Journal of Agriculture, Food Systems, and Community Development

Volume 5, Issue 1
Fall 2014

JAFSCD
www.AgDevJournal.com
ISSN 2152-0801 (online only)

Published by the Food Systems Development Project with the support of:

Johns Hopkins Center for a Livable Future
KPU Kwantlen Polytechnic University
Leopold Center for Sustainable Agriculture
The University of Vermont

Journal of Agriculture, Food Systems, and Community Development

Published by the Food Systems Development Project of the Center for Transformative Action and with the support of our institutional sponsors:

The *Journal of Agriculture, Food Systems, and Community Development,* ISSN 2152-0801 (online only), is published quarterly (Summer, Fall, Winter, Spring) by the Food Systems Development Project of the Center for Transformative Action (an affiliate of Cornell University). Journal office: 295 Hook Place, Ithaca, NY 14850 USA.

Online subscriptions: Farmer/Student/Sole Proprietor/Retiree: US$39; Agency/Nonprofit Staffperson: US$49; Faculty/Consultant/Corporate Employee: US$69; Institutional Library: US$227–US$658 (based on FTE students).

JAFSCD Reviewers

Paivi Abernethy, U of Waterloo (Canada)
Mahbubul Alam, Ehime U (Japan)
Colin R. Anderson, Coventry U (UK)
Molly Anderson, College of the Atlantic (USA)
Hossein Azadi, Ghent U (Belgium)
Sandip Banerjee, Hawassa U (India)
Mary Margaret Barth, Responsible Source, UIUC (USA)
Ricky Martin Bates, Penn State U (USA)
Dani E. Battle, Patriot RC&D (USA)
Mark Bauermeister, Iowa State U (USA)
Molly K. Bean, The Ohio State U (USA)
Mihaela Begea, Institute of Food Research (Romania)
Ghose Bishwajit, Tong Ji Medical College (China)
Eliav Bitan, Darden School of Business, U of Virginia (USA)
Rachelle Bostwick, Farmer, Earthkeeper Farm (USA)
Mladen Brnčić, U of Zagreb (Croatia)
Megan Carney, U.C.–Santa Barbara (USA)
Michelle Carnegie, U of New England (Australia)
Marcia Caton Campbell, Center for Resilient Cities (USA)
Kuo-Chiang (Matt) Chang, South Dakota State U (USA)
Hannah Chiswell, U of Exeter (UK)
Elizabeth Church, Jacobs Farm/DelCabo (USA)
Renee Ciulla, Instituto Ricerche Economico Sociale (USA)
Sean Connelly, Alberta Social Economy Research Alliance Centre for Sustainable Community Development (Canada)
Christine Costello, Cornell U (USA)
Valencia Coty-Barker, Ashford U (USA)
Sasha Cuerda, U of Illinois at Urbana-Champaign (USA)
Kynda R. Curtis, Utah State U (USA)
Carolyn Dimitri, New York U (USA)
Michael L. Dougherty, Illinois State U (USA)
Leslie Duram, Southern Illinois U (USA)
Ayman Ekram Fahim, Suez Canal U (Egypt)
Hamid El Bilali, Mediterranean Agronomic Institute of Bari (CIHEAM-MAIB) (Italy)
Patti Taranto Erickson, Salisbury U (USA)
Mark Estep, Montana Mobile Processing Co. (USA)
James R. Farmer, Earlham College (USA)
David Fazzino, Bloomsburg U of Pennsylvania (USA)
Melissa Fernandez Arrigoitia, London School of Economics (UK)
Ian Finch, U of Montana (USA)
Rok Fink, Univerza v Ljubljani (Slovenia)
Danielle Fisher, Eagle Ridge Ranch Beef (USA)
Jill Ann Fitzsimmons, U of Massachusetts–Amherst (USA)
Nancy Franz, Iowa S tate U (USA)
Lynn Fredericks, FamilyCook Productions (USA)
Kathlee Freeman, Food Tank (USA)
Jasenka Gajdoš Kljusurić, U of Zagreb (Croatia)
Stephan Goetz, Pennsylvania State U (USA)
Angela Gordon Glore, AmeriCorps/VISTA (USA)
Carol Goland, Ohio Ecological Food and Farm Association (USA)
Sheila L. Gray, Washington State U–Lewis County Extension (USA)
Arthur Green, Okanagan College (Canada)
John Guszkowski, CME Associates, Inc. (USA)
Ella Haley, Athabasca U (Canada)
Edmund Harris, Clark U (USA)
Neva Hassanein, U of Montana (USA)
Lena Hatchett, Loyola U Chicago (USA)
Amber A. Heckelman, Washington State U (USA)
Mary Hendrickson, U of Missouri (USA)
Leslie Hossfeld, U of North Carolina–Wilmington (USA)
Guiping Hu, Iowa State U (USA)
Lauren Hunter, Coop. Extension, U of Idaho-Blaine County (USA)
Lucilla Iacumin, U of Udine (Italy)
Valerie Imbruce, Bennington College (USA)
Martin Kabaluapa, World Food Programme (Kenya)
Sanjay Kharod, New Orleans Food and Farm Network (USA)
David A. Knauft, U of Georgia (USA)
Fiona Knight, Private food system consulting practice (Canada)
Uma Koirala, Tribhuvan U (Nepal)
Jane Kolodinsky, U of Vermont (USA)
Laura Lavid, Florida Organic Growers (USA)
Dale Levering, LCC International U (Lithuania)
Matt Lobley, U of Exeter (UK)
Bohdan Lojka, Czech U of Life Sciences (Czech Republic)
Samya Lutz, Whatcom County (USA)
Uford A. Madden, Florida A&M U (USA)
William Armand Mala, U of Yaounde I (Cameroon)
Christian Man, Bring It Food Hub (USA)
Lisa Markowitz, U of Louisville (USA)
Sarah Martin, U of Waterloo (Canada)
Derek Masselink, Masselink Environmental Design (Canada)
Florentina Matei, Universitatea de Stiinte Agronomice si Medicina Veterinara – Bucuresti (Romania)
Nathan McClintock, Portland State U (USA)
Jesse C. McEntee, Food Systems Research Institute, LLC (USA)
Devan McGranahan, North Dakota State U (USA)
Kim McMann, Berkshire Community Action Council (USA)
Mahbubur R. Meenar, Temple U (USA)
Bethann G. Merkle, Independent consultant (USA)
Farhad Mirzaei, Animal Sciences Research Institute of Iran (Iran)
Bernadette Montanari, U of Kent, Canterbury (UK)
Alfonso Morales, U of Wisconsin–Madison (USA)
Vicki Morrone, Michigan State U (USA)
Phil Mount, U of Guelph (Canada)
Joe Nasr, Centre for Studies in Food Security, Ryerson U (Canada)
Kim L. Niewolny, Virginia Tech (USA)
Samantha Noll, Michigan State U (USA)
Kimberly Norris, U of Maryland (USA)
Lydia Oberholtzer, Penn State U (USA)
Fernando Ona, Tufts U (USA)
Aleck Ostry, U of Victoria (Canada)
Isidro Ovando-Medina, U of Chiapas (Mexico)
Laxmi Prasad Pant, U of Guelph (Canada)
Tapan B. Pathak, U of Nebraska (USA)
François Pelatan, AMAP Dordogne (France)
Robert Perry, U of Kentucky (USA)
Greg Pillar, Queens U of Charlotte (USA)
Emily Piltch, Tufts U (USA)
Michael Pinto, Osborn Architects (USA)
Madeleine Pullman, Portland State U (USA)
Masud Parves Rana, Rajshahi U (Bangladesh)
Shivaugn M. Rayl, Carolina Farm Stewardship Association (USA)
Taylor Reid, Michigan State U (USA)
Kristin A. Reynolds, The New School (USA)
David Richey, Lane Council of Governments (USA)
Suzana Rimac Brnčić, U of Zagreb (Croatia)
Antonio Roman-Alcalá, Alemany Farm (USA)
Natalie R. Sampson, U of Michigan (USA)
Brian J. Schilling, Rutgers U (USA)
Syed Suhail Mumtaz Shah, The Agronomy Institute (Scotland)
Uma i Shankari, Rashtriya Raithu Seva Samithi, a farmers' organization (India)
Garry Stephenson, Oregon State U (USA)
Bill Swanson, Valentine Hill Farm (USA)
Nicole Elizabeth Tichenor, Tufts U (USA)
Diana Vergis Vinh, Public Health Department, Seattle (USA)
Matteo Vittuari, U of Bologna (Italy)
Gerald W. Warmann, South Dakota State U (USA)
Amy Webb Girard, Emory U (USA)
E. Christian Wells, U of South Florida (USA)
Robert Wengronowitz, U of Chicago (USA)
Spencer D. Wood, Kansas State U (USA)
Jen Wrye, Carleton U (USA)
Steve Young-Burns, PastureLand Cooperative and freelance food writer (USA)
Lorna Zach, U of Wisconsin (USA)

Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
www.AgDevJournal.com

Contents | Volume 5, Issue 1 / Fall 2014

On the cover: After watching a knife skills demonstration, food service professionals rolled up their sleeves and practiced washing, slicing, and dicing fresh produce at a professional development workshop hosted by the New Jersey Farm to School Network. Access to training and proper equipment is essential to the success of local food procurement in school cafeterias since many local products are delivered whole and unprocessed.

(Photo by Chelsey Simpson, National Farm To School Network, and used with permission.)

(Continued)

The Food Systems Development Project of the Center for Transformative Action (an affiliate of Cornell University), publisher of JAFSCD, is grateful for the support of our sponsors.

Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
www.AgDevJournal.com

IN THIS ISSUE

DUNCAN L. HILCHEY

A challenging new profession: Food systems development practice

Published online December 19, 2014

Citation: Hilchey, D. L. (2014). A challenging new profession: Food systems development practice [Editorial]. *Journal of Agriculture, Food Systems, and Community Development, 5*(1), 1–3. http://dx.doi.org/10.5304/jafscd.2014.043.018

In this issue of the *Food Systems Journal* we offer a bountiful fall harvest of papers on subjects ranging from urban soils and supply chains to social networks and community building. A cursory look at the titles in this issue would probably not yield a common theme, but it is there in plain sight. It's the same theme that cuts across all our accepted papers and across all issues we publish. That theme is *people* — us — food systems development practitioners, working hard and enjoying our work (as this fall issue's cover image depicts). We are scholars, farmer-activists, land-use officials, organizers, nutritionists, farmers market managers, food service directors, planners, program volunteers, extension educators, graduate students, and the list goes on. We are stewards of a vast, complicated, and fragile system that is linked to food security, livelihoods, culture, open space, quality of life, and many other multifunctional benefits. Yet as people we have our needs as well.

To learn more about *us* — our needs and challenges in food systems work — JAFSCD conducted a survey in collaboration with a group of colleagues around North America of self-identified "food systems development practitioners" in 2011–12. We promoted the survey on COMFOOD and other email lists, and even developed a Québécois version of the survey in order to have more participation from French Canadians. Given the "whiteness" of food systems work, we also made a special effort to encourage people of color to complete the survey. To our amazement, over 1,300 individuals responded. What we learned, in a nutshell, was that not only is the food system fragile, but so too are the projects many of us are working on, along with our livelihoods. By all accounts food systems work is emerging as a profession (or as a facet of other traditional professions like planning or extension), but during these nascent stages the profession is subject to the whims of pubic and private funders and ultimately, by unfortunate necessity, the stock market. This dictates the size of endowments and government coffers — the core resources for funding food systems work.

With the results of the survey in hand, a working group of over 100 survey respondents was formed to address the professional development needs of food systems development practitioners, and a steering committee was created to provide some leadership to the group. Without resources, the launch of what has become known as the **North American Food Systems Network** (NAFSN) has been challenging. But the development of this "community of practice" is ongoing and has begun to focus on establishing a food systems development certification curriculum that will provide a foundation of practice to those who are working in the trenches on hunger, new farmer programing, farm-to-institution projects, food hubs, food policy councils, agriculture of the middle value chains, etc., including the practical tools they need to plan and execute successful projects — tools such as methods of stakeholder participation, asset mapping, and metrics for measuring success and impacts.

