossroads Resource Center. Many of the ideas in the discussion were generated in conversations and communications with them.

Results of our inquiries are presented in table 3.

Discussion

Estimation of Current and Target Consumption Patterns in Vermont

We found that in order to meet the dietary guidelines, Vermonters need to increase their consumption of fruits, vegetables, and dairy while decreasing their consumption of meat. These dietary changes provide the Vermont agricultural sector with potential new markets. When looking at the current level of production in the state, we found that the state produces more than enough fruits and dairy to meet the Recommended diet, but not enough vegetables and protein. Our findings, particularly concerning fruit consumption and production, differ from those of Timmons et al. (2008) in part because our analysis focused on locally and seasonally available products.

Based on these findings, at least two scenarios emerge. First, a state could devote all resources only to feeding its own people — a type of autarky. In this scenario in Vermont, dairy and fruit production would need to be scaled down, leaving the state with excess capacity, and concomitant loss of revenue and employment in these sectors, while production of protein and vegetables would have to be scaled up. This scenario would require major restructuring and would likely be both politically and economically untenable.

In another scenario, each state could coordinate with others in the region, with each pursuing a more localized and regionalized diet. Such coordination would allow access to regional markets and create a smoother transition for the regional agricultural economy. It would be important for other states to conduct a similar kind of analysis in order to inform future allocation and align food system development with local communities' goals, such as economic development, nutritionally improved diets, and around those products which are best suited for the soils, climate, land base, and existing infrastructure of a given state in the region.

Though extreme, these scenarios highlight the need for collaboration between states at least at the regional level. Collaboration should take place not only at the planning level, but also at the production, processing, and distribution levels. Suggestions for collaboration in terms of data needs and research is highlighted in the paragraph below.

Estimating Actual Current Consumption of Local Food

Our estimate of about US$52 million makes up a small percentage (2.5%) of Vermont's US$2 billion total food bill. We had a great deal of cooperation from many partners and agencies in this research, but still lack data of a potentially large magnitude from a few sources. Nationally, the largest purveyors of local food are distributors and retailers (Low & Vogel, 2011), so their lack of response is significant. At this time, most see too little (or no) benefit and/or too high a cost in reporting these figures. Given current food safety protocols, they are able to trace back foods to the farm of origin in case of a recall, but they may consider it too costly to measure local food sales as a routine practice. Methods must be developed which either automatically gather this information or circumvent the need for it. Below we discuss the limitations of our study and potential strategies for overcoming them.

Limitations and Strategies

Regardless of what strategies are used, we have identified many lingering issues that need to be addressed.

- What is local? How is it defined? The Farm to Plate Initiative defines local as food produced from Vermont plus within a 30-mile radius of state borders. State boundaries are used in many other contexts. One Vermont-based distributor defines local as the region it serves, that is, where its trucks go. Should a single definition be used by all

investigators? Which definition should be used and why? State boundaries would be an obvious choice, both for clarity and to build on existing state promotion efforts.

- Similarly, where in the supply chain should the data be measured? At the farm gate: what distributors or wholesalers pay to farmers? What foodservice or retail buyers pay to distributors? What end consumers pay to the retailer or foodservice operation? Collecting data directly from farmers, as discussed above, would address this problem, but places a large burden on farmers. On the other hand, assuming they can be adequately compensated and equipped to do so, data collection would also serve as a means to triangulate traceability protocols (tracing forward as well as back). Furthermore, it would permit input-output analyses based on increased farm income like those discussed above (Conner, Knudson, et al., 2008; Swenson, 2010).
- Double counting is a challenge. If we were to get data from both distributors and their buyers, how can we be sure to subtract out duplicate purchases? Again, measuring at the farm level would address this, assuming adequate compensation and mechanisms are provided.
- If we are to count food products (e.g., jams, baked goods, and sauces) processed locally, how do we account for ingredient foods grown elsewhere? The Farm to Plate Initiative defines as local those value-added food products that are processed in Vermont with ingredients grown in Vermont or within a 30 mile radius (Vermont Sustainable Jobs Fund Aggregation & Distribution Working Group, 2012; Vermont Sustainable Jobs Fund, 2011). The Michigan Good Food Charter requires 50% local ingredients (Colasanti et al., 2010). Should a single standard be used, and if so, which one? Furthermore, sourcing of products can change depending on the time of the year. How should this be addressed? Again, measurement at the farmgate level would address these issues.
- Fluid milk may be difficult to trace back to a single farm, given the degree to which it is pooled from multiple farms. How can this counted with accuracy?
- With increased attention to the capacity and prospects for regional food systems, interstate cooperation, notably harmonization of standards and definitions, will be needed to conduct these types of studies on regional scales. Vermont's Farm to Plate Initiative and Michigan's Good Food Charter are two prominent examples from which to start.

Based on our work so far, we foresee the following opportunities and obstacles for a more comprehensive and accurate count. Potential strategies include:

- Work with agencies already collecting data from farmers to get information directly from farmers. One promising idea is to work with the state or regional National Agricultural Statistics Service, as it is capable of developing and administering surveys with high response rates at affordable rates (M. Hamm, personal communication, June 12, 2012). One method would be to ask for total farm sales revenue, and then to list percentages sold to various market channel categories (summing to 100%). As emphasized above, care must be made, however, to avoid putting all the data collection burden on farmers without consideration of their time. Hunt and Matteson (2012) made a few suggestions in a recent paper: engage farm stakeholders during census survey development, improve question specificity to reduce reporting ambiguities, introduce questions based on marketing channel usage, and track market-level characteristics of different market channels.
- Hunt and Matteson's (2012) suggestions may be operationalized best by forming a community of practice (COP) around measuring local foods. This may involve participatory action research to develop goals and discover perceived benefits and barriers. Pos-

sible roles for researchers and practitioners within a COP approach may include:
    - Helping purveyors develop standard stock keeping units (SKU) systems for local produce, sharing best practices and experiences among the group;
    - Providing resources and technical assistance to their efforts; and
    - Developing, testing, and refining methods for data collection. In particular, if farmers are to be the primary source, methods must compensate farmers, minimize their burden, and be feasibly implemented.

  Even if farmer data collection is put in place, these suggestions will serve the dual purpose of encouraging local food purchase and triangulating farmer-generated data.
- Work with local buyers to incorporate local product supply requirements into bids and requests for proposals within their procurement practices. Effective examples could be shared and tested elsewhere to develop a set of tools or lists of best practices.
- Building on the point above, work with state legislatures to require public institutions to annually report this information.
- Use the public relations power ("bully pulpit") of local food advocates to publicly praise businesses that provide data.

Conclusions

The potential economic impact of increased consumption of locally grown food is of interest to policy makers and other stakeholders, yet to date little research has been conducted that estimates current consumption, a benchmark against which progress can be measured. This paper began by estimating the quantities of food, potential farmgate income, and number of acres needed to supply Vermont's current diet, as well as a diet in line with USDA dietary guidelines. We then developed and utilized a set of methods to measure current consumption of locally grown foods, and shared and discussed outcomes with an advisory committee of national experts. We were unable to gather data from several sources, creating a significant gap in our study. We then discussed the potential to use farm-level data to address key limitations.

Our study focuses on one state, but as discussed above, collaboration among states in a region would foster a smoother transition to a more localized and regionalized agricultural economy. The Northeast region has a track record of regional collaboration through the Northeast Sustainable Agriculture Working Group (NESAWG), whose mission is to "build a more sustainable, healthy, and equitable food system for our region" (Northeast Sustainable Agriculture Working Group, 2013). Using a community of practice like NESAWG is crucial to continue improving the methodology to measure local consumption and data collection robustness. Efforts to test and build on the methods discussed in this paper, and learn from others' work, are already underway.

The strengths of this paper include being the first attempt known to the authors to comprehensively measure this local food consumption statewide, as well as the degree of cooperation from stakeholders and the project advisory committee, which led to the lessons learned above and the opportunity to improve on this pilot effort. The weaknesses are the lack of data from the likely largest sources of local food and the other barriers discussed above. We hope our study assists scholars and practitioners elsewhere in their efforts and facilitates development of sound methods to address this important but difficult question.

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Toward an applied methodology for price comparison studies of farmers' markets and competing retailers at the local scale

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Abstract

Qualitative research on food pricing in regional markets is currently underrepresented in the scholarly literature. The methods used in existing peer-reviewed studies tend to obscure important qualitative differences in the food items they compare and the retail spaces they source. Recently, some non–peer reviewed price comparison studies have emerged that point to some of the complications of earlier studies and offer alternative methods for data collection and comparison. Building upon the contributions of these latter works, this study attempts to improve upon previous studies and provide a set of methods that contribute thoughtfully to future studies. The main goal of this study is to advance research that would better inform consumers and the producers who serve them. The key contribution of this study is a new model for future price comparison studies that accurately provides accessible and practical information for farmers' market producers and consumers.

Keywords

consumer attitudes, farmers' markets, local food, price comparison studies, price premiums

Introduction

An increasing number of American consumers are becoming concerned with such agricultural issues as food origin, worker rights, ethical treatment of animals, growing practices, and other issues within the contemporary food system. Yet while there is no shortage of information available to consumers about how, why, and where they should purchase their food, studies that compare the prices of qualitatively similar food items within a local

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market area are largely absent from the peer-reviewed scholarly literature. Accessible information from such a study may improve decision-making capacity for consumers who are currently presented with a complex diversity of food choices. Likewise, information from a localized price-comparison study would better inform the business models of small-scale, direct-market producers and help them engage their customer base more effectively. The purpose of this research is to develop a set of reproducible methods for local price-comparison studies that (1) reflects the motivations and considerations of the contemporary local food shopper, and (2) presents relevant and accessible data that can benefit farmers' market consumers and producers.

As research for this paper revealed, however, conducting such a price-comparison study and presenting its findings in an accessible format can be a challenging task. Price-comparison studies (PCS) vary according to location and are also susceptible to methodological mistakes and bias. Further, the diversity and complexity of the modern food retail landscape makes one-dimensional, item-to-item comparisons difficult and even misleading. This paper addresses the empirical and theoretical issues that must be considered in order to develop a new PCS model. We begin with a review of the scholarly literature in order to evaluate the applicability of previous PCS, assess the consumer motivations of local food patrons, and gather relevant information regarding food price premiums. Next, information is presented about the specific study sites and the methods used to select items, record data, and compare prices. Following a presentation of findings, this paper offers a set of recommendations for future studies in an attempt to advance this mode of research. Ultimately, this study presents a new set of reproducible methods for conducting PCSs that can be presented in a clear and accessible manner to farmers' market producers and consumers.

Case Study Background and Literature Review

The impetus for this study emerged from a larger research project that included a survey of three farmers' markets in the Austin, Texas MSA (metropolitan statistical area). During research, market organizers and vendors mentioned the unreliability and inapplicability of existing PCSs. They suggested that a more robust set of methods for PCSs should be developed in order to provide vendors and consumers with accurate pricing information. In order to do this, we first reviewed existing PCSs in order to identify the strengths and weaknesses of those studies. We then engaged in a review of the literature on the local food movement and farm direct markets in order to better contextualize our study and inform our methods. This section summarizes that literature.

Previous Price Comparison Studies

Research that compares food pricing among farmers' markets and local competitors is currently underrepresented in the peer-reviewed literature. As of the writing of this manuscript, only two peer-reviewed PCSs of farmers' markets and conventional grocery stores have appeared since 1980 (Gunderson & Earl 2010; McGuirt, Jilcott, Liu, & Ammerman, 2011). These studies are broad in scope and are not always useful for farmers' market vendors or consumers because they (1) do not reflect the complexity of the contemporary food retail landscape, (2) are not accessible to most consumers, and (3) do not reflect the changing preferences of the contemporary consumer.

The first known peer-reviewed PCS appeared over three decades ago (Sommer, Wing, & Aitkens, 1980). Like studies that appeared much later, this research was broad in scope, considering the prices of over 350 items at 18 different certified Northern California farmers' markets and an undisclosed number of nearby supermarkets. The study revealed a price savings in favor of farmers' market at the time, determining that the "average unit cost in the supermarkets…was [US]70¢ and in the farmers' market it was [US]46¢" (Sommer et al., 1980, p. 47). Perhaps most notably, this study recognized the importance of conducting future research that considered such factors as quality, consumer motivation, and seasonality.

Three decades passed before PCSs appeared again in the scholarly literature. McGuirt et al. (2011) conducted an analysis of 12 farmers' markets and an undisclosed number of conventional

supermarkets across North Carolina. The study recorded 230 food items for comparison. They also found "an overall price savings to consumers who shop at farmers' markets compared to supermarkets" (McGuirt et al., 2011, p. 91) across a diverse geographic landscape within the state. The McGuirt et al. research identifies the same methodological limitations and complications of conducting a PCS, including convenience, location, and price fluctuation. Another peer-reviewed study (Gunderson & Earl, 2010) proposed a model of price-comparison research between supermarkets and farmers' markets in Florida for the stated purpose of "advis[ing] farmers how to more competitively price their produce" (p. 54). Their research provides detailed methods for a large-scale statistical pricing model to be carried out in 2010, but as of the writing of this manuscript, the results have not been published.

Alternatively, two non–peer reviewed studies (Claro, 2011; Pirog & McCann, 2009) highlight some of the methodological challenges of conducting PCSs within regional food systems, calling attention to differences in food origin, quality, and seasonality when drawing comparisons and determining prices.[1] Pirog and McCann (2009) recorded prices with the intent of comparing cost between "local" and "nonlocal" foods at Iowa markets. Unlike previous studies that had only compared two types of retail markets (farmers' markets and conventional supermarkets), this study considered four "natural grocery stores" and three butcher shops, as well as four conventional supermarket chains and six farmers' markets. Perhaps most importantly, the researchers considered food origin, certification, and growing or raising practices when comparing "like items" (pp. 3–5). A second study by Claro (2011) compared 12 "core items" at nine farmers markets and 10 grocery stores. Like the Pirog and McCann study, distinctions were made between certified organic and nonorganic items, but unlike that research, little mention was made of food origin. The stated goals of the study included establishing "an overview of prices at farmers markets that consumers can expect to encounter"; offering information that could improve the effectiveness of SNAP (Supplemental Nutrition Assistance Program) beneficiaries; and providing "robust pricing data" that could inform vendors and farmers at markets (Claro, 2011, p. 4). The study succeeded in its aims, contributing detailed data for farmers and consumers in Vermont and successfully offering marketing suggestions to their intended audience. The Claro (2011) study, however, did not build upon many of the suggestions of the earlier studies, and its findings were limited to a regional audience.

This study draws from many of the methodological improvements and suggestions of Pirog and McCann (2009) and Claro (2011). In order to better inform this study, we reviewed the recent scholarly literature on direct food markets, their patrons, and their role in contemporary food culture. This review strongly influenced our choice of methods and our discussion of results.

Farm Direct Markets and their Patrons

The number of farmers' markets more than doubled in the first decade of the 21st century (United States Department of Agriculture [USDA], 2012) and the number of community supported agriculture (CSA) programs reached 3,600 by the end of that decade (see Galt, 2011, for an alternative count). This trend has garnered significant attention from popular books, film, and mainstream media (Lavin, 2009; Long, 2011), and scholarly publications have paralleled this trend. As these studies reveal, consumers rarely make food choices based upon price alone.

First, community building and social interaction are important motivations for many farmers' market patrons (Farmer, Chancellor, Gooding, Shubowitz, & Bryant, 2011; Feagan & Morris, 2009; Hunt, 2007; Svenfelt & Carlsson-Kanyama, 2010; Tiemann, 2008). Building upon Hinrichs' (2000; 2003) discussion of social embeddedness in local agriculture, Feagan and Morris (2009) argue that several forms of "embeddedness" drive consumer

[1] An additional price comparison analysis should be mentioned here. For at least three consecutive years, students at Seattle University's Albers School of Business have conducted informal price comparisons between local grocers and farmers' markets in the Seattle area. However, the details of this study — particularly the methodological considerations — have not been published, and we were unable to locate these details.

motivations and regularly supplant price as the primary factor in food selection. Social embeddedness implies a sense of connection, community, loyalty, and belonging to the material purchase of food items (Feagan & Morris, 2009; Hunt, 2007). The purchase of items that exhibit those qualities therefore encourages a sense of identity and cohesion among consumers. In addition, farmers' markets represent an idealized landscape for support of the "local economy" both in terms of regional economic sustainability and perpetuation of social ties that are often seen as a necessary feature of sustainable communities (Lyson, Gillespie, & Hilchey, 1995; Kingsolver, Hopp, & Kingsolver, 2007; McKibben, 2007; Winter, 2003). Lastly, the space of the farmers' market is seen as a safe area of recreation, entertainment, and socialization, further adding to its role as a space for community building and social interaction (Farmer et al., 2011; Svenfelt & Carlsson-Kanyama, 2010; Tiemann, 2008).

Second, there are political motivations for patronizing a farmers' market. Choosing to shop at a farmers' market is seen as a local act, but it is also sometimes portrayed as a politically motivated decision with global consequences (DeLind, 2011; Lavin, 2009). Popular books such as Schlosser (2001), Nestle (2002), Pollan (2006; 2009), Bendrick (2008), and films such as *King Corn* (2007), *Fresh* (2008), and *Food Inc.* (2008) criticize corporate retailers and industrial agribusiness while simultaneously romanticizing local, small-scale farmers and direct food markets. As scholarly authors point to the social and environmental consequences of corporate agribusiness (see for instance, Barrientos & Dolan, 2007; Boucher, 1999; Patel, 2008; Shiva, 2000), popular writers provide step-by-step instructions for resisting global injustices through acts of local consumption — acts that are portrayed as more transparent, ethical, and environmentally friendly (Kingsolver et al., 2007; Pollan, 2008).

Lastly, empirical studies find that for many local food consumers, freshness, variety, value, and nutrition are also key motivating factors (Feagan & Morris, 2009; McEntee, 2010; Onianwa, Mojica, & Wheelock, 2006; Svenfelt & Carlsson-Kanyama, 2010; Wolf, Spittler, & Ahern, 2005; Zepeda, 2009; Zepeda & Li, 2006). And while the consumer quest for fresh and healthy ingredients tends to be practiced disproportionately by different demographic groups, evidence suggests that an increasing number of Americans are making their way to the space of the farmers' market (Detre, Mark, & Clark, 2010; Wolf et al., 2005; Zepeda, 2009).

Paying the Price

Numerous studies address the idea of a "local food price premium," with farmers' markets as one of the chief beneficiaries of that premium (Adams & Adams, 2011; Adams & Salois, 2010; Burnett, Kuethe, & Price, 2011; Carpio & Isengildina-Massa, 2009; Lyon, Collie, Kvarnbrink, & Colquhoun, 2009; Toler, Briggeman, Lusk, & Adams, 2009). Some time near the turn of the century, consumer preference for "local" began increasing significantly (Adams & Salois, 2010), and as demand for local products increased, so did the local price premium. Carpio and Isengildina-Massa (2009) found that South Carolina consumers were willing to pay an average of 27% more for local produce and 23% more for local animal products. Adams and Adams (2011) found that while consumers across demographic groups exhibited a different level of willingness to pay the local premium, the overall average price was 76% higher for local foods. In short, there is strong evidence that consumers are increasingly willing to pay more for local foods, but there are additional factors that weigh on the consumer mind.

In addition to the local premium, Moser et al. (2011) and Burnett et al. (2011) both address several other "credence attributes" that affect a consumer's willingness to pay a higher price. These may be positive or negative in the mind of the consumer, and include production methods such as integrated pest management, genetic modification, the use of chemicals, and a host of other environmental and social concerns. The increased availability of these foods in retail markets denotes a shift in consumer preference for local and sustainable foods.

This shift has not gone unnoticed by corporate retailers who have strategically co-opted messages of "local" and "sustainable." Long (2011) discusses the inclusion of "surrogate" and "counternarratives" of sustainability in the supermarket landscape

intended to mimic the authentic, local, and personal food experiences of farm direct markets. Drawing from the information produced by popular and alternative media, supermarkets follow with their own on-site narratives of local, personal, and "close-to-home" connections (Long, 2011). This has produced a complex retail landscape for the consumer in which they must critically evaluate competing messages of production practices, environmental impact, and social relationships. Incidentally, this has also produced a challenging environment for conducting a PCS. As this literature review argues, strictly quantitative price comparisons fall short of addressing the values of today's local food consumer.

Study Site Information

This study offers a new model for PCSs among farmers' markets and local retail competitors, but results may vary according to geographic location and retail competition. To account for this, the following section provides information about the geographic region studied, descriptions of the farmers' markets, and information about the nearest natural and conventional retailer grocers. All research was conducted in or near the Austin, Texas MSA during March and April 2012 by a nine-member research team, including the principle investigator and co-authors of this manuscript. Austin is a city of nearly 800,000 residents with more than 1.7 million in the extended MSA (U.S. Census Bureau, n.d.). Austin is considered one of the fastest growing U.S. metropolitan areas in terms of employment, population increase, and economic growth (Fisher, 2012; Florida, 2012). Austin's direct food markets grew steadily during the first decade of the 21st century, and the MSA is now home to six active markets and nearly 20 CSAs (Wood, 2011).

Study Site 1: Downtown Austin

The downtown Austin farmers' market is a weekend market operated by the Austin Sustainable Food Center (SFC). It is the largest certified-growers market in the state of Texas. The downtown Austin market is part of the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) Farmers' Market Nutrition Program (FMNP) and also accepts Lone Star food stamps (SNAP). In addition to a vast selection of produce, vendors sell dairy products, meat products, and additional specialty items. There are also hot food items and drinks available, and there is an outdoor seating area with a stage for musical acts and other performances. The market also sells nonfood items such as organic soaps, clothing, and crafts.

For the downtown Austin market, we compared prices to the closest H-E-B grocery store (2.3 miles or 3.7 km away) and nearby natural grocery store,[2] Whole Foods Market (0.7 miles or 1.1 km away). H-E-B is an award-winning San Antonio–based supermarket chain that is the largest privately owned company in Texas, the largest private employer in Texas, and one of the largest supermarket chains in the U.S. (Pack, 2012; San Antonio Business Journal, 2010). H-E-B boasts a strong commitment to sourcing foods from producers within Texas, but the number of Texas brands and offerings varies according to seasonality and store location (H-E-B, n.d.). Austin-based Whole Foods Market is currently the world's largest natural and organic food retailer (Whole Foods Market, 2012). Whole Foods lists more than 2,400 natural and organic products in its Whole Foods, 365 Everyday Value, and Whole Catch brands (Whole Foods Market, 2012). Like H-E-B, Whole Foods has made a "permanent commit[ment] to buying from local producers," but the number of local offerings varies seasonally and by store location (Whole Foods Market, 2012).

Study Site 2: Cedar Park

The Cedar Park farmers' market is located in Cedar Park, Texas, a suburban community of 48,937 residents that shares a municipal boundary with Austin (U.S. Census Bureau, n.d.). The market is a member of the Farmers' Market Coalition, a nonprofit corporation, and is managed by F2M Texas, another nonprofit corporation (Central Texas Media, 2010). The Cedar Park farmers' market

[2] "Natural grocer" is a self-identifying term used loosely by each of the stores chosen for this study. The term is also often used by upscale grocers to differentiate themselves from conventional supermarkets.

opened in 2010 and is open year-round every Saturday morning. The market accepts Lone Star (SNAP) food stamps. There are approximately 50 vendors who participate at the Cedar Park farmers' market, and the diversity of food offerings closely resembles that of the downtown Austin market. The Cedar Park market does not have well defined rules about product origin, but similar to the downtown Austin market, the vast majority of products are sourced within a 150-mile (241-km) radius of the market (Cedar Park Farmers' Market 2012).

For the Cedar Park farmers' market, we compared prices to the nearest H-E-B (1.2 miles or 1.9 km away) and nearby natural grocery store (4.5 miles or 7.2 km away), in this case called Natural Grocers, a Colorado-based natural food retailer with over 50 locations nationwide. Natural Grocers sells a diverse selection of produce, meats, dairy products, bakery items, and other products. Natural Grocers sells "only natural and organic groceries and dietary supplements that meet our strict quality guidelines" (Natural Grocers, n.d.).

Study Site 3: Georgetown

The Georgetown farmers' market is located in Georgetown, Texas, a town of 47,400 residents approximately 25 miles (40 km) north of Austin on Interstate I-35. This market is open on Thursday afternoons. The market is now open year-round, but at the time this research was conducted the market was open seasonally from the first Thursday in April until the week before Thanksgiving (Georgetown Farmers Market Association, n.d.). It was founded as a part of the *Go Texan* program under the Texas Department of Agriculture that encourages Texans to purchase local products. The Georgetown farmers' market is by far the smallest of the three study sites, hosting anywhere from 8 to 15 vendors, although there can be as many as 20 to 25 vendors. There is a large selection of local produce available, but the Georgetown market does not have the same level of diversity of meat and dairy items as the other study sites. The Georgetown farmers' market requires its vendors to sell items that are produced within Williamson County or one of 11 nearby counties. This market also accepts Lone Star (SNAP) food stamps.

For the Georgetown farmers' market, we compared prices with the nearby H-E-B (3.8 miles or 6.1 km away) and Sprouts Farmers' Market (8.1 miles or 13 km away), an Arizona-based natural food retailer with over 100 locations in the southwestern United States. It is important to mention that despite its name, Sprout's "Farmers' Market" openly states that it is not a traditional farmers' market, and while it offers a large selection of natural and organic food items and other products, it also carries a large number of "great-tasting mainstream foods" (Sprouts, n.d.).

Methodology

This research consisted of three interrelated methodological components, including price comparisons, surveys, and participant observation. As such, this was a QUAN (+qual) study — one that considers qualitative features to enhance the conduct and understanding of an otherwise purely quantitative study (Creswell & Piano Clark, 2011). The result was a PCS intended to mimic the experience of the local food shopper while accounting for the complexity of the contemporary food retail landscape.

Survey Methods

The research for this study was conducted as part of a larger research project that included semistructured, open-ended surveys. The survey included 10 questions, but only two were written specifically with the PCS in mind. Approximately 400 surveys were completed and returned (Downtown Austin, n=146; Cedar Park, n=180; Georgetown, n=70). We employed purposive convenience sampling based upon our ability to attract respondents within the space of the farmers' market. Put simply, all respondents who were shopping at that farmers' market on the day of the survey were invited to participate. Worth noting is that little demographic data (other than respondent zip code) was gathered in this study. Market operators welcomed our survey, but some requested that we conduct our research with minimal interference to normal market activity and with the greatest respect for patron privacy. As a result, we chose not to ask any demographic information (e.g. age, income, ethnicity, employment status) that might make participants feel uncomfortable or infringe on their privacy.

To recruit participants, a table was set up at each farmers' market with a sign indicating that a survey was being conducted. Additionally, members of the research team walked through the market and asked patrons if they would like to participate in a survey of the farmers' market. If patrons chose to take the survey, they had the option of either filling out the survey themselves or being read the questions while a member of the research team recorded their responses. The survey was one page double-sided and consisted of 10 questions. Respondents were given the option of filling out the survey in either English or Spanish. The survey was open-ended and qualitative. Respondents were encouraged to "write as much or as little as they liked." All written and verbal results were fully transcribed and coded into suitable categories. The two questions in the survey written in order to complement the PCS were as follows:

(1) In your opinion, are most items more or less expensive at the farmers' market than at your local grocery store?
(2) What is the most important quality or qualities you look for in the items you purchase (examples: organic, local, GMO-free, taste, appearance, selection, etc.)? Would you be willing to pay more for these qualities?

Price Comparison Study (PCS) Methods

All prices were recorded in March and April 2012 in two separate rounds for each location to ensure accuracy, account for price fluctuations, and account for changes in seasonal availability. We recorded prices for 20 to 30 items at each farmers' market and then compared them to like items at a nearby conventional grocery store and nearby natural grocery store. To gain reliable comparisons within the market itself, we recorded prices from different vendors, and selected items in a way that replicated the known and observed behavior of patrons at the market (i.e., we chose a diverse basket of items based upon the growing practices, product origins, and appearance of food items as described in the literature, observed in the field, and articulated in survey responses). In addition, members of the research team interviewed farmers and vendors about their specific growing practices and recorded the farm location where each item was produced. The research team then recorded prices of the most qualitatively similar items available at the conventional grocery store and natural grocer within the local area. Information about certifications, labeling, growing practices, and food origins for items were recorded at all three locations. Prices for items at all locations were standardized by weight after the removal of water weight. These were listed as price per pound unless a different unit of measurement was deemed appropriate.[3] As mentioned earlier, a second round of the PCS was conducted in April. In a few cases, the same item from the same vendor or retailer was recorded during the second round, and the price had changed. In the few instances when this occurred, we averaged the two prices.

Initially, we had planned to include only those items for which we could determine the precise origins, but this proved impossible for some items found at the conventional supermarket and natural grocers. For all food items gathered at the farmers' market, precise product origin was recorded and mapped (see Appendix D for this map). However, the supermarket and natural grocery stores do not always disclose the location of their suppliers. In these cases, we researched product origin by visiting their websites or contacting the producers directly. The results of this exercise varied. At times, companies were eager to provide the location of the producer farm. In other cases, companies were unwilling to disclose a more specific origin than a state or province.

In five specific cases, the store produce manager or company spokesperson was unable to provide any detailed information about the product origin. Consider the following example of our experience with a national organic milk company: As explained by a customer service representative, because they sourced milk from over 350 organic farms across the United States, and because different sources of milk were homogenized at a single processing plant, it was nearly impossible to track

[3] Examples of alternative measurements include eggs and milk, which are generally measured by the dozen and by the gallon or liter, respectively.

down the origin of a single gallon of milk. That same milk was mass distributed from a separate location than the processing plant, further complicating the commodity chain and making it extremely difficult to determine the number of food miles traveled (customer service representative, personal communication, April 12, 2012).

In addition to considering product origin, we created a classification scheme that accounted for differences and similarities among food items. USDA and FDA certifications provide information for food consumers through the use of standardized labels, but these labels are not always used at farmers' markets. Markets have different rules about the use of terms like "organic" (which according to USDA regulations requires certification for any grower selling more than US$5,000 per year of agricultural products), and most allow alternative labeling schemes in order to inform the consumer of "organic-like" practices (Guthman, 1998; Kremen, Greene, & Hanson, 2004). But while labels such as "sustainably grown" or "beyond organic" are often appealing to consumers (Kremen et al., 2004), they do not conform strictly to standardized criteria. In order to account for this, we created a classification scheme that mimicked USDA and FDA standards while considering the different growing practices used by producers (see appendix B for this scheme).

Common supermarket labels and certifications were used for food prices recorded in that retail space (for example, USDA certified organic, naturally raised, free-range, vegetarian-fed, cage-free, conventional, hormone-free, etc.). For farmers who were USDA or FDA certified, we employ the same terms (e.g., "certified organic"). But as mentioned previously, some farmers choose not to pay the fees and complete the paperwork for USDA certification, and instead choose alternative labels. For farmers who abide by organic practices but do not have official USDA certification, we applied the term "organic practices"—a term that the reader will see frequently in tables 1-B and the three tables in appendix A. Also, many producers employ a mixture of organic and conventional practices. For instance, a large majority of the farmers do not use pesticides or herbicides and do not grow genetically modified produce (two key USDA organic standards), but still use chemical fertilizers for some of their crops. For these, the term "mixed practices" was used. A full description of the classification scheme can be found in Appendix B.

We recorded prices for 490 food items (see table 1-A for a summary of methods). For each round of data collection, we recorded prices for

Table 1–A. Summary of Price Comparison Methods

Method	Description
Sampling	• Diverse basket of 20–30 items chosen at FM based upon growing practice, origin, and appearance. • Comparable items chosen at retail grocers that exhibited the greatest degree of similarity.
Frequency	• Two rounds of data collection divided by one month (1st round: March 2012; 2nd round: April 2012).
Data Recording (Price)	• Standardized by price per pound after removing excess water weight (in the case of produce). • Standardized by comparable volume (e.g. liter, gallon) for items such as milk and olive oil, or by piece for items such as eggs. • Sale prices not considered. • Difference in prices between two rounds averaged.
Data Recording (Product Attribute)	• Growing practices recorded based upon interviews with supplier for FMs, or based upon product labels, certifications, and website information for retail grocers. • Classification schemes for FM growing practices standardized for comparison with recognized labels and certifications (Appendix B). • Product origin recorded and mapped based upon interviews with supplier at FM, or in the case of retail grocers, based upon interviews with retailers, labeling information, website information, or communication with company spokesperson.

Table 1–B. Product Selection Chart (all prices in US$)
(✓ indicates items chosen for comparison)

Farmers' Market	Conventional Supermarket	Natural Grocers
$6.45/lb. ✓ Organic Practices Manor, Texas (14 mi.) Rounds 1 & 2	$2.24/lb. Conventional Mexico (+200 mi.) Round 1 only	$2.88/lb. Conventional Mexico (+200 mi.) Rounds 1 & 2
$5.50/lb. Mixed Practices La Grange, Texas (62 mi.) Rounds 1 & 2	$3.98/lb. ✓ Certified Organic Salinas, California (1,680 mi.) Rounds 1 & 2	$5.16/1b. ✓ Certified Organic Austin, Texas (<5 mi.) Rounds 1 & 2
$5.50/lb. Mixed Practices Bastrop, Texas (30 mi.) Round 1 only	$2.45/lb. Conventional California (+1,100 mi.) Round 2 only	

Note: 1 mile = 1.6 km

similar products at the farmers' market and compared them with the most qualitatively similar products at conventional and natural grocers based upon product origin (items that were produced closest to the retail venue) and growing practices (items that exhibited the most comparable production methods and/or certifications). Of the items that remained, only the most qualitatively similar items were then chosen for comparison. For instance, if we recorded prices of a pound of locally produced green onions, grown with organic practices, and sold at the farmers' market, we sought out green onions with the same or most similar attributes at the conventional and natural grocery stores. Eight bunches of green onions were recorded over three different venues, but only the "most similar" were considered for comparison (see table 1-B).

This method is intended to mimic the process that a selective consumer may use when presented with different options. In every instance we asked ourselves: if a consumer were looking for the highest standards and quality in their food item, which would he or she choose, and what would be the most comparable item at all three venues?[4] Ultimately, 156 out of the original 490 food items were deemed suitable for comparison. This includes 18 items from each retail space (54 total) in the downtown Austin market area, 18 items from each retail space (54 total) for the Cedar Park market area, and 16 items from each retail space (48 total) for the Georgetown area.

Field Observation Methods

Lastly, it is important to mention that members of the research team also engaged in various forms of field observation both as participant observers and onlookers (as described in Patton, 2002). Researchers walked through the farmers' market observing conversations between patrons and vendors and making field notes on the buying habits of farmers' market patrons. Also, researchers purchased items, spoke with vendors and consumers about specific products and growing practices, and engaged in numerous informal conversations with farmers' market patrons. Additionally, two researchers later volunteered as vendors at a farmers' market (although not at the same time prices were being recorded or the survey was being conducted). Another member of the research team volunteered as an intern at one of the producer farms. Lastly, another member of the research team visited one of the producer farms and observed its growing practices. At some point during the course of this study, all the researchers purchased items, gathered information about the products, and engaged in conversations with retailers and vendors beyond the formal interview process. In accordance with traditional field observation practices, these activities were carried out in a way that yielded "the most meaningful data…given the characteristics of the participants, the nature of staff-participant interactions, the socio-political context of the program, and the information needs of intended evaluation users" (Patton, 2002, p. 267).

[4] As stated previously, the items were selected based upon consumer preferences described in the literature, observed in the field, and articulated in survey responses.

Results

The following sections detail the results of our survey and PCS. Note: the information provided in the surveys (particularly table 2-B) may prove useful for future researchers who wish to consider other food attributes beyond product origin, price, and growing practices.

Survey Questions

Two questions from the survey were relevant to this paper, and because the surveys were open-ended, many participants provided lengthy responses that added qualitative depth to the PCS. As mentioned previously, all responses were transcribed and coded into categories. The first question asked respondents if they thought the items at the farmers' market were more or less expensive than at their local grocery store (see table 2-A). Just over half of respondents at each location stated that items were more expensive at the farmers' market, but perhaps most interestingly, many respondents felt the need to justify the premium cost. For instance, 61 of the 84 respondents in the Cedar Park survey who answered "more expensive" justified their response with comments such as:

- "[It is] more expensive, but worth it in many cases. I'm here [because] of the variety, atmosphere and desire to support local food."
- "I don't care. It's [supporting] organic, local, individuals."
- "It is just a little more expensive for some items: eggs, meat. But freshness and quality offset the cost. We love the variety in produce."

Similar results were found in the Austin and Georgetown surveys, where respondents qualified their answers about price with comments such as:

- "It depends, but locally grown is an investment in the community! It's a civic duty!"
- "[It is] more but I am willing to pay a little more for local."
- "Items are a bit more expensive; however, it is all fresher and I want to support my local farmers. I am grateful that they grow this food."
- "I don't compare the prices. I know that getting food here is FRESH!"

Responses like these seem to confirm scholarly research on the relationship among community interaction, consumer preference, and price premiums. They also imply a strong degree of consumer loyalty among farmers' market patrons — a phenomenon that was, incidentally, repeated in other sections of the survey. A full list of written responses was provided to the farmers' market vendors and organizers. The second question asked respondents to list the quality or qualities they look for in the food items they purchase (see table 2-B). Respondents were allowed to list as many qualities as they like, and while there were some differences, all three locations voiced a strong preference for local (over 60% of responses at each location) and organic (over 50% of responses at each location).

A second part of the question asked participants if they were willing to pay more for those qualities, and at least 95% of respondents at each location answered "yes." While this is perhaps not surprising, it does confirm previous findings of scholarly research about value premiums and consumer willingness to pay. This information may also prove useful for farmers' market vendors. Such an overwhelming response suggests that vendors may be able to charge higher premiums if they are able to offer the qualities and standards voiced by respondents in table 2-B.

Table 2–A. Responses to the survey question, *In your opinion, are items more or less expensive at the farmers' market than at your local grocery store?*

Austin n=121		Cedar Park n=162		Georgetown n=61	
More	= 66 (55%)	More	= 84 (52%)	More	= 35 (57%)
Less	= 14 (12%)	Less	= 18 (11%)	Less	= 9 (15%)
Same	= 23 (19%)	Same	= 21 (13%)	Same	= 4 (7%)
Depends	= 15 (12%)	Depends	= 30 (17%)	Depends	= 9 (15%)
Unsure	= 3 (2%)	Unsure	= 9 (5%)	Unsure	= 4 (7%)

Table 2–B. Responses to the survey question, *What is the most important quality or qualities you look for in the items you purchase?*

Austin (n=146)						
Local	= 88	(65.2%)	Quality	= 7	(5.2%)	
Organic	= 71	(52.6%)	Uniqueness	= 4	(3.0%)	
Taste	= 38	(28.1%)	Sustainable	= 4	(3.0%)	
Fresh	= 24	(17.8%)	Seasonality	= 2	(1.5%)	
Appearance	= 17	(12.6%)	Health	= 2	(1.5%)	
GMO-free	= 13	(9.6%)	Price	= 1	(0.7%)	
Selection	= 11	(8.1%)	Humane/Ethical	= 1	(0.7%)	
Cedar Park (n=180)						
Local	= 117	(67.6%)	Quality	= 9	(5.2%)	
Organic	= 88	(50.9%)	Price	= 9	(5.2%)	
Taste	= 46	(26.6%)	Uniqueness	= 4	(2.3%)	
Fresh	= 45	(26.0%)	Seasonality	= 2	(1.2%)	
Appearance	= 25	(14.5%)	Health	= 2	(1.2%)	
GMO-free	= 23	(13.3%)	Sustainable	= 2	(1.2%)	
Selection	= 20	(11.6%)	Humane/Ethical	= 1	(0.5%)	
Georgetown (n=70)						
Local	= 44	(64.7%)	Quality	2	(2.9%)	
Organic	= 35	(51.5%)	Uniqueness	1	(1.5%)	
Fresh	= 25	(36.8%)	Humane/Ethical	1	(1.5%)	
Taste	= 21	(30.9%)	Seasonality	1	(1.5%)	
GMO-free	= 12	(17.6%)	Sustainable	1	(1.5%)	
Appearance	= 10	(14.7%)				
Selection	= 5	(7.4%)				

Price Comparison Study

The price comparison study found great variation in price, growing practices, and product origin among food items from different study sites. In broad terms the data reveals that the farmers' markets, at least in this case study, were often more expensive than their competition at supermarkets and natural grocers. Only 4 out of 18 products at the downtown Austin farmers' market and 2 of 18 items at the Cedar Park farmers' market were lowest among comparable items at nearby retail stores. The Georgetown farmers' market seemed to be more competitive in terms of cost, with lowest prices for 7 out of 16 products. When the results from all three market areas are combined, 21 of the 52 recorded items were cheapest at the conventional supermarket sites, 17 were cheapest at the natural grocers, and 13 were cheapest at the farmers' markets.

Despite attempts to find the most qualitatively similar items for comparison, there were often key differences among available items. Product origin is the most apparent of these differences. All 52 of the farmers' market items recorded in PCS were produced in Texas, and most within a 50-mile (80-km) radius. Only 11 of the comparable items at the natural grocery stores and 9 of the comparable supermarket items were grown in state, despite the inclusion of product origin as a key criterion for choosing items for comparison (see appendix D).

In contrast to product origin, it proved easier to find items of similar growing practices for comparison. A similar number of organic items, for instance, were purchased at the supermarket (29), the natural grocer (30), and the farmers' market (29). Overall, more than half the items at each of the locations were certified organic or were produced using organic practices. Also, many of the items grown at the farmers' market were grown using "mixed practices." Appendix A presents this information (price, product origin, and growing practices) in a way that is intended to be accessible to consumers for easy comparison.

Discussion

This study confirmed that competing consumer motivations, product diversity and availability, and the overall complexity of the food retail landscape must be accounted for if a PCS is to be both accurate and useful. The presentation of clear and accessible data is important for producers and consumers, but additionally, the inclusion of survey responses also proved insightful.

For producers, the information provided by question 1 (see table 2-A) gives some idea of consumer perceptions about price comparisons

between the farmers' market and local grocers. But more importantly, the written responses to this question were also useful.[5] Combined with the responses to question 2 (table 2-B), producers are given insight into consumer perceptions about pricing, have access to a list of qualities that consumers considered most desirable, and can read comments about how consumers justified those prices. They are also provided with some idea about consumer loyalty and the degree to which consumers are willing to pay more for certain food attributes. The tables in appendix A also allow producers to see how market prices compare both in price (quantitatively) and in attribute (qualitatively) to similar products at competing retail venues. In the interactive, conversational space of the farmers' market, such information can be extremely valuable for engaging with consumers (Kirschenmann, 2003).

For consumers, the information in appendix A is intended to provide them with easily comparable data about pricing in their local market area. By providing not just price, but also growing practices and product origin, consumers are able to evaluate potential purchases according to their own values and motivations. Also, by comparing these items by venue, the consumer can factor in convenience. Further, mapping product origins increases the accessibility of that information to consumers.[6] For those consumers who are concerned with sourcing their food locally, appendix D leaves little doubt as to which venue provides the largest offering of local products.

An example here may help demonstrate the utility of this presentation: Consider strawberries chosen for comparison in the Georgetown market area and how a consumer might use this information. The strawberries sold by a vendor at that farmers' market were grown using organic practices near Elgin, Texas (approximately 35 miles or 56 km away), and were sold for US$4.00/lb. This price is less than that of USDA-certified organic strawberries grown over 1,400 miles (2,253 km) away in Oxnard, California, which was priced at the nearby supermarket for US$4.59/lb. Both of these products were, however, more than double the cost of the conventional items purchased at the nearby natural grocery store, which were grown in Mexico and sold for US$2.00/lb. In this example, it is easy to see how a consumer might weigh the values of product origin (and food miles traveled), growing practices, convenience, and price in order to better inform his or her purchase. Based upon the survey results, most patrons from the Georgetown farmers' market place value premiums on local, organic, and fresh produce (see table 2-B). The local, organically grown strawberries from the farmers' market match that description, and with a lower price than organically grown strawberries available from the nearby natural grocer, this item seems an easy choice for a food shopper in the Georgetown area.

However, other items present more complicated scenarios. Consider the example of tomatoes available in the Cedar Park market area. Locally grown, mixed-practice tomatoes sold at the Cedar Park farmers' market for US$3.00/lb. are more expensive than the certified organic, Mexican-grown tomatoes available for US$2.19/lb. at the nearby natural grocer. Both of these items are considerably more expensive than the conventionally grown tomatoes of unknown origin available for US$0.94/lb. at the nearby supermarket. This comparison brings a host of values into play, and invites several questions. For instance, is the consumer concerned with USDA organic certification, or would he or she prefer to ask the farmers' market vendor about the farm's growing practices? Second, is this consumer concerned about the origin of the food item, and if so, how local is local enough (i.e., is it necessary for their food to be grown within a 10-mile or 16-km radius, 50-mile or 80-km radius, within state boundaries)? Lastly, how does convenience factor in this consumer's decision (consider, for instance, the limited hours of operation for the farmers' market)? These questions engage such issues as transparency in the food chain, support of local producers, and varying issues of environmental sustainability.

[5] As mentioned previously, a full list of comments was distributed to the farmers' market organizers.

[6] The map in appendix C presents how each venue defines "local," and the map in appendix D provides a quick visual reference for consumers who wish to see how each venue sources a basket of food items with comparable attributes.

A PCS table that offers local, detailed information about items and their prices may improve decision-making capacity for consumers, but additional survey questions may also provide insight. For instance, this study noted that consumers are willing to pay more for local and organic products, but exactly *how much* more they are willing to pay was not the main focus of this research. Additionally, more research is needed on those benefits of direct markets not directly tied to food attributes. For some consumers, having access to farmers and their agricultural knowledge is important. Others may prioritize support of the local economy. And yet others may visit the market for social interaction and community building. How these benefits translate into a measurable "price premium" could be valuable for both consumers and producers.

Recommendations for Future Price Comparison Studies

This research revealed many challenges in conducting a reliable and accessible PCS, and addressing these challenges led to the creation of an improved model for future studies. First, the decision to conduct two rounds of data collection strengthened the reliability of our data, but it did not adequately address the question of seasonality, a factor that may affect prices and that could be investigated in a longitudinal study. Second, while issues of convenience are discussed throughout this paper, this was not directly examined in the surveys. Almost certainly, consumers base part of their choices on location, hours of operation, and other factors of convenience, and while the information provided in appendix A may assist consumers in some measures of convenience, survey questions may provide insight into how those issues affect consumer behavior. Lastly, future researchers may wish to seek out additional information about respondent demographics. Such information may reveal patterns according to age, income, education level, or other characteristics of farmers' market shoppers.

In short, while we feel that this study represents a marked improvement on previous

Table 3: An Improved Model for Local Price Comparison Studies

Method	Description
Sampling	• Choose a diverse basket of 20–30 items from different farmer' market (FM) vendors based upon growing practice, product origin, and apparent quality. • Select comparable items chosen at retail grocers that exhibit the greatest degree of similarity based upon the above criteria.
Frequency	• Choose dates that reflect seasonal variation (which varies according to region and climate). • Conduct two rounds of data collection per season to ensure accuracy of information.
Data Recording (Price)	• Standardize by price per pound after removing excess water weight from produce. • Standardize by comparable volume (e.g. liter, gallon) for items such as milk and olive oil, or by piece for items such as eggs. • Use the average price between the two rounds of data collection per season.
Data Recording (Product Attribute)	• Record growing practices based on certifications or interviews with vendors (in the case of the FM), or on product labels, certifications, and website information (in the case of retail stores). • Record product origin for all items and map that information. This information should be based upon interviews with vendors (in the case of the FM), or should be based upon labeling information, website information, or communication with company spokespersons (in the case of retail grocers). • Standardize classification schemes for FM growing practices for comparison with recognized labels and certifications (see appendix B in this study for example).
Data Display and Distribution	• Present the data in a clear and accessible tabular display that includes cross comparisons of items by food item and venue. • Include information for each food item (average price, growing practice, and product origin) for quick comparison. • Distribute the final display tables in a way that reaches the greatest number of vendors and producers (by disseminating through FM managers or through direct contact) and potential consumers (through local, mainstream media sources as well as alternative media sites such as food blogs and social media).

price comparison studies, it can still be polished, and we have detailed these potential improvements in table 3. Further, while the methods are replicable, our findings are site-specific and suggest that studies in other regions may reveal certain differences. We offer the below recommendations for future studies and also include a new model for price comparison studies.

(1) **Seasonality:** Two rounds of data collection did not allow enough time to account for changes in seasonality, and we recommend that future studies include two rounds per growing season (depending on location and climate).
(2) **Product Origin:** Our inability to track the origin of several products reveals much about the lack of transparency in the food system, and it also may make comparisons difficult for some consumers who strongly value this attribute. It may also cast farmers' markets in a favorable light, since this information is usually readily available by speaking with the vendor. Future studies may wish to weigh the benefits and challenges of including only those products that reveal their source.
(3) **Convenience:** This was something that we did not explore in depth in our study, and which almost certainly influences consumers' choice of shopping venues. Future studies may wish to consider pursuing this issue.
(4) **Food Attributes:** Reflecting information within the literature about consumer preferences and attitudes, this study placed a high premium on growing practices and product origin. However, this may change in the future, and consumer preferences and attitudes also may be region-specific. Future studies may wish to consider additional attributes of the food items they choose for comparison (e.g. genetic modification, worker and animal welfare, etc.).
(5) **Distribution of Information:** We strongly recommend that future studies distribute this information to consumers and producers. We have chosen to share all our survey and PCS data with producers and organizers at the farmers' markets, as well as with the retail outlets where we conducted our comparisons. Once research has completed the peer-review process, we will be sharing a summary of the results with local media outlets in order to disseminate this information and encourage further scrutiny and improvement of this model.

Conclusion

This research builds upon the work of previous PCSs in order to create a new model that considers consumer preferences and the diversity of choices in the contemporary food landscape. The result is an improved, reproducible set of methods for PCSs that provides practical and accessible information to consumers and producers about food origin, growing practices, and of course, price. We argue that the utility and practicality of such a study is strengthened by presenting the results in a way that allows consumers to draw their own conclusions about the foods they value and the prices they are willing to pay. This information also provides small-scale producers with data that informs their business model and allows them to better connect to their customer base. Lastly, the results also suggest that methods for PCSs still have room for improvement. Issues such as seasonality and convenience need further attention, and information about other food qualities (such as data on worker and animal welfare, genetic modification, and other attributes) could be included to create a more comprehensive study. Ultimately, the most important result of this study is a more thorough model for price comparison studies that provides accessible and practical information for farmers' market producers and consumers. We encourage researchers to review this model, improve upon it, and conduct further studies.

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Appendix A. Price Comparison Tables for Three Study Sites

Austin PCS

* denotes the lowest price per comparison.

Item	FM	Supermarket	Natural Grocer
Artichoke	2.42/lb.*	3.48/lb.	5.32/lb.
	Conventional	Conventional	Certified Organic
	Taylor, TX	Castroville, CA	California, USA
Bacon	6.50/lb.*	6.99/lb.	9.58/lb.
	Pastured	Conventional	Naturally Raised
	Rosanky, TX	Canada	Hamilton, TX
Beets	2.00/lb.	1.59/lb.	0.75/lb.*
	Organic Practices	Certified Organic	Certified Organic
	Austin, TX	Nevada City, CA	La Monte, CA
Broccoli	3.00/lb.	2.49/lb.	1.88/lb.*
	Certified Organic	Certified Organic	Certified Organic
	Austin, TX	Santa Maria, CA	Kern County, CA
Cabbage	2.00/lb.	0.44/lb.*	1.29/lb.
	Organic Practices	Conventional	Organic
	Manor, TX	Hondo, TX	California, USA
Carrots	1.79/lb.*	1.98/lb.	3.32/lb.
	Organic Practices	Certified Organic	Certified Organic
	Lytle, TX	La Monte, CA	Santa Maria, CA
Chevre	20.00/lb.	15.36/lb.*	21.00/lb.
	Conventional	Conventional	Conventional
	Waller, TX	Wisconsin, USA	Dripping Springs, TX
Eggs	5.00/dozen.	4.10/dozen.*	4.79/dozen.
	Free Roaming, Organic Practices	Cage Free, Certified Organic, Vegetarian Fed	Cage Free, Certified Organic, Vegetarian Fed
	Fredericksburg, TX	Chase, KS	La Farge, WI
Green Onions	6.45/lb.	3.98/lb.*	5.16/lb.
	Organic Practices	Certified Organic	Certified Organic
	Manor, TX	Salinas, CA	Austin, TX
Lettuce	8.00/lb.	2.48/lb.*	3.93/lb.
	Certified Organic	Certified Organic	Certified Organic
	Austin, TX	California, USA	California, USA
Olive Oil	14.20/liter*	16.93/liter*	20.69/liter*
	Conventional	Conventional	Conventional
	Texas, USA	Texas, USA	Texas, USA
Parsley	10.53/lb.	1.96/lb.*	2.98/lb.
	Certified Organic	Certified Organic	Certified Organic
	Austin, TX	No Data	California, USA
Radish	2.82/lb.	1.98/lb.*	2.54/lb.
	Organic Practices	Conventional	Conventional
	Mullin, TX	Muranaka, Mexico	No Data
Sourdough Bread	4.50/lb.	2.66/lb.	2.66/lb.
	Conventional	Conventional	Conventional
	Austin, TX	USA	USA

continued

Spinach	5.00/lb.	1.71/lb.*	3.54/lb.
	Certified Organic	Certified Organic	Certified Organic
	Austin, TX	Bakersfield, CA	San Juan Bautista, CA
Strawberries	6.50/lb.	3.98/lb.*	5.44/lb.
	Organic Practices	Certified Organic	Certified Organic
	Lytle, TX	Oxnard, CA	Mexico
Sweet Potatoes	2.38/lb.	.78/lb.*	1.99/lb.
	Organic Practices	Conventional	Conventional
	Lytle, TX	No Data	California, USA
Tomatoes	3.50/lb.	1.98/lb.	1.99/lb.
	Organic Practices	Conventional	Conventional
	Kyle, TX	Guadeloupe, Mexico	Marfa, TX

CA = California; KS = Kansas; TX = Texas; WI = Wisconsin

Cedar Park PCS

Item	FM	Supermarket	Natural
Broccoli	2.50/lb.	1.69/lb.	1.03/lb.*
	Organic Practices	Certified Organic	Certified Organic
	Austin, TX	Lamont, CA	Colorado, USA
Cremini Mushrooms	5.50/lb.	3.98/lb.*	6.06/lb.
	Conventional	Conventional	Certified Organic
	Gonzales, TX	Madisonville, TX	USA
Green Cabbage	2.00/lb.	1.47/lb.	1.09/lb.*
	Organic Practices	Certified Organic	Certified Organic
	Austin, TX	Lamont, CA	Austin, TX
Carrots	3.77/lb.	1.10/lb.	1.09/lb.*
	Certified Organic	Organic	Organic
	Austin, TX	Lamont, CA	Lamont, CA
Eggs	4.50/dozen	4.10/dozen*	5.89/dozen
	Organic practices, Free-roaming	Organic, Cage-free	Organic, Free-roaming
	Rogers, TX	Chase, KS	Austin, TX
Green Onions	5.56/lb.	2.94/lb.	2.00/lb.*
	Organic Practices	Certified Organic	Certified Organic
	Austin, TX	Lamont, CA	Austin, TX
Granola	12.00/lb.	3.22/lb.*	17.98/lb.
	Mixed practices	Conventional	Certified Organic
	Cedar Park, TX	St. Louis, MO	Lafayette, CO
Hummus	5.00/lb.*	5.76/lb.	5.30/lb.
	Conventional	Conventional	Conventional
	Leander, TX	San Antonio, TX	Austin, TX
Kale	4.69/lb.	3.96/lb.	2.69/lb.*
	Organic Practices	Certified Organic	Certified Organic
	Austin, TX	South Carolina, USA	Austin, TX
Milk	7.00/gallon	5.98/gallon	5.75/gallon*
	Naturally Produced	Certified Organic	Certified Organic
	McGregor, TX	Bloomfield, CO	Hopkins County, TX
Mozzarella	10.00/lb.	5.29/lb.*	5.78/lb.
	Naturally Produced	Conventional	Conventional
	Kemp, TX	San Antonio, TX	Green Bay, WI
Olive Oil	49.98/liter	7.80/liter	24.47/liter
	Organic Practices	Conventional	Certified Organic
	Dripping Springs, TX	Spain	Spain
Red Leaf Lettuce	5.00/lb.	3.81/lb.	2.00/lb.*
	Organic Practices	Certified Organic	Certified Organic
	Burnet, TX	Lamont, CA	Central Southern CA
Strawberries	7.69/lb.	3.98/lb.	3.99/lb.
	Organic Practices	Certified Organic	Certified Organic
	Burnet, TX	Santa Maria, CA	California
Spinach	5.00/lb.	3.00/lb.	1.99/lb.*
	Organic Practices	Certified Organic	Certified Organic
	Austin, TX	Guanajuato, Mexico	Austin, TX

continued

Sourdough bread	2.25/lb.*	3.98/lb.	3.34/lb.
	Mixed Practices	Conventional	Certified Organic
	Austin, TX	San Antonio, TX	Boulder, CO
Shrimp	13.00/lb.	8.98/lb.*	16.98/lb.
	Wild Caught	Wild Caught	Farm Raised
	Matagorda Bay, TX	Gulf of Mexico, USA	Dover, NH
Tomatoes	3.00/lb.	0.94/lb.*	2.19/lb.
	Mixed practices	Conventional	Certified Organic
	Kingsbury, TX	USA/Mexico	Mexico

CA = California; CO = Colorado; KS = Kansas; MO = Missouri; NH = New Hampshire; TX = Texas; WI = Wisconsin