As I write this, a partnership of national organizations and institutions is forming to help move NAFSN's agenda forward in 2015. Anyone interested in joining the NAFSN working group is invited to contact me at duncan@newleafnet.com.

We start off this issue with a guest editorial from JAFSCD's cosponsor, the Leopold Center for Sustainable Agriculture at Iowa State University. In *Evaluation and the Local Foods Data Void,* **Corry Bregendahl** and **Craig Chase** offer a fresh approach to gathering impact data on local food initiatives.

Next up is a column from **John Ikerd**, who is developing a keen interest in multifunctionality in agriculture and food systems. In *Multifunctionality: A New Future for Family Farms,* he puts the spotlight on recognizing multifunctionality as a means to a more sustainable future for family farmers.

Instead of writing his regular column, in this issue **Rami Zurayk** has written a deeper commentary of the insidious links between Ebola and fragile food systems in *Looking at Sierra Leone's Ebola Epidemic Through an Agrarian Lens.*

In an open access paper entitled *Increasing Prosperity for Small Farms Through Sustainable Livestock Production, Processing, and Marketing,* **Darin Saul, Soren Newman, Tracie Lee, Steven Peterson, Stephen Devadoss, Dev Shrestha,** and **Nick Sanyal** explore the feasibility of regional livestock strategies in surmounting very high supply-chain barriers.

Jill Clark, Shoshanah Inwood, and **Douglas Jackson-Smith** present stakeholders' feedback on farmland protection policy in the hinterlands of cities in *Exurban Farmers' Perceptions of Land Use Policy Effectiveness: Implications for the Next Generation of Policy Development.*

The Farm Fresh Healthcare Project: Analysis of a Hybrid Values-based Supply Chain by **Kendra Klein** and **Ariane Michas** provides an inside view of a farm-to-institution project attempting to balance values and efficiency.

In *A Framework for Site Assessment Guides for Urban Impacted Soils: A Vancouver Case Study,* **Melissa Iverson, Maja Krzic,** and **Arthur Bomke** proffer a comprehensive method of evaluating and addressing the problems of soils in cities.

Next, **Yue Cui** evaluates the online social networking potential of farmers markets in *Examining Farmers Markets' Usage of Social Media: An Investigation of a Farmers Market Facebook Page.*

Nathan Hilbert, Jennifer Evans-Cowley, Jason Reece, Christy Rogers, Wendy Ake, and **Casey Hoy** then challenge us to measure travel time in our identification of food deserts in *Mapping the Cost of a Balanced Diet, as a Function of Travel Time and Food Price.*

In *Bridging the Gap Between Farmers and Food Service Directors: The Social Challenges in Farm to School Purchasing,* **Brandi Janssen** presents an insightful reflective essay on the social barriers between farmers and food service directors.

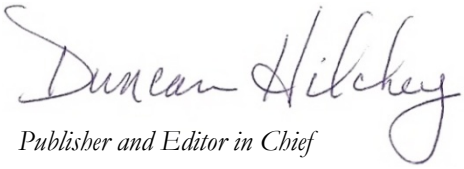
Cultural differences among local food system stakeholders are explored in **Yuki Kato's** *Gardeners, Locavores, Hipsters, and Residents: An Alternative Local Food Market's Potential for "Community" Building.*

Melissa Poulsen, Marie Spiker, and **Peter Winch** then explore the value of the acceptance and active engagement of local residents in *Conceptualizing Community Buy-in and its Application to Urban Farming.*

In our final paper of the issue, entitled *Illinois Farmers Markets Using EBT: Impacts on SNAP Redemption and Market Sales,* **Afroza Hasin, Sylvia Smith,** and **Pat Stieren** find that accepting EBT does increase market sales, and that the use of incentives, receipts and direct swipes, and volunteers handling EBT transactions can have significant positive effects on EBT sales.

In this issue we also offer two book reviews and JAFSCD's first movie review. **Philip Loring** reviews *Grass, Soil, Hope: A Journey Through Carbon Country,* by Courtney White, and **Molly Anderson** reviews *Sustainable Food Systems: Building a New Paradigm,* edited by Terry Marsden and Adrian Morley. Finally, **Jane Kolodinsky** goes to the movies and discovers there's more than one meaning of "chains" in the documentary *Food Chains.*

Best wishes for a healthy and happy New Year!



Publisher and Editor in Chief

Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
www.AgDevJournal.com

GUEST EDITORIAL
CORRY BREGENDAHL AND CRAIG CHASE
LEOPOLD CENTER FOR SUSTAINABLE AGRICULTURE

Evaluation and the local foods data void

Published online November 20, 2014

Citation: Bregendahl, C., & Chase, C. (2014). Evaluation and the local foods data void [Guest editorial]. *Journal of Agriculture, Food Systems, and Community Development, 5*(1), 5–9. http://dx.doi.org/10.5304/jafscd.2014.051.007

Local and regional food system professionals are obliged to rely on imperfect, incomplete, and evolving measures to track economic changes in the local food industry. These data are critical for informing decisions on how to invest limited resources to create optimal impacts. U.S. Department of Agriculture (USDA) Census of Agriculture figures indicate that direct food sales in the U.S. appeared to have increased from US$1.2 billion in 2007 to US$1.3 billion in 2012 — but when adjusted for inflation, sales actually remained steady. These figures, however, do not account for local food sales to institutions, restaurants, and retailers. The 2008 Agricultural Resource Management Survey (ARMS) partially addressed this gap by tracking local food sales from farmers to both individuals and "intermediated" markets such as restaurants and grocery stores. But the ARMS data did not include local food sales to institutions such as schools or hospitals, thus leaving another gap in the data.

Data derived from various national sources indicate that local food systems may be growing, but the data collection methods are inconsistent and the results piecemeal (Hunt & Matteson, 2012). Moreover, the information is presented at a scale that often is irrelevant to local professionals serving constituents within a specific geographic region. The absence of locally relevant pre-existing data on local foods means that entities like local governments, community foundations, school administrators, and others are creating policies, programs, and investments that affect the local food sector without having basic information about its scope.

In the 2013 summer issue of JAFSCD, O'Hara and Pirog called for more local food studies to (1) be conducted on a larger geographic scale and (2) measure more diverse economic impacts (i.e., more than just jobs). We would add to O'Hara and Pirog's first recommendation that in order to be useful for local food professionals, a national dataset should be reducible to smaller units for more detailed and relevant analysis.

Corry Bregendahl is associate scientist at the Leopold Center for Sustainable Agriculture and can be contacted at 209 Curtiss Hall; Ames, Iowa 50011 USA; +1-515-462-0450; corry@iastate.edu.

Craig Chase leads the Marketing and Food Systems Initiative at the Leopold Center for Sustainable Agriculture and the Iowa Food Systems Working Group for Iowa State University Extension and Outreach. He can be contacted at cchase@iastate.edu.

Learn more about the Leopold Center for Sustainable Agriculture at http://www.leopold.iastate.edu.

The second recommendation, for tracking economic indicators beyond jobs, is important because other economic factors related to local and regional food systems are affecting communities and families. These include, among others, changes in wages; net household income for farmers, farm businesses, and farm service providers; dollars leveraged by communities; and local institutional food purchases.

O'Hara and Pirog (2013) also described three categories of economic studies that have been done on local foods, two of which rely on economic models and associated assumptions. These two include estimates of the regional impacts of specific local food markets and farm-level impacts derived from a specified level of local produce consumption (say, five servings a day). They identified a third category of economic impact studies that examine local food sales at a multistate or national level. To this, we would add a fourth category: economic evaluations of local food system efforts.

To address all of the data gaps we encountered at the national level and to get a better handle on the economics of the local foodscape in Iowa, in 2012 we began coordinating data collection with the help of a network of local food coordinators. This was not a *study* per se, but an evaluation of impacts from a decade of work with the Iowa Regional Food Systems Working Group (RFSWG). We set out to discover and document outcomes — or what changed — as a result of, or in association with, particular actions. In our 2013 (Bregendahl & Enderton, 2013) and forthcoming 2014 reports we collected and analyzed data on four economic measures:

1. Local food sales reported by farmers in our network;
2. Local food purchases reported by institutional and intermediated buyers in our network (grocery stores, restaurants, schools, etc.);
3. Jobs created in connection with local food production and procurement reported by local food farmers and buyers in our network; and
4. Financial leverage (grants, donations, fundraisers, county Extension funds, etc.) secured by our local food coordinators to support regional food system development.

We began the process by convening an advisory group of local food coordinators drawn from the RFSWG who had experience in tracking and documenting outcomes of their work. Together, we developed a draft evaluation plan that borrowed heavily from their pre-existing work. After much dialogue and revision, a final evaluation plan emerged that relied on the entire network of 15 local food coordinators to recruit local food farmers and local food buyers from their respective regions to complete one of two surveys (a farmer survey and a buyer survey). All the local food coordinators were encouraged to participate through a series of presentations, discussions, and conference calls delivered at or between each quarterly RFSWG meeting. All coordinators who participated received a small stipend for their cooperation and were promised not only inclusion by name in the statewide report but also a customized report with their region's results. Each local food coordinator was encouraged to use this professionally designed, color, two-page report to share their progress with local partners and stakeholders, including farmers and buyers of local food who had completed the surveys. Follow-up with these two latter groups after the work was done gave local food coordinators the opportunity to (1) show respondents how their data was used and reported, (2) improve transparency, (3) strength the relationship, and (4) provide additional support.

We published a guidebook (Bregendahl, Kleiman, & Wiemerslage, 2013) to ensure the data were collected in a systematic and consistent way, with some room for flexibility. For example, some local food coordinators distributed hard copies of the surveys in person to their partnering farmers and local food buyers. Other food coordinators simply sent their partners a link to the electronic surveys and asked them to complete it. In the guide we also described why we developed a shared measurement system, what tools we were using, how this process was expected to benefit the work of each regional group, and anticipated challenges.

For instance, sales data are notoriously difficult to collect from farmers. That is why we asked local food coordinators to request the data since they, not the evaluators, had a trusted personal relationship with

farmers in their region and were most likely to elicit a response. Having local food coordinators involved in the process also provided some accountability in terms of vetting the information that farmers provided since most local food coordinators had access to and reviewed the data prior to submission to us. Farmers were instructed to consult their IRS Schedule F for local food sales figures from the previous calendar year. However, they were also allowed to estimate their sales and indicate if they provided actual figures or estimates.

In the guidebook we provided local food coordinators tips and strategies for maximizing participation. Among them were:

- Build quality relationships with partners early on by hosting meet-and-greets or calling local food farmers and buyers;
- Consider providing something in exchange for survey participation, such as farm labor or recruiting volunteers to help on the farm;
- Initiate multiple and gentle modes of contact with potential respondents, all of whom are busy;
- Ask farmers how they prefer to respond (electronically, hard copy, or through a personal conversation); and
- Time distribution of the surveys to coincide with tax deadlines and prior to the next growing season.

Once the data were collected, we generated a list of respondent identification numbers and sent them to local food coordinators, if they did not already have that information, so they could determine who had not responded so they could make follow-up calls. We also reviewed each completed survey for skewed or missing data and followed up as warranted. To address concerns that self-reported data may not be reliable, readers should note that the U.S. Census of Agriculture relies on self-reported data. Furthermore, no data collection process is without bias or error. In addition, it would have been unrealistic to expect farmers to hand over their tax returns or business financial records, nor did we have the resources to protect those documents and analyze them given we received no funding to conduct the evaluation. As a team we agreed that unrealistic standards of perfection would not prevent us from gathering heretofore uncollected information on local food system change in Iowa.

In November of this year, we completed our second year of data collection. Sample data from the forthcoming 2014 report are shown in Table 1.