Georgetown PCS

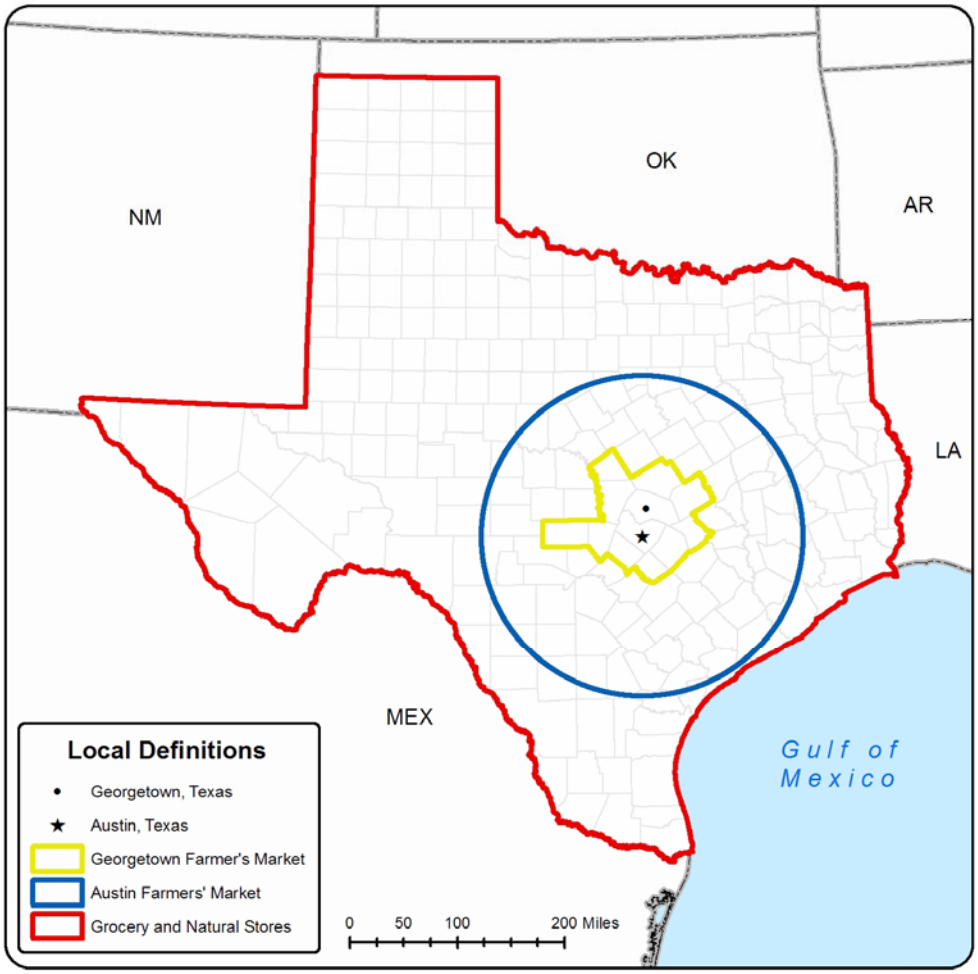
Item	FM	Supermarket	Natural Grocer
Artichoke	1.54/lb.*	4.29/lb.	5.04/lb.
	Conventional	Conventional	Conventional
	Taylor, TX	Mexico	USA
Bacon	6.00/lb.	3.97/lb.*	7.99/lb.
	Naturally Raised	Conventional	Naturally Raised
	Thorndale, TX	San Antonio, TX	Alameda, CA
Beets	.91/lb.*	1.75/lb.	2.26/lb.
	Organic Practices	Certified Organic	Certified Organic
	Granger, TX	California	El Centro, CA
Green Cabbage	.42/lb.*	.44/lb.	.49/lb.
	Mixed Practices	Conventional	Conventional
	Taylor, TX	Texas	California
Carrots	2.60/lb.	2.46/lb.	2.11/lb.*
	Mixed Practices	Certified Organic	Conventional
	Taylor, TX	California	Bakersfield, CA
Eggs	4.00/Dozen*	4.99/Dozen	4.10/Dozen
	Free Range, Organic Practices	Cage Free, Certified Organic	Cage Free, Naturally Raised
	Georgetown, TX	La Farge, WI	Gonzalez, TX
Green Onions	4.88/lb.	3.58/lb.	2.97/lb.*
	Conventional	Conventional	Certified Organic
	Elgin, TX	Mexico	USA
Honey	7.00/lb.	5.38/lb.	5.99/lb.
	Naturally Raised	Certified Organic	Conventional
	Georgetown, TX	Brazil	Phoenix, AZ
Kale	1.36/lb.*	2.83/lb.	3.62/lb.
	Organic Practices	Certified Organic	Certified Organic
	Granger, TX	La Monte, CA	El Centro, CA
Romaine Lettuce	1.39/lb.*	2.20/lb.	1.67/lb.
	Organic Practices	Certified Organic	Certified Organic
	Granger, TX	Mexico	No Data
Radishes	2.86/lb.	2.81/lb.	2.54/lb.*
	Mixed Practices	Certified Organic	Conventional
	Taylor, TX	Bakersfield, CA	No Data
Sourdough Bread	4.45/lb.	3.98/lb.	3.89/lb.*
	Conventional	Conventional	Conventional
	Austin, TX	San Antonio, TX	Scottsdale, AZ
Spinach	4.88/lb.	2.68/lb.	2.35/lb.*
	Mixed Practices	Certified Organic	Conventional
	Elgin, TX	Bakersfield, CA	Mexico
Strawberries	4.00/lb.	4.59/lb.	2.00/lb.*
	Organic Practices	USDA Organic	Conventional
	Elgin, TX	Oxnard, CA	Mexico
Swiss Chard	1.69/lb.*	2.83/lb.	3.73/lb.
	Organic Practices	Certified Organic	Conventional
	Weir, TX	Bakersfield, CA	Ventura, CA
Zucchini	1.89/lb.	1.28/lb.	.99/lb.*
	Mixed Practices	Conventional	Conventional
	Briggs, TX	USA/Mexico	Mexico

AZ = Arizona; CA = California; TX = Texas; WI = Wisconsin

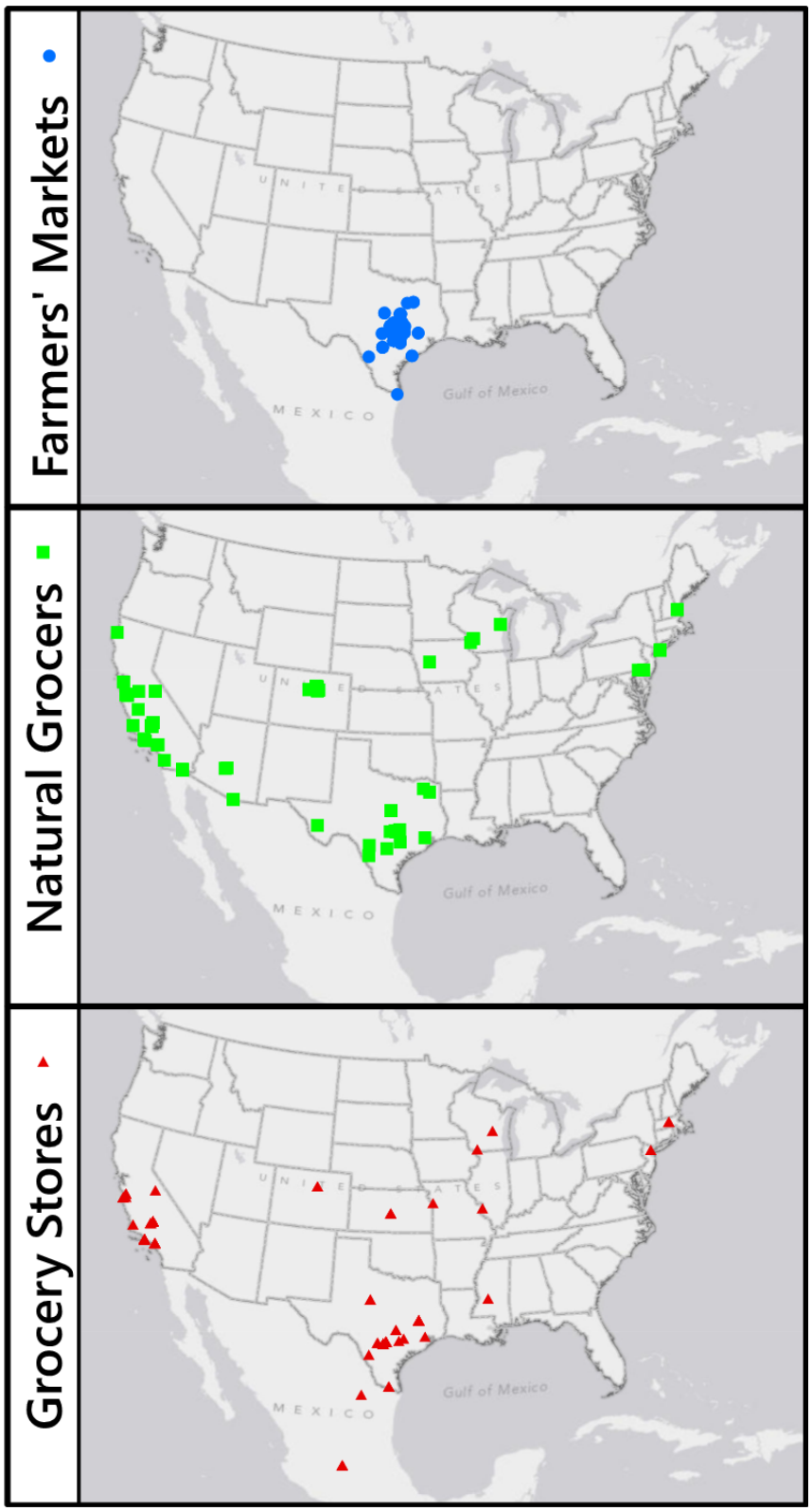
Appendix B. Growing Practices Classification

Cage-free	Hens are uncaged inside barns or warehouses with unlimited access to food and fresh water, but they generally do not have access to the outdoors (USDA, 2012).
Certified organic	A label given by the United States Department of Agriculture (USDA, 2012) to identify products that have been produced in an ecologically and environmentally sound manner. For certified organic produce, synthetic fertilizers, prohibited pesticides, sewage sludge, irradiation, and genetic engineering are not permitted. For organic livestock, no antibiotics or growth hormones are permitted, 100% organic feed must be given, and the livestock must have access to the outdoors.
Conventional practices	Do not follow the guidelines of organic practices; pesticides, fertilizers, and external energy inputs may be used. This may include crops that have been genetically modified. In terms of livestock, the animals may be confined to concentrated areas, given certain antibiotics, as well as fed certain food.
Free roaming	Hens are uncaged inside barns or warehouses and have some degree of outside access. There are no set requirements for the amount, duration, or quality of access (USDA, 2012).
Mixed practices	This term is primarily used to discuss particular farmers' practices from the farmers' market. After discussion with the farmers, we identified mixed practices to indicate the attempt to be as organic as possible, but occasionally using fertilizers or pesticides not supported by organic growing practices.
Natural practices	The product has been minimally processed and contains no preservatives or artificial ingredients. There are no standards regulating farm practices (USDA, 2012).
Naturally raised	The use of hormones, antibiotics, and animal byproducts is prohibited (USDA, 2012).
Organic practices	Not certified by the USDA, but follow the exact or similar guidelines outlined for the USDA certified organic label. This was only used to describe practices by the farmers' market vendors based on their personal description of their growing practices.
Pastured	There is no USDA label for pasture-raised animals, but the term refers to livestock that has been raised primarily outdoors (USDA, 2012).
Vegetarian fed	Hens are fed food that does not contain animal byproducts (USDA, 2012).

Appendix C. Map of Local Definitions by Venue Type



Appendix D. Maps of Item Product Origins by Venue



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Community food systems: Strengthening the research-to-practice continuum

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Abstract
Growing public interest in links between food, health, and the environment has sparked exponential growth in local and regional food system projects. Along with local experimentation has come an accompanying surge in related academic research. Are we learning what we need to know to expand the impact of the work? This paper introduces a new community food systems bibliography as a tool to help build usable knowledge. Drawing on a set of literature reviews prepared by students in a University of California Davis graduate seminar, we illustrate how the bibliography can facilitate literature scans to begin to identify persistent and strategic challenges facing community food system practitioners. Our analysis of the student reviews finds three interrelated challenges: (1) an economic challenge rooted in the difficulty of finding price points that work for farmers while ensuring that low-income consumers have access to healthy food and food system workers have decent wages and benefits; (2) a social challenge to confront racial and class bias while forging practical solutions; and (3) a political challenge of reconciling "insider" and

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"outsider" strategies, the former emphasizing incremental reform and the latter systemic change. These challenges resist simple solutions, but progress can be made if researchers and practitioners join forces. We discuss the potential for conceptual frameworks drawn from the applied fields of community development and public policy to inform the needed dialog between theory and practice.

Keywords
bibliography, community development, community food systems, food policy, food systems literature review, local food, local food systems, regional food systems, sustainable agriculture

Introduction

Growing public interest in links between food, health, and the environment has sparked exponential growth in local and regional food system projects. The specific projects vary widely in their focus, scope, and motivation. Although many efforts are modest and initiated in response to specific community needs, when viewed collectively the projects are contributing to a broad-based social and economic experiment in how to build food economies that are more locally based and increasingly self-reliant. At issue is whether and how we can move closer to the vision of a community food system in which sustainable food production, processing, distribution, and consumption are integrated to enhance the economic, environmental, and social health of a particular place (Feenstra, 2002).

Along with local experimentation has come an accompanying surge in related academic research. With tremendous growth both in on-the-ground activity and academic reflection, we would hope to find strong, mutually enhancing linkages between research and practice. Local food system practitioners, ideally, would gain information and assessments to guide their strategies and activities. Researchers looking across local settings would gain a better sense of practical challenges being encountered and opportunities seized, shaping their research agendas accordingly. Reality, however, often falls short of this ideal two-way engagement. Bridging the gap requires intentionally bringing research and practice into better alignment.

Animated by a desire to bring researchers and practitioners into fruitful conversation, a University of California Davis (UC Davis) research team began to compile, organize, and analyze the large body of community food systems research literature into a bibliography.[1] The bibliography was designed to be a tool to aid researchers in identifying potential research topics, questions, and current literature in the field. We hoped it would help focus questions that inform graduate students and other researchers as they contribute to the research-to-practice continuum. For example, do we know enough to say whether particular local strategies and approaches are working or not working, and why? What research topics need more attention? How effectively are we organizing research projects to learn across local cases? What creative changes are local practitioners forging in response to academic advice and critique? Likewise, what new topics are researchers tackling in response to stated needs of practitioners? It is a propitious time to be asking these and related questions, as local experimentation and academic work in this field take deeper root.

Definitive answers to any of the above questions are beyond the scope of this paper. Instead, we will (1) introduce the bibliography as a research tool, noting the methods by which it was constructed, assumptions it makes, and associated limitations; (2) illustrate how the bibliography might be used to generate important questions for academic analysis and local experimentation; and (3) offer suggestions about how academics and practitioners might join forces to puzzle through persistent challenges facing the field. Our analysis and discussion are preliminary and open-ended, intended to promote further inquiry by raising key issues rather than settling well-established questions. Indeed,

[1] The bibliography was compiled in 2011 by a graduate student researcher, Courtney Marshall, under the direction of UC Davis researchers David Campbell, Gail Feenstra, and Ryan Galt. Pending resource availability, we hope to update it annually. So that it might be used by researchers and practitioners, the bibliography is publicly available; it can be downloaded in any of three formats (PDF, Excel, Endnote), depending on the needs of users, at: http://www.sarep.ucdavis.edu/sfs/CFSresources

our experience with the bibliography project has been humbling. We encountered greater than expected difficulties assembling and then categorizing the large, wide-ranging, and quickly expanding literature. And if our preliminary reviews of some of the literature are a good indication, it will be even more difficult to take the additional step of discerning evidence-based lessons for practice or a focused research agenda. Still, even small, tentative steps toward these ends are worth taking.

Approach and Methods

Constructing the Community Food Systems Bibliography

While noting the lack of clear boundaries in this field of study, we sought out academic articles that dealt with one or more projects, processes, institutions, or other elements frequently associated with the idea of community food systems. The focus was on collaborative efforts that seek to benefit a particular, geographically bounded place or region and are concerned with enhancing the environmental, economic, and/or social impacts of the food system. We limited our scope by excluding articles whose sole or predominant focus was how food is grown (agricultural production practices) as well as articles that focused on food issues in global south settings. Most articles we selected analyze activities and trends within the United States, although some articles from and about Europe and some parts of Asia are included. Targeting primarily work published since 2000 in peer-reviewed journals, but including some seminal research published prior to that, we compiled relevant literature using three main approaches:

- reading through every issue of leading journals in the field since 2000 and scanning the abstracts of all their research articles, including *Community Development*, *Rural Sociology*, *Agriculture and Human Values, Journal of Environmental Hunger & Nutrition, Renewable Agriculture and Food Systems* (formerly *American Journal of Alternative Agriculture)*, and *Journal of Agriculture, Food Systems, and Community Development;*
- using key search terms in Google Scholar and the Web of Science database; and
- consulting reading lists from UC Davis food system classes and bibliographies.

Beginning with categories drawn from the authors' knowledge of the field, we categorized the literature by key topics. As new articles accumulated, we revisited the list of categories in an iterative fashion, adding new topics when it seemed warranted, reconsidering whether and how various topics might be lumped together, and looking for ways to name broad analytic categories under which specific topics might be listed. Eventually, we grouped the various subtopics into four overarching categories: (1) underlying definitions and assumptions; (2) strategies linking production, marketing, and consumption; (3) institutional supports; and (4) ethical concerns and social-justice issues. The final categorization scheme is included in table 1.

Because the categorization scheme changed somewhat during the search process, many articles added to the bibliography early in the process needed to be recategorized after our category list was finalized. In addition, some articles originally included needed to be culled. The latter occurred because our inclusion parameters were deliberately broad early in the process, and grew more refined as the work continued. The team read the abstract of each article and often skimmed the body of the article if it was deemed necessary to get a better idea of whether to include the article and, if so, how to most properly categorize it.

Three important caveats should be kept in mind. First, any categorization scheme of a literature this wide-ranging is bound to be somewhat arbitrary. Having gone through many potential schemes before settling on this one, we appreciate that there are alternatives. Second, despite our efforts to be systematic in compiling the bibliography, we recognize that this product is not complete or fully comprehensive. The volume of work published on this topic has increased exponentially in recent years, and new work appears frequently. Third, the key role played by systems thinking in this field makes it difficult to generate discrete analytical categories and to use them to label the content of individual articles. Our working procedure has been to assign any particular article to up

to three subcategories, based in the majority of cases on examining only the title and abstract. This is at best an approximate method. We see it as a starting point for students and scholars working on particular topics, from which they can launch more thorough reviews.

Exploring the Analytic Uses of the Bibliography

During fall 2011, the authors were part of a graduate seminar in which students prepared literature reviews on topics of their choice from among the subcategories in the bibliography. Driven by interests of the 15 enrolled students, many of whom had previous on-the-ground experience in local food systems work, these topics included: assumptions about the constraints and opportunities posed by conventional systems; labor and farmworkers; race, ethnicity, gender, and class; food security and food justice; local food systems and social movements; consumer behavior and demand; values-based supply chains; community gardens; energy and environment; and tapping local knowledge and networks. Subsequent independent study by additional students examined the topics of land tenure and beginning farmers; city and regional planning and foodshed planning; and economic benefits of community food systems. Since a few students chose to work on the same topic, the

Table 1. Outline of Categories and Subcategories in Community Food Systems Bibliography

I. DEFINITIONS AND ASSUMPTIONS
- A. Definitions of regional/local/sustainable food systems
- B. Assumptions about constraints/opportunities posed by conventional systems

II. STRATEGIES LINKING PRODUCTION, MARKETING, AND CONSUMPTION
- A. Economic and business development
  1. Consumer behavior/demand
  2. Direct marketing
     a. Community supported agriculture (CSAs)
     b. Farmers' markets
     c. Farm stands
     d. Farm to restaurant
     e. Farm to institution
  3. Regional food systems marketing (campaigns, branding, etc.)
  4. Venues for local foods processing and distribution
  5. Economic benefits of regional food systems
  6. Agritourism
  7. Values-based supply chains
- B. Gardens
  1. School gardens
  2. Home gardens
  3. Community gardens
- C. Urban farms
- D. Civic agriculture
- E. Changing cultural values around food consumption
- F. Energy and environment
  1. Waste/recycling
  2. Food miles

III. INSTITUTIONAL SUPPORTS
- A. Regional food systems planning
  1. City and regional planning and/or foodshed planning
     a. Community food system assessments/local food system indicators
     b. Farmland preservation
- B. Policies, regulations, and governance mechanisms or processes
  1. Local (including food policy councils)
  2. State/regional
  3. Federal (farm bill, etc.)
- C. Education and training
  1. The university's role (e.g. student farms, university curriculum, and faculty research/public scholarship)
  2. Training programs
  3. Tapping local knowledge/networks for sharing ideas, learning
  4. Nutrition education

IV. ETHICAL CONCERNS AND SOCIAL JUSTICE ISSUES
- A. Labor
- B. Race/ethnicity/gender/class
- C. Food security/justice
- D. Local control/democracy
- E. Social movements
- F. Critique of localism

reviews ended up addressing 13 of the 41 subtopics identified in the bibliography, with varying degrees of literature coverage. Table 2 reports the number and percentage of articles in the total bibliography (N=1,598) that we read and analyzed, by individual subtopic. Figure 1 shows the percentages of the articles reviewed for this paper (n=501) that came from each of the four main categories of the bibliography.

During the seminar, students were asked to present the findings from their literature reviews. As part of that assignment, they were asked to address whether the research had reached any common conclusions about which local strategies, approaches, or activities were succeeding and which were not. Without exception, they reported that the literature provided little evidence to support definitive statements of this type. This finding is perhaps not too surprising given that (1) many students selected topics that featured more theoretical articles and fewer devoted to specific strategies and practices in communities, and (2) each student reviewed in depth a relatively small number of articles on their topic (approximately 25–30). The students also found that much of the literature consists of microscale case histories with insufficient attention to middle-range conceptual frameworks by which the individual cases could be

Table 2. Count and Percentage of Articles Reviewed Within Each Category and Subcategory (out of all articles in the bibliography)

Category Subcategory	*Number of Articles Reviewed (Total articles in category)*	*Percentage of Articles Reviewed*
Definitions and Assumptions	**31 (162)**	**19%**
Assumptions about constraints and opportunities posed by conventional systems	28 (79)	35%
Definitions of regional, local, and sustainable food systems	3 (83)	4%
Ethical Concerns and Social-Justice Issues	**168 (562)**	**30%**
Food security and food justice	70 (115)	61%
Race, ethnicity, gender, class	50 (203)	25%
Local food systems and social movements	27 (92)	29%
Labor and farmworkers	21 (21)	100%
All other subcategories in this category (see table 1)	0 (131)	0%
Strategies Linking Production, Marketing, and Consumption	**254 (1,551)**	**16%**
Values-based supply chains	117 (117)	100%
Community gardens	48 (110)	44%
Economic benefits of regional food systems	36 (114)	32%
Energy and environment	28 (47)	60%
Consumer behavior and demand	25 (177)	14%
All other subcategories in this category (see table 1)	0 (986)	0%
Institutional Supports	**48 (773)**	**6%**
Education: Tapping local knowledge and networks for sharing ideas, learning	21 (154)	14%
City and regional planning and/or foodshed planning	16 (91)	18%
Farmland preservation	11 (11)	100%
All other subcategories in this category (see table 1)	0 (517)	0%
TOTAL (using unduplicated count) [a]	**501 (1,598)**	**31%**

[a] The number of articles in the cells represent the total number of articles reviewed in each category or subcategory. Because each article could be coded into up to 3 subcategories, the total unduplicated count of articles in the entire bibliography (1,598) is lower than the count one would get by totaling the categories in this table (3,048).

compared to deepen insight. A more thorough review of the literature than we have conducted to date would be needed to validate this initial impression.

For the analysis presented in this paper, we asked ourselves a different question, wondering whether the student literature reviews identified issues, questions, or challenges worthy of more attention by researchers and practitioners. That work began during the seminar, as the class heard and discussed presentations on the literature reviews. It continued when the authors read and reread the written student literature reviews, taking careful notes. While the individual reviews identified many themes and issues, most were specific to literature in particular subcategories. By contrast, three interrelated but distinct strategic challenges stood out as having surfaced in five or more reviews (table 3):

- an *economic* challenge of finding price points that work for multiple constituencies (addressed in 5 of 13 subcategories reviewed);
- a *social* challenge to confront racial and class bias while forging practical solutions (addressed in 9 of 13 subcategories reviewed);
- a *political* challenge of reconciling "insider" and "outsider" change strategies (addressed in 8 of 13 subcategories reviewed).

Figure 1. Of the 501 Articles Reviewed for This Paper, the Percentage That Came from Each of the Four Main Categories of the Bibliography

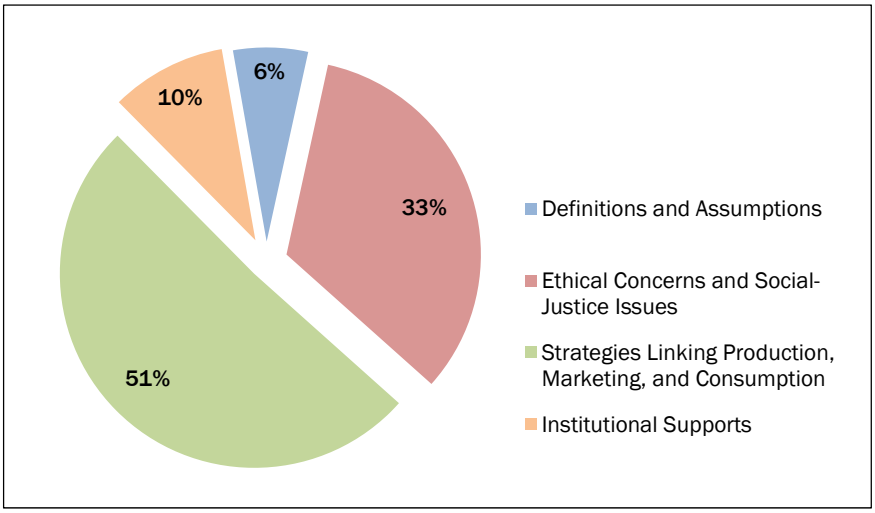

Table 3. Strategic Challenges Identified in Five or More Student Literature Reviews (by subcategories)

Subcategory Reviewed	*Economic Challenge*	*Social Challenge*	*Political Challenge*
Assumptions about constraints and opportunities posed by conventional systems			X
City and regional planning and foodshed planning			X
Community food security and food justice	X	X	X
Community gardens		X	
Consumer behavior and demand	X	X	
Economic benefits of regional food systems	X	X	
Education: Tapping local knowledge networks		X	
Energy and the environment		X	
Farmland preservation			X
Labor and farmworkers	X	X	X
Local food systems and social movements		X	X
Race and food justice	X	X	X
Values-based supply chains			X

Having the bibliography as a tool made it possible to scan a wider range of literature than is typical in most literature reviews, which often focus on a single topic. This broader scan in turn revealed cross-cutting challenges that appear with some regularity. The following section describes what we learned about these challenges, drawing on evidence from the literature that students reviewed. We offer them as illustrative of the potential uses of the bibliography to provide greater analytic focus for research and practice, and in hopes they may be further refined by subsequent meta-analyses. While we discuss the three challenges separately to underscore their unique dimensions, in everyday practice they interact in complex ways, making easy solutions elusive.

Strategic Challenges in Community Food Systems Work

Below we describe the three strategic challenges identified by the student reviews, drawing on the literature to illustrate various ways these challenges are framed by academics and practitioners.

Economic challenge: Dealing with the promise and limits of markets

Perhaps no institution is more associated with community food systems than the farmers' market. The growth in the number of farmers' markets over recent decades might be used as a proxy indicator for growing public interest in local and regional food. But while markets are a necessary part of the solution, there are numerous indications in our literature reviews that private enterprise alone is insufficient by itself to achieve key community food system values, such as equity, sustainability, and democracy. Research points to the need to supplement market-based solutions with carefully targeted public investments (Allen, 2010; Campbell & Feenstra, 2001) in order to offset two market dynamics.

Market challenge 1: Finding price points that work for farmers while ensuring low-income consumers have access to healthy food. Many low-income communities are isolated from access to healthy food options (Algert, Agrawal, & Lewis, 2006; Block & Kouba, 2006), leading to efforts to expand access. Research shows that disparities lead certain populations to experience diet-related chronic disease, deficient cognitive development, and poor educational attainment (Murphy & Smith, 2009; Seligman & Schillinger, 2010). Among the remedial alternatives discussed in the literature are gardening and nutrition education (Lautenschlager & Smith, 2007; Meehan, Yeh, & Spark, 2008), increasing enrollment in food assistance programs (e.g. WIC and SNAP) and use of government assistance programs at farmers' markets (Grace, Grace, Becker, & Lyden, 2008), as well as other efforts to improve access to and availability of fresh, healthy food (Munoz-Plaza, Filomena, & Morland, 2008; Ohri-Vachaspati, Masi, Taggart, Konen, & Kerrigan, 2009). At least potentially, some of these efforts might also benefit small to medium-scale farmers looking for alternative marketing outlets.

Marshall's paper on community food security concludes: "The literature reviewed shows the difficulty of both supporting food security and small scale local farmers" (2011, p. 22; see also Allen, 1999; Baker, 2003; Guthman, Morris, & Allen, 2006; Johnston & Baker, 2005). Even organizations whose leaders deeply believe in both these goals have a hard time achieving them simultaneously (Johnston & Baker, 2005). McEntee (2010) describes the uneasy relationship between the needs of food producers to have better income and the needs of food "consumers" to have affordable and equitable access to healthy food. Alkon (2008b) demonstrates the difficulties in a case study of a West Oakland market that struggles to both attract local residents and support the vendors, many of whom have left due to the limited economic benefits. Interviews with farmers' market managers show that some markets prioritize farmers' income over food security, while markets that prioritize food security understandably have trouble convincing farmers to continue to sell at their market (Alkon, 2008a; Guthman et al., 2006). Marshall notes, "Despite the best intentions, it is difficult to find a price point that meets the needs of both small-scale farmers and a diverse group of consumers" (2011, p. 22). Tensions such as this will no doubt persist as long as we experience an economic system that leaves many without sufficient resources to buy food and in which less

healthy food products benefit from substantial public subsidies.

Market challenge 2: Finding price points that work for farmers while ensuring just pay and working conditions for farmworkers and other food system employees.[2] A distinct but related lens on economic issues (and in turn race and class) involves labor, focusing on pay and working conditions for those who are employed to grow, harvest, process, market, distribute, and serve food. Since its inception, the sustainable agriculture movement has included activists motivated by concerns for farmworkers, but it has also been critiqued by those who do not feel the movement is making enough progress in addressing farm or food system labor issues (Food Chain Alliance, 2012). Proponents of community food systems initiatives experience this same tension on a broader scale since the focus includes workers across the food system, such as those in food-processing industries, in addition to workers in the field.

Among the motivations for relocalization of food is the preservation of small and medium-scale family farms. Yet this motive runs up against some evidence suggesting there are better working conditions for farm labor on large farms than on smaller, organic farms (Shreck, Getz, & Feenstra, 2006). Because of this, some observers view the romantic image of small farms as "an incomplete and unsatisfactory entry into issues of fairness and justice in local food systems" (Hinrichs & Allen, 2008, p. 348). The larger point is that all farmers — big or small, organic or conventional, locally oriented or global — participate in the same economic system and face strong pressures to reduce labor costs. The U.S. agriculture system is embedded within the greater economic capitalistic system, which seeks to lower labor costs for greater economic profit. At issue is how to confront this reality without either blaming the victim (i.e., small farmers as a group) or ignoring the responsibility to improve working conditions (Martin, 2003).

Social challenge: Confronting racial and class bias[3]

One of the most persistent challenges evident in our literature reviews is racial and class bias. At issue is the degree to which relocalization reinforces or exacerbates existing racial and class bias in society, rather than challenging or transforming existing race/class relations. Proponents of community food system initiatives are susceptible to the criticism that they are offering only superficial remedies to deeply rooted problems. The same reality is interpreted by others in the literature as doing the best to carve reform alternatives out of the situation at hand and in the context of constraints and limited resources.

Cultural privilege: The tendency of local food efforts to reinforce the pre-existing advantages of white and more privileged populations. Racial and class tensions within community food systems initiatives have been framed by some researchers using a sociocultural lens. The issue is whether initiatives led predominantly by white, well-to-do leaders can effectively address the social and cultural concerns and ideas of nonwhite and poor individuals and communities. Some research argues that existing practices and outcomes are reinforcing existing race and class privileges (Guthman, 2011; Hayes-Conroy, 2010). Boule notes, "Many alternative agriculture institutions such as farmers' markets typically fail to focus on racial and economic equality and even those who do ironically must rely on affluent (often White) consumers for their existence (Alkon, 2008b)" (2012, p. 11). At the same time, when they seek to expand healthy food options in low-income communities, community food activists — mostly white and affluent — have been criticized for imposing "elite culinary preferences" of minimally processed, local, and organic food on the rest of the population (Laudan, 2001). Transcending these tensions will not be easy, but applied research can open up new possibilities. For example, a few researchers are documenting how people of color

[2] This subsection draws on the literature review of Rittenhouse (2011).

[3] This section draws on literature reviews written by graduate students Marshall (2011), Bradley (2011), and Harris (2011), and a master's thesis written by Boule (2012).

can take ownership of community food initiatives (Ahmadi, 2011; Bonacich & Alimahomed-Wilson, 2011; Patel, 2011).

Boule (2012) argues that by focusing primarily on legitimate concerns about *financial* and *physical* access to food, alternative food movements do not give adequate attention to how *sociocultural* issues affect access. She draws on a variety of sources (Green & Kleiner, 2011; Johnston & Baumann, 2010; Norgaard, Reed, & Van Horn, 2011; Slocum, 2006, 2008) to show how aspects of the dominant white culture often limit the success of community food security initiatives. A deeper understanding of how sociocultural factors come into play in defining and promoting healthy food access is needed. Boule (2012) draws attention to the variety of ways in which everyday people actually define healthy food, often significantly mediated by family, ethnicity, or neighborhood setting. For example, some of her respondents consider a shared family meal using traditional recipes to be healthy, regardless of the nutritional content.

Social distinctions influence how "local" is defined.[4] Our review suggests there is no clear agreement on exactly what counts as local food. Some researchers skirt the issue, noting simply that the term "local" is controversial (Cleveland et al., 2011), debatable (Connelly, Markey, & Roseland, 2011), or lacking in agreed-upon guidelines (Blake, Mellor, & Crane, 2010). Many definitions of "local" envision a circumference within which food is to be grown and marketed; we find definitions ranging from 50 to 500 miles (80 to 800 kilometers), and using existing political boundaries from county to state to nation (Colasanti, Conner, & Smalleya, 2010; Edwards-Jones et al., 2008).

Interestingly, social distinctions appear to matter in defining local. As Weinberg's (2011) review notes, some definitions of local were centered on social interaction rather than geography. Nurse, Onozaka, & McFadden (2010) found that definitions changed based on who was doing the defining — consumers or retailers. Zepeda and Reid (2004), for example, cite a number of local food definitions that were based on methods of harvest like hunting, fishing, and foraging as well as food grown by friends, relatives, and acquaintances. Produce could be considered local, other studies found, if the consumer knew the person who grew it (Milestad, Westberg, Geber, & Bjorklund, 2010) or even if the produce was delivered by the person who grew it (Bingen, Sage, & Sirieix, 2011). The presence of different definitions can be instructive since they often imply different ideas about which underlying values are most important. For example, the food miles framing puts the emphasis on ecological concerns surrounding the use of fossil fuels, while for others, the mileage circumference may be less important than whether there is a direct marketing relationship.

Political challenge: Reconciling diverse approaches to creating change

The literature reveals persistent tradeoffs in forging politically viable change strategies. For example, a common question is whether to pursue an "insider" or "outsider" strategy in making change: emphasizing reform at the margins or more fundamental systemic change (Campbell, 2002). Some advocates work primarily within mainstream institutions in order to encourage incremental adoption of short-term objectives, compromising in the process and risking co-optation. Others seek deeper institutional change or work to build alternative systems that attempt to preserve movement values in their purest forms, even at the cost of short-term gains. Still others suggest that posing the alternatives this starkly is not helpful, instead arguing for middle-ground solutions that weave together these approaches. Finding common ground amidst strategic differences can be challenging, but not impossible (Campbell, 1997, 2002; Stevenson, Ruhf, Lezberg, & Clancy, 2007). For example, Mendes (2008) shows how an effective food policy council in Vancouver acted as a bridge between inside groups within city bureaucracies and citizens' organizations doing community organizing outside government.

The challenge is to foster a democratic debate that weighs the need to get things done against the

[4] The discussion of the ambiguous definition of local draws on papers written by graduate students Weinberg (2011) and Pries (2011).

competing goal of staying true to core values. Allen (2010, p. 297) rightly insists that re-localization of the food and agricultural system will not inherently or inevitably realize values such as social justice or increased equity. On the other hand, neither should local food activists be burdened with the unrealistic expectation that they alone will solve entrenched social dilemmas generated by the current political economy of food and agriculture (Tregear, 2011).

Another way the political strategy question is framed in the literature has to do with the scale at which change strategies are focused. One approach emphasizes a bottom-up approach using local initiative and action to carve out alternatives in light of existing constraints and opportunities (Campbell & Feenstra, 2001). A more top-down approach emphasizes political and economic reform on broader scales in order to create greater space in which local reform can advance. The skills and proclivities for working at these different scales are distinct, and while some local practitioners have succeeded in aligning themselves with larger coalitions, knitting the two together effectively can be elusive (Sennett, 2012). Even the terminology used to describe food systems, and the assumptions those terms carry, can reinforce stereotypes that may limit creative options. For example, Tregear argues convincingly against the tendency in the literature to set up rigid bifurcations — such as "conventional" and "alternative" — with the result that "existing orthodoxies…are reinforced rather than rethought" (2011, p. 424).

Two examples gleaned from our literature review illustrate how vexing it can be to reconcile diverse change strategies (e.g. insider vs. outsider, reform vs. structural change) and the often strident and ideologically charged debates that arise. These are (1) the controversy over the conventionalization of organics and (2) the recent move to promote values-based supply chains as a key local and regional food system strategy.

Conventionalization of organics. One of the most prominent examples of tension between change strategies in the community food systems literature is the debate over the "conventionalization" of organic food systems (Buck, Getz, & Guthman, 1997; Guthman, 2004; Rosset & Alteri, 1997). Before the rise of large-scale organic farms and distribution networks, "organic" was seen by many sustainable agriculture advocates as the true alternative to "conventional." Now, many aspects of organic production, marketing, processing, and distribution practices mimic conventional systems, leading some to question the role organics can and should play in food systems change. While Pollan's discussion of "big organic" in his best-selling *The Omnivore's Dilemma* (2006) has raised the public profile of this debate, questions began much earlier.

The 1997 article that touched off the debate, by Buck, Getz, and Guthman, claims that organic agriculture has become "conventionalized," moving toward large, mono- or bicropping systems that employ migrant wage labor. The trend has fueled both the explosive growth of organic farms that started out small and the transition of conventional farms and food industries looking to enter the "lucrative, niche" organic market. The authors note that this "conventionalization" was fueled by the passage of the Organic Food Production Act as part of the 1990 farm bill that defined organic in terms of a set of production practices. The social and economic values that may have been included in the organic movement in its early days, including social justice and community economic development, were not advanced in this process. This was especially true, the authors claim, at the marketing and distribution end of the food chain.

Many authors of articles we reviewed analyze the process of conventionalization and its effects (Clark, 2007; Goldberger, 2011; Marsden, Murdoch, & Morgan, 1999; Thompson & Coskuner-Balli, 2007). For example, Goldberger's (2011) study reports on a survey conducted with 356 organic farmers in Washington state, finding a range of degrees of conventionalization. While not referencing this debate directly, two articles on organics (Allen & Kovach, 2000; DuPuis & Gillon, 2009) go out of their way to argue that organic agriculture still has some power to change the agro-food system. Guptill (2009) suggests there may be some middle ground, noting that family-scale organic dairy producers are responding to conventionalization pressures by seeking out alternative, direct relationships with consumers.

Organic has been the fastest-growing sector of the food economy for the past two decades, with U.S. sales of organic food and beverages growing from US$1 billion in 1990 to US$26.7 billion in 2010 (Organic Trade Association, 2011). While contributing to a significant reduction in petrochemical use, these gains have done little to slow the power of transnational companies over food production and distribution across the globe. The mixed results create a situation in which proponents of an insider reform strategy can claim some credit for the scope of the former victory, while proponents of an outsider, fundamental change strategy can lament the lack of progress on deeper structural issues.

Values-based supply chains: Blended alternative and conventional food systems.[5] Values-based supply chains (VBSCs) are those that aggregate, market, process, and distribute products based on environmental, economic, and social values. Often described as alternative, "these chains are different from traditional supply chains in that they attempt to enhance small and midscale farmers' financial viability by capturing price premiums in the marketplace for the environmental and social benefits (values) embedded in the products" (Feenstra, Allen, Hardesty, Ohmart, & Perez, 2011, p. 71). This new model for supply chains can offer a range of benefits to farmers, consumers, and food system workers that are not characteristic of the conventional food system as a whole. For example, VBSCs can open up markets for midscale farmers, who often have been left out of burgeoning small-scale, direct-to-consumer markets and for whom commodity markets offer little profit. For consumers some researchers hold out hope that VBSCs can deliver high-quality produce to low-income communities, primarily through institutions like schools and hospitals as well as retail outlets.

At the same time, several researchers have questioned the division between conventional supply chains and VBSCs. These researchers describe VBSCs as what they are calling "hybrid food chains" (Bloom & Hinrichs, 2011a; Clancy & Ruhf, 2010), which share infrastructure and markets with conventional firms while moving produce with "alternative" values. Both conventional and VBSCs are driven and limited by the same factors that determine success in the market, including price, efficiency, food safety, and convenience (Feenstra et al., 2011). Whether alternative values will be sacrificed in serving these conventional priorities remains a key concern. There is disagreement in the literature about whether VBSCs are a type of shallow reform or a genuine alternative. Citing pragmatism, some authors argue that local supply chains cannot develop without the use of the conventional food system infrastructure and markets (King et al., 2010). Others warn that VBSCs constructed in this way will reproduce the social inequities that they sought to reform (Trauger, 2009) and, worse still, they will co-opt the market for values-based food and mask injustice in their supply chains (Bloom & Hinrichs, 2011b). The debates surrounding organics and VBSCs highlight the interconnections between conventional and alternative food systems, suggesting that for some purposes it is not useful to view them as two separate systems at all.

Toward a Research Agenda To Inform Community Food Systems Practice

Local actors with diverse goals and motivations are pursuing work that has the potential to advance goals and values associated with community food systems. Aided by a new tool — a community food systems bibliography — our partial review of the literature in the field suggests a set of persistent and interrelated strategic challenges that pose tradeoffs among competing values and priorities. Rooted in some of the longest-standing social structures, from the capitalist marketplace to persistent racial and class tensions, these challenges defy simple or ready resolution, and do not lend themselves to tidy lists of best practices. Instead, they call for strategic thinking to resolve tensions and tradeoffs in context-specific settings via ongoing experimentation, contestation, compromise, and working accommodation. Viable options must be carved out of the situation at hand using

[5] The values based supply chain discussion draws on papers written by graduate students O'Sullivan (2011) and Lerman (2011).

existing resources and against the backdrop of mainstream institutions that alternatively embrace, resist, or refashion specific reforms (Hess, 2007). At issue for the field as this process of incorporation and transformation proceeds: How can researchers and practitioners join forces to promote the kind of learning needed to advance this work?

Our research suggests one approach that may be particularly fruitful. The three strategic challenges identified in our partial review of the literature, and others that might surface in future reviews by our team or others, provide a set of reference points by which one might compare and learn from the distinct problem-solving activities of local reformers working in different settings. By designing comparative case studies focused on how the challenges are being addressed in distinct community settings, or by mining existing case studies in the literature using meta-analytic techniques (Hodson, 2001), we can create empirically informed theory that helps guide practice. It may be particularly useful to craft new applied studies with a developmental lens and with the active participation of people working on the ground. The developmental perspective is particularly useful in situations where there is not a clear set of procedures for moving forward that can be specified in advance (Patton, 2010). Instead, innovations might be pursued through a succession of experiments from which participants in the process attempt to learn what needs to be done.

Applied research in this fashion is not completely open-ended, however, since it can build on some general and well-established ideas from the fields of community development and public policy about what it takes to build a successful community change coalition. These include:

- *clarity of purpose and focus:* articulating overall community-scale change objectives with broad appeal while also establishing concrete priorities that compel the attention of task-specific groups (Gardner, 2005; Stone, Orr, & Worgs, 2006);
- *community legitimacy:* broad and inclusive membership that is sustained over time (Flora, Sharp, Flora, & Newlon, 1997);
- *mobilization of resources:* tapping and expanding existing networks such that partners are contributing their own resources to the larger effort, and resources are strategically realigned to support coalition goals (Gardner, 2005; Kubisch, 2005);
- *policy development:* a strategy targeting particular policies or systems to change and particular constituencies to mobilize (Kubisch, 2005; Stone et al., 2006); and
- *institutional embeddedness and transparency:* anchoring the work in some form of organizational home with skilled staff and clear, inclusive decision-making processes (Flora et al., 1997; Stone et al., 2006).

Three examples can be noted to indicate the types of practice-oriented research we have in mind. First, Boyte and Kari's (1996) theory of public work is a useful conceptual framework to guide comparative case studies. It focuses particularly on examining what it takes to bring together diverse groups (in terms of race, class, etc.) with divergent interests in order to build, in common, things of public value. Drawing on this framework, Peters, Jordan, Adamek, & Alter (2005) have compared cases where land grant university researchers have partnered with local communities around food system projects. Their exploration of the concept and practice of "public scholarship" through case studies at eight land grant and state universities shows how academics and community practitioners can support each other in building community food system initiatives.

Second, comparative case studies might fruitfully use the community capitals framework (Emery & Flora, 2006) to deepen insight. For example, researchers at Virginia Tech and North Carolina State have used community capitals to compare the development of community food systems at a variety of locations across Virginia and North Carolina.[6] Their case studies examine how local food activists mobilize various forms of capital — social, political, financial, human, etc. — to realize the values of equity, justice, sustainability,

[6] For information on this ongoing project, see: http://www.cfse.ext.vt.edu/index.php/about-cfse

and democracy in the face of challenges such as those we have described. For example, do communities spend most of their political capital on local battles or attempt to balance that with engaging national or international issues? Is the approach to political engagement weighted toward insider or outsider strategies, and what effect does this have on their ability to access public or private funding support? A wide range of important questions such as these flow from using the capitals framework and would be ideally suited to shaping comparative case study research.

Third, it will be useful to view community food system challenges within the framework of community governance and planning (Campbell, 2004; Stone et al., 2006). For example, Mendes (2008) shows how a focus on local governance capacity can help answer the question of why sustainability policies around food take deeper root in some settings than others. Key variables identified in her research include both structural variables ("legal status and mandated role; staffing support; integration of food policy into normative and legal frameworks") and procedural factors ("involvement of joint-actor partnerships and networks in planning and policy making; citizen participation mechanisms including marginalized populations") (Mendes, 2008, p. 951). A more extensive set of case histories — with appropriate attention paid to particular local dynamics and unique circumstances — might provide a range of lessons to inform how other communities confront a number of vexing questions. These include: Which local food strategies require institutionalization and which do not? How to garner the resources of institutions without losing the sense of community ownership? How to take advantage of the space for local experimentation while remaining cognizant of how local governments often serve entrenched interests?

Whatever conceptual frameworks are used, practitioners need to be active partners in advancing and generating new knowledge. This might include putting greater priority on fostering partnerships between practitioners and researchers to design and implement research projects on identified challenges. Funders need to be part of this dialog as well, in part because they often approach research solely through the lens of evaluation, and in ways that discourage honest appraisal by grantees hoping to remain in good favor. If organizations could build relationships with funders where they are rewarded for being in partnership with researchers, no matter the outcome of the research, we might see more progress on some of the deeper challenges we have identified.

With each year, even each month, that passes, the body of research on community food systems grows. We have shown how a comprehensive community food systems bibliography can be a useful tool for identifying key challenges in the field, and argued for how research might be better conceived and analyzed in order to create insights that can shape and guide practice. We hope others will use and improve upon the community food systems bibliography we have compiled to further this goal. Together we can foster a conversation about community food systems in which research and practice are mutually reinforcing.

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Strengthening informal seed systems to enhance food security in Southeast Asia

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Abstract

In 2011, the number of hungry people in the world surpassed one billion for the first time. The majority of these people are largely dependent for their food security upon resource-poor smallholder farmers in developing or emerging economies. These smallholders depend on informal seed systems for 75–90% of their food crop cultivation. Southeast Asia, one of the world's biodiversity hotspots in the face of rapidly dwindling global genetic diversity, is at the forefront of seed systems issues. This article examines activities undertaken by a collaboration of researchers and local institutions to enhance food security within informal seed systems in Thai and Cambodian rural communities. We employed a two-step model for strengthening food security using a range of participatory activities to first understand and characterize, and secondly strengthen informal seed systems in the target regions. We documented seed

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pathways, histories, and storage as well as gender roles in each community. Informal seed systems were strengthened through identifying potential species for commercialization, addressing technological barriers to seed analysis, and conducting seed fairs and seed banking. These activities not only strengthened informal seed systems, but also significantly enhanced all four pillars of food security in the study communities. Recommendations for future informal seed systems and food security research include extending research into more communities and countries, focusing on the potential for enhancing formal seed systems, and examining the possibilities for synergies with food sovereignty approaches.

Keywords
appropriate technology, biodiversity, Cambodia, food security, hunger, participatory methods, seed systems, Thailand

Introduction

In 2011, the number of hungry people in the world surpassed one billion for the first time (Food and Agriculture Organization of the United Nations [FAO], 2011). Disasters such as the famine in the Horn of Africa and a mega-typhoon scything through the Philippines, in conjunction with rapidly rising food prices worldwide, have further reduced food security for millions of people. Despite a declining trend in the proportion of hungry people in the world in the last 30 years of the 20th century, since 2004 there has been a reversal of this trend (FAO, 2011). With the world's population forecast to rise to 9 billion by 2050, Malthusian speculation has once again emerged with concerns that the number of hungry and malnourished people will continue to rise and outpace food production increases, resulting in a food insecure world.

Food security was first defined at the 1974 World Food Summit as "availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices" (United Nations, 2003, "Official concepts of food security," para. 2), reflecting the main supply-side concerns at the time in the context of repeated famines, hunger, and food crises around the world. Since then, the concept has been re-defined numerous times, and generally accepted definitions of food security have adopted a threefold axis of availability, accessibility, and utilization of food (FAO, 2008). More recently, concerns about the stability of the food system and its relation to the environment have also been incorporated. Despite this concept being present for several decades, food security has taken a sideline until the past few years to other critical global concerns, such as health, education, and the environment. All has changed in the past five years. Food security concerns rose rapidly to the forefront of the global agenda beginning with the food price crisis of 2007–2008. Food riots from Haiti to Mozambique brought the realization that the world hunger problem had not yet been solved. At the 2009 L'Aquila summit, the G8 nations acknowledged the need to tackle food insecurity head on, and pledged $22bn to set up the Global Agriculture and Food Security Program (GAFSP), administered jointly by the World Bank, International Monetary Fund, and G8 governments (United States Treasury, 2011).

Renewed emphasis thus is now being placed on addressing food security at its roots — in regions and locales where undernourishment is king and many households live daily on the edge. Arguably the most important focus of present-day food security concerns is resource-poor smallholder farmers in developing or emerging economies. The vast majority of the world's one billion undernourished people resides in Asia or sub-Saharan Africa and depends daily on small farm output for their livelihood and/or their food. This farm output is dependent upon many inputs, of which seed is one of the most critical. Without available or accessible seed, many households in developing nations are exposed to the potential of becoming food insecure.

In much of the developing world, informal seed systems remain the prevailing source of seed for smallholder farmers (Seboka & Deressa, 1999; Thiele, 1999). Informal seed systems are characterized by multiple components, including (1) farmer self-saved seed of indigenous annual and perennial vegetable crops, (2) informal seed markets, (3) seed

networks and "germplasm gatekeepers," (4) informal seed storage mechanisms, and (5) the conservation of the knowledge base surrounding the local system. Such systems are termed informal because they are (1) farmer organized and managed, (2) flexible and dynamic, (3) indigenous to a community or set of communities, (4) local or regional in scope and scale, and (5) typically undocumented (Sperling, 2008).

The informal seed system contrasts with the formal seed system, which involves governmental, institutional, or private control of the whole gamut of seed activities, including but not limited to breeding, multiplication, processing, and storage. Such formal systems are typically vertically organized with specific structures in place for production and distribution of seed and operate on generally strict and similar principles across the globe (Almekinders, Louwaars & de Bruijn, 1994). These formal systems are the source of modern varieties and certified seed (Sperling & McGuire, 2010), usually developed through modern breeding technologies and often tested on research farms.

The landscape in many parts of rural southeast Asia is dominated by resource-poor smallholders, who operate complex, biodiverse farming systems. Informal seed systems central to such farming systems are critical to enhancing 21st century global food security for several interconnected reasons (Tscharntke, Clough, Wanger, Jackson, Motzke, Perfecto, Vandermeer, & Whitbread, 2012). First, seed sourced from informal systems by resource-poor smallholders in developing countries, such as those in southeast Asia, is estimated to account for 75% to 90% of all food crops cultivated (Almekinders et al., 1994; Sperling & McGuire, 2010). Although some farmers may be able to purchase seed and access the formal seed system for some commonly cultivated food crops, such as rice, the informal seed system is the primary and often sole source of the majority of foods in these smallholder communities.

Secondly, informal seed systems are critical for the production of a diversity of foods to ensure dietary diversity in smallholder communities. Many crop species integral to the informal seed system provide valuable macro- and micronutrients to the communities in which they are grown and consumed. In particular, informal seed systems are often the sole source of neglected and underutilized species (NUS), which are critical for providing the vast majority of essential nutrients to smallholder communities (Mayes, Massawe, Alderson, Roberts, Azam-Ali, & Hermann, 2012). There is significant potential to extend the nutritional benefits of NUS in particular to regional and global levels to assuage the growing scourge of hidden hunger and the increasing homogenization of the global food base.

Thirdly, informal seed systems are central to the conservation of biodiversity in smallholder production systems (Badstue, Bellon, Berthaud, Juárez, Rosas, Solano, & Ramírez, 2006) and, hence, the ecological landscape of Southeast Asia. Renowned Russian botanist Nikolay Vavilov included a region of Asia stretching from the Indian subcontinent through Southeast Asia as a "key global center of origin" for food crops (Nabhan, 2009). More than 170 crop species originate in this geographic swath. The Southeast Asian peninsula has since been recognized as a hotspot of biodiversity (Myers, Mittermeier, Mittermeier, da Fonseca, & Kent, 2000). In Southeast Asia alone there are an estimated 1,500 to 2,000 plant species incorporated into the food system (Engle & Faustino, 2007). Many of these vegetables are not widely known and could be classified as NUS, often overlooked during inventories, particularly if the species are foraged from the wild versus tended in garden plots or farmers' fields. The informal seed system in this region is critical to maintaining biodiverse agroecologies as it is the main source of diverse germplasm.

Furthermore, informal seed systems broaden the genetic base of production with multiple crop species and varieties adapted to specific production systems and microclimates. By preserving *in situ* locally adapted varieties, saved through the informal seed system and cultivated in biodiverse agroecologies, smallholder communities are able to reduce risk in their agricultural systems (Jackson, Pascual & Hodgkin, 2007; Thrupp, 2000). Risks may involve ongoing environmental pressures facing smallholders on a daily basis, including pest and disease pressure, low soil fertility, and severe weather conditions. Meanwhile, the provision of

locally well-adapted germplasm also provides these communities with greater resilience in the face of significant events, including climate change, natural disasters, and political instability, pressures all too familiar in Southeast Asia. Strengthening informal seed systems that revolve around a broad genetic base thus provides an alternative paradigm to the increasing corporate control and monopolization of the global formal seed system that is resulting in an increasingly rapid reduction in global seed biodiversity (Schanbacher, 2010).

Finally, the rich diversity of indigenous germplasm in informal seed systems represents a valuable resource for the development and improvement of crop species locally, regionally, and globally. Many of the species that are preserved in informal seed systems may have significant untapped potential for commercialization and diversification of diets, which could lead to improved nutrition globally. Although local vegetable varieties are currently grown mostly for home consumption, over the past decade they have been increasingly sold in urban markets in Southeast Asia. The high diversity of ethnic groups within a small region has produced extraordinary diversity in indigenous vegetables, as different groups favor specific culinary and agronomic qualities.

Despite this critical importance of informal seed systems to smallholder communities, little is known or documented about how households in these agroecosystems select, conserve, and exchange their biodiverse germplasm resources. This project sought to address this issue and strengthen these informal seed systems in rural Southeast Asia using methodologies that could enhance food security. The two main objectives of this project were to:

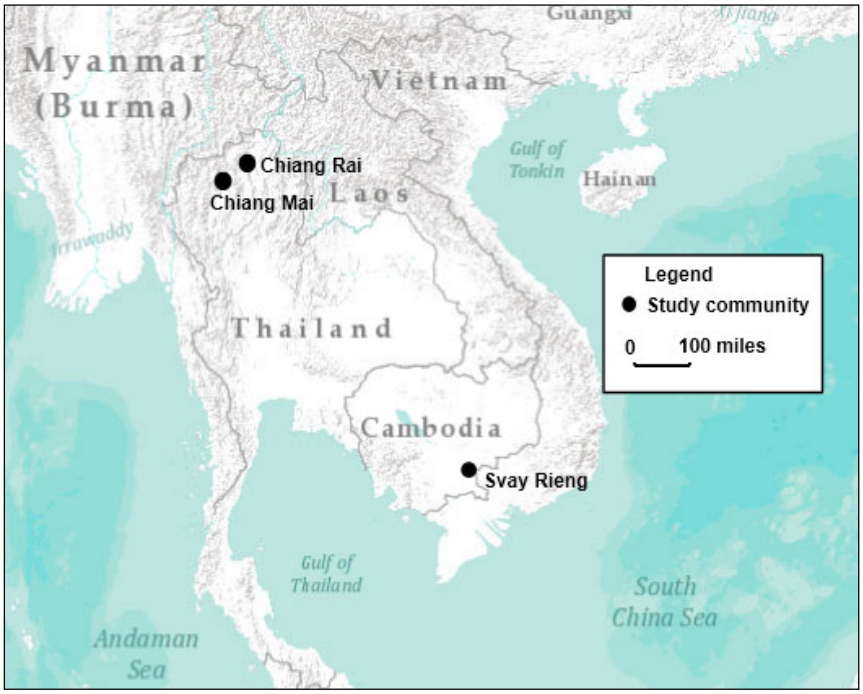
1. Understand and characterize informal seed systems, including species, pathways, and "germplasm gatekeepers" for indigenous annual and perennial vegetable crops important to Northern Thailand hilltribe communities, and Cambodian Khmer farmers.