Table 1. Selected Data from Evaluation of the Iowa Regional Food Systems Working Group (all in US$)

	2012	2013	% change
Total local food sales by farmers	$10,549,296	$13,035,445	+23%
Total local food purchases by institutions and intermediated markets	$8,934,126	$13,129,702	+47%
Total funds leveraged by regional food groups for use in the calendar year	$766,020	$882,842	+15%
Total number of new jobs created by local food producers and local food buyers	53	118	+123%
Total number of new full-time jobs	24	39	+63%
Public cost of creating 1 new full-time job	$17,874	$14,300	–20%

Program evaluators rarely claim causality, but do determine *association.* Association is a more realistic statistical achievement because there often are many confounding variables in messy, uncontrolled human systems that we can neither perfectly comprehend nor perfectly measure. Further, evaluators typically do not construct or test hypotheses, as we are not trying to *predict* behavior but measure behavior ex post facto.

As a result, evaluation is often dismissed as having little to contribute to scientific discourse on what constitutes valid and reliable data, specifically related to local foods or otherwise. This is in error. While the results of our economic impact evaluation are specific to Iowa and our networks, they are *actual* results generated from a process of systematic and scientific inquiry. They are not estimates based on assumptions, but rather measured impacts that help us understand what difference coordinated local/regional food systems efforts have made in Iowa.

Like any organized system of inquiry with rules and conventions, evaluation also has its limitations. The primary limitation is its ability to measure complete impacts. Given that outcomes-based evaluation efforts typically only receive between 0 and 10 percent of total project budgets, evaluations typically lack ample resources to include feedback from those who were not directly involved in a given program, but probably were affected by it. Thus, outcomes-based evaluations are likely to be more *conservative* than what has actually occurred. Evaluation and the scientific method are both tools we have at our disposal to better understand the world we live in. However, we underutilize the former for a variety of reasons.

First, we underutilize evaluation because it lacks institutional scientific credibility, given that evaluators do not test hypotheses. For academia this is a perceived weakness, but it is not for practitioners, who work outside "ideal" conditions. Second, evaluation results (particularly long-term ones) are often difficult to track because they typically appear long after a project is no longer funded. Third, if an evaluation is conducted, results are rarely circulated to the public. Fourth, evaluation reports fall into the genre of technical writing and are typically both visually and substantively unappealing to the casual observer and even those directly involved in project management. We need these things to change. The following are some recommendations based on our experience for conducting project evaluations:

- Bring project leaders and partners on board to appreciate the value and potential of evaluation to inform local/regional food work and to ensure that resources are secured to fund evaluation. We often are heavily engaged in activities but fail to reflect on what outcomes the activities achieved once the work is completed. Evaluation aims to find out what changed as a result of those activities, who or which groups changed and why, which groups benefited, and why it matters. Evaluation can be especially critical for positioning work to receive new sources of support when the work expands.

- Implement evaluation using common metrics across different places, people, and projects or efforts to track the collective impact (Kania & Kramer, 2011) of cross-sectoral work. Although this sounds easy, in practice it becomes a major effort to bring people together around common measures and ways of measuring change. The key is to start small with a focus on a few indicators, especially if you have many partners. In our case, developing a shared measurement system to track and report the four economic indicators cited above took over a year and half for the RFSWG, which represented 15 geographic areas. However, the coordinated process we used has become the foundation for tracking impacts of other regions' work in local and regional food systems, namely the Michigan Food Charter (R. Pirog, personal communication, Oct. 21, 2014).

- Be deliberate about actively communicating evaluation results in a way that is accessible. In communicating impacts, consider the various audiences, prepare different reports for each, and make results easy to consume (keep reports brief, visually appealing, and include both stories and numbers; also publicize results using a variety of media, including websites, Facebook, Twitter, etc.). For the RFSWG evaluation we created a two-page brief of the evaluation results, a customized report for each local food region that participated, and a professionally formatted report of the most important results. We also issued a press release. In turn, nearly 30 media outlets in and outside Iowa carried the results, which made it into several legislative briefs.

In the absence of national census or research data, as acknowledged by O'Hara and Pirog (2013), evaluation can be a locally achievable solution for addressing the data gap. Local food leaders, practitioners, politicians, business owners, and the public are thirsty for new, relevant, credible, and accessible sources of information on changes to their local food systems. In Iowa, these groups are using the data to make funding decisions on how to support regional food systems development, assess public health needs, and grow rural businesses. Local food evaluators, particularly those focusing on regional collective impact, can inform that work by systematically measuring a few key indicators and telling the story of change to help the movement overcome the void in local food data.

References

Bregendahl, C., & Enderton, A. (2013). *2012 economic impacts of Iowa's Regional Food Systems Working Group.* Ames, Iowa: Leopold Center for Sustainable Agriculture. Retrieved from http://www.leopold.iastate.edu/pubs-and-papers/2013-11-2012-economic-impacts-iowas-regional-food-systems-working-group

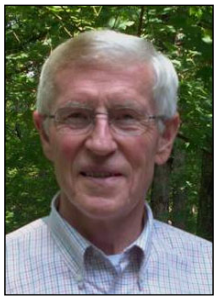
Bregendahl, C., Kleiman, L., & Wiemerslage, T. (2013). *Collecting data for collective impact: A guide for coordinators in the Regional Food Systems Working Group. A how-to manual for documenting the economic impact of regional food systems work in Iowa.* Ames, Iowa: Leopold Center for Sustainable Agriculture. Retrieved from http://www.leopold.iastate.edu/pubs-and-papers/2013-02-rfswg-data-collection-guide

Kania, J., & Kramer, M. (2011). Collective impact. *Stanford Social Innovation Review, 1*(9), 36–41. Retrieved from http://www.ssireview.org/pdf/2011_WI_Feature_Kania.pdf

Hunt, A. R., & Matteson, G. (2012). More than counting beans: Adapting USDA data collection practices to track marketing channel diversification. *Journal of Agriculture, Food Systems, and Community Development, 2*(4), 101–117. http://dx.doi.org/10.5304/jafscd.2012.024.010

O'Hara, J., & Pirog, R. (2013). Economic impacts of local food systems: Future research priorities. *Journal of Agriculture, Food Systems, and Community Development, 3*(4), 35–42. http://dx.doi.org/10.5304/jafscd.2013.034.003

Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
www.AgDevJournal.com



THE ECONOMIC PAMPHLETEER
JOHN IKERD

Multifunctionality: A new future for family farms

Published online December 19, 2014

Citation: Ikerd, J. (2014). Multifunctionality: A new future for family farms. *Journal of Agriculture, Food Systems, and Community Development, 5*(1), 11–13. http://dx.doi.org/10.5304/jafscd.2014.051.016

I was surprised to have been asked recently by the Food and Agricultural Organization (FAO) of the United Nations to write a policy paper on family farming in North America in recognition of the International Year of the Family Farm (Ikerd, 2014). I questioned whether the FAO actually wanted me to write the paper, because of my non-conventional views of American agriculture. In the process, however, I discovered that much of the rest of the world is awakening to the realization that the values of traditional family farming are essential to ensure global food security. The U.S., Canada, and Australia have found few allies in their championing of industrial agriculture as being necessary to avoid massive hunger in the future.

The concept of multifunctional agriculture, as

John Ikerd *is professor emeritus of agricultural economics, University of Missouri, Columbia. He was raised on a small dairy farm in southwest Missouri and received his BS, MS, and Ph.D. degrees in agricultural economics from the University of Missouri. He worked in private industry for a time and spent 30 years in various professorial positions at North Carolina State University, Oklahoma State University, University of Georgia, and the University of Missouri before retiring in 2000. Since retiring, he spends most of his time writing and speaking on issues related to sustainability with an emphasis on economics and agriculture. Ikerd is author of* Sustainable Capitalism; A Return to Common Sense; Small Farms Are Real Farms; Crisis and Opportunity: Sustainability in American Agriculture; A Revolution of the Middle; *and the just-released* The Essentials of Economic Sustainability. *More background and selected writings are at http://web.missouri.edu/~ikerdj.*

*Why did I name my column "**The Economic Pamphleteer**"? Pamphlets historically were short, thoughtfully written opinion pieces and were at the center of every revolution in western history. Current ways of economic thinking aren't working and aren't going to work in the future. Nowhere are the negative consequences more apparent than in foods, farms, and communities. I know where today's economists are coming from; I have been there. I spent the first half of my 30-year academic career as a very conventional free-market, bottom-line agricultural economist. I eventually became convinced that the economics I had been taught and was teaching wasn't good for farmers, wasn't good for rural communities, and didn't even produce food that was good for people. I have spent the 25 years since learning and teaching the principles of a new economics of sustainability. Hopefully my "pamphlets" will help spark a revolution in economic thinking.*

commonly used in international trade and policy discussions, refers to the multiple potential benefits of agriculture, emphasizing the importance of non-economic benefits of agriculture. Farms in this context are inherently multifunctional in that they have multiple ecological, social, and economic impacts on nature and society. A global report, *Agriculture at a Crossroads,* points out that multifunctional agriculture "provides food, feed, fiber, fuel and other goods…has a major influence on other essential ecosystem services such as water supply and carbon sequestration or release…plays an important social role, providing employment and a way of life…is a medium of cultural transmission and cultural practices worldwide…[and] provide[s] a foundation for local economies" (International Assessment of Agricultural Knowledge, Science, and Technology for Development [IAASTD], p. 6).

The report also points out that "sustainable development is about meeting current needs without compromising the ability of future generations to meet their own needs. It is indisputable that agriculture as a sector cannot meet this goal on its own. Agriculture, however, fulfills a series of additional goals besides food production. Last but by no means least, agriculture ensures the delivery of a range of ecosystem services. In view of a globally sustainable form of development, the importance of this role may increase and become central for human survival on this planet" (IAASTD, p. 15). At least four recent UN-sponsored global reports have confirmed that multifunctional farming is the best hope for global food security and agricultural sustainability (Kirschenmann, 2012).

Sustainable farms are unique in that they are *intentionally* multifunctional. They are intentionally managed to provide multiple positive benefits, not only for the economic bottom line. The global food policy agenda is being shifted toward agricultural sustainability by the growing realization that industrial agriculture is inherently incapable of providing long-run global food security. In retrospect, many so-called developing nations see the Green Revolution as a failure. It failed to provide food for those who were hungry because most hungry people are poor. Many subsistence family farmers were displaced, leaving them without their previous means of meeting the basic food needs of their families.

Farms managed solely or even predominately for the economic bottom line are managed *monofunctionally,* even though they have multiple impacts on communities and ecosystems. Agricultural industrialization is motivated by economic efficiency and thus industrial farms, including those of the Green Revolution, are managed monofunctionally — even if they are owned and operated by families. There is no economic value in doing anything for the sole benefit of society as a whole or the future of humanity. The myopic pursuit of economic efficiency inevitably degrades natural ecosystems and degenerates societies. Monofunctional farms are not sustainable.

Many farms today share far more characteristics with the businessmen, financiers, and corporate managers distrusted by Jefferson, Smith, and Confucius than with the farmers valorized in past cultures.

Historically, family farms have been held in cultural positions of high esteem. Thomas Jefferson, for example, believed strongly that the "yeoman farmer" best exemplified the kind of "independence and virtue" essential for democracy. He did not believe financiers, bankers, or industrialists could be trusted to be responsible citizens. Adam Smith, an icon of capitalism, observed that farmers ranked among the highest social classes in China and India and suggested it would be the same everywhere if the "corporate spirit" did not prevent it. Smith never trusted businessmen and distrusted corporations in particular. The philosophy of Confucius ranked farmers second only to academics and scholars in the Chinese social order, who were then followed by workers, and lastly, businessmen. All of these respected historical figures placed farmers at or near the top of society

and those concerned with business and economics at the bottom.

Today, Americans are being subjected to an ongoing multimillion-dollar corporately funded propaganda campaign designed to convince us that today's conventional farm businesses deserve the same high esteem historically reserved for family farmers (Lappe, 2011). All family-owned or -operated farm businesses are being portrayed as "modern family farms," suggesting they possess the same values and virtues of the family farmers idealized by Jefferson and Smith. In truth, many farms today share far more characteristics with the businessmen, financiers, and corporate managers distrusted by Jefferson, Smith, and Confucius than with the farmers valorized in past cultures.

The family farms deemed uniquely worthy of high esteem were *intentionally* multifunctional family farms. They were managed to provide positive ecological, social, and economic benefits. On a true family farm, the farm and the family are inseparable. This sense of personal interconnectedness of the family with the farm is ultimately what makes a farm a "family farm" and a family a "farm family." The same farm with a different family would be a different farm, and the same family with a different farm would be a different family. The well-being of the farm is inseparable from the well-being of the family.

A true family farm is managed to reflect the cultural and social values of the farm family as well as their economic necessities and preferences. The core "culture" of agriculture embodied in family farming is one of stewardship or caring for the land, society, and humanity. The core social value of family farming is one of neighborliness and caring for community and society. At the same time, a true family farm must also provide the economic essentials of a desirable quality of life. These were the virtues of farming idealized by past cultures and are the virtues still essential for global food security and agricultural sustainability.

The core "culture" of agriculture embodied in family farming is one of stewardship or caring for the land, society, and humanity.

Family farmers have the advantages of a natural motivation and an inherent potential to farm sustainably. Intentionally multifunctional farms need not be owned or operated by families, but they must reflect the traditional cultural and social values of family farmers. Returning multifunctional farming to its honored, almost sacred, position in the cultures of North America and the world promises a bright, new future for family farming.

References

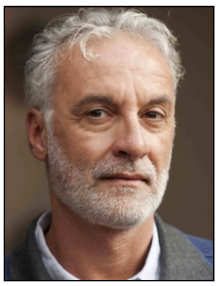
Ikerd, J. E. (2014). Family farms of North America [North American regional perspective]. In Food and Agriculture Organization of the United Nations (Ed.), *Deep Roots* (pages 30–32). Rome: FAO. Retrieved from http://www.fao.org/3/a-i3976e.pdf

International Assessment of Agricultural Knowledge, Science, and Technology for Development (IAASTD). (2009). *Agriculture at a crossroads: Global report*. Washington, D.C.: Island Press. Retrieved from http://www.agassessment.org/reports/IAASTD/EN/Agriculture%20at%20a%20Crossroads_Global%20Report%20(English).pdf

Kirschenmann, F. (2012, Winter). The challenge of ending hunger. *Leopold Letter, 24*(4), 5. Retrieved from the Leopold Center for Sustainable Agriculture website: http://www.leopold.iastate.edu/news/leopold-letter/2012/winter/future

Lappe, A. (2011, September 27). Who's behind the US Farmers & Ranchers Alliance and why it matters [Web log post]. Retrieved from http://grist.org/factory-farms/2011-09-26-whos-behind-the-u-s-farmers-ranchers-alliance-and-why-it-m/

Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
www.AgDevJournal.com



COMMENTARY

Looking at Sierra Leone's Ebola epidemic through an agrarian lens

Rami Zurayk
American University of Beirut

Submitted November 10, 2014 / Published online November 17, 2014

Citation: Zurayk, R. (2014). Looking at Sierra Leone's Ebola epidemic through an agrarian lens [Commentary]. *Journal of Agriculture, Food Systems, and Community Development, 5*(1), 15–20. http://dx.doi.org/10.5304/jafscd.2014.051.005

When the residents of the small town of Fort Kent in rural Maine expressed their concerns about Sierra Leone's Ebola epidemic arriving "on their doorstep" (Freyer, 2014), they may have not known that they were right to realize that Sierra Leone is actually far closer to the United States than may be immediately obvious. The West African country, which is about the size of the state of Maine, is home to a population of six million, among whom many are descended from the 1,200 freed enslaved people who were brought back from the U.S. in 1791. The freed slaves had been returned to the same spot of the African coast from which millions of slaves had been shipped to the U.S. to work in the rice and sugar cane plantations.

The history of Sierra Leone is one of dispossession, enslavement, exploitation, and thievery at the hand of local, colonial, and imperial powers. These hardships have contributed to the enrichment of many, including Hollywood magnates and actors who dug into the country's 1991–2002 civil war, fueled by the illegal sale of the country's diamonds, for inspiration. The award-winning 2006 movie *Blood Diamond,* starring Leonardo DiCaprio, grossed over US$170 million, of which the people of Sierra Leone never saw a single cent.

For this is Sierra Leone's predicament: its people do not benefit from its riches. For instance, while natural resources abound, especially fertile lands, diamonds, and tropical forests, the country is plagued by land grabs, blood diamonds, and conflict timber (McCoy, 2014). Sierra Leone is one of

Rami Zurayk *is professor at the Faculty of Agricultural and Food Sciences at the American University of Beirut, Lebanon. His research addresses issues at the nexus of food, landscapes, and livelihoods. He is an active member of Lebanese civil society and a founding member of the Arab Network for Food Sovereignty. His book* Food, Farming, and Freedom: Sowing the Arab Spring *was published by Just World Books in 2011. He can be contacted at ramizurayk@gmail.com.*

the poorest countries in the world, with a Human Development Index ranking in 2013 of 183 out of 187 (United Nations Development Programme [UNDP], 2014).

Rural Sierra Leone: Poverty, Food Insecurity, and Land Grabs

Like its population, poverty in Sierra Leone is mainly rural. Data from the World Food Programme (WFP) shows that up to 70 percent of the population live below the national poverty line of US$2 per day (WFP, 2011, p. 31). Food insecurity is rife: 45 percent of people are food insecure (WFP, 2011, p. 9). Even though 95 percent of the population grow food crops (WFP, 2008, p. X), 63 percent of the household income is spent on food (WFP, 2011 p. 34). However, farming is the exclusive source of livelihood for just 15 percent of producers (WFP, 2008, p. 57), and only 5.5 percent of rice cultivators can feed their families from their own production for the whole year (WFP, 2011, p. 38). Livelihood diversification strategies are essentially based on natural resources: oil palm extraction, fishing, animal husbandry, or charcoal-making. Coping strategies in times of crises are essentially borrowing food and money (WFP, 2008, p. 53)

Although yields are very low (often below 1 metric ton per hectare or 0.45 U.S. tons per acre), Sierra Leone's small farmers produced about 80 percent of the country's rice needs in 2010 (WFP, 2011, p. 19). The rest is imported from volatile international markets. Improving access to agricultural inputs and introducing better farming practices would greatly contribute to enhancing the sustainability of production, and would have positive impacts on food security and poverty alleviation. A relatively straightforward agrarian development program aiming to bolster small farm productivity needs to be put in place with the clear goals of improving access to resources and bridging the yield gap using agroecological approaches. The issue of land tenure and fair access to resources will need to be given careful consideration, as tenure is predominantly communal and under the control of local chiefs. This system is unfavorable to vulnerable groups who cannot easily gain access to land, and to women who cannot inherit land (Larbi, 2012).

Instead of an agrarian revolution aimed at improving the sustainability of small farmers, rural Sierra Leone is experiencing a different kind of agricultural restructuring. According to a recent report commissioned by international organizations (Baxter, 2013), up to one-fifth of the country's farmland has been leased since 2009 to industrial agriculture investors, most often for the production of bioethanol from palm oil and sugar cane. International investors co-opt local chiefs to serve the projects at the expense of their traditional duties, which include fair allocation of land to cultivators. Money becomes the main currency of social power, to the great disadvantage of the poor and the disenfranchised.

These investments have resulted in turning scores of farmers into farmworkers earning wages of US$2–US$3 per day, dangerously close to the poverty line. It is sadly ironic that the descendants of the freed slaves from the sugarcane fields of America are now held in quasibondage as wage laborers in sugarcane farms and factories in their own countries. Examples of agricultural investment projects include 44,000 ha (109,000 acres) of long-term land leases to the Addax Corporation in the district of Bombali, and 42,000 ha (104,000 acres) to the same corporation in Port Loko district, where there is widespread discontent about the deals (Baxter, 2013). Port Loko is also the site of a controversial project by the Portuguals Quifel Group, whose work started in Brazil but, attracted by lower land prices, was moved to Sierra Leone (Environmental Justice Atlas, 2014). In total, 231,326 ha (40 percent of the total area of the districts) in seven of 11 chiefdoms of Port Loko have been leased (Baxter, 2013, p. 14). It is worth noting here that the independent WFP report reported that over 70 percent of households in Port Loko are food insecure (WFP, 2011 p. 10). A full environmental, social, and economic impact assessment and cost-benefit analysis, including a wealth of quantitative data about agriculture in Sierra Leone, can be found in the extensive report by Baxter (2013).

An Epidemic Anchored in Rurality

It is against this agrarian backdrop that the rural origin and spread of the current Ebola epidemic

must be examined. This is especially important as reports at the time of writing (November 2014) indicate that the virus may be spreading "9 times faster" than two months ago in rural Sierra Leone while it is subsiding in neighboring Liberia (Al Jazeera, 2014).

The rural origins of the current epidemic can be traced with relative certainty to a first case that may have involved bat-child infection in Guinea. Its toll, however, has been heaviest in rural Sierra Leone. Experts agree that the mechanism and modalities underlying the spread in rural areas are still unknown. For David Heymann, professor of infectious disease epidemiology at the London School of Hygiene and Tropical Medicine, speaking to the UK's *Guardian* (Krysiak, 2014), the inability to stop the epidemic in rural areas is baffling, as "there is better community organisation…traditional systems which help people better understand the cause of the disease and how to prevent spread" (para. 7). He dismisses the possibility that this may be due solely to an ailing health system, since previous epidemics in Zaire and the Democratic Republic of the Congo were controlled in spite of the existing poor health systems. Richards et al. (2014), one of the few research teams with direct access to present-time field data, called the spread in rural areas "the least understood part of the epidemic" (para. 1). They report in an article in the *PLOS Neglected Tropical Diseases* on the interaction between the pathways of transmission of the disease and social networking in rural communities, with particular focus on the relationships between marriage, funerals, and land tenure. Funeral rites, including the washing of corpses, are practiced in order to mark the "end" of marriage and address the complex issue of land rights. The authors also look at the role of migration and (food) markets in the transmission of the disease. They conclude that risk reduction may require rural people to adapt their behavior regarding funeral rites to the Ebola crisis, something they have observed to be currently happening. However, they recommend improved access to health-care facilities, transportation to hospitals and triage centers, and health education about the modes of transmission of the disease.

Most of the emerging literature on the 2014 Ebola outbreak has focused on the epidemiological and medical determinants of the spread of the disease. A few, such as the insightful article by Richards et al. (2014), have addressed the socio-cultural determinants of the crisis. Even fewer have sought to unravel in any depth the ecological and livelihood linkages (Bausch & Schwarz, 2014; McCoy, 2014). Bausch and Schwarz (2014) underscore the importance of the sociopolitical landscape in the emergence and spread of Ebola. Driven by need, the poor move into the forest and tap natural resources to diversify vulnerable livelihoods, thus increasing risks of exposure. This "dive into the forest" for income supplementation is indeed the main livelihood diversification of the vulnerable in Sierra Leone (WFP, 2008, p. 57).

My own rudimentary spatial analysis of the current outbreak confirms the marked linkages between the socio-politico-economic landscape and the spread of the epidemic in rural Sierra Leone. As of November 7, and according to data released by the Government of Sierra Leone (Government of Sierra Leone, 2014), the cumulative confirmed cases of Ebola had reached 4,234. Fifty-three percent of these cases were in 4 of the 14 districts of the country: these are Port Loko (565) and Bombali (631) (both proximal districts in the North), and Kailahun (555) and Kenema (490) (both proximal districts in the South). Overlaying this information with the available data on poverty, food security, and economic activity shows that these districts are also home to 45 percent of the nation's farmers and include 45 percent of its farmland. While geographically, ethnically, and ecologically distinct, the affected districts are also among the poorest of the country (WFP, 2011 p. 32). Kenema is the center of both the (blood) diamond trade and the mining industry. As shown above, Bombali and Port Loko are zones of expansion of overseas agricultural investments for bioethanol production. Kailahun is the coffee and cocoa growing zone and was also a stronghold for Revolutionary United Front (RUF) rebels during the civil war, when forests were decimated to fund the conflict.