2. Facilitate the exchange, preservation, and dissemination of important genetic resources identified through participatory methodologies employed under objective 1 in order to strengthen the informal seed systems in each community.

Study Areas

The three study communities for this project were located in rural areas in Thailand and Cambodia. Two of the study communities were located near the Myanmar border of northern Thailand, with the third located in the Svay Rieng Province of southeast Cambodia, adjacent to the border of Vietnam (figure 1). The two northern Thai study sites, in Chiang Dao (Chiang Mai Province) and

Figure 1. Locations of the Study Communities in Northern Thailand and Southeastern Cambodia. Map scale 1:18,500,000.



Map produced courtesy of Arc Explorer Online, www.esri.com

Mae Yao (Chiang Rai Province), are composed of clusters of upland communities and ethnic groups. The Chiang Dao study community clusters are largely composed of ethnic Palaung with a minority of Lahu residents. The ethnic composition of the Mae Yao community clusters is somewhat more diverse, including three distinct Lahu groups (Black, Yellow, and Red) as well as the Akha ethnic group. In contrast, the population of the Svay Rieng study community clusters in Cambodia is entirely Khmer. All three communities fall in the broad geographic swath identified by Vavilov as being rich in biodiversity, and the Thai-Cambodian contrast was chosen to compare communities with different ethnic backgrounds and who are dealing with different agroecologies.

Although language and religious differences separate the Thai hilltribe groups, they share similar recent histories and livelihoods. All the communities in the two Thai sites were established by migrants from Myanmar, with most of the recent migration having taken place between the early 1960s and mid-1980s. In comparison, the Khmer survey collaborators in the Svay Rieng area are native to a region that is still recovering from the Vietnam War and subsequent Khmer Rouge regime (1975–79). Average annual income for households in the Thai communities is considerably lower than the Thai national average of 141,480 baht (US$4,716), while income in the Svay Rieng community clusters is only approximately one-quarter of both an average household in Cambodia (US$931) and households in the two Thai community clusters (table 1).

Food insecurity remains a risk for many in all three study sites. Childhood malnutrition is prevalent, especially in the Khmer communities. In Thailand, with both community clusters located on public land (national park and reserve forest), there is no formal land ownership or secure land tenure. Although many residents seek outside, supplemental employment as wage laborers, agriculture remains the main local livelihood, centered around complex biodiverse farming systems. These systems are centered around rice production for food, supplemented by a variety of annual and perennial vegetables grown primarily in mixed home gardens and used abundantly, both raw and cooked, in local dishes. Crops that are cultivated strictly for market sale are few, but do include maize and some legumes. Farmers in Mae Yao (Chiang Rai) have limited access to rainfed paddy (approximately 0.64 ha per family), whereas those in Chiang Dao lack access to such paddy environment. However, the majority of households in both Thai study communities tend home gardens, particularly during the rainy season, and gather wild vegetables from the forest. In general, the residents of Svay Rieng have limited access to farmland, mainly growing irrigated paddy rice during the rainy season. In this region, household food production is generally at the subsistence level, with reliance on small home gardens. Compared to northern Thailand, there is much less forest cover in southeast Cambodia, resulting in limited access to wild foods.

In all three communities, the agricultural system is distinctly gendered through both the different spatial domains of men and women and the

Table 1. Key Characteristics of Study Community Clusters

Characteristic	Chiang Dao District, Chiang Mai Province (Thailand)	Mae Yao District, Chiang Rai Province (Thailand)	Svay Rieng Province (Cambodia)
Ethnic group	Palaung, Lahu	Lahu, Akha	Khmer
Historical ties	Myanmar	Myanmar	Cambodia/Vietnam
Average (mean) annual income (US$)	995	827	220
Population of province (million)	1.68	1.19	0.56
Average farm size (ha/acres)	3.0 / 7.4	2.0 / 4.9	1.2 / 3.0
Environment	Tropical highland	Tropical highland	Tropical lowland

Sources: Kingdom of Cambodia, 2009; Government of the Kingdom of Thailand, 2011, 2012.

gendered division of knowledge in these communities. Women keep home gardens — small, multipurpose gardens adjacent to a dwelling — with crops for household consumption, a common piece of the agricultural system in Southeast Asia (Gajaseni & Gajaseni, 1999; Kehlenbeck & Maass, 2004; Srithi, Trisonthi, Wangpakapattanawong, Srisanga, & Balslev, 2012). This allows women to have a hand in providing for their households while remaining in the vicinity of their homestead for other female-assigned activities, such as childcare, cleaning, and washing clothes. Women's involvement in home gardens ensures their role as gatekeepers of germplasm and of knowledge about indigenous vegetable species for household use. Women's use of home gardens is therefore critical in conserving biocultural diversity and ensuring the nutritional quality of household diets (Kumar & Nair, 2004). Women's day-to-day handling of a variety of locally important species also facilitates their familiarity with a range of crops about which they know significantly more than men. Men, meanwhile, invest their time in learning about other important household enterprises that fall within their typical domains. The spatial domains of men are typically away from the home, gathering forest products (in Thailand only), keeping fields, hunting, and dealing with animals such as pigs, fish, and chickens. In our observation, men do not have as keen an eye on seed selection, separation, and storage from the informal system as do the women.

Methods

Methodologies undertaken involved a two-step process of (1) understanding and characterizing the informal seed systems, and (2) strengthening these systems.

Understanding and Characterizing Informal Seed Systems

We conducted a variety of participatory activities to facilitate understanding and knowledge of the informal seed systems not only by researchers but also by households in the study communities. The first of these activities was to conduct semistructured household and individual interviews in the three study communities. The research team met with community leaders and organized a sampling framework based on wealth stratification of each community to ensure that sampled households spanned the range of socioeconomic strata. We selected four villages in each of three village clusters (communities). A total of 171 (40 in Chiang Dao, 30 in Chiang Rai, and 101 in Svay Rieng) semistructured, observation-based interviews with 10% of the households in each community were conducted. Interviews were conducted in each home and garden/farm to permit observation of actual seed-saving and storage practices. Interviews covered topics such as novel and annual seed acquisition, seed trade pathways, and seed selection and saving practices.

Secondly, we conducted focus groups with male and female representatives from several households in each community and utilized participatory resource mapping, shared histories, and gender roles exercises. For the mapping exercises, the groups drew their community location, identified available natural, social, and economic resources, and illustrated the location and importance of these resources. For the shared histories exercises, groups constructed a timeline of their recent history, identifying particular events that impacted their seed system in terms of seed selection, exchange pathways, and storage. For the gender roles exercises, participants in each community were split into two groups (one male and one female) and were asked to identify the gender responsible (male, female or both) for each of 12 different tasks associated with household participation in selected activities related to seed systems and vegetable production.

Finally, researchers compiled a set of large picture cards of 77 annual and perennial vegetables in the region, based on researcher experience and knowledge of the target communities. Each card included a color photograph of the plant, its edible vegetable parts and/or seeds, which enabled villagers to recognize the species. These cards were used in both individual interviews and focus-group discussions as a common visual reference point to obtain the crop names in local languages and to discuss the presence and use of those vegetables in each community (Bicksler, Bates, Burnette, Gill, Meitzner Yoder, Ricciardi & Srigiofun, 2012).

Strengthening Informal Seed Systems

Identify species of potential commercialization
Participants involved in the card sorts to understand and characterize the informal seed systems in their communities were then invited to participate in a follow-up activity to (1) identify species that were not included in the card sorts, and (2) help researchers generate additional lists of important, yet often (still) underutilized indigenous species. Participants gave species identified a score to rank their utilization, whereby 0 = common, 1 = uncommon, and 2 = rare. Participants were also asked to identify whether a species was important or unimportant to their seed system in terms of household diet or a potentially marketable crop. This activity was conducted to uncover which species had the greatest untapped potential for future crop improvement and commercialization for the target communities.

Address technological barriers to seed analysis
In-situ experimentation involved seed viability (germination and vigor) experiments using locally available species, collected through donations from local households during the card sorts and structured interview times. We constructed germination chambers at the nongovernmental organization ECHO's (Educational Concerns for Hunger Organization) seed bank and in each community, made out of locally available, low-cost materials. We then conducted these experiments both at the ECHO seed bank and in the village to procure real-time vigor and germination data while conducting the household interviews and focus groups, and to train local people in appropriate technology usage and stimulate interest in simple research methodologies within the communities.

Conduct seed fairs and seed banking
Three seed fair events were held (one in each province) in early 2011. The first was held in Pang Daeng Nawk community in the Chiang Dao District (Chiang Mai Province), the second in Mae Yao District (Chiang Rai Province), and the third in Svay Rieng Province, Cambodia. The seed fair events created opportunities for farmers to learn about seed saving through the teaching of local nongovernmental organizations and to share knowledge and seeds, the majority of which were unavailable through the formal seed system. We held brief seed-saving training sessions as part of each fair in which we used a specially designed flip chart highlighting different seed species to help increase farmer awareness and knowledge.

In order to increase the availability of informal seed system germplasm and to extend the reach of this germplasm into new communities, we encouraged project participants during interviews, focus groups, and seed fairs to donate a small portion of their available germplasm for conservation at the ECHO Asia Regional Impact Center's seed bank at the Upland Holistic Development Project (UHDP) in Mae Ai, Thailand. ECHO's seed bank operates as a germplasm repository with currently more than 400 master accessions of locally important species, with the goals of increasing the availability of appropriate seeds of select regionally important crops among development workers and communities, encouraging regional seed saving and sharing.

In addition, we conducted training of selected Thai or Cambodian seed germplasm gatekeepers from the study communities about seed systems and in particular about community seed banking. One Thai national was trained at the ECHO seed bank in Mae Ai, Thailand, and also at the ECHO headquarters in Fort Myers, Florida, in low-cost and appropriate technology seed system activities, including seed selection, cleaning, inventory maintenance, germination and vigor trials, storage, and grow-out for multiplication.

Results

Characterized Seed Systems

Household interviews and participatory methodologies revealed that seed saving is far more frequent and important among poor households than wealthier households, who have greater access to commercial seed. Purchased seed carries greater prestige than home-saved seed, and thus wealthier households prefer and seek to be more closely connected with the formal seed system. Additionally, poor villagers tend to trade with those of similar socio-economic standing, rather than approaching wealthier village members to trade or

borrow seed. In all cases, vegetable seeds are reportedly traded freely without expectation of return in terms of cash, seed, or produce. In terms of seed trading pathways, the Thai communities in particular confined their trading to ethnic lines, with just a few reported cases of seed being traded across ethno-linguistic lines. These examples serve to highlight that the quality of social ties within and between these communities is critical in determining the dynamics of mutual seed exchange (McGuire, 2008).

Seed histories revealed that villagers who resettled recently (in the past 30 to 50 years) attempted to carry seeds of their culturally most important crops, but lost several of these species as they fled through conflict. In northern Thailand, many of these resettled refugees came from or through civil unrest in China or Burma, while in Cambodia, many communities were ravaged for several years under the brutal Khmer Rouge regime.

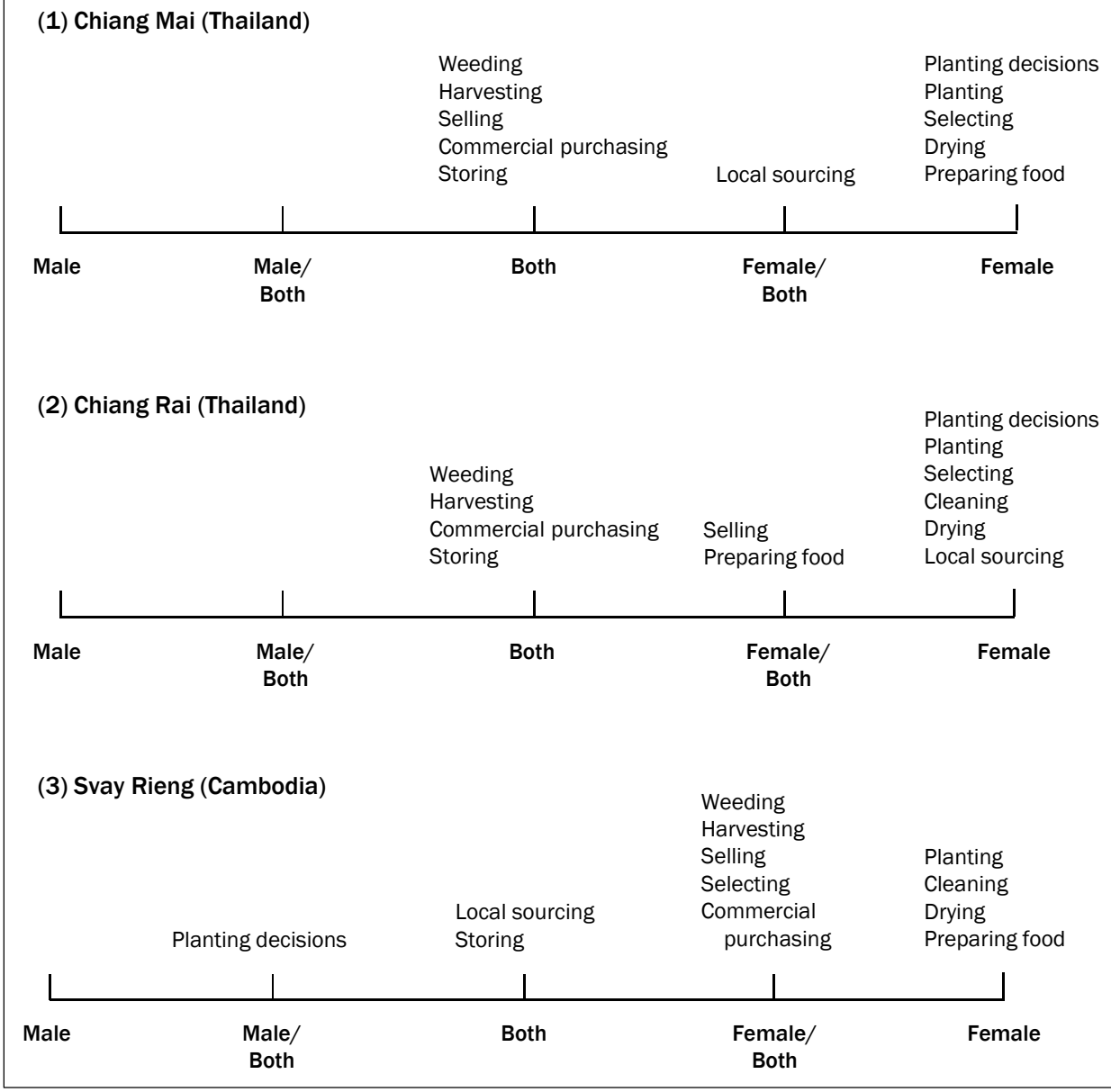
In terms of seed storage, 77 different seed species were identified and analyzed across the three study communities. These were species that were being collected, prepared, and stored at the time of the data collection. Sun drying was the preferred method of preparing seeds for storage (41 species), followed by drying on the plant (29 species), and fire drying (7 species). Sun drying is thought to be the most common method due to the combination of ease of use and ability to quickly bring seeds inside the home if rain comes. Plastic bags were the most common storage vessel, and storage above the fire in the home was the most common storage location (table 2). It is assumed that plastic bags are used because they are readily available, inexpensive, and can be made water-tight to preserve seed viability. Storage above the fire was preferred by many as a place to prevent pest infestation, because the smoke and heat potentially create inhospitable environments for stored seed pests. The two most common combinations of storage vessel and location were seeds kept in plastic bags hung on walls and open seed clusters stored above the household fire (13 species for both methods).

Gender analysis conducted in all three village clusters revealed women's dominant role in the informal seed system. There were no activities in the informal seed system identified by both men and women as ones that were exclusively performed by men. On the other hand, there were many activities identified as exclusively performed by women. Figure 2 shows the breakdown of individual seed system activities for each community, with results aggregated from men's and women's focus-group responses. Activities such as planting, selecting, cleaning, and drying the seeds were typically in the female domain, giving women exclusive access to seeds at the sowing and post-harvest stages. Meanwhile, activities such as weeding and harvesting, which required a lot of manual labor, typically were performed by both men and women. Both men and women were active in the sourcing and selling of seeds, while

Table 2. Storage Vessels and Locations for 77 Seed Species, Aggregated Across All Three Communities

Storage Vessel	Storage location				
	Above Fire	Hung on Wall	On or In Cabinet in Kitchen	Outside House	Total
Plastic bag	7	13	3	0	23
Open seed cluster	13	4	1	1	19
Cloth bag	9	5	2	0	16
Paper bag	1	2	4	0	7
Plastic netting	5	0	1	0	6
Plastic bottle	0	2	1	0	3
In basket	0	0	0	2	2
Glass bottle	0	0	1	0	1
Total	**35**	**26**	**13**	**3**	**77**

Figure 2. Gender Roles in the Informal Seed System as Identified by Focus Group Participants in the Three Study Communities



the only activity in all three village clusters that fell more under the male domain was decisions about planting in Svay Rieng, Cambodia.

Strengthened Informal Seed Systems

Identify species of potential commercialization

Overall, 23 species were identified that were classified by community members and researchers as important foods, yet that are uncommonly or rarely cultivated or collected. Fifteen of these species are perennial, while eight are cultivated as annuals. Much of the robust diversity present within the food systems of these study communities is due to perennial species used as vegetables. Table 3 provides a partial list of the most important under-

Table 3. Partial List of Underutilized but Regionally Important Perennial Species Often Consumed as Vegetables in Study Communities

Family	Scientific Name	Common Name	Thai Name (ภาษาไทย)	Edible Portion
Araliaceae	*Trevesia palmata*	snowflake tree	tang luang / ต้างหลวง	Shoots, flowers
Arecacea	*Caryota mitis*	fish tail palm	tao rang daeng / เต่าร้างแดง	Inner core (heart)
Asclepiadaceae	*Gymnema inodorum*	chiang daa	chiang daa / เชียงดา	Shoots
Bignoniaceae	*Oroxylum indicum*	Indian trumpet	pheka / เพกา	Flowers, pods
Fabaceae	*Acacia concinna*	shikakai	sompoi / สัมป่อย	Shoots, flowers, pods
Moraceae	*Ficus racemosa*	cluster fig	madeua kliang / มะเดื่อเกลี้ยง	Leaf shoots
Verbenaceae	*Clerodendrum glandulosum*	clerodendrum	nang yaem pa / นางแย้มป่า	Leaf shoots

utilized perennial species identified in these study communities. Although perennial plants often contribute to family nutrition in significant ways, they are sometimes overlooked during inventories of underutilized indigenous vegetables. This is particularly true if the species are foraged from the wild, versus tended in garden plots or farmers' fields. Perennial plants are also critical to the sustainable management of these biodiverse agroecosystems, as they can maintain ground cover for longer periods of time to reduce soil degradation.

Address technological barriers to seed analysis

Optimum conditions for seed storage include low temperature and low relative humidity (Rao, Hanson, Dulloo, Ghosh, Nowell, & Larinde, 2006). However, providing such optimum conditions is particularly difficult to achieve in the hot, humid environment of Southeast Asia.

Seed germination rates were therefore not as high as would be expected from seed in the formal sector. It is generally accepted that the shorter number of days to 50% germination, the better the chance of seedling survival. So, although Cambodian seeds generally had a lower viability than the other two village clusters, the seeds that did germinate may in fact exhibit greater vigor because of the lower time to 50% germination (table 4).

Meanwhile, across village clusters, seeds in the *Fabaceae* (bean) family exhibited the greatest viability (70.8%), and seeds in the *Solanaceae* (tomatoes, eggplant, pepper) family exhibited the lowest viability (21.5%). The great spread in farmer-saved seed viability across families may be due to inhibitory mechanisms in seeds from different seed families or an inherent difficulty in maintaining seed viability for particular seed families in specific locations.

To address these challenges of vigor and germination, we established low-cost germination chambers constructed from locally available materials in each community as well as the ECHO Asia seed bank. During the construction of these chambers, several people from each community were trained in the building and use of these germination chambers for seed germination and vigor testing. We encouraged these people to train others in their communities in order to build capacity for *in situ* testing of informally saved seed by and for local people.

Conduct seed fairs and seed banking

Farmers left the seed fairs with enhanced food security because of their increased access to a wider variety of germplasm through seed-swapping; most who attended these fairs left with crop species or varieties that they had not previously cultivated, even though farmers attending the seed fair events

Table 4. Seed Germination and Vigor Results for Donated Seed Species by Study Community

Community	Seed germination (%)	Seed vigor (days to 50% germination)
Chiang Mai	54.4	5.5
Chiang Rai	64.3	6.1
Svay Rieng	44.2	5.3

lived geographically close to one another. In all, more than 150 people participated from nearby communities, and post-swap surveys indicated that on average, each participant both gave and received five packets of seed, with a total of more than 700 packets of seeds exchanged across the three study communities.

Eighty different accessions were donated to the ECHO Asia seed bank during household interviews and seed fair events. The majority of these accessions were from the Thai communities; only 22 distinct seed species were donated by the Cambodian community. Once transferred to the ECHO seed bank, this germplasm was screened for potential on-farm grow-out for seed multiplication and further evaluation and for potential distribution to and promotion among communities across the Southeast Asia region. Those who receive plant material from the ECHO seed bank are encouraged to offer feedback on the performance of each crop under their particular growing conditions. Thus incorporating new accessions into the seed bank enhanced the possibility of extending the benefits of these species to new regions.

Discussion and Future Research Directions: Enhancing Food Security Through Strengthening Informal Seed Systems

This model of enhancing food security through a variety of activities to strengthen informal seed systems was both comprehensive and effective. The informal seed systems in all three community clusters are now better understood, and informal seed systems strengthened to ensure enhanced local and regional food security. Project activities either directly or potentially strengthened all four pillars of food security in the study communities. First, and probably most effectively, availability of food was increased in each community through activities that sought to expand the reach of germplasm into new households and communities. Activities undertaken to understand and characterize the informal seed system led to increased local awareness and knowledge of the foods (many underutilized) available to communities, and affirmed the value of their diverse germplasm resource base to provide enough food year-round. Hands-on training and *in situ* experimentation increased local knowledge of how to secure sufficient, high quality germplasm for subsequent growing seasons, thus enhancing the available food sources for future years. Seed fairs improved food availability by promoting seed and knowledge exchange among diverse households, thereby increasing available options of foods to cultivate at the household level. Regional seed banking made possible effective storage, evaluation, and future dissemination of a wide range of available food sources for local communities.

Secondly, access to food was enhanced through a variety of approaches during the project. The most notable of these was through the erosion of intra- and intercommunity barriers to seed access. Intracommunity barriers were reduced primarily using participatory methods, such as resource mapping and the use of focus groups with both male and female participants, which deliberately included women as equal partners in seed systems in the study communities. Such inclusive approaches served to initiate opportunities for pan-community access to diverse germplasm sources. Intercommunity barriers were especially broken down through seed fair events, which served to develop and enhance networks and market opportunities among diverse ethnic and socioeconomic groups within a geographic area for increased access to diverse crop species and varieties.

Thirdly, utilization of food was potentially improved through activities that strengthened understanding of gender roles and the availability of underutilized species. Women were identified as being able to source a more diverse food base for household meals than men, making them the critical players in enhancing food security through improved food utilization. The identification of multiple species that participants highlighted as key food crops, yet uncommonly or rarely cultivated, served to strengthen the knowledge base of communities on their agrobiodiverse systems and the need to continue to conserve these critically important species.

The final pillar of food security — increased stability of food systems — was also potentially enhanced through project activities. The promotion of underutilized species increased the value attributed to agrobiodiverse systems. This is

critically important in strengthening the resilience of these systems to shocks such as climate change, as these systems are well adapted to the ecosystems in which they are found and more closely resemble the natural ecosystem structure and functioning than monoculture systems. Increasing household dependence on a wide range of locally adapted species therefore improves the ability of these communities to withstand potentially diverse impacts from external shocks. In addition, the exchange of knowledge among households and communities through the use of participatory methods — particularly the seed fairs — encouraged households to continue to seek ways to adopt diverse livelihood strategies to minimize system risk, seek symbiotic crop-crop and crop-animal relationships, and increase market opportunities and dietary diversity. Furthermore, the sharing of germplasm via seed-swapping at seed fair events encouraged crop diversification, which in turn encouraged households to increase the biodiversity of their rural environments and their provision of ecosystems services, such as enhanced soil fertility, and water, pest, and disease management.

In order to facilitate country-led growth, there is a need to expand this research and extend activities for strengthening informal seed systems into other communities and countries. This scale-up is critical to enhancing food security, preserving biodiversity, and facilitating the sustainable development of these rural agroecosystems. Following the completion of the project, the two Thai community clusters have benefited more than the Khmer cluster due to their proximity to the ECHO Asia Regional Impact Center, which has been able to continue some post-project activities within these communities. Efforts have also been made to expand activities; for example, in early 2011 ECHO Asia seed-bank staff began training community leaders through regional development projects in essential seed-banking practices, including two groups in Myanmar. For maximum impact, this methodological approach to strengthening informal seed systems should continue to be extended into other regions that have high biodiversity, yet are faced with the burdens of hunger and malnutrition. Such regions include not only other parts of South and Southeast Asia, such as Bangladesh, Laos, and Vietnam, but also many other low-income regions of the tropics.

One important region with significant potential for work in strengthening informal seed systems is sub-Saharan Africa, where renewed emphasis is being placed on transforming the whole seed sector under calls for a new "uniquely African" Green Revolution (Annan, 2004). The model presented here could complement critical ongoing work, such as AGRA's Programme for Africa's Seed Systems (PASS), by providing additional options for African smallholders to enhance food security (Scoones & Thompson, 2011). Indeed, the development of stronger informal seed systems might be a way in which formal seed systems (such as those at the focus of PASS efforts) could also be strengthened. An informal seed system that incorporates the generation of higher quality germplasm, increased gender equality and empowerment in managing seed, and increased knowledge of seed system best practices (sourcing, field use, and storage) would result in reduction of losses to the system through poor yields and post-harvest loss, and increased household incomes through increased and higher quality produce to market. These increased incomes could not only enhance food security, but also enhance involvement in the formal seed system among resource-poor communities.

The need to expand research on informal seed systems, however, goes beyond concerns about informal and formal seed system linkages, to bigger debates about the contribution of informal seed systems to local, regional, and global food security. Of particular import is that informal seed systems lie at the nexus of food sovereignty and food security debates. This case study has highlighted the value of informal seed systems toward enhancing food security, but food sovereignty concerns in such seed systems are also critically important, especially as they can uncover subtle dynamics of these seed systems that can influence food security outcomes. The importance of seed to the food sovereignty of households includes both (1) who gets to decide which seeds to plant, when, and where, and (2) how intra- and inter-household and community inequalities affect this decision-making process. Although some argue that food security

and food sovereignty are competing paradigms (Boyer, 2010; Schanbacher, 2010; Wittman, 2011), there is also a growing literature positing that these paradigms can co-exist (Lee, 2007). This has been highlighted by the recent push to finally acknowledge Via Campesina's (1996) stated position that food sovereignty is a necessary precondition for food security. In 2010, the FAO revised its definition of food security to incorporate elements of food sovereignty, stating that, "The right to adequate food is a fundamental human right and must be safeguarded, particularly for the most vulnerable" (FAO, 2010, p. 9). Furthermore, Menezes (2001) and Rosset (2011) have posited that enhancing food security to tackle global hunger cannot be successful without first taking the food sovereignty step, that is, communities cannot be truly food secure and free from hunger concerns unless they have some say about where their food comes from and how it is produced. The role of informal seed systems in providing such a food sovereignty step toward more food-secure futures is worth further investigation.

Conclusion

This study outlined a broad spectrum of approaches to strengthen informal seed systems in resource-poor rural communities in Southeast Asia. Much of the work undertaken provided a baseline of informal seed system understanding in the three communities of study. Although this project either directly or potentially enhanced all four pillars of food security in each community, it succeeded only in laying the foundation upon which future approaches to informal seed system strengthening could be built. Future studies to assess these communities' level of continued involvement in informal seed systems would be useful in further understanding the success of these strengthening approaches. Furthermore, expanding informal seed systems research into other geographic locations and integrating informal seed systems considerations into wider debates are both critical for the continued preservation and optimum utilization of important genetic resources in a rapidly changing world.

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Regulatory and other barriers to urban and peri-urban agriculture: A case study of urban planners and urban farmers from the greater Chicago metropolitan area

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Abstract

Seven perceived barriers to urban and peri-urban agriculture in the greater Chicago metropolitan area are identified through interviews with urban planners and farmers. All seven perceived barriers involve unclear or agriculture-unfriendly regulations governing urban and peri-urban agriculture. Results suggest that urban and peri-urban farmers commonly are being forced to operate within a legal limbo or petition for exceptions to a variety of current regulations. The study documents the need for clear and agriculture-inclusive local ordinances and provides direction for local efforts to create them.

Keywords

Chicago, comprehensive plan, food planning, local food production, urban agriculture, urban planning

Introduction

Despite surging interest in urban and peri-urban agriculture, relatively little research has documented barriers to urban and peri-urban agriculture in the United States. The current study seeks to identify perceived barriers and supportive factors for urban and peri-urban agriculture by interviewing urban farmers and urban planners about their experiences with urban and peri-urban agriculture in the greater Chicago metropolitan area.

Over the past one hundred years, governance processes have evolved under conditions where urban and peri-urban agriculture was less valued than it is now. Land use regulation and urban planning sought to separate incompatible land uses, proactively eliminating the nuisances or negative externalities of agriculture from residential land in

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order to protect the health, safety, and welfare of the population (Platt, 2004). Now, however, having food production in closer proximity to residential land has become more highly valued.

Local food production is thought to support economic development (Ilbery & Maye, 2005; Marsden, Banks, & Bristow, 2000; Martinez et al., 2010), generate social support networks (Hinrichs, 2000; Sage, 2003), improve dietary habits (Bellows, Brown & Smit, 2003), and have a positive environmental impact (Edwards-Jones et al., 2008). It is credited with improving health (Morgan, Marsden, & Murdoch, 2006) and reducing urban health disparities (Conner & Levine, 2007). Local food production can also green neighborhoods (Lovell, 2010) and may increase property values (Voicu & Been, 2008). If properly developed, local food systems may also be able to completely meet the nutritional demands of a large American city (e.g., Kremer & Schreuder, 2012).

In response to rising interest in local urban and peri-urban agriculture, some municipalities have begun to reform local ordinances to support agriculture. For example, Chicago made changes intended to support urban agriculture when it revised its zoning ordinance in 2011 (City of Chicago, 2012; Goldstein, Bellis, Morse, Myers, & Ura, 2011). Other large municipalities that have started this process include Portland, Seattle, Milwaukee, Boston, Kansas City (Missouri), and San Francisco (Mukherji, 2009; Mukherji & Morales, 2010). Smaller communities in Maine and California have also passed or considered ordinances recognizing a right to grow food (Wilce, 2011).

The planning profession, which plays a key role in the formation and dissemination of regulations that may affect urban agriculture, is just beginning to identify its relationship to the food system, and to urban agriculture in particular. Pothukuchi and Kaufman (2000) argued that planners traditionally tended to ignore the food system, in part because planners saw food as a rural agricultural issue and not as an urban issue. In an attempt to inform the planning community of the importance of the food system, the American Planning Association (APA) in 2007 issued a policy guide on urban and regional food planning. In this guide, the APA (2007) argued that planners can and should conduct community and regional food planning, and further recommended that "planners support developing land use planning policies, economic development programs, land taxation, and development regulations to enhance the viability of agriculture in the region" (p. 9). This increased interest in the food system is displayed in many efforts, such as cataloging how cities include agriculture in zoning ordinances (Goldstein et al., 2011).

Academic planning literature has begun to examine methods for planning for urban agriculture (Mendes, Balmer, Kaethler, & Rhoads, 2008). The annual conference of the APA now regularly has sessions on food systems planning. The APA has also produced a special issue of its trade publication *Planning: The Magazine of the American Planning Association* that focuses on food systems planning, including urban agriculture (Bonfiglio, 2009; Flisram, 2009), and using zoning and other tools to increase the amount of healthy food in underserved neighborhoods (Shigley, 2009).

Even with scattered efforts to reform ordinances and nascent changes in the planning profession itself, it is unclear the degree to which prospective urban growers perceive local ordinances to be a barrier to urban agriculture, especially in the many thousands of local governments that have yet to consider the impacts of their regulatory structure on urban agriculture. In order to get the issue of urban food production on the agenda and focus reform efforts, systematic research is needed documenting the degree to which regulatory barriers are perceived as problematic and which regulatory barriers merit the greatest attention.

Past Research on Barriers to Urban and Peri-urban Food Production

There is evidence that many barriers still hinder urban agriculture and local food production. Lovell (2010) reviewed literature on barriers to urban agriculture and identify the following: (1) limited access to land, (2) insufficient infrastructure and supportive services, (3) intense competition from other land uses, (4) lack of research on human health risks in growing food, and (5) lack of skills and

experience in urban agriculture. She did not identify regulatory frameworks within the myriad units of local governments as a barrier. Martinez and colleagues (2010) examined barriers to local food market expansion (as opposed to urban agriculture) and identified limitations in capacity, lack of infrastructure, lack of trace-back mechanisms to identify the source of food aggregated to supply large consumers, limited experience and training of farmers, and regulatory uncertainties. Similarly, Tropp and Barham (2008) identified needs for uniformity in food safety and processing regulations, for clarity in zoning and business permit requirements, and for better policy coordination between the national United States Department of Agriculture Food and Nutrition Services and the regional and local Women, Infants and Children offices. Lawless and colleagues (1999) identified barriers to direct markets for farmers such as community supported agriculture (CSA) operations, and indicated that farmers have an interest in working with wholesalers. Erickson and colleagues (n.d.) examined barriers to urban agriculture in Seattle, focusing primarily on local ordinances, and noted stakeholder desire for greater knowledge of who is responsible for regulation.

Only a relatively small number of studies have been conducted that ask stakeholders about what barriers they have experienced, and these studies typically are only marginally related to urban agriculture and/or urban planning. For example, Starr and colleagues (2003) looked into the perceptions and experiences of buyers and producers in Colorado to determine the major barriers to the direct marketing of local food within the region. Similarly, Peterson, Selfa, and Janke (2010) surveyed producers and institutional buyers in Kansas on their perceptions about barriers to their participation in the local food system. Most research on stakeholder experiences with barriers has focused on relatively rural regions or states, with little attention given to urban and peri-urban agriculture. As a result, it is currently unclear whether the existing research on perceptions of barriers can be extended to more urban areas, such as the greater Chicago metropolitan area.

Possibly as a result of a focus on rural areas in the literature, urban planners' perspectives on barriers to urban agriculture have never been examined. City and county planners help to determine land use, transportation networks, and the regulatory apparatus that governs agriculture and other commerce within their jurisdictions. Thus urban planners are a key stakeholder group, and their unique perceptions about urban agriculture have not been sufficiently included in the literature.

Research is needed that catalogs the producers' and planners' perceptions and experiences with barriers to urban agriculture over an entire metropolitan area that has multiple local governmental units. It is not known whether fragmented metropolitan governance and any resulting variance in regulations within a single regional food market creates barriers to urban agriculture.

The Current Study

In the current study, interviews were conducted with farmers and urban planners in the greater Chicago region on the regulatory barriers and challenges to local food production that most concern them. The greater Chicago metropolitan area, which is the subject area for the current paper, stretches from southeast Wisconsin all the way into southwest Michigan.

This paper will rely on the terms "urban" and/or "peri-urban" to refer to food grown and distributed within the greater Chicago metropolitan area. Examples of urban and peri-urban agriculture include community gardens, backyard gardens, and small to medium-scale commercial agriculture operations that typically distribute on a local level.

Methods

Study Area

The study area in this paper will be referred to as the greater Chicago metropolitan area. The greater Chicago metropolitan area consists of the Chicago Consolidated Metropolitan Statistical Area (CMSA), as defined by the U.S. Census Bureau (2010), with the addition of Berrien and Cass counties in Michigan. This was the geographic region selected by the Center of Excellence in the Elimination of Disparities (CEED@Chicago) as the area for all of its services.

In 2010, the CMSA had a population of 9.7 million people (U.S. Census Bureau, 2010). The CMSA is anchored by the city of Chicago (population of 2.7 million), which is located in Cook County, Illinois (population of 5.2 million).

Government in the region is highly fragmented. The CMSA, as defined by the U.S. Census Bureau (2000), spans 16 counties across three states: Wisconsin, Illinois, and Indiana. Cook County alone, which includes the city of Chicago, has 131 municipalities and 244 special districts (U.S. Census Bureau, 2010).

Much of the Chicago region is relatively flat and located on fertile prairie or former swampland. Chicago is estimated to have a much larger foodshed than most areas, requiring 5.5 times as much land as an average Midwestern city to become self-sustaining (Hu, Wang, Arendt, & Boeckenstedt, 2011).

Participants

Potential participants were identified with the assistance of the CEED@Chicago Food Equity Policy Committee which included members from the Chicago Metropolitan Agency for Planning and other local universities and non-profits. Potential participants were then contacted to determine whether they would be willing to be interviewed regarding their professional experience with urban agriculture and their perspective on major barriers and opportunities in urban agriculture. A total of 95 individuals were contacted and 49 agreed to participate in a one-hour interview. However, only 25 urban farmers (11 male and 14 female) and 13 urban or county planners (11 male and 2 female) were interviewed.

The urban farmers included in the study ran a very diverse set of farms. These farms ranged from community gardens operating on far less than an acre (0.4 ha) of land to peri-urban operations using up to 500 acres (202 ha). The average farm size was 47 acres (19 ha) (SD = 131 acres (53 ha)). Of the planners interviewed, six worked for municipal governments and seven worked for county governments. Populations within their jurisdictions ranged from 11,000 to nearly 3 million. Titles ranged from directors of planning and village administrators to associate planners.

The Interviews

The interview questions were adapted from a list of questions provided by the American Planning Association that were written for urban planners regarding urban agriculture (Hodgson, Campbell, & Bailkey, 2011). Fourteen questions were adapted to ask specifically about barriers and opportunities in urban agriculture and to provide context for the interpretation of participant answer. Versions of these questions were then adapted for urban farmers.

The current paper is primarily concerned with responses to a small set of interrelated questions. Urban planners were asked, "What do you think may be regulatory challenges and/or barriers to urban agriculture in your city/county?" Urban farmers were asked, "What do you think may be regulatory challenges and/or barriers to your urban agriculture practice?" Both planners and farmers and were then asked a follow-up question, "What was done or is being done to overcome these?"

Interviews were held in person or over the phone. Interviews took around 45 minutes on average to complete. Completed interviews were transcribed so that they could be coded.

Coding was conducted by separate raters using an iterative and emergent process. In this process, an initial set of codes was created by the research team and explained to the raters, who provided feedback that the researchers used to modify the codes. Once preliminary agreement on the set of codes and its meaning was reached, raters individually coded participant answers. Two raters were assigned to each section to help ensure that the codes were applied in a consistent and accurate manner. Inter-rater agreement was then calculated using Cohen's Kappa. If substantial agreement for a code was not reached, which was indicated by a Cohen's Kappa of .60 or lower (Landis & Koch, 1977), then that particular code was reexamined, explained again, and then was used to recode the data until substantial agreement between the raters was finally reached.

For the codes used for the urban planner interviews, the average Cohen's Kappa was .93, which indicates a nearly perfect level of agreement (Landis & Koch, 1977). For the codes used in the urban farmer interviews, the average Cohen's

Kappa was .81, which indicates an excellent level of agreement (Landis & Koch, 1977).

Results

The interviews yielded a rich and diverse database of urban planners' and urban farmers' perspectives. As these results were qualitative in nature and the sample size was small, a detailed statistical analysis was not done beyond an analysis of frequency to determine the most frequently mentioned barriers. In addition, there was a strong tendency for participants to only mention the largest one or two barriers that they personally had witnessed or experienced. For example, if 28% of urban farmers mentioned barriers related to zoning codes, this means that at least 28% of urban farmers in our sample had had problems with zoning (or had seen problems) *and* also thought zoning was one of the largest regulatory barriers affecting them. This analysis identified the major barriers as a lack of clear and inclusive ordinances, zoning issues, limited land access, costs, access to training and certification, water issues, and insurance.

Lack of Clear, Agriculture-Inclusive Ordinances

A lack of clear ordinances that are friendly to agriculture was the most frequently mentioned barrier to urban agriculture, and was mentioned by 54% of the 13 planners and 28% of the 25 urban farmers. Planners and farmers specifically mentioned the importance of ordinances pertaining to a wide variety of agricultural activities and infrastructure, which included ordinances on farmers' markets, land use, plumbing, electricity, greenhouses, hoophouses, water access, water run-off, fencing, and shading.

There was an apparent difference between planners and farmers in their interpretation of unclear ordinances and unregulated activities. In general, farmers who mentioned unclear ordinances were bothered by these ordinances and felt uncomfortable participating in unregulated activities. Planners also saw unclear and unfriendly ordinances as a problem, but were more comfortable with unclear and silent ordinances than were farmers. As one farmer who sells directly to the public explained, "My township defined a farm stand differently in two different places in their laws...The township supervisor keeps telling me not to worry about it but he is the fourth supervisor since I have had my business." Similarly, one planner stated that "I am an advocate [for urban agriculture]…the ordinance is silent, which gives me great latitude." Another planner stated that, as far as urban agriculture, "nothing is prohibited, [but] it's not specifically allowed, or permitted by right. It doesn't say specifically, for example, that [producing food] is a permitted use…but we don't prevent it."

Farmers reported that they felt little assurance and support for agriculture if the ordinances did not explicitly protect local food production. Without ordinances supporting a farmer's long-term security, farmers may be hesitant to make serious capital investments in land, buildings, and equipment. Overall, the farmers interviewed in this study were relatively unified in the view that additional inclusive and clear regulations are needed to support the growth of urban agriculture.

Zoning That Makes Agriculture a Special Use Is Overly Specific

Regulatory barriers related to zoning were mentioned by 31% of planners and 28% of urban farmers. Zoning codes regulate land uses and activities. Zoning codes posed an obstacle for many urban farmers, who frequently reported that that they farmed on land that was not zoned for agriculture. As one farmer put it, "Zoning is the biggest barrier, together with special-use permits."

The farmers' perspective is supported by the fact that some planners reported that the zoning code in their urban jurisdictions does not identify urban agriculture as a possible primary land use. For example, one planner indicated that in his suburb, "gardens are considered accessory use. They can be located in the side and the rear of lots." This means that special-use permits are required to use a piece of land primarily for agriculture, such as having a garden on a vacant lot. As another planner explained, "a lot could not be used solely as a community garden because an accessory use requires a primary use. So, it would need to be an exception to the zoning laws."

Applying for special-use permits can be burdensome and provides less security than a

zoning code might. As such, many of the planners and farmers reported concerns about farming on land in urban areas. As one planner concludes, "We need to amend the current zoning codes to clarify the process of acquiring land and building a garden."

In some jurisdictions, whether agriculture is permitted fell solely on the officials' personal views. As one planner put it, "We are informal, so it really depends a lot on the personality of the zoning administrator." As such, urban farmers may find themselves at the mercy of the zoning administrator without a feasible legal recourse. Without zoning codes that recognize and protect small-scale agriculture, farmers are faced with uncertainty. As one planner explained, "I'm the zoning administrator, so if someone comes to me and asks me, 'Hey, my neighbor has a garden and is composting in the backyard. I want you to stop it.' Happily, I have not had to face that kind of question or complaint….[There is a need for] us to make it a permitted use so it's abundantly clear in the zoning ordinance." As zoning codes regulate land use, planners and practitioners reported having to follow zoning regulations that included such things as permitted plant heights and limits on the garden structures they could build, such as flower beds or greenhouses. For example, one urban farmer said that, "a zoning code would not allow for both indoor and outdoor growing" on the same piece of land. This made it necessary to get a special-use permit to build a greenhouse so that he could grow year round.

In contrast, peri-urban farmers whose land was zoned for agricultural use reported few issues. These farmers reported the ability to operate at full capacity without the interference of local officials because their agricultural activities were specifically included in zoning codes. As one peri-urban farmer put it, "zoning codes are no big deal because I live in an agricultural area. The only way it would be hard is if I lived more inside the city." Due to urban sprawl, the city also comes to peri-urban farmers, which makes peri-urban farmers in agricultural zones leery of zoning changes. As one planner explained, "there has also been a push for a mixed-use (residential and agriculture) zone…. [This] most likely will not be approved by the board because the residents who are farmers want them to stay separate."

Limited Access to Land

Having adequate access to land was mentioned as a barrier by 28% of farmers and 23% of urban planners. For those who mentioned land access as a barrier, it was frequently listed as their largest barrier. For example, multiple farmers simply stated, "The biggest challenge is access to land."

Many farmers participating in this study did not own their own land. Farmers who lease land are subject to changes made by the landowner, which may be abrupt and costly. For example, one farmer using leased land reported numerous bad experiences: "We're concerned about how much money was spent to move us from the first to the second site and then all that was lost in the move from the second site to the third site, so we are a little leery of really asking for a lot of investment in the site that might be moving in two years." In short, without long-term assurances, investments were seen as risky for farmers.

Owning or long-term leasing of land would provide assurance for the future and perhaps encourage investment. Vacant lots were commonly mentioned as a potential opportunity for urban agriculture. However, the work needed to prepare some of the vacant land was also reported to be cost-prohibitive. One grower noted the need for "a way to make land less cost-prohibitive. In other words, having more affordable ways to remediate brownfield sites that doesn't cost millions of dollars." Vacant lots, including brownfields, are tempting options for those seeing land to farm; however, they remain out of reach because of the prohibitive cost to purchase and prepare the land.

Additionally, land use and zoning regulations greatly limit the land available in more urbanized environments. Gardens in urban areas tend to be situated on residential land or parkland. Unlike agricultural land in rural areas, these zoned lots are not specifically planned for agricultural activities, making it difficult for potential users. For example, building a greenhouse may be prohibited, plant height may be restricted, water use and access may have certain regulations, and distribution may be limited.

In contrast to more urban areas, many peri-urban areas have land dedicated to agriculture. However, as urban areas expand as a result of sprawl, agricultural land is eaten up by developments. As development grows, the land becomes increasingly expensive and farmers may be pushed even farther away from urban centers.

Land zoned for agriculture is commonly sold in large lots far from urban centers, which caters to the needs of large-scale corporate agriculture. One farmer expressed his disillusionment with the availability of land by saying, "[I] would eventually like to buy land, but the only agricultural land available is situated on huge plots which would be too big for [my] enterprise." In addition, urban farmers frequently reported that they grew labor-intensive crops, such as vegetables, particularly if they were using environmentally friendly or organic methods. Because much of the land zoned for agriculture is located far from population centers, there were some concerns about readily finding the labor needed for more labor-intensive farming, such as organic vegetable farming. This labor problem is compounded by the land commonly being sold in large lots, which would require even more labor to work.

In summary, farmers in our survey reported using all kinds of land, from traditional farms in peri-urban areas, to vacant lots, rooftops, parkland, and even brownfields. Based on information from interviews, it is clear that finding land that meets the financial, location, and land use needs of urban farmers has proven to be a major barrier for the growth of urban and peri-urban agriculture.

High Costs and Lack of Funding

Costs and funding were also reported as barriers to urban agriculture by 28% of the urban farmers. One urban farmer explained the cost of running a local community farm, "We need more funding, more technical assistance. We are also very limited in space, the garden can only grow so much and the kids can only do so much. We have a cap to the number of kids we can involve because of budget restraints. We also cannot start another garden without more people involved; it's just too big to start cleaning the lot and then finding money for the dirt and flower beds, etc."

Other urban farmers were more succinct in identifying costs and funding as a barrier created by government policy. As one farmer put it, "It's the way…the government subsidizes agriculture and it's the way we do things in this country since the 1940s….Because of how agriculture is subsidized, you're not going to see great advances [in local agriculture], despite much effort in promoting local agriculture." The nation's food system is organized around commodity crops, which are supported through federal subsidies. However, most urban agriculture does not involve commodity crops, so no federal subsidies are gained. As another farmer put it, "The government does not support local producers; there are no subsidies for the local producers like there are for crop producers. If funding was readily available, then the operation would be much easier." The reality of subsidized crops and unsubsidized fruits and vegetables makes it more difficult for most urban farmers to find funding. This also means that there is increased financial risk for urban farmers relative to rural commodity farmers. In short, most urban farmers do not receive the same level of financial support from the government as rural commodity farmers, which places urban farmers at increased financial risk.

Lack of Farmer Training and Certification

Farmer training and certification was listed as a barrier by 23% of urban planners and 8% of farmers. Food production is difficult and requires a significant amount of training to do effectively and efficiently. Economic realities and the need for federal subsidies have driven farmers toward commercial training and specialization in growing commodity crops, which are primarily corn and soybeans in the region surrounding Chicago. As such, traditional farmer training focuses on commodity crops and does not meet farmers' needs for education in the application of sustainable, organic, urban, or varied agriculture practices. As one farmer indicated, "[food production] is really hard work. A fundamental understanding of plant growth and pesticides, soils, biology of pests, and fungal diseases is critical. Education is necessary! Agriculture is a knowledge-based science." In short, supporting a more diverse food system would

point to the need for better farmer training options.

Similarly, several urban planners indicated their concern about small-scale farmers' access to the US Department of Agriculture (USDA) Good Agricultural Practice (GAP) certification. As one planner put it, "Local food producers need help becoming USDA GAP certified in order to be viable within the market." GAP certification is required to sell food through many distributors, as this is one of the primary ways that the federal government tries to ensure that food sold in stores is safe to eat. Another planner explained that, "not many growers are certified because there are no training facilities in Northern Illinois." Because GAP certification is only available at a limited number of training sites, which are far from the greater Chicago metropolitan area, certification may be difficult to complete. Therefore, improving opportunities for acquiring the GAP certification may address this barrier.

Some urban farmers who were interviewed appeared not to understand the importance of GAP certification, which supports the urban planners' concerns. For example, some urban farmers perceived that GAP certification, instead of being mandatory, was some sort of alternative to organic certification. As one farmer put it, "for organic farming, it's ludicrous because it's no longer about what you're doing! It's about being able to do the paperwork!...There's a system called GAP that most of the state right now is involved with and I'd rather be certified through that."

In addition to the difficulties associated with the GAP training, several urban farmers mentioned that obtaining organic certification was extremely challenging for them. As one farmer bluntly put it, "we follow organic principles…[but] we're not in a position to pursue organic certification." In short, although multiple farmers reported practicing organic methods, no one mentioned that they had obtained organic certification. The interviewers, however, did not specifically ask whether the farmers obtained organic certification, so it is very possible that only farmers who had difficulty with organic certification brought it up. Nevertheless, the extraneous paperwork and high costs of the application process were both reported as significant barriers for multiple practicing organic farmers. Frustrated by the process, one farmer gave up efforts to obtain organic certification because, "You have to be more of a bureaucrat than a farmer." This lack of certification reduces the farmer's access to markets, and makes the produce worth less once it gets to market.

In short, both the inaccessibility of GAP training and the burdensome paperwork associated with organic certification were reported as barriers to farmers becoming trained and certified. This lack of certification restricts urban farmers' options for distribution.

Limited Access to Water and Dealing with Water Runoff

Another reported challenge to urban farming was acquiring access to water and dealing with water runoff, which was reported by 20% of urban farmers and 23% of planners. For many urban farmers, a water source was important not only for watering crops, but also for preparing their crops for distribution. Access to water meant finding land already equipped with pipes and a spigot for fresh water, which was reported to be quite difficult to do by a significant portion of our sample.

If land did not have an existing water line, putting one in was reported to be prohibitively expensive. For example, as one urban farmer put it, "It is also challenging to receive water from the city….A water line move to the site, 25 ft. [7.6 m] from the street, [costs] USD25,000." Twenty-five thousand dollars is unaffordable for many urban farmers, and it even exceeds the annual operating budget reported by a few of the urban farmers in this study.

Stormwater and other water runoff was also a concern to many urban planners. As one planner explained, "There are a lot of flooding problems due to the lack of infrastructure, such as storm sewers, so deciding who is responsible may be an issue." This has led to strict stormwater ordinances, which impact urban farmers in a surprising number of ways. For example, one farmer reported that, "Stormwater ordinances prevented our plumbing permit for one of our sites….The only way we could get around this was if the greenhouse was

recognized as a 'Technical College' so that we could get plumbing in there."

In short, both water access and water runoff were reported as barriers for urban agriculture in the greater Chicago metropolitan area. Carefully planning for the support and growth of urban agriculture through clear and agriculture-friendly regulation of water access and water runoff may help urban agriculture continue to grow.

Finding Insurance

Insurance coverage was reported as yet another financial and logistical hurdle for urban agriculture. Insurance coverage was mentioned as a major concern by 16% of urban farmers and 8% of planners. Recognizing the need for insurance, one urban farmer complained that, "I'm having difficulty even finding companies that will give me insurance."

In addition to traditional liability insurance, environmental liability insurance also may be necessary, and both difficult and costly to obtain. As an urban farmer explains, "We were talking to a hospital about using their land, but they wanted us to have environmental liability, and that could be costly." The expense of insurance is an especially large concern for urban farmers, who tend to be operating on a small scale with narrow profit margins.

This was a surprising finding given the universal need for insurance in any enterprise. This finding may indicate that insurance companies have not yet learned how to accurately assess risk for newer forms of urban farming, such as rooftop gardens.

Discussion

Through interviews with urban planners and urban farmers, the current study identified seven barriers that hinder the growth of urban agriculture in the greater Chicago metropolitan area. The barriers are lack of clear and inclusive ordinances; zoning; land access; costs; training and certification; water; and insurance.

All seven barriers involve, at least in part, unclear or unfriendly regulations governing urban agriculture. Both urban planners and urban farmers agree that urban agriculture in the greater Chicago metropolitan area is commonly operating as an exception to current regulations or within a legal limbo, subject to the whims of local officials and the complaints of neighbors. Some planners value the flexibility afforded to them when zoning ordinances treat agriculture as a conditional use rather than as of right, but growers experience regulatory uncertainty as a barrier.

Regulatory reform could greatly reduce the time required to engage in urban agriculture. For example, Chicago has had a fairly conventional permitting process up until 2011 that was not agriculture-friendly. According to the experience of one nonprofit organization in Chicago, which was not part of the current study, it encountered delays when trying to get permits to build a greenhouse during the mid-2000s: "Once we decided to get the greenhouse funded, we started the process of the permits. It took us two years fighting with the zoning commission. They rejected our request a number of times, but finally…[after] working with the alderman's office, finally they agreed. Then, once we got the OK from the zoning department, then we had to go to the department of buildings to get the actual permits. That took over a year. [It was a] very slow process. But once we got the permits in place and everything then it only took about three months to build it." In short, the process was long and frustrating. The 2011 Chicago zoning reform made many types of agricultural operations permitted by right. This means that the zoning commission no longer needed to approve many types of urban farms and gardens, such as a greenhouse in a Chicago commercial district. Only a building permit is now required in a much streamlined process.

While ordinance reform has begun in some places, there are thousands of local governmental units in the United States and hundreds in some metropolitan areas. This study may help put reform on the agenda in some of these jurisdictions.

All the barriers identified here may be addressed to some degree by regulatory reform, but some of the barriers also imply a lack of resources: lack of government subsidies for noncommodity crops, lack of low-cost land, lack of resources for irrigation, and lack of training programs in urban agriculture. Regulatory reform, while likely to make urban agriculture more feasible, may not be

sufficient to overcome all barriers to urban agriculture.

We see a need for additional research, innovation, and resources to help municipalities address barriers to urban agriculture. First, if local governments are to develop the will to start regulatory reform, studies are needed that examine the compatibility of land uses. For example, what is the impact of urban agriculture on land values? What is resident satisfaction with urban agriculture? Does the impact of urban agriculture depend on the type of urban agriculture being conducted?

Second, even if one is convinced that agricultural land uses are compatible with other land uses, it may be necessary to reimagine zoning and other regulations in order to find ways to allow their close proximity. Although this may be as simple as adding certain kinds of agriculture as primary or secondary uses in zoning ordinances, it also may be useful to think about ways to create districts that encourage urban agriculture. Change may be incremental, as it was for regulations that support other types of mixed-use development. For example, Euclidian zoning once kept business and residential land uses apart in Chicago's central business district by excluding housing, resulting in a central business district that, by the late 1960s, had very little activity after business hours. By the 1970s, there was a preference for multiuse blocks, which increased the use of Planned Unit Development (PUD) zoning and allowed multiple land uses to co-exist on an exceptions basis. As an exception, however, approval of PUDs was uncertain, time-consuming, and costly. In 2011, the city of Chicago revised its central area zoning to encourage multiple uses over large areas as a right. Similar innovation and evolution may be useful in planning for urban agriculture.

Third, although the Chicago region could arguably evolve as a single foodshed, it has a very fragmented governmental structure that makes this difficult. Urban farmers could eventually benefit from regional coordination and consistency, as navigating multiple approaches to regulation quickly becomes burdensome. Model ordinances and regional leadership may help to address this, but a movement focused on the "right to grow" might stimulate the reform of ordinances in multiple jurisdictions simultaneously in order to create a predictable playing field across an entire region for urban agriculture.

A fourth area is land access. There is a need for regional studies that identify land prime for urban agriculture. Some of the factors that shape this are proximity to underserved neighborhoods, water, quality of soil, and access to food markets and labor.

Finally, additional education is needed for both planners and urban farmers. Following Soma and Wakefield (2011), our study suggests the need for additional training of planners about urban food issues. This may be done through planning schools, Certification Maintenance for American Institute for Certified Planners, and sessions at conferences. Education of prospective farmers might be accomplished by creating coalitions that focus on urban food production.

Limitations

The current study has several important limitations that should be considered. First, the study involves a fairly small number of participants, and this sample may not be representative of the overall populations of urban farmers and urban planners. In particular, because participants knew that they were to be interviewed regarding urban and peri-urban agriculture issues, the participants may have self-selected based on their particular interests, experiences, and concerns involving urban and peri-urban agriculture. Second, the study used open-ended questions that provided insight into the primary concerns of participants, but did not allow a quantification of some important questions, such as how many urban farmers had trouble with water access or zoning regulations. Third, the current study described the perceptions of growers and planners, but did not examine the actual ordinances. Therefore, the current study could not examine the causes and accuracy of these perceptions.

Conclusions

It is highly unlikely that the greater Chicago metropolitan area is alone in forcing many urban farmers to operate in a legal limbo or to petition for exceptions to current regulations. Until urban agriculture

becomes a right within the law, development of urban agriculture will continue to be uncertain, time-consuming, and costly. As Chicago has recently shown, municipalities have started to show a willingness to pass ordinances that simplify their permitting processes by making agricultural activities and buildings permitted by right. This study of barriers may help in creating a friendlier regulatory environment for urban and peri-urban agriculture. 