Beyond the Biomedical Response

There is little doubt left that poverty and food insecurity are closely associated with the spread of

Ebola. When people spend over two-thirds of their incomes on food, and 3 percent on education and 3 percent on soap (WFP, 2011 p. 34), it does not take a genius to figure that out. However, poverty is merely an indicator, a number, a statistic. What is more important than listing poverty figures and associating them with biomedical circumstances is to develop an in-depth understanding of why people are poor in Sierra Leone. The mechanisms underlying the dispossession, the local accumulation, as well as the flight of capital outside of this resource-rich but money-poor country must be understood, exposed, and dismantled. The latter poses serious questions regarding the role of the global financial policeman, the U.S., which largely controls the flow of money in the global economy and is able to pursue, sue, and embargo entire nations, such as Iran and South Korea, by tracing money all the way into individual accounts in commercial banks tens of thousands of miles away from the U.S. mainland. There is also a pressing need to evaluate the impact of decades of international aid to Sierra Leone. Donor countries currently cover up to 20 percent of the cost of Sierra Leone's health sector (McCoy, 2014) but as the current epidemic shows, there is not much to show for it. The role of the swarm of micro-NGOs in the health and other sectors such as rural development needs particular scrutiny. As the Ebola crisis has shown, these do not have a sustainable impact. Kenema district has its very own WWOOF program (see http://www.wwoofsl.org/preview.php). Kailahun, with its cocoa and coffee plantations, is an area predisposed to organic farming and fair trade. The Ebola epidemic has dismantled the fragile architecture of development aid and alternative trade . A report from the FairMatch Support organization dated October 20, 2014, reveals that work was frozen on May 30, 2014, and that 17,000 cocoa and coffee growers are now out of the certification and trade program as they could not be audited, while 20 local staff were sent home on leaves without pay (Huurdeman, 2014).

The Ebola crisis has elicited responses from across the globe. Nearly every international medical NGO and UN organization have intervened in some way. The U.S. and the UK have formed a minicoalition and have sent troops (Mpoke Bigg and Fofana, 2014). China is building a hospital in Liberia. Even Cuba has sent a team that has been lauded for its people-oriented, sustainable development approach (Sifferlin, 2014). The United Nations is calling for investments in the health system, the latest estimates being US$1 billion (UNMEER, 2014). The International Monetary Fund (IMF) has already approved US$130 million in new credit for Sierra Leone, Guinea, and Liberia (IMF, 2014). There is a race between pharmaceutical corporations for the development of a vaccine (Economist, November 1, 2014).

Two not unrelated issues emerge here: one is the question of whether it is at all possible to build a (health) system that will operate durably within a larger sociopolitical system that does not. This seems to negate the most basic laws of systems. The issue of the possibility of constructing a standalone, effective, and functional health system in Sierra Leone where plunder, pillage, and economic laissez-faire dominate the scene needs deeper consideration before starting to accumulate debt.

The second issue relates to why are we seeing such willingness on behalf of the international community to participate in the battle against Ebola. After all, we live in a world where 3.1 million children die every year from a fully preventable death by malnutrition (WFP, 2014). One is tempted by the easy answer: because Western/financial capital's interests are threatened. It is true that the diamond trade has receded during this period, but there is so much reserve in De Beers vaults that this setback will only contribute to increasing profits due to temporary scarcity. I am also not convinced of the argument that involves the potential exposure of the entire world due to globalization, as experts agree that Ebola is relatively easy to contain where proper structures exist (Walsh, 2014).

There may be a different explanation for the rush to fight Ebola, inspired by Slovene philosopher and cultural theorist Slavoj Zizek. In Sophie Fiennes' 2012 movie *A Pervert's Guide to Ideology,* Zizek offers an interesting analysis of the classic Hollywood movie *Jaws*. For Zizek, *Jaws* symbolizes the lumped fears of U.S. society. For the working class, it is the rich, blood-sucking capitalists. For the average anticommunist, it represents Castro's

Cuba. The obliteration of the shark in the movie symbolizes the annihilation of all these fears, providing psychological solace without actually having to directly address any of the fear-triggering issues. I contend that Ebola is today used as the materialization of the ailments of Africa, and that the vast mobilization will achieve an epic victory in halting the epidemic that will substitute for addressing any of the real political and economic problems remaining in Africa. This is akin to the relief felt by spectators when, after a heroic battle involving an impressive array of weaponry, Roy Scheider blasts the shark in the movie's apocalyptic final scene. This, of course, did not prevent Hollywood from producing *Jaws 2* and *Jaws 3* a few years later… 

References

Al Jazeera. (2014, November 2). Ebola cases 'surge' in rural Sierra Leone. *Al Jazeera News*. Retrieved from http://www.aljazeera.com/news/africa/2014/11/ebola-cases-surge-rural-sierra-leone-20141122218546034 55.html

Bausch, D. G., & Schwarz, L. (2014). Outbreak of Ebola virus disease in Guinea: Where ecology meets economy. *PLOS Neglected Tropical Diseases, 8*(7), e3056. http://dx.doi.org/10.1371/journal.pntd.0003056

Baxter, J. (2013). *Who is benefitting? The social and economic impact of three large-scale land investments in Sierra Leone: A cost benefit analysis*. Freetown, Sierra Leone: Action for Large-scale Land Acquisition Transparency (ALLAT). Retrieved from http://www.christianaid.org.uk/images/who-is-benefitting-Sierra-Leone-report.pdf

Economist, The. (2014, November 1). Vaccine-makers and Ebola: Giving it a shot. Retrieved from http://www.economist.com/news/business/21629399-drugmakers-bet-vaccines-will-help-fight-against-ebola-giving-it-shot

Environmental Justice Atlas. (2014). Quifel Agribusiness agrofuels or foodcrops projects in Port Loko, Sierra Leone. Retrieved November 6, 2014, from http://ejatlas.org/conflict/quifel-agribusiness-agrofuels-or-foodcrop-projects-in-port-loko-sierra-leone

Freyer, F. (2014, October 31). The specter of Ebola arrives on the doorstep of rural Maine. *The Boston Globe*. Retrieved from http://www.bostonglobe.com/metro/2014/10/30/the-specter-ebola-arrives-doorstep-rural-maine/3AFQuK1qf DIJ9zITH sujOO/story.html

Government of Sierra Leone. (2014). *Ebola outbreak updates—November 7, 2014*. Retrieved from http://reliefweb.int/sites/reliefweb.int/files/resources/Ebola-Update-November-7-2014.pdf

Huurdeman, K. (2014). *Ebola report from Sierra Leone*. Retrieved from the FairMatch Support website: http://www.fairmatchsupport.nl/en/ebola-report-from-sierra-leone-2

International Monetary Fund (IMF). (2014). *IMF approves $130 million for countries worst hit by Ebola*. Retrieved from http://www.imf.org/external/pubs/ft/survey/so/2014/new092614a.htm

Krysiak, E. (Producer). (2014, November 4). *What does the Ebola crisis reveal about the state of global health? — podcast transcript*. Retrieved from The Guardian Global Development website: http://www.theguardian.com/global-development/2014/nov/04/ebola-crisis-global-health-podcast-transcript

Larbi, A. (2012). *Country pasture/forage resources profiles: Sierra Leone*. Retrieved November 6, 2014, from http://www.fao.org/ag/agp/AGPC/doc/Counprof/Sierraleone/Sierraleone.htm

McCoy, D. (2014, November 3). The social, political and ecological pathologies of the Ebola crisis cannot be ignored [Web log post]. Retrieved from http://blogs.bmj.com/bmj/2014/11/03/david-mccoy-the-social-political-and-ecological-pathologies-of-the-ebola-crisis-cannot-be-ignored/

Mpoke Bigg, M., &Fofana, U. (2014, October 8). U.N. Liberia medic catches Ebola; Sierra Leone burial teams end strike. Reuters [U.S. Edition]. Retrieved from http://www.reuters.com/article/2014/10/08/us-health-ebola-liberia-un-idUSKCN0HX0Y520141008

Richards, P., Amara, J., Ferme, M. C., Kamara, P., Mokuwa, E., Sheriff, A. I., Suluku, R., & Voors, M. (In press). Social pathways for Ebola virus disease in rural Sierra Leone, and some implications for containment. *PLOS Neglected Tropical Diseases*. Retrieved from http://blogs.plos.org/speakingofmedicine/2014/10/31/social-pathways-ebola-virus-disease-rural-sierra-leone-implications-containment/

Sifferlin, A. (2014, November). Why Cuba is so good at fighting Ebola. *Time*. Retrieved from http://time.com/3556670/ebola-cuba/

United Nations Development Programme [UNDP]. (2014). *Human Development Report 2014: Sierra Leone*. Retrieved from http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/SLE.pdf

United Nations Mission for Ebola Emergency Response [UNMEER]. (2014, October 17). *External situation report*. Retrieved from http://www.un.org/ebolaresponse/pdf/Situation_Report-Ebola-17Oct14.pdf

Walsh, B. (2014, October 21). Why Ebola isn't really a threat to the U.S. *Time*. Retrieved from http://time.com/3525385/ebola-threat-us-cdc/

World Food Programme [WFP]. (2008). *Sierra Leone: household food security survey in rural areas*. Retrieved from http://home.wfp.org/stellent/groups/public/documents/ena/wfp216299.pdf

WFP. (2011).*The state of food security and nutrition in Sierra Leone 2011*. Retrieved from http://documents.wfp.org/stellent/groups/public/documents/ena/wfp250158.pdf

WFP. (2014). *Hunger statistics*. Retrieved November 8, 2014, from http://www.wfp.org/hunger/stats

Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
www.AgDevJournal.com

Increasing prosperity for small farms through sustainable livestock production, processing, and marketing

Darin A. Saul,[a *] Soren M. Newman,[b] Tracie Lee,[c] Steven Peterson,[d] Stephen Devadoss,[e] Dev S. Shrestha,[f] and Nick Sanyal [g]

University of Idaho

Submitted February 10, 2014 / Revised May 9 and August 21, 2014 / Accepted August 24, 2014 / Published online November 9, 2014

Citation: Saul, D. A., Newman, S. M., Lee, T., Peterson, S., Devadoss, S, Shrestha, D. S, & Sanyal, N. (2014). Increasing prosperity for small farms through sustainable livestock production, processing, and marketing. *Journal of Agriculture, Food Systems, and Community Development, 5*(1), 21–37. http://dx.doi.org/10.5304/jafscd.2014.051.004

Abstract

This article presents results from a multidisciplinary project that examined whether increased production and processing of livestock for local and regional markets was a feasible economic development strategy in rural areas of northern Idaho and eastern Washington. Currently no substantial, accessible feedlot or U.S. Department of Agriculture (USDA)-inspected processing infrastructure exists in the study area, leading most small producers to sell their livestock at auction with few options for branding their products to participate in higher value markets. The closest substantial processing facilities are a four to six hour drive from the area — farther than most producers are willing to transport their livestock. To assess and overcome these barriers to local and regional markets, we explored the viability of

[a] Interim Director, Office of Community Partnerships, University of Idaho; dsaul@uidaho.edu

[b] Research Associate, Office of Community Partnerships, University of Idaho; newman@uidaho.edu

[c] Instructor of Operations Management, Department of Business, University of Idaho; tlee@uidaho.edu

[d] Instructor of Economics, Department of Business, University of Idaho; stevenp@uidaho.edu

[e] Professor, Agricultural Economics and Rural Sociology, University of Idaho; sdevadoss@uidaho.edu

[f] Associate Professor, Department of Biological and Agricultural Engineering, University of Idaho; devs@uidaho.edu

[g] Associate Professor, Department of Conservation, Social Sciences and Bioregional Planning and Community Design, University of Idaho; nsanyal@uidaho.edu

* *Corresponding author:* Darin A. Saul, Office of Community Partnerships, University of Idaho; P.O. Box 442007; Moscow, Idaho 83844 USA; +1-208-885-0124; dsaul@uidaho.edu

different USDA-inspected processing options to better understand economic feasibility, environmental impacts, and the small-scale livestock production value chain (i.e., consumer demand, producer capacity and willingness to participate, and processing capacity). In this paper, we present results from stakeholder surveys, interviews, forums, and an economic impact analysis. Results indicate that several livestock processing development scenarios are socially, economically, and environmentally viable in the region. Project findings are relevant to many areas of the United States, especially areas of the West, that have low population densities, large transportation distances, and few processing options for small-scale livestock producers.