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Integrating food waste diversion into food systems planning: A case study of the Mississippi Gulf Coast

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Abstract

Food waste presents a great challenge for the efficiency of food systems and for solid waste management. Many solid waste management strategies can be used for managing food waste in the food system, but their implementation depends on local factors. Strategies must also be modified or designed to accommodate local needs and unique circumstances. This paper reports the planning process undertaken in the Mississippi Gulf Coast to develop a food system plan that integrated strategies to manage food waste more sustainably. The planning process was a three-step process that engaged stakeholders in the food supply chain from production, distribution, retail, and consumption through to post-consumption. The article describes the specific steps taken to assess the generation of food waste in the foodshed, engage stakeholders, and develop strategies for food waste diversion and management. It concludes by offering recommendations on how communities can integrate food waste diversion into their food system planning efforts.

Keywords

food scraps, food system, food waste, Gulf Coast, Mississippi, sustainability

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Introduction

The Mississippi Gulf Coast is famous for its food culture. Locals and tourists alike delight in eating fresh shrimp, crabs, and oysters. Not only has seafood had a prominent role in the local food system, but the food system itself has shaped the history, culture, and economy of the region for well over a century. In 1890, the region processed two million pounds (907,000 kg) of oysters and 614,000 pounds (278,500 kg) of shrimp in canneries in Biloxi. By 1902, this grew to almost six million pounds (2,700,000 kg) of oysters and 4.4 million pounds (2,000,000 kg) of shrimp, earning the region the title of seafood capital of the world by 1903 (Nuwer, 2006). While seafood is prominent, the region has had an equally important land-based agricultural tradition. For example, radishes were a beer hall staple in the 1910s and 1920s in the northern United States, leading the community of Long Beach to be known as the radish capital of the world (Society, 2010).

In 2010, the region was awarded a HUD Regional Sustainability Planning grant. As part of the region's proposal, it pledged to focus on the Mississippi Gulf Coast's food system. In part this was driven by the social, economic, and environmental impacts of Hurricane Katrina (2005) and the Deepwater Horizon oil spill (2010) on the seafood industry. While the three costal counties and their 11 cities developed comprehensive plans in the years following Hurricane Katrina, the planning efforts primarily focused on broader rebuilding issues, such as reconstruction of housing, and provided limited focus on social, economic, and environmental issues tied to the seafood industry and the food system (Evans-Cowley, 2011; Evans-Cowley & Gough, 2007, 2008; Mississippi Renewal Forum, 2005). An evaluation of the inclusion of food system considerations in 12 of the comprehensive plans revealed that eight of the plans did not include goals or objectives directly related to the food system, and four supported the food system to varying degrees. The evaluative study also found that the food systems considerations, when included, were mainly focused on tourism and economic development and not as strongly focused on environmental protection (Evans-Cowley, 2011).

Although municipalities' interest in food system planning has grown over the past few decades, this planning still is conducted generally as a separate effort from comprehensive planning. A study of 22 U.S. planning agencies in locations with either a food policy council or active food organization found that planning agencies are only lightly involved in food system planning (Pothukuchi & Kaufman, 2000). The study found that the planners in those locations perceived food issues as being a rural policy issue centered on agriculture, farms, and food production. The planners in the study also failed to recognize the roles that food processing, wholesaling, retailing, consumption, and food waste disposal have in the food system.

One aspect of the food system that can be argued to be often lightly considered, if not forgotten, during planning is the management of food waste. Food waste is generated at every stage of the food system. During farming and post-harvest handling, food is wasted due to weather, disease, mechanization, selective harvesting to meet specifications, storage conditions, processing, selective packaging, and damage during transportation. Food waste is also generated by retailers, food service establishments, and households as a result of storage conditions, buying improper amounts, food safety regulations, personal taste preferences, and behavior toward food. According to the USDA Economic Research Survey, about 96 billion pounds (44 billion kg) of food, or 27% of the 356 billion pounds (161 billion kg) of edible food available for human consumption, were lost as food waste at the retail, food service, and household levels in 1995 in the United States (Kantor, Lipton, Manchester, & Oliveria, 1997). A county-level study found that food waste was generated across production (20%), processing (1%), distribution (19%), and consumption (60%) (Griffin, Sobal, & Lyson, 2009). Of the food waste generated, only 27% was recovered (Griffin et al., 2009). Food waste is part of the residential, commercial, and industrial waste streams. Nationally, food waste is estimated to make up about 14% of the residential and commercial solid waste stream (U.S. Environmental Protection Agency [USEPA], 2011b). For this reason, diversion efforts are generally conducted by environmental protection pro-

fessionals engaged in solid waste management planning. Solid waste planning is conducted in the interest of environmental protection, and requirements for preparing solid waste management plans vary by state. In Mississippi, the Nonhazardous Waste Planning Act of 1991 requires each county to prepare a solid waste management plan that must be updated at least once every five years (Nonhazardous Solid Waste Planning Act, 1991). As in the majority of states, in Mississippi the primary focus of these plans is to ensure available capacity for disposal of the waste generated in the county (or relevant planning area) at a properly engineered sanitary landfill. As a way to extend disposal capacity and reduce reliance in landfills, solid waste management plans require the inclusion of waste diversion and reduction strategies, such as recycling (Mississippi Department of Environmental Quality [MDEQ], 1992).

Until recently, efforts have been focused on traditional recyclables (paper, metals, plastics) and not so much on food waste. Recently, several municipalities throughout the United States have developed "zero waste" plans that address the collection and diversion of food waste from the residential, commercial (restaurants, supermarkets, hospitality sector), institutional (schools, universities, hospitals), and industrial (large food processing plants) waste streams. Still, most plans are limited to providing best options for the collection and recycling of food waste through waste management options such as composting. For example, the Zero Waste Strategic Plan for the city of San José, California, delineates strategies for the efficient collection of food waste and diversion for composting and/or biogas recovery for energy (City of San José Environmental Services Department, 2008). In terms of strategies that could be related to the food system, it specifies reducing food packaging and ensuring that any packaging is compostable or recyclable, along with educating about backyard composting and gardening. Although certainly related to the food system, these strategies are mainly aimed at facilitating the management and recycling of food waste and, in the case of backyard composting, reducing the costs of transportation and processing. This illustrates that their focus on finding disposal options limits the ability of solid waste planners to be involved in the comprehensive prevention and management of waste through food system planning. Hence, solid waste plans do not appropriately address all food waste at all stages of the food system.

Of the 12 comprehensive plans evaluated in the Mississippi Gulf Coast, only one mentioned food waste, but it provided no details nor specific policies, tools, or strategies for promoting food waste recovery and diversion (Evans-Cowley, 2011). Each of the three coastal counties prepares its own solid waste management plans. One of the counties adopted an updated solid waste plan in 2009, and the other two are in the process of updating their plans. The current plans do not include strategies that target food waste diversion. However, Harrison County is in the process of updating its solid waste plan and has included residential food waste diversion programs as an option that citizens can prioritize for inclusion in the plan (Environmental Business Services, 2012).

In this paper, we argue that finding appropriate solutions for managing food waste produced throughout the food system would be easier if food system planners and solid waste management planners were engaged jointly in food waste planning. As considered here, food waste planning entails integrating waste reduction, reuse and recycling strategies into food systems plans in order to make the food system more efficient and sustainable. The HUD funding provided the Mississippi Gulf Coast with a unique opportunity to bring together food system and solid waste planners and begin having conversations around what the sustainability of the region's food system meant and to talk about what happens to food as it enters the different waste streams. The main purpose of this paper is to describe a planning process that seems to be effective, but for which we cannot yet measure accurately its success. This is not unusual in the planning field as most plans take years to implement. We surveyed current policy to gain understanding of the region, but we did not analyze the effectiveness of the policies. We applied this knowledge in guiding the planning process to help determine what new policies might be needed. While analyzing the effectiveness of new policies is

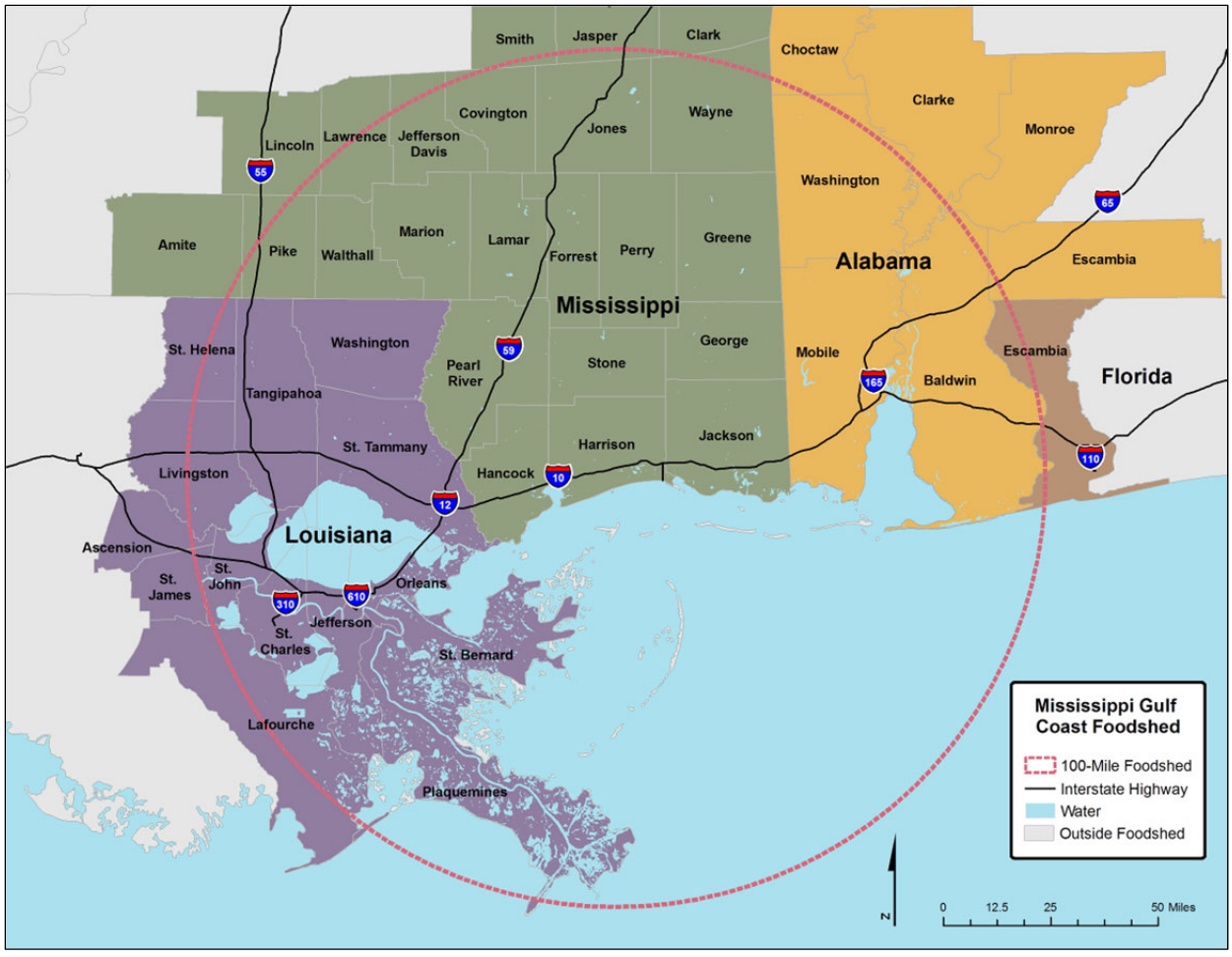
very important, it cannot be performed yet. However, we feel that our process is very promising and is the first attempt at delineating a planning process for food waste management in the food system.

This case study explains how food waste planning was incorporated during the regional food system planning process, which included a food system assessment, a stakeholder assessment, and a food system plan. The plan, titled Savor the Coast: A Recipe for a Sustainable Coast, includes goals, objectives, and strategies directly and indirectly related to food waste management. We begin the paper with a description of the planning area (foodshed). A discussion of the planning approach follows, including a description of the process for assessing food waste generation in the region, the methods used to engage stakeholders, and the development of the plan. We then present a description of the early implementation of strategies. The paper concludes with a discussion of policy decisions and recommendations for achieving food waste diversion in other communities and regions.

Planning Approach

This food system planning effort is one component of a more expansive sustainability planning effort focusing on Mississippi's three coastal counties: Hancock, Harrison, and Jackson. However, the food system functions beyond the boundaries of the three counties and any reasonable planning effort should consider how food moves across these boundaries. In other words, it is necessary to define the regional foodshed. The foodshed is defined as the 100-mile (161 km) radius from the center of the region designated as the Gulfport-

Figure 1 The Mississippi Gulf Coast Foodshed



Biloxi area. The 100-mile radius foodshed includes 33 counties and parishes across Alabama, Louisiana and Mississippi, including the waters of the Mississippi Sound and portion of the Gulf of Mexico. See figure 1.

A 12-member food systems subcommittee consisting of local and statewide stakeholders representing all stages of the food system for the Mississippi Gulf Coast guided the planning process. A solid waste planning specialist with the Mississippi Department of Environmental Quality represented the food waste aspect of the food system. The role of the subcommittee is to provide general guidance on the preparation of assessments, identify additional stakeholders, facilitate connections, review documents, and approve final recommendations. The subcommittee serves as a sounding board to help ensure that all work is locally relevant and connected to the region's citizens.

The planning process comprised three steps. The first step consists of a comprehensive assessment of the existing regional food system, including a general assessment of food waste generation and management (Plan for Opportunity, 2011a). The second step, a stakeholder assessment, includes field visits to food waste generators in all stages of the food system, visits to waste processing facilities, and open meetings with food waste stakeholders (Plan for Opportunity, 2011b). The third step entails the development of a strategic food systems plan that integrates sustainable food waste diversion goals, objectives, and strategies (Plan for Opportunity, 2011c). Each of these steps is discussed in detail below.

Food System and Food Waste Assessment

The purpose of the food system assessment is to describe the current status of the food system. It addresses a variety of topics, including agricultural and aquaculture resources, food distribution infrastructure, food security, the food economy, food waste, and climate change. For the purpose of the discussion here, only the process for assessing food waste will be discussed. The food waste assessment is based on widely practiced solid waste management planning approaches that include identifying waste generators, estimating amounts of waste generated, characterizing waste streams, and inventorying management options. In addition, the assessment includes a review of the regulatory framework relevant to waste management, and potential technologies and market outlets for compost products. The assessment was conducted through literature and information research, phone interviews with solid waste planning stakeholders and in-person interviews with food waste stakeholders. The content of the assessment, considerations during evaluation, and findings are explained below.

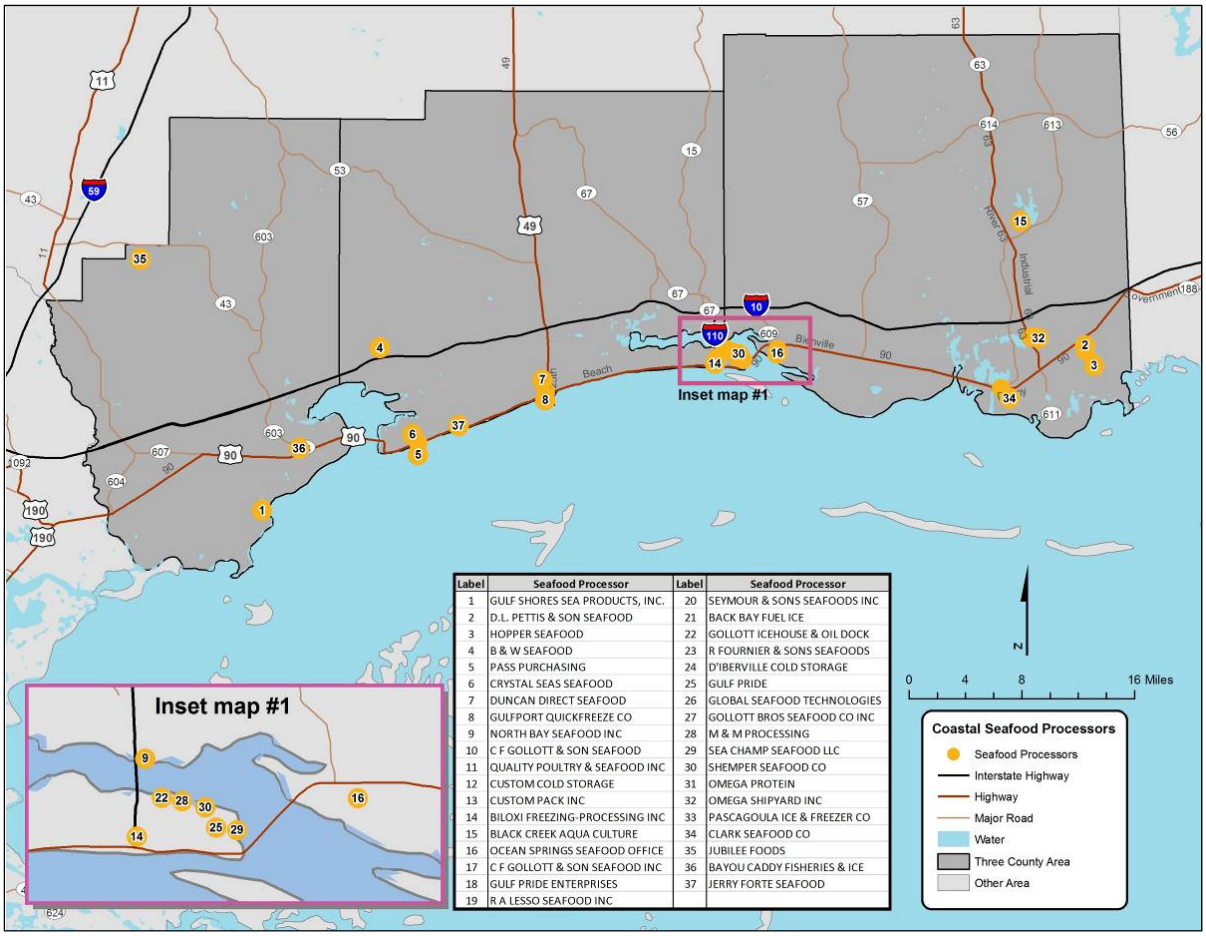
1. **Food waste generation assessment.** We based our assessment on waste characterizations and waste audits commonly done in solid waste planning, where the waste stream content is segregated by types of materials, such as glass, plastics, paper, yard waste, food waste, and others, and each type's portion of the waste stream is measured or estimated. Because of constrains in time and resources, however, conducting a detailed assessment of the food waste generated throughout the food system is beyond the reach of this planning process. With this in mind, we decided to focus on three areas: estimating the amount of food waste potentially generated in the three counties; identifying the major generators of food waste in the three counties, with consideration of other generators in the region that could offer opportunity for collaboration; and identifying other organic wastes, such as yard waste and manures, that could enhance food waste management options such as composting.

   The food waste that might be generated in the coastal counties can be estimated using the amounts of waste received from these counties at local landfills and national estimates for the amount of food waste in the municipal solid waste stream. The U.S. Environmental Protection Agency (USEPA) estimates that in 2010 food waste represented 14% of the waste disposed of at landfills (USEPA, 2011b). The USEPA indicates that the percentage of food waste in the solid waste stream has remained at about 14% for the last several years, so this seems to be an appropriate percentage to apply to regional estimations. On the basis of 14%,

the three coastal counties generated an estimated 84,700 tons (76,800 tonnes) of food waste that were disposed of at the two municipal solid waste landfills in 2009 (MDEQ, 2009b). This estimate is based on data for waste disposed of at the local landfills and does not capture food waste that was composted by homeowners, donated to charities, or managed at farms, as this data is either not collected or easy to extract. In addition, there is no easy way to verify if this estimate reflects the amount of food waste generated locally. However, it is helpful for providing stakeholders with a tangible representation of the amount of food waste that might be generated locally and is still being landfilled.

While diverting all food waste from landfill is a good goal, there is a greater likelihood of seeing substantial diversion results by focusing first on the generators of the largest amounts of waste. Those who generate the largest amounts are more likely to experience cost savings, assuming that sustainable management options are less costly than landfilling. Some of these large generators of waste might have an increased interest in engaging in sustainable practices due to customer expectations. For implementation planning, these large generators also can provide a predictable amount of food waste at a predictable frequency, thus making it easier for waste processors to plan their operations. These large generators include seafood processors, other food processors, grocers, hotels and casinos, government

Figure 2. Seafood Processors on the Mississippi Gulf Coast



Source: The Plan for Opportunity.

institutions, and farming operations. Generators such as restaurants, schools, and higher education institutions have great potential for significant diversion of food waste, but data on waste generation was not easy to find within the time and resources constraints of this assessment. However, these generators were engaged later in the process.

2. **Waste characterization.** Understanding the estimated amounts and likely composition of the waste stream from the different generators helps to determine suitable management options. The composition of the food waste is greatly dependent on where it was generated. For example, a grocery store will have food that could be donated to food banks and foods in many different types of packaging, while a shrimp processor will mainly have shrimp hulls. Efforts were directed to assess the food waste generation quantities, characteristics, and current management by these specific generators.

In the Mississippi Gulf Coast, seafood processors are significant generators of food processing waste. The three coastal counties have six major types of seafood processors, with over 70 percent producing shrimp or oysters. In 2010, 36 seafood-processing plants were located across the Mississippi Gulf Coast, with 15 seafood processors concentrated just on the Back Bay of Biloxi, as seen in figure 2. Common food processing wastes generated by seafood processing plants include skins or shells, remaining fats, carcasses, items rejected for poor quality, blood, and wastewater, all with varying qualities and quantities (Islam, Khan, & Tanaka, 2004) (see figure 3). Practically all of the wastes are either inedible or not fit for making other food products for human consumption.

Among the seafood processors, shrimp processors make up the largest waste producers. With an annual shrimp production at 53 million pounds (24 million kg) of raw product, which yields just less than 32 million pounds (14.5 million kg) of processed shrimp, the industry generates approximately 21 million pounds (10,500 tons, or 9.5 million kg or 9,500 tonnes) of waste during its seven-month season (Seymour Engineering, 2009). In addition, production fluctuates throughout the season, resulting in fluctuating amounts of waste, which can increase fivefold from April to June (Mississippi State University, 1998). The seasonality of waste production is an important factor to consider when looking for alternatives to disposal. This food processing waste was utilized for animal feed until 2005, when Hurricane Katrina destroyed the feed plant.

Convenience stores, grocery stores, and superstores are generally considered to generate significant amounts of food waste. Published estimates of food waste generated per store are not available, so other estimations are necessary. The average grocery store with 150 full-time employees generates approximately 500 tons (454 tonnes) of solid waste annually (Michel, Drew, Reddy, Forney, & Trondle, 1995). In this context, the approximately 46 grocery stores in the three-county area will generate an estimated 23,000 tons (20,865 tonnes) of solid waste per year. It is important to note that the 46 grocery stores include many convenience stores that employ fewer than 150 full-time employees, so this amount of waste is an overestimate. Furthermore, detailed waste characterizations conducted by a grocery chain at several of its stores found that after cardboard, paper, and plastics are removed for recycling, 75% to 90% of the remaining waste is compostable (JFConnolly & Associates, 2005). Using the conservative estimate of 75%, a typical grocery store generates 375 tons (340 tonnes) of compostable waste per year. For the 46 grocery stores in the region, this could mean that an estimated 17,250 tons (15,650 tonnes) of compostable waste could potentially be diverted from the landfill.

Although this estimate includes wastes other than food waste, it provides an idea of

how much waste is available to be co-managed through the same process, such as composting. At the time of this assessment, Walmart had started diverting food waste from its seven supercenters and one Sam's Club store in the three counties as well as from stores in adjacent counties and in Mobile, Alabama (see figure 4). Between August and December of 2010, Walmart sent 374 tons (339 tonnes) of organic waste, including food waste, to a composting facility in Franklinton, Louisiana. If this early data is typical of monthly collection, then Walmart alone could divert 900 tons (816 tonnes) of organic wastes annually. This number could grow if Walmart were to include waste from its meat and seafood departments, which was not the case at the time of the assessment (A. Hedrick, Terra Nova Recycling, personal correspondence, March 1, 2011).

The Mississippi Gulf Coast is home to several military bases and federal government agencies that generate large amounts of waste: the John C. Stennis Space Center in Hancock County; the Naval Construction Battalion Center (Seabee Base), the Air National Guard, the Department of Homeland Security, and Keesler Air Force Base (Keesler AFB) in Harrison County; and the Pascagoula Naval Complex in Jackson County. All of these institutional complexes provide daily food services to a large number of military and civilian staff, presenting an opportunity for diverting kitchen (preconsumer) and dining hall (postconsumer) food waste. In any one day, there are approximately 4,000 cadets, 2,870 military personnel, and 1,530 civilian personnel at Keesler (Keesler AFB, n.d.). During the assessment, we found that Keesler was

Figure 3. Workers shucking oysters in a Mississippi Gulf Coast seafood processing plant. The shucking process generates significant waste byproduct.

Photo by Jim Melka.

collecting up to 26 tons (24 tonnes) of food waste each month from its kitchen and dining hall; however, this waste was being sent to the landfill as no other options were available (D. Smith, Zero Waste Solutions/Mark Dunning Industries, personal communication, March 21, 2011). It is expected that similar amounts are generated at the Stennis Space Center and Seabee Base. Together, these represent a potential diversion of 936 tons (849 tonnes) per year.

The Mississippi Gulf Coast is also host to 12 casinos and their associated hotels. In most casinos, food service is the largest function after gaming and is offered during most of the day and night, generating large amounts of pre- and postconsumer food waste and other organic wastes, such as waxed cardboard, paper containers, and napkins. Just as with grocery stores, there are no accepted published estimates of food waste generation at casinos. This requires us to use data from known food waste generation in limited locations to extrapolate and make estimates for the region. The Ho-Chunk Nation, a tribe in the Black River Falls area in Wisconsin, reports collecting 150 pounds (68 kg) of food waste a day, or 54,750 pounds (24,830 kg) or 27 tons (24 tonnes) per year, from one of their casinos (Goldstein, 2008). For the 12 coastal casinos, this represents 324 tons (294 tonnes) per year. Some of the local casinos were contacted, but it was not possible at the time to obtain waste data from them to compare and assess if they

Figure 4. Walmart sends its food scraps to Brinson Poultry Farm by the truckload.

Photo by Megan O'Connor.

experience similar waste generation amounts. However, these numbers provide a general picture of the potential generation of food waste in the hospitality sector in the three coastal Mississippi counties.

According to the most recent survey of agriculture by the U.S. Department of Agriculture, there are 1,107 farms in the three coastal counties encompassing 105,159 acres (42,556 hectares). Approximately 61% of the farm acreage is dedicated to woodlands and pasture, 31% to cropland, and 8% to other practices. This 8% includes 143 acres (58 ha) for poultry, 568 acres (230 ha) for cattle and 37 acres (15 ha) for hog farming. None of these farms is regulated as a confined animal feeding operation (CAFO). In addition, 513 out of the 1,107 farms are 10 to 49 acres (4 to 20 ha) in size. Farm-generated food waste is typically left on the fields, taken back to the same fields for incorporation into the soil, or managed on farm and not disposed at landfills; hence, it is rarely accounted for and data is not available to solid waste planners. In addition, most state solid waste environmental regulations provide full exemptions to agricultural operations, which reduces the possibility of consistently tracking waste generation. On the basis of this information, we concluded that few agricultural operations would generate food waste, and those that do generate it will be very unlikely to send their food waste for disposal off the farm. On the other hand, the farm operations would be likely to accept food waste for composting and land application and would also be a market for compost produced off-farm.

There is certainly a substantial amount of food waste generated by seafood processing, military and government institutions, casinos and hotels in the region. Adding other generators, such as schools, colleges, universities, hospitals, restaurants, and homes, further increases the amount of food waste.

3. **Inventory of disposal and management options.** Guidance on how to divert food waste with a sustainable approach is provided by the USEPA's food recovery hierarchy. The hierarchy focuses on reducing food waste at the source, followed by recovering edible food for feeding people and then animals, using nonedible food waste for industrial uses such as biogas generation, composting, and, as the last option, landfilling (USEPA, 2010a). The inventory efforts tried to identify existing disposal facilities and identify alternative management options.

The prominence of the seafood industry in the Mississippi Gulf Coast food system adds another dimension to the complexity of understanding and managing the food waste generated in the region. Sometimes management solutions are technologically simple and easy to implement, while others require considerable technology and investment. For instance, at the turn of the 19th century, discarded oyster shells would be turned into paving for streets throughout Biloxi (Ellis & Shambra, 2009). While solutions for oyster shells are relatively simple, alternative uses for the nutrient-rich shrimp byproduct are not as simple to implement. For example, during the early 2000s, a processing factory turned the shrimp waste into other products, such as cat food. However, Hurricane Katrina destroyed the factory in 2005, leaving shrimp processors with the two local landfills as the only alternative for managing their shrimp waste.

At the time of this assessment, no composting facilities were permitted to accept food waste in the coastal three county region. There were only two commercial food waste composting facilities in the foodshed, in Franklinton, Louisiana, and Prentiss, Mississippi, both just over 110 miles from the center of the foodshed (Gulfport-Biloxi). The Prentiss facility, located at a chicken farm, also has an anaerobic digester with biogas recovery that is mainly used to manage the chicken farm's waste. There were no other facilities available that would beneficially use food waste for animal feed or other industrial processes.