Keywords
economic impacts, food systems, local, livestock producer attitudes, regional, USDA-inspected meat processing

Introduction and Literature Review

While the business model for large-scale agriculture involves specialization, many small farms survive through diversification. Raising livestock can be an important mainstay of or supplement to small diversified farms. Unfortunately, the conventional livestock system includes pricing determined largely by the efficiencies and business models of the largest livestock operations, reducing the viability of small-scale livestock producers. At the same time, many consumers and small producers have become dissatisfied with the industrial food system, resulting in a national resurgence of interest in local foods (Hinrichs & Welsh, 2003). Sales of locally produced fruits, vegetables, and beef products are on the rise (Springer, Biermacher, Childs, Alkire, & Grooms, 2009). The revival of farmers markets, community gardens, and food co-ops, the recent media coverage of food safety issues, the use of local foods in restaurants, and the pressure to include sourcing information in grocery stores all represent the increasing market value and consumer interest in local foods.

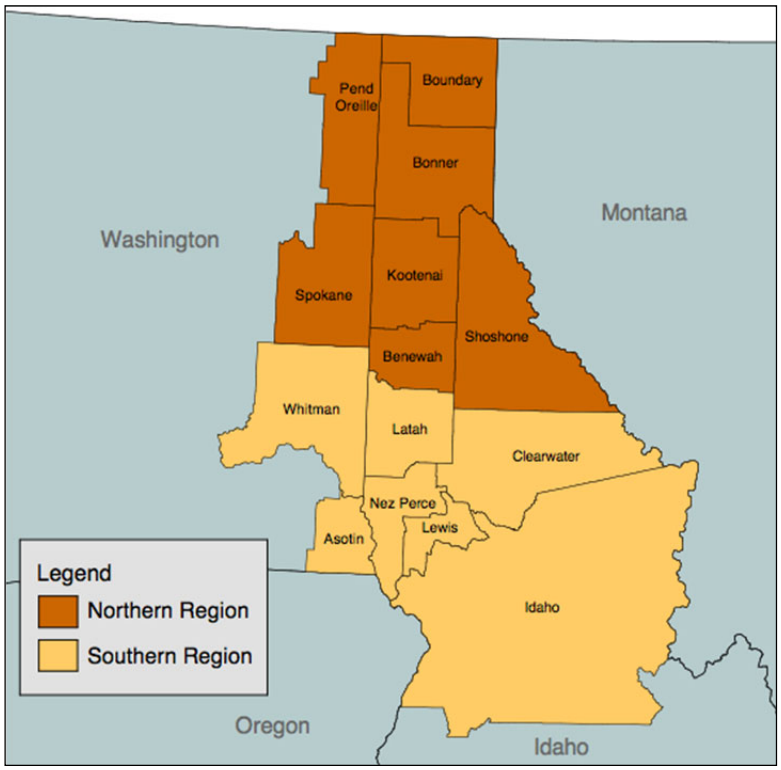
The increased interest in and demand for locally produced foods is well documented. The Agricultural Sustainability Institute at the University of California, Davis published a bibliography (2013) that includes over 2,000 articles published in the past 13 years on local and regional food systems. Many consumers prefer meat products sourced locally or produced by someone they know (Winter, 2003) and are willing to pay considerably more for these products (Carpio & Isengildina-Massa, 2009; Darby, Batte, Ernst, & Roe, 2008). Restaurants have also increased their purchases of locally grown products in response to consumer interest (National Restaurant Association, 2009).

A growing body of research highlights the potential benefits of small-scale food systems, including rural community revitalization, ecological sustainability, and improved social equity (Brehm & Eisenhauer, 2008; Feenstra, 1997; Hultine, Cooperband, Curry, & Gasteyer, 2007). Worosz, Knight, Harris, and Conner (2008) found that local food system participation increases the quality of life for farmers, their employees, and livestock. Some research found that selling to local markets provides economic support for rural areas. Foltz, Jackson-Smith, and Chen (2002) found that smaller, independent farms that market their products directly to local communities support local businesses and stimulate economic activity.

Growing interest in local foods presents an opportunity for small-scale livestock producers to enter higher-profit market niches, potentially increasing the viability and profitability of their operations. Many small-scale livestock producers already participate in local food systems. In the United States, the number of farms that directly market livestock or livestock products to consumers is far greater than those that directly sell fruits and vegetables. In 2007, more than 79,000 producers reported selling livestock or livestock products directly to consumers, generating over US$377 million of revenue (USDA, 2009c). Raising livestock can be an important source of income for small farms, yet many producers face barriers that limit their ability to benefit from consumer demand for locally produced livestock products.

A central barrier for small-scale livestock producers is the result of structural changes in the livestock industry. Technological developments, the drive to increase efficiencies and control costs,

Figure 1. Map of the Study Region



and increasing consumer demand for beef worldwide have played significant roles in the consolidation and vertical integration of feedlots and meat processors (Boehljie, Hofing, & Schroeder, 1999; Johnson et al., 2012; Lowe & Gereffi, 2009). Consolidation in the livestock industry into very large-volume plants has resulted in "disintegration of small, localized processing facilities" (Ross, 2006, p. 119). As a result, producers often find themselves competing with hunters at custom-exempt meat processing plants or having to drive several hours to the nearest USDA-inspected facility.[1]

Furthermore, large USDA-inspected plants often charge higher fees for producers with only a few head of cattle, require reservations months in advance, or are not able or interested in working with small producers (Worosz et al., 2008). One strategy for small producers to overcome these barriers is the formation of producer-owned cooperatives (Holcomb, Flynn, & Kenkel, 2012; McCann & Montabon, 2012).

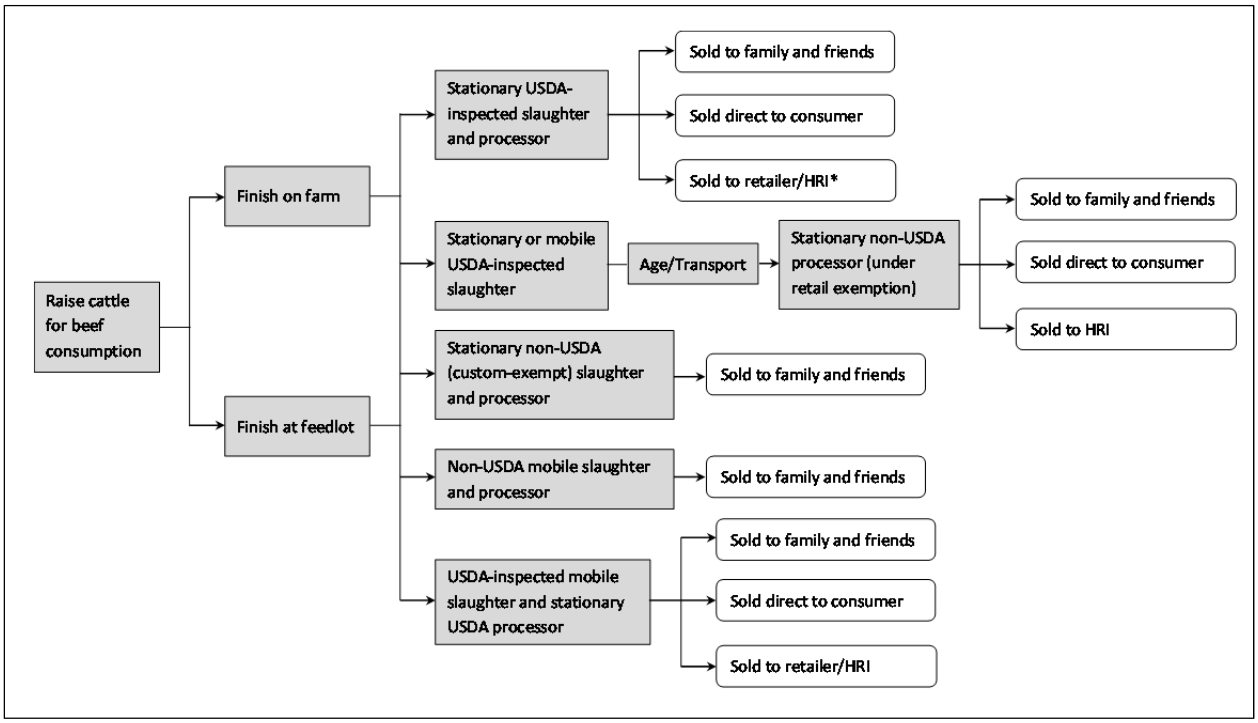
Background

In this article, we present research on the feasibility of developing small-scale, USDA-inspected livestock processing options to increase producer access to higher-profit local and regional markets as an economic development strategy in Idaho's 10 northernmost counties and four adjacent counties in eastern Washington. The study region was divided into northern and southern regions based on where producers were most likely to sell livestock at auction (see Figure 1). In the northern region, producers typically attend the livestock auction in Davenport, Washington. In the southern region, producers attend auctions in Lewiston, Idaho, or in Cottonwood, Idaho.

No substantial, accessible local feedlot or USDA-inspected processing infrastructure exists in the study area, limiting options for producers of any size to retain ownership of their livestock through the finishing and processing stages of production. Small producers in the area typically sell their livestock at auction, with few options for branding their products to participate in higher-value markets. The closest substantial processing facilities are located in the Columbia Basin, a four to six hour drive for most producers in the study area and farther than most are willing to transport their livestock. Furthermore, these facilities are not

[1] Meat processors are businesses that slaughter an animal, cut up the carcass, and package the cuts for a customer. Animals may be harvested from a mobile slaughter unit (MSU) or on a kill floor in the plant. Meat-processing plants in Idaho and Washington are either federally inspected (also called USDA-inspected) or custom-exempt. Federally inspected plants have an inspector present during slaughter and the meat can be sold directly to consumers or to wholesalers and distributors. A custom-exempt plant is inspected annually (at a minimum) by the USDA, but an inspector is not present during slaughter; the meat from an animal slaughtered at this plant can be consumed only by the producer or sold by the producer while the animal is still alive.

Figure 2. Potential Regional Livestock Finishing, Processing, and Marketing Options
The producer maintains ownership through the grey-shaded steps.



* HRI refers to hotels, restaurants, and institutions.

geared toward, and often are not interested in, working with small numbers of livestock.

Interviews, surveys, and community forums with producers in the 14-county area indicate that the two existing USDA-inspected meat-processing facilities in this study area cannot meet producer demand. These plants are at the University of Idaho in Moscow, Idaho (Latah County), and in Sandpoint, Idaho (Bonner County). Both plants are considered small or very small, in terms of the number of employees and number of livestock processed annually (Johnson et al., 2012). Vandal Meats at the University of Idaho is primarily an educational program and processes a small number of locally raised livestock; the other operation is able to partially meet demand for USDA-inspected processing in the northern third of the study area. Preliminary findings identified inadequate USDA-inspected processing capacity within a reasonable driving distance as the primary factor limiting the ability of small-scale livestock producers to produce and market value-added meat products.

Our project examined the feasibility of developing additional USDA-inspected meat processing capacity in the context of consumer demand, environmental tradeoffs, local and regional livestock supply chains, and the economic impacts associated with livestock finishing and processing options (illustrated in Figure 2). We applied an interdisciplinary, mixed-methods approach that collected primary data through surveys, interviews, and stakeholder forums, and used other available forms of data.