There are 14 class I and 22 class II permitted rubbish landfills across the three counties (MDEQ, 2009b). Rubbish landfills receive cardboard, sawdust, and wood chips,

which can be used as amendments for composting food waste. A rubbish landfill in one of the counties managed by a solid waste management district manages the yard waste received by composting it. The facility location, design and available equipment in the designated composting area would allow for food waste composting once the required permit were obtained.

4. **Inventory of waste hauling services.** At the time of the assessment, there was only one waste hauling company in the three-county region providing hauling services exclusively for food waste and other organics. This company was hauling food waste for Walmart and Sam's Club superstores, but had capacity to include other local clients (A. Hedrick, Terra Nova Recycling, personal correspondence, March 1, 2011).

5. **Regulatory framework.** To divert food waste following the USEPA hierarchy, it is important to understand the applicable regulatory framework. Since discarded food is considered a solid waste, the regulatory programs for solid waste implemented by the Mississippi Department of Environmental Quality (MDEQ) are applicable. Current regulations require operators of facilities that compost food wastes to obtain a solid waste facility permit, a process that can take up to two years to complete (M. Williams, Solid Waste Policy, Planning & Grants Branch, MDEQ, personal communication, March 23, 2011). Acceptance of food wastes at nonagricultural anaerobic digesters for biogas recovery would require a solid waste permit; however, existing solid waste regulations do not properly address this type of facilities. Beneficial-use determinations and land application permits are two other mechanisms that MDEQ can use to approve alternative disposal of food wastes. These mechanisms, however, are not typically issued for food wastes and are probably useful for a limited portion of the food waste stream. In addition, MDEQ provides support to counties for the preparation of Municipal Solid Waste Management plans (MDEQ, 2009a), which provides an opportunity to include food waste management strategies.

Federal regulations also affect the options for managing food waste. For instance, the Bill Emerson Good Samaritan Act of 1996 created limited liability for food donations to nonprofits by minimizing liability to donors (Bill Emerson Good Samaritan Food Donation Act, 1996). Ensuring that potential donors are well aware of this legal protection is essential for promoting and increasing donations of food that is still edible. In addition, the U.S. Food and Drug Administration (FDA) has a limited set of policies regarding use of food waste for animal feed. The policies are primarily targeted at stopping the spread of bovine spongiform encephalopathy, commonly known as mad cow disease. Specifically, "the regulation prohibits the use of certain proteins derived from mammalian tissue in feeding ruminant animals" (U.S. FDA, 2010, para. 4). This regulatory requirement can affect the use of some food waste streams for animal feed in some sectors. For example, a grocery store might have to separate mammalian meats from all other food waste if the waste is intended for feed of beef livestock.

The analysis of the food system demonstrated that there is high potential for diverting considerable amounts of food wastes. It also suggested that the hauling, disposal, and management infrastructures, as well as some regulations, can be limiting factors for diversion. However, previous beneficial reuse of some of these wastes revealed a regional preference for more sustainable management options.

Stakeholder Analysis

The second step in the planning process was a stakeholder analysis. We engaged food waste stakeholders through field visits, interviews and organized stakeholder meetings. We conducted field visits and stakeholder interviews at the places where the food is produced, processed, distributed, sold, consumed, and disposed. This included a poultry farm, a seafood processor, produce distributors, farmers' markets, a brewery, grocery stores,

restaurants, casino, military bases, food pantry, composting facility, and others. We asked stakeholders about their role regarding food waste, the barriers to diversion, opportunities for sustainable management, and their waste management needs in general.

We organized a food waste stakeholders meeting at a central location. In addition to inviting the stakeholders representing the sectors we had visited and interviewed, we also invited representatives from the various state and local government agencies, nongovernmental organizations, and academia. Participants included farms, military bases, local solid waste planning authorities, food banks and pantries, restaurants and members of the hospitality sector, educators, extension agents, federal and state environmental regulatory agencies, local governments, regional planning agencies, and organic waste haulers, among others.

During the first part of the meeting, we introduced stakeholders to the general food system planning effort for the region and the USEPA's national efforts for food waste diversion, and reviewed current management practices and technology. The purpose of this introduction was to illustrate how the food system gives commonality to such a diverse group of stakeholders while also ensuring that all participants had a basic knowledge of common food waste management practices. The second part of the meeting was a guided, open forum during which we asked stakeholders to share their understanding of the importance of diverting food waste, the role their organizations have in food waste diversion and the food system, the opportunities that food waste diversion offers to the region and their specific sectors, barriers to these opportunities, and potential solutions.

All stakeholders expressed great interest in food waste diversion and quickly identified benefits for both their sectors and the region. In general, stakeholders were well aware of the environmental benefits of diverting food waste, such as extending the capacity of landfills and reducing the generation of greenhouse gases, but they also indicated other benefits. For example, the hospitality, grocery, and institutional sectors considered the potential to reduce disposal costs by diverting to beneficial and less costly options as a significant benefit. The hospitality and grocery sectors expressed that disposal cost avoidance can increase profit margins. While seafood processors had high interest in cost avoidance through environmentally sensitive solutions, the hospitality sector, regulatory agencies, and local governments were very interested in diverting seafood waste from landfills due to concerns with odors caused by this waste at the local landfills. Most local stakeholders indicated that on occasion, odors are detected up to a few miles away. Not only are the odors a nuisance to residents, but they felt that odors can also negatively affect tourism. Food banks and pantries considered diverting food that is still edible to be an opportunity to extend their resources and meet demand for food. Stakeholders indicated better utilization of food resources to reduce food insecurity by donating edible food and by using food waste for sustainable agricultural practices as the main benefit and the top priority for the region.

Regarding barriers to diverting food waste, stakeholders noted that while extending landfill capacity is a motivating factor in other parts of the country, it is not a factor in the region because there is ample landfill capacity for the foreseeable future and landfill disposal fees are currently relatively low. Despite the relatively low disposal fees, cost avoidance is still a motivating factor for several sectors. One important barrier is the lack of other disposal options, such as composting facilities, animal feed manufacturers, and biogas recovery. The distant location of existing options results in transportation costs that are not competitive with the local landfill fees. Prohibitive or discouraging regulatory frameworks were also identified as a major barrier and the probable reason that there were no other existing options for management of food waste in the region. Stakeholders from solid waste planning agencies and local and state government expressed that the permitting requirements for composting facilities were established for facilities that require more stringent oversight than should be required for food waste composting. Likewise, a proposed ordinance by a coastal municipality would allow backyard composting of yard waste, but it specifically prohibits the addition of food wastes. Adjustments to existing regulations could allow or encourage new waste handling facil-

ities in the region, create jobs and products, and provide new waste management options, all of which were potential benefits identified by stakeholders. Involving government stakeholders in further dialogue, as suggested during the stakeholder meeting, could help mitigate regulatory barriers.

Stakeholders identified the creation of financial incentives as a necessary step in changing the way the region handles its food waste. Kick-starting innovation with tax incentives, grant programs, or other investments could support new projects and push the region's waste management in a new direction. In addition, stakeholders recognized cost avoidance as a financial incentive, and considered general efforts that result in cost avoidance as a principal incentive-based strategy. Stakeholders want waste management solutions that are economically feasible and sustainable. In addition, they want innovative solutions that reduce waste and address food insecurity by promoting such things as the improvement of soils and community gardening.

A common topic that came up during the food waste stakeholders meeting, as well as during interviews and site visits with other stakeholders, is the psychological or attitudinal barriers relating to waste. Many stakeholders volunteered that since Hurricane Katrina, there has been a good general awareness among Gulf Coast residents about the importance of sustainable practices. Many cited the implementation of curbside collection of residential recyclables as evidence of this increased awareness. However, they feel that there is need for education about the consequences of wasting edible food and actual food waste. Thus the stakeholders identified incorporating education into the public dialogue around food and sustainability as a necessary step for addressing this barrier.

Key strategies were identified that could lead to new partnerships among the stakeholders and help in "closing the loop" of food waste, such as creating communication networks and fostering the exchange of information. Stakeholders are committed and engaged in their respective sectors, but they often do not have the time or resources to seek out or create new collaborations without a framework for doing so. The stakeholders' request to meet again with the planning team as a "food waste stakeholders group" to discuss the findings of the stakeholder engagement process and engage additional stakeholders is evidence of the importance of being able to connect in an organized framework. Three months after the original assessment, we hosted a second meeting during which stakeholders had the opportunity to discuss and provide input on ideas for solutions and strategies.

In addition, a focus group with homeless persons was organized. While the intention of the focus group was to discuss food access issues, the 15 participants quickly identified food waste as a significant problem. They explained that due to the lack of refrigerated storage opportunities, their food often spoils and end up as food waste. This problem is compounded by the region's mostly warm and humid climate, which is conducive to quick spoilage of food. The participants emphatically explained that the food waste not only represents a wasted nutritional resource, but a misuse of the limited economic resources they have. While this food waste might not be in amounts large enough as to affect regional diversion rates, preventing it can be important for changing attitudes toward food waste.

Food Systems Plan

The third step in the planning process was to develop the actual plan document, Savor the Coast: A Recipe for a Sustainable Coast. We developed a framework to help guide potential solutions based on what was learned through the stakeholders analysis and with the guidance of the food systems subcommittee. The framework includes four goals applicable systemwide. Each goal has specific objectives, and for each objective, there are suggested strategies. The goals and objectives, as well as the related strategies, are presented below.

Goals and Objectives

Systemwide, stakeholders wanted to support increased access to food, foster connections between stakeholders, strengthen the food economy, and promote environmental health. These four key concepts served as the guiding goals for developing strategies and solutions to increase the sustainability of the food system.

Food waste diversion is integrated into the objectives under each goal. For example, under goal one — support access to healthy food for all community members — there is an objective to expand food diversion to food banks and food pantries. Goal two is focused on fostering connections between stakeholders, so the objectives related to food waste include amplifying communication among stakeholders and educating consumers about the food system. Under goal three, there is an objective to strengthen the regional food economy to promote economic efficiency through resource reuse. Goal four is to promote environmental health and includes the objectives of increasing awareness of human impacts on the food system and fostering a waste-conscious culture.

Strategies

We developed 12 strategies for advancing food waste diversion in consultation with stakeholders. These strategies are diverse, resulting in solutions related to access to edible food as well as waste management at the end of the waste cycle. Only 10 strategies are presented below, as we think these could be replicated in any community. The strategies are presented organized by the specific goal they support.

Goal 1: Support access to healthy food for all community members.

1. **Amend zoning ordinances to accommodate the food system.** Zoning codes could be amended to include urban agriculture with composting activities as acceptable accessory activities, allow sales of produce at community gardens, and allow households to compost their food waste.
2. **Create a surplus food–matching service.** A surplus food–matchmaking website could be a means for food donors to advertise surplus food available for donation. Food banks, food pantries, and soup kitchens could check the website and claim the available food.
3. **Create a community kitchen.** Homeless citizens reported food waste as a major issue due to lack of **refrigeration** and storage facilities. These citizens proposed creating a community kitchen with storage lockers and refrigeration.

Goal 2: Foster connections between stakeholders.

4. **Establish a regional food policy council.** A common concern among stakeholders was their lack of connection to others in the food system. The proposed food policy council would be composed of volunteer members who represent the full range of food system activities: producers, processors, distributors, and waste managers. There would be task forces within the council engaged in working on different projects, such as a Food Waste Task Force.
5. **Expand school demonstration projects.** In addition to producing healthy foods and educating students, on-site demonstration projects could include food waste diversion and composting projects that utilize food waste from the school.

Goal 3: Strengthen the regional food economy.

6. **Use vacant lots for community gardens.** Allowing and encouraging these community gardens to compost could provide a viable alternative for diverting food waste, producing compost to improve the gardening soils. This alternative becomes more effective if the gardens are allowed to accept food wastes from outside the community garden premises.

Goal 4: Promote environmental health.

7. **Launch a renewable-energy technology innovation investment strategy.** There are numerous opportunities to reduce energy consumption throughout the food system. For example, food waste can be converted to energy through anaerobic digestion.
8. **Institute a Compost Mississippi program.** Solid waste management companies and state and local agencies indicated that there is a lack of knowledge about the benefits and science of composting at the individual and household levels. In addition, they indicated that those who were knowledgeable still lacked information and understanding of the existing reg-

ulatory requirements and financial opportunities. Composting demonstration projects could be established as start-up businesses or as a means to foster a cultural shift toward food waste diversion.

9. **Incorporate food waste recovery into public events.** Incorporating recycling of traditional recyclables and food wastes during public events would help foster a cultural shift toward turning wastes into resources.
10. **Streamline state permitting rules for composting and anaerobic digesters.** The regulations governing the permitting process should be changed to streamline the process and encourage the establishment of food waste composting and anaerobic digestion facilities. Regulations for solid waste management, water resources, and agricultural permitting should be coordinated.

Implementation

There has been significant action forward on five of the 12 strategies in the food system plan directly related to food waste diversion. This is impressive, given that the food system recommendations were accepted by the region's executive committee in September 2011. Below is a summary of the progress on five strategies as of May 2012.

1. **Amend zoning ordinances to accommodate the food system.** An effort is underway by the regional planning agency to create a model zoning ordinance for food that would integrate composting activities.

2. **Create a surplus food–matching service.** The United Way of Southern Mississippi has offered to expand its volunteer-matching website to also encompass food donation. In discussions with the military, it became clear that the bases in the region were disposing of significant volumes of edible food. Thinking creatively, the military bases and their waste management offices propose to reclassify the excess food as a salvaged item and sell it for a nominal amount to church groups that would collect the food at the base and deliver it to food pantries.

3. **Establish a regional food policy council.** The participants in the food waste stakeholder meetings were enthusiastic about continuing to meet and wanted to ensure that the Food Waste Task Force component of the regional policy council moves forward. The MDEQ volunteered to organize and facilitate quarterly meetings. The meetings have provided opportunities for networking and the group has expanded. For example, a small composting business was able to obtain approval for a food waste composting pilot project and make connections with organic farmers who are currently buying compost from out of state. In another example, the Keesler Air Force Base connected with a company specializing in the collection and transportation of food wastes and, as a result, was able to send its food waste to a composting facility. This newly formed Mississippi Gulf Coast Food Waste Task Force has continued to meet on a quarterly basis.

4. **Institute a Compost Mississippi program.** The MDEQ volunteered to start developing this program with the help of the newly formed Food Waste Task Force. A meeting of the Mississippi Gulf Coast Food Waste Task Force focused on brainstorming ideas for developing initiatives and outreach projects under a Compost Mississippi branding effort.

5. **Streamline state permit process rules for composting and anaerobic digesters.** The MDEQ had identified updating the permitting rules as a state priority. To effectively update the regulations, the department wants to work directly with composting and anaerobic digestion operations in order to create pilot projects to demonstrate how operations could effectively manage some of the more common wastes in the state, such as shrimp processing waste. In January 2012, the department released the *Guidance for Pilot Composting Facility Operations,* which outlines the process of obtaining approval as a pilot project as an alternative to the current permit process while the regulations are being streamlined (MDEQ, 2012).

Conclusion

Planning for the management of food waste is an important emerging issue not only for professionals in planning, food systems, and solid waste management, but also for all other stakeholders in the system. The information resulting from the assessment and the experiences shared by the stakeholders in the Mississippi Gulf Coast shed light on the importance of planning for food waste management as an integral component of a food system. This case study demonstrated that preventing and managing food waste involves the efforts of practically all stakeholders invested in each stage of the food system and that there can be great benefits by integrating solid waste planning into food systems planning.

Importantly, this planning process in the Mississippi Gulf Coast provided evidence of the lack of accurate and tested estimates of food waste generation in some stages of the food system. At the production and processing stages, the seafood industry generally keeps detailed records of how much processing waste is produced as this is customarily provided by their waste haulers. For land-based agriculture, records of food waste generated in the production stage are generally not available. The need for better estimates in the service industry, specially casinos and hotels, was also evident as the project team had to rely on a few studies that have not been replicated yet in other casinos and hotels offering the same regional amenities and catering to the clientele that the Gulf Coast seeks to attract. Research for developing measurement tools better suited to these generators and for developing reliable generation factors is needed to assist planners in undertaking accurate assessments and determining solutions.

The measurement constraints explained above affect not only the assessments and planning for solutions, but also the measurement of the implemented strategies. As a result, success of the strategies might be based on qualitative more than quantitative measurements. To spur interest and demonstrate the need for this research, we consider it is important to raise awareness that the strategies presented in this project can be accepted readily by the community and quickly implemented; hence is important to be able to quantify their effectiveness. We believe these strategies will be effective and it is necessary to have the means and tools to be able to demonstrate their long-term economic, social, and environmental value to the community.

Throughout the stakeholder process, large managed institutions were recognized as valuable starting points for diverting food waste. Hierarchical management and efficiencies of scale mean that new waste practices can be successfully implemented with relative ease in these institutions as compared to, for example, households or independent restaurants. Continuing to engage and highlight interested institutions was considered crucial in changing waste management practices in the region.

In guiding planning efforts of others interested in food waste reduction, there are several key recommendations. To combat the idea that food is a rural issue that is outside the bounds of the jurisdiction, planners should be considering the foodshed as a geographic area not only where foods can be grown (Getz, 1991), but also where food waste can be utilized as a resource. Because of their traditional involvement in economic development and land use issues, planners are in a good position to foster interactions among the different food systems' producers, distributors, and consumers, as well as solid waste managers. Not only is the Mississippi Gulf Coast Food Waste Task Force that emerged from this project an example of this facilitated interaction, but it also demonstrates how powerful the interaction can be in fostering and implementing regional sustainability goals.

Elevating the importance of food waste planning can be achieved through stronger engagement of food system stakeholders. The boundaries of a foodshed planning area can be set arbitrarily based on regional food production and commerce activities. However, the boundaries of the planning areas for solid waste disposal are determined and/or greatly influenced by governmental structures at the state and local level. In this case study, county boundaries demarcate the larger area in which detailed solid waste planning currently can occur in accordance with state law. This fact was not perceived as an impediment by the project planning team, nor was it identified as such by stakeholders,

but it did require awareness that all solid waste planning stakeholders for each county needed to be engaged. In the case of the Mississippi Gulf Coast, a regional collaboration can take on food waste planning through its regional sustainability planning process. By creating stronger collaborative planning processes that integrate all stakeholders, from the low-income resident to the seafood processor, communities can develop a higher level of interest in planning (Beatly, 1995; Brody, 2003; Innes, 1996; Roberts, 2006). Part of the success of this effort can be attributed to the significant stakeholder engagement and the willingness of these stakeholders to tackle the environmental issues surrounding food waste diversion (Yaffee & Wondolleck, 1997). The creation of a department of food by cities, regional food policy councils, and full support of food systems by city planning departments have all been suggested as potential means to support stakeholder engagement around food systems planning (Pohukuchi & Kaufman, 2000). As demonstrated here, all of these can also serve as means to support planning for food waste diversion.

There are a number of existing regulatory measures and policy tools that could limit food waste diversion. At the state level, environmental and food safety and health regulations must be evaluated for their support of food waste diversion efforts and revised as needed. Regulations on backyard and large-scale composting and biogas facilities should also be evaluated to ensure that they meet their intended environmental protection goals in innovative and flexible ways. Food safety and health regulations at the state level must ensure that they promote (or at least are not an impediment to) recovery and use of edible foods through donations and similar venues. These are just a few examples of the types of policies and regulations that could be included as part of food waste planning.

Implementing regulations and policies that promote food waste diversion can serve as a cornerstone for significant economic development opportunities. Beyond grants and loans, composting, biogas facilities, and other diversion options can benefit the community. For example, the diversion of food waste from grocery stores and military bases along the Gulf Coast spurred the development of a company that specializes in food waste hauling and pilot projects for composting facilities. Economic development tools to further expand this market could foster and strengthen a local economy based on food waste diversion. An effective regulatory framework and market development incentives that focus on locally driven food waste diversion can support job creation in the food system by allowing businesses involved in food waste management the opportunity to grow (Goicochea & Arroyo-Rodríguez, 2012).

This paper seeks to share a story of success of not only regional planning for food waste diversion, but also early implementation of the plan. This case study demonstrates the potential of food waste planning for integrating food waste diversion strategies into a regional plan. A robust food systems planning effort will consider all aspects of the food system, including food waste, and make culturally appropriate determinations of which goals and implementation strategies are most appropriate. There is a need for further research to explore the success of implementation strategies that emerge from comprehensive planning efforts as they relate to food waste planning. The Mississippi Gulf Coast provides an example of a region where food waste planning efforts can succeed. With the current sustainability planning effort underway, there is significant promise that regional food system planning will be enhanced.

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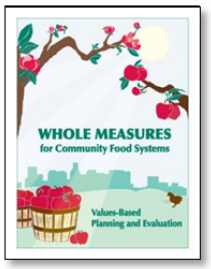
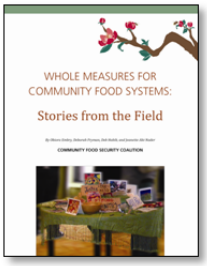
Whole Measures only partially measures up

Book reviews by Bethann Garramon Merkle



Whole Measures for Community Food Systems: Values-Based Planning and Evaluation

Abi-Nader, J., Ayson, A., Harris, K., Herrera, H., Eddins, D., Habib, D., Hanna, J., Paterson, C., Sutton, K., & Villanueva, L. (2009). *Whole measures for community food systems: Values-based planning and evaluation.* Portland, Oregon: Community Food Security Coalition.



Whole Measures for Community Food Systems: Stories from the Field

Embry, O., Fryman, D., Habib, D., & Abi-Nader, J. (2012). *Whole measures for community food systems: Stories from the field.* Portland, Oregon: Community Food Security Coalition.

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Whole Measures for Community Food Systems, published in 2009 by the Community Food Security Coalition (CFSC), proposes one approach planners and organizers may find useful in concert with other tools and resources. A companion publication, *Whole Measures for Community Food Systems: Stories from the Field,* was published in 2012. (See "Case studies supplement to *WM CFS* published recently" sidebar for a review of *Stories from the Field.*) PDFs of both guides may be downloaded for free at http://foodsecurity.org/publications/.

"Food can be a common and unifying force socially, culturally, and spiritually," write the authors of *Whole Measures for Community Food Systems (WM CFS),* a truth with which I heartily agree. In the past decade, I have been a teacher, student, organizer, dreamer, schemer, more recently a gardener, and always an eater. Much of my personal and professional energy is directed toward food-related initiatives. Particularly in multicultural and multilingual environments, food has proven a common language, providing fertile soil in which these efforts are cultivated.

When I began this work, as a naïve and passionate university student, I needed all the information, insight and tools available. I needed to learn about the complexities of the food system and the nuances of community organizing that go beyond small-town 4-H and Key Club projects. I needed to

study and come to understand the importance of planning and evaluation that involve a diverse group of stakeholders. Some of this I gained through university courses, but most of it I learned elbow-deep in the nitty gritty of community initiatives that contributed to food system stability.

As a result, I looked forward to what *WM CFS* might offer. The authors present it as a tool for planning and evaluating community food systems-related projects, programs, and initiatives, which sounds like just the right thing for beginning food systems practitioners. It is also appealing to me because this kind of work, just like our communities, is dynamic and not entirely predictable.

Synopsis

WM CFS provides a framework for how to evaluate a community food system by considering what the document refers to as *values-based fields:* Justice and Fairness; Strong Communities; Vibrant Farms; Healthy People; Sustainable Ecosystems; and Thriving Local Economies. As the authors write, "*WM CFS* is a values-based, community-oriented tool for evaluation, planning, and dialogue geared toward organizational and community change." They continue, "*WM CFS* is designed to give organizations and communities a collaborative process for defining and expressing their complex stories and the multiple outcomes that emerge from their work."

The authors emphasize their vision that the tool offers communities a catalyst for dialog and learning. As most food systems practitioners can attest, our work is complex, and the people involved can prove astonishingly diverse. *WM CFS* is meant to address this diversity by enabling organizations, facilitators, individuals, and communities to discuss and evaluate hard-to-measure aspects of food systems work. In fact, the authors affirm that "these practices were developed with input from dozens of community food projects and represent common qualities they strive for as they seek to create healthier, whole communities."

The document itself is divided into several sections that elaborate on these objectives. It begins by providing background on how the tool was developed, presents clarification of the terms used within the document, a glossary of key concepts, fields, and terms, and concludes with discussion prompts and rubrics for evaluation of several essential aspects of a community food system.

Commentary

Thanks to previous and current responsibilities including program development, management, fundraising, and outreach, I found the vocabulary, processes, and references to group facilitation familiar and plainly accessible.

Of particular use are the glossary and the identification and definition of the six values-based fields. When included in group discussions at any point in a food system project, these concepts will likely have two influences. First, these resources should encourage those gathered at the table to consider the depth and breadth of the factors influencing a food system. Second, in a word, this aspect of *WM CFS* can ensure that diverse stakeholders are communicating with a common vocabulary.

Additionally, the rubrics assess possible activities and outcomes that may influence the state of the six values-based fields. These rubrics, in the hands of individuals new to food systems work, can offer a great deal of food for thought, jumping-off points for discussions, and inquiry into their applicability to a specific community initiative. When applied by more experienced practitioners and facilitators, the rubrics could streamline evaluation at various points in an initiative's planning, implementation, and review.

For inexperienced facilitators, the "evaluation team discussion guides" may prove invaluable. They outline how to facilitate several aspects of an initiative. Though not formatted as such on the page, these guides effectively present five checklists with brief explanations for each step in the *WM CFS* process. These include distinguishing between process and outcomes; setting goals and reaching a common understanding of objectives; evaluation; and debriefing and reflection.

Finally, I can envision how some of the admonitions regarding inclusion, diversity, and thinking about the big picture would be valuable to my past and current projects. Some points in particular can and should inform facilitators' ap-

proaches. Early in my career, knowing that "groups of six to twelve people may offer the greatest opportunities for dialogue, learning, and guiding the evaluation process" would have been helpful for making decisions about how many people to include in focus groups and steering committees.

To this day, it is beneficial to be reminded that "it is useful for an evaluation team to consider any potentially negative impacts of their work." Equally, *WM CFS* notes that focusing discussions on consensus can limit dialogue and potential for deep understanding of a community's needs. For all passionate community members and food systems practitioners, a final admonition to "Inspire action, don't demand it" could mean the difference between an inclusive versus exclusive initiative.

On the other hand, looking at *WM CFS* through the eyes of a newcomer to food systems work, I found some elements lacking. The authors offer no suggestions for how to actually assess the relevance of their tool to one's own circumstances. This is despite their writing, "while the authors have strived to make the language as applicable and representative as possible for a wide range of projects and contexts, it will not be equally relevant or appropriate for all groups."

The current publication does not include any real world examples of how this process has been implemented. Knowing how it was applied, whether the facilitators using the tool were experienced or novices, and what the outcomes were, would enhance the value of *WM CFS* substantially. Supplemental material, particularly in the form of case studies, is a welcome addition (see sidebar "Case studies supplement to WM CFS published recently.")

Perhaps most telling is a quote from page 12, where the authors write, "the most important consideration is that the process is designed to promote learning." It appears the learning process intended by this tool is aimed at community- or organization-level learning guided by experienced facilitators. This not the first resource I would recommend for beginners seeking professional development.

Conclusion

Granted, *WM CFS* lacks case studies and other practical examples that would help food systems initiatives more directly relate its principles to their own needs (see sidebar). At the same time, certain elements of the tool clearly offer value. Future users of the tool will hopefully benefit from access to explicit examples of how community-based initiatives have applied *WM CFS* as a planning and evaluation method.

As food systems practitioners increasingly recognize, diversity in value systems, priorities, and cultural constructs can dramatically influence a community's food-related experiences. Resources that assist communities to take these factors into consideration will continue to be in high demand. *WM CFS,* as written and any ensuing supplements, contributes to this body of resources.

Case studies supplement to *WM CFS* published recently

In 2012, the Community Food Security Coalition (CFSC) published digital and hard copy versions of a supplement to *WM CFS.* Entitled *Whole Measures for Community Food Systems: Stories from the Field (SF),* this publication provides some of what I found lacking in the original document. In addition to the case studies and clear presentation of the challenges and lessons learned, *SF* includes a glossary of key terms and several supplements developed by the pilot projects.

The scenarios presented in *SF* represent community-level, regional, and national initiatives, and range from entirely rural to completely urban. All organizations were based in the United States, but were widely dispersed across the country. Of the eight initiatives and organizations featured in *SF,* each adapted *WM CFS* to suit. For some, translating the document, both from "academic" language to plain language and from English to Spanish and other languages, was a key consideration. For others, a great deal of advance planning was required to ensure facilitators were on the same page before community consultations began. In other situations, organizations used *WM*

CFS as a launching point for internal assessments as well as strategic planning and visioning.

I found CFSC's support offered to these eight pilot projects particularly interesting. Each one was connected with a mentor who possessed extensive experience in community-based food systems work. The mentoring phase lasted 18 months and required a solid commitment on the part of all stakeholders. Judging by the "lessons learned" sections of *SF,* having access to this level of insight and guidance was fundamental to how much these organizations were able to engage with, and gain from, the *WM CFS.* However, no mention is made of an ongoing forum for organizations currently using the framework.

As the authors of *Stories from the Field* write, this new publication features examples of "community partners who have used *WM CFS* in innovative ways." I strongly recommend reading both for a more complete understanding of how *WM CFS* may suit specific community-based food system initiatives. *—BGM*

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