To start, we estimated existing and potential markets for locally and regionally produced beef products (Ridley, Devadoss, & Shook, 2014; Ridley, Shook, & Devadoss, 2014). Ridley, Devadoss, and Shook (2014) surveyed consumers in northern Idaho and eastern Washington and conducted a conjoint analysis to examine how locality of production, production method, and price of beef and beef products influenced purchasing preferences.[2]

[2] Conjoint analysis uses a practical subset of possible product

Distance of origin had the strongest effect on consumer preference. On average, the distance threshold to be considered locally grown was approximately 85 miles (137 km), far below the USDA definition of 400 miles (644 km). Distance of origin accounted for nearly 60 percent of the total importance of all attributes. Ridley, Devadoss, and Shook (2014) also found that consumers who preferred certified organic and all-natural beef were generally willing to pay a higher price (10 percent more than conventional beef), since they consider these qualities important relative to beef raised with hormones, antibiotics, or vaccinations. Overall the results indicated that consumer interest exists to support development of a locally oriented quality beef economy.

A second project component conducted life-cycle analyses (LCAs) of a small-scale, locally oriented livestock system and of a regional-scale production and processing system to determine environmental benefits and tradeoffs. A first study compared emissions from five small beef operations in the Palouse region of eastern Washington and northern Idaho to emissions from conventional livestock production systems (Roop, Shrestha, & Saul, 2013). A second study compared emissions from a regional-scale livestock production and processing system to determine the greenhouse gas (GHG) emissions associated with beef production on a regional scale (Roop, Shrestha, Saul, & Newman, in press). The regional system had slightly lower emissions than the small-scale system, but both systems studied had lower impacts than conventional, national-scale livestock production and processing systems.

In this paper, we present findings for the final two components of the research project: livestock producers' and processors' capacity and willingness to participate, and economic impact analysis. We then discuss each of the component findings in the context of the study as a whole and offer conclusions relevant to livestock producers and other professionals.

attribute combinations to identify the relative importance of each attribute in purchasing decisions and is often used to assess the market for locally produced foods (Batte, Hu, Woods, & Ernst, 2010; Brocklebank, Hobbs, & Kerr, 2008; Darby et al, 2008; Orme, 2006).

Methods and Results

Livestock Producers' and Processors' Capacity and Willingness to Participate

To better understand livestock producer and processor perspectives on developing livestock processing capacity we focused on several core questions: What are the constraints livestock producers and processors experience in the study region? What processing options are livestock producers interested in pursuing and why? Are a sufficient number of producers willing to participate and, if so, will enough livestock be available to make specific finishing and processing options viable? Finally, to what extent will small-scale processors already in operation in the area support new processing capacity? To address these questions we used 2007 Agricultural Census data and collected primary data through stakeholder forums, interviews, and surveys.

Methods

Seven stakeholder forums were conducted in the study area from August 2011 to June 2012 in which 142 livestock producers and small-scale processors participated (see Table 1). Forums were primarily used to gather data, disseminate research findings, and involve stakeholders in interpreting results. The researchers facilitated discussions among participants regarding challenges and interests in developing additional processing capacity, as well as the number of livestock producers who would commit to specific finishing and processing options. Detailed notes were kept at each forum and later coded to identify emergent themes in the perspectives of ranchers, processors, and other stakeholders. (The analysis process is described in more depth below.)

A culminating regional forum brought together livestock producers and processors to explore findings and to determine if enough producers were motivated to take further steps to develop livestock processing options in the study area. At the regional forum, evidence of willingness to participate was shown by the formation of an eight-member steer-

ing committee of livestock producers, which then recruited 26 additional producers for a livestock processing cooperative working group.

To gain a deeper understanding of the lived experiences of producing and processing livestock in the study area, we conducted 19 interviews from May 2011 to July 2012: seven with small-scale livestock producers, 10 with meat-processing facility owners and managers, one with the manager of the Cottonwood (Idaho) Livestock Auction, and one with the manager of a rendering plant in Spokane, Washington. Interviews ranged from one to several hours. Topics covered included motivation, willingness, and interest in participating in different processing options, as well as current experiences, concerns, and constraints. Producers volunteered to participate after researchers announced the opportunity at stakeholder forums.

Table 1. Stakeholder Forum Dates, Locations, and Attendance

Date	Location	Attendees
May 2011	Sandpoint, Idaho	20
August 2011	Moscow, Idaho	23
November 2011	Lewiston, Idaho	10
March 2012	Lewiston, Idaho	8
April 2012	Palouse, Washington	26
May 2012	Cottonwood, Idaho	20
June 2012	Post Falls, Idaho	35

Starting with an interview with the manager of the University of Idaho USDA-inspected processing facility, we used chain-referral sampling to identify and recruit custom-exempt meat processors representing a variety of business models (e.g., mobile slaughter and in-house cut and wrap, or on-site slaughter and cut and wrap). We also interviewed the owners of the USDA-inspected meat processing plant in the northern part of the study area. The manager of the Spokane rendering plant was included because the plant is the single source for rendering in the study area and was identified by all meat-processing plant managers as a critical component of processing. All interviews were conducted on-site and included a tour of the operation. Interviews with the meat processors and rendering plant managers were audio recorded and transcribed. Participants were asked to review and approve the transcript.

Qualitative data collection and analysis for stakeholder forums and interviews followed a systematic approach. Once the first set of interviews was transcribed and stakeholder forum notes were available, we conducted preliminary coding to label and sort data into theoretical categories. Initial codes and categories were discussed among the research team members to identify and refine themes and anomalies, and to ensure intercoder reliability. Through subsequent interviews, preliminary codes were validated or refined, and additional codes emerged. Participants were involved in further refining and interpreting results during stakeholder forums. Finally, codes and categories were organized into key themes and representative quotations were selected.

In addition to forums and interviews, we conducted three surveys: Livestock Producer, Livestock Supply, and Preferred Locations for Livestock Processing surveys. Due to challenges in obtaining a meaningful response rate from this relatively small target population and a primary research objective that did not necessitate a probability sample, we used nonprobability-sampling techniques (Mammen & Sano, 2012). The Livestock Producer Survey included questions related to livestock processing needs as well as willingness and interest in participating in marketing, feedlot, and processing cooperatives. It was conducted at stakeholder forums and online through the project website. With assistance from the USDA National Agricultural Statistics Service (NASS), letters were mailed to all 2,830 livestock producers in the study area, sorted by county, with annual sales greater than US$1,000. Letters were mailed in waves to producers based on when a stakeholder forum meeting was scheduled within about an hour's drive of the recipient. The letter included an invitation to attend the meeting and a link to the online version of the Livestock Producer Survey.

Preliminary stakeholder forum and interview data highlighted a need to collect additional data on

livestock supply and preferred processing locations. Therefore, the Livestock Supply and Preferred Locations for Livestock Processing surveys were conducted in spring 2012 and fall 2012, respectively, and conducted through the project website, newsletters, and at the final regional forum. These surveys included questions related to the number and type of livestock that would be committed if USDA-inspected processing were available, preferred location for a USDA-inspected processing facility, and willingness to change their livestock birthing cycle. A total of 140 livestock producers responded to surveys.

Producer results

Data from forums, interviews, and surveys confirmed development of additional slaughter and processing options as a priority for area producers. Most survey respondents said development of additional processing options is either important (28 percent) or very important (60 percent). Producers said the two processing options that would be most helpful for their operations were USDA-inspected on-farm or mobile slaughter (49 percent) and stationary USDA-inspected processing (42 percent). Smaller percentages of producers said non–USDA-inspected stationary processing (2 percent) or non–USDA-inspected on-farm or mobile processing (7 percent) would be most useful. Survey and forum data indicate that producers most interested in USDA-inspected processing cooperatives have operations that sell 200 head of beef or fewer each year.

Through forums, interviews, and surveys, producers described factors that motivate their interest in new USDA-inspected processing options. Many participants said that developing USDA-inspected processing capacity in the region would enable them to participate primarily in local markets, thereby circumventing the conventional food system. These producers perceive local food systems as providing a variety of social, economic, environmental, and health benefits. Many of these producers strongly believe a grass-fed diet and mobile slaughter produces a higher-quality product and higher quality of life for livestock animals. As one survey respondent explained,

> There is a great demand for smaller-scale farming, better treatment of animals (i.e., not feedlots), grass-fed meat, etc. It would be great to have a mobile USDA facility so animals can be raised on small farms [and not have] to be transported to slaughter facilities. The whole point is to let the animal have a calm and happy existence. Putting animals on trucks breaks that whole cycle.

Many participants who hold this or similar perspectives defined "local" as within a short distance (e.g., the nearest town).

For most livestock producers, the perception that expanded processing capacity will help them overcome current constraints motivates their interest in small-scale USDA-inspected processing. As this producer summarizes, the fundamental challenges confronting livestock producers are a limited number of USDA-inspected processors in the region and the long distances many producers must travel to access them: "We know we have a market, we just need a local USDA processor before we can get into it. We have lots of area for livestock, it was just too damn much hassle to haul them." Sheep and goat producers especially expressed the need for additional processing capacity, since fewer processing options are available to them than for beef producers: "If a USDA facility for lamb and kid processing were located near enough to me, I would like to be actively involved. The lack of processing possibilities for lamb is my single most limiting factor."

Many livestock producers said their current strategy is to save a few animals to sell to family and friends or other consumers in quarters and halves (i.e., direct marketing), and then sell the rest at auction. This type of producer was most likely to state an interest in participating in USDA-inspected processing cooperatives, driven by the potential for higher-profit alternatives to selling animals at auction.

Another common theme relates to overcoming time constraints. Since livestock production is often an activity secondary to off-farm employment or retirement, many producers have limited time to spend on additional livestock-related activities. A commonly expressed problem is that

while satisfied with their profit on sales of live animals in quarters and halves, they cannot expand because of the time and logistics that direct marketing requires. Therefore, some operations in our study area are at capacity, not because they are limited by how many animals they can raise, but rather by the time it takes to successfully direct market each animal: "Marketing is our weak point — something we don't enjoy or have a lot of time for." In addition to developing USDA-inspected processing capacity, producers experiencing this constraint expressed interest in joining branding and marketing cooperatives so they can expand into retail markets, such as restaurants, and pursue other strategies that do not require as much of their time on the phone to sell each quarter animal.

Some producers want to grow their operations to provide income for additional family members, but do not have the ability to expand animal production. These producers are interested in value-added marketing, moving into markets that require USDA inspection such as restaurants, and other strategies for increasing profits without also increasing production. Producers also mentioned constraints related to current processing in the area. Producers described a mismatch between the timing of their livestock production and processor availability. Some participants noted that a lack of year-round supply could be a constraint to future USDA-inspected processing:

> [Processors] are not getting enough cattle in January to March.…All calves around here are [born] in spring and for sale after the first of January. What are you going to do when there are no cows available in different seasons? [Producers] want to calve all cows at the same time so they all are ready at the same time. Cheapest way to feed is on grass not hay, so producers calve in spring because mama is on grass while nursing so a lot cheaper than calving in winter and feeding hay.

Livestock Supply Survey respondents were asked if they would be willing to change their birthing cycle for at least a portion of their herd if doing so would make a local USDA-inspected

Figure 3. Percentage of livestock producers who said they would commit to having livestock ready for slaughter by season and livestock type, if altering the birthing cycle for at least a portion of their herd would make a USDA-inspected livestock processing facility feasible.

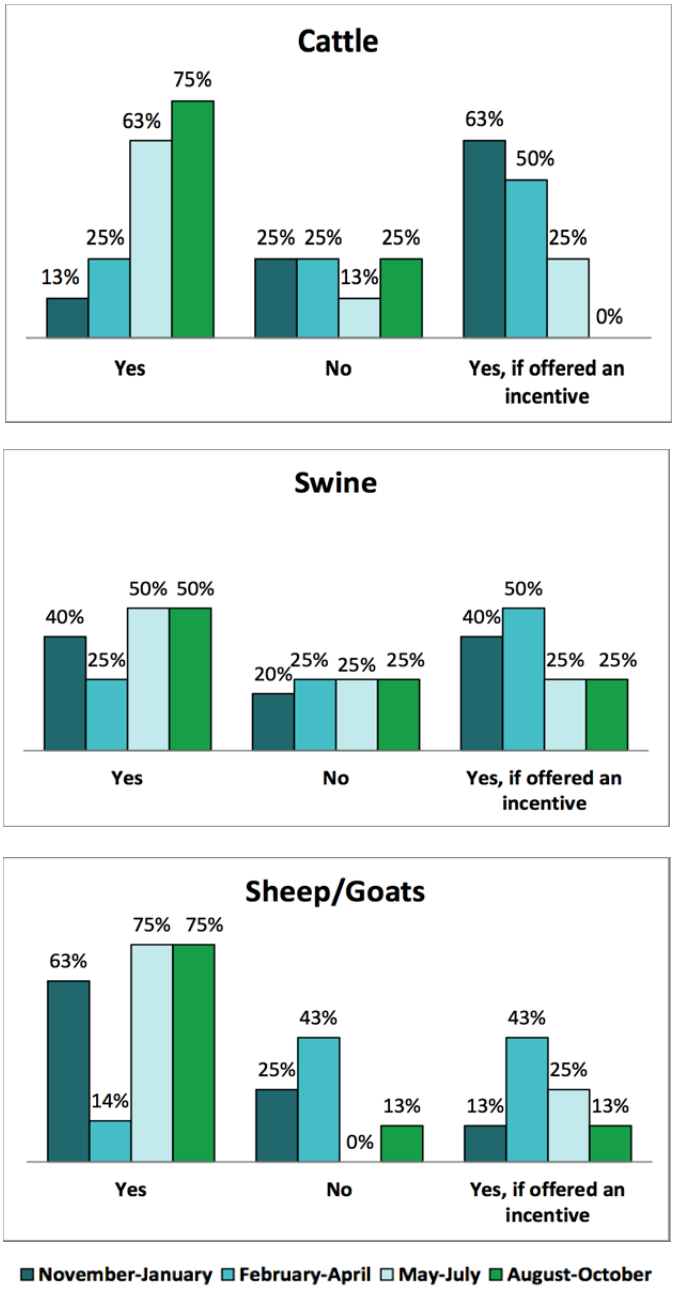
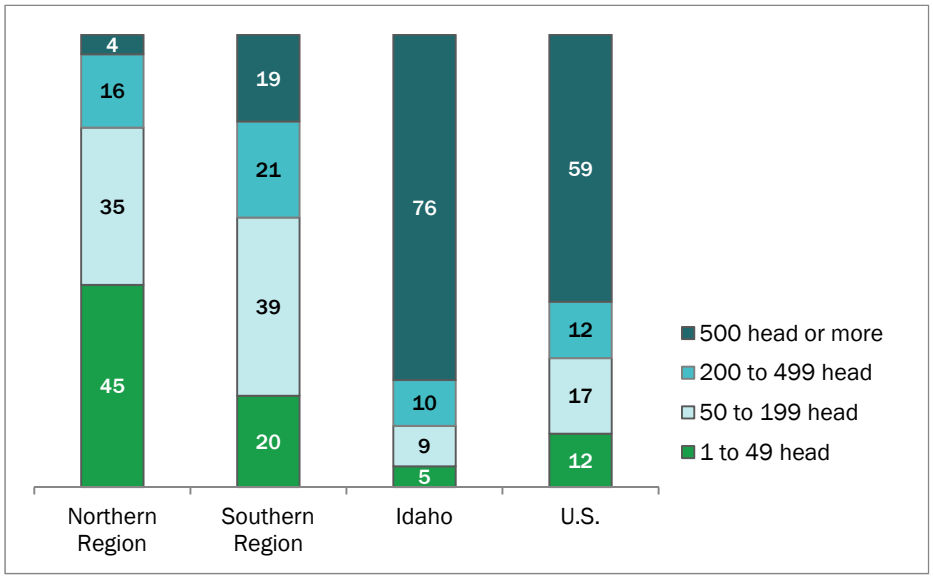


Figure 4. Distribution of Cattle and Calves Sold (%), by Number Sold by Operation in 2007



Source: Agricultural Census, 2009a; 2009b.

processing facility feasible (see Figure 3). While 43 percent of producers said they would not commit to having sheep and/or goats ready for slaughter in February–April, only 25 percent or less of producers said they would not alter their birthing cycle, regardless of season or animal type. The majority of producers indicated that they would be willing to alter their livestock birthing cycle to access small-scale, USDA-inspected livestock processing.

Having an adequate supply of livestock to support additional processing capacity is an important consideration. Most livestock in the study area come from small farms where livestock production is secondary to off-farm employment or tillage agriculture. According to the Agricultural Census (USDA, 2009a; 2009b), the majority of cattle and calves sold in the study area come from small operations (i.e., those selling fewer than 199 head per year), which distinguishes our study area from the rest of Idaho and Washington, and the nation, where the majority of sales come from operations with 500 head or more (see Figure 4).

In 2007, approximately 85,000 cattle-equivalent animals were sold in the study area (see Table 2). Only a small percentage of these would likely be available for a new processing operation. Most livestock are sold at auction, and while many producers are interested in alternatives, many do not have the ability (i.e., available land and feed or access to a local feedlot) to finish animals to slaughter weight. Additional finishing capacity will need to be developed before these producers can significantly participate in local supply chains. Other producers are satisfied with their current local custom-exempt processor or are otherwise not interested in additional options. Also, the study area is large and producers are unlikely and unwilling to transport animals across more than a portion of it, reducing the potential animals available in any particular location.

Results of the Livestock Supply Survey provide an estimate of the number of animals producers would be

Table 2. Number of Livestock Sold in 2007 in the Study Region and Idaho State

Livestock Sold (#), 2007	Northern Region	Southern Region	Total Study Region	Idaho State
Total Cattle Equivalents*	27,140	57,519	84,659	1,888,076
Cattle and Calves	24,680	50,540	75,220	1,829,456
Hogs	6,008	17,416	23,424	65,618
Sheep	2,743	7,040	9,783	220,481

Source: Agricultural Census, 2009a; 2009b.
* One cattle equivalent is equal to three hogs or six sheep. Sales data for some livestock in some counties were withheld by USDA and are not included in the total.

interested in committing, either by diverting animals from auction or by raising additional animals, to a new processing operation. Respondents reported that 2,120 cattle, 542 swine, 569 sheep and goats, 13 yaks, and 10 horses would be committed to a new USDA-inspected processing annually if a facility were available. Many more producers expressed interest and potential commitment of animals at the public forums, interviews, and other interactions.

Meat Processor Results

Interviews with livestock-processing business owners and managers operating in the study area provided insight into current processing capacity and fertile areas for cooperative venture. With the exception of two USDA-inspected processing facilities, processors in the area fall into the custom-exempt category. Most custom-exempt processors supplement their income from livestock processing, which is seasonal, by processing game for hunters, smoking turkey, and making sausage and jerky. As one processor explained it, "Primarily we are a custom operation. I would say probably 80 percent of our business is people bringing us their animals; we slaughter them, process them, cut and wrap them. Most everything leaves frozen."

Custom-exempt processors are subject to annual inspections by the USDA and state food inspection agencies, but do not have a USDA inspector present during slaughter. Without USDA inspection, meat slaughtered and processed by a custom-exempt facility cannot be sold in retail environments such as farmers markets, grocery stores, or at institutions like hotels, schools, or restaurants.

Confirming producer comments, many livestock processors indicated they have periodic unused livestock-processing capacity, especially from March through July of each year: "The busiest time starts about mid-August and will go to the middle of February and then the slow times are the rest." Processors said they would like to process more animals during slow times of the year, but they perceived unwillingness on the part of producers to alter their animals' birthing cycle — a necessary condition to having animals available for processing throughout the winter and spring.

Overall, livestock processors agreed that the development of additional small-scale, USDA-inspected processing capacity would benefit the region. Most processors shared the perception that developing additional processing capacity would not hurt existing businesses: "I seriously doubt [a USDA-inspected facility would] take a lot of business from [existing custom-exempt processors like] myself, but maybe in your immediate area." Another processor echoed this perception, hinting at the possibility that new processing would mostly serve a different market than custom-exempt:

> I don't feel threatened by it because I think I'm still going to get my loyal customers. They bring me their beef and I cut it up for them, they are the only ones [who] are going to eat it.…It probably depends on where the facility gets built, if it gets built. If it's across the street, yeah maybe I'll lose a bit of business.

Both of these quotations indicate the importance of the relationship between livestock producers and their meat processor. The words "loyal" and "relationship" came up often in forum meetings and interviews. Meat processing is a referral-based business for a custom-exempt shop. Processors have a core of loyal customers who refer other producers to the processor; in turn, processors recommend producers to people who call their shop looking for locally raised meat.

Most processors in the study area confirmed that available processing capacity is inadequate to respond to the growing market and producers' demand for USDA-inspected livestock products: "There is plenty of demand and supply. I turn people away every day from September, October, and November for slaughter because I just can't fit it in." They cited three primary factors constraining their ability to meet the growing demand: infrastructure, especially freezer space ("I would need to have more cooler space [and] a little bit more up-to-date system. I mean this is a 1967 building."); a limited number of trained employees ("There's always somebody that wants to learn. To find somebody to do it as a career is a little bit tougher."); and retirement plans without a

succession strategy ("It seems to be a tough industry, not too many people want to get into it.…I mean, I would love to train somebody to take it over.…I would be ready in 10 years real easy. But so far no one has come down the line for me to do that.").

Processors said they are not planning (or able) to expand to meet the growing demand for USDA-inspected livestock processing options. The trends of rising demand and decreasing processing capacity as processors retire will only increase the need to develop additional processing capacity in the study region.

Summary of results for producers and processors

This component of the project found sufficient producer willingness to participate and a sufficient number of livestock available in the study area to support a variety of processing options. Livestock processors currently in operation do not have the capacity to meet growing demand. Many producers prefer the development of USDA-inspected processing, with either stationary or mobile slaughter options. The majority of producers also expressed interest in developing cooperative local or regional marketing.

Economic Impact Analysis

Agriculture and the food-processing supply chain make up a small but important part of the overall economy in the study area. In this section, we summarize the expected economic impacts of developing livestock processing in the area and provide economic impacts analysis for the two most promising scenarios: USDA-inspected mobile processing and stationary processing.

Methods

A social accounting matrix (SAM) model was developed using Minnesota IMPLAN Group's software (Impacts for Planning) and data package (IMPLAN, 2013). The model assessed the contributions to the total economy of the region of different sectors of the economy with a focus on agriculture, food processing, and beef processing. Economic base and profile assessments were conducted using an IMPLAN model for a subset of counties in the southern portion of the study area (Clearwater, Idaho, Latah, Lewis, and Nez Perce counties in Idaho, and Asotin and Whitman counties in Washington) and for the entire study area. The economic base was calculated using the ASAM model developed by Braak, Watson, and Rodriguez (2010). The base assessment identified and reported the actual drivers of the regional economy (Miller & Blair, 2009).

We then conducted an economic impact assessment of USDA-inspected mobile processing and USDA-inspected stationary processing scenarios. The financial and input data for these analyses came from several sources:

1. A regional survey (including financial information) of local beef and meat producers as part of the supply-chain analysis of the study.
2. A feasibility analysis conducted by Painter (2008).
3. A student-led project analysis: *Cost-Benefit Analysis: Creating a USDA Processing Plant in Lewiston, ID or Clarkston, WA* (an unpublished report, University of Idaho, Moscow, Idaho).
4. A review of existing studies of small-scale beef and meat producers.

As processing practices and cost information vary more among rural, small-scale processing operations than they do across larger operations where economies of scale foster standardization and uniformity, there was some variance in the financial and input data we used to estimate the economic impacts. Cost differences in available input data were accounted for by calculating averages.

Base and profile assessment results

The base assessment found that agriculture and food processing constitute about 7.2 percent (6,303 jobs) of actual employment and 10.1 percent (8,811) of the employment base (including the multiplier effects) in the study area. Animal processing (all) is only 0.3 percent (268) of actual employment and 0.7 percent (585) of base employment. Cattle ranching constitutes 0.3 percent (252) of the region's employment and 0.2 percent (180) of its

base. Beef consumption (cooked at home) in the southern subset of the study region is estimated at about US$16 million per year, meat consumption is estimated at US$57.6 million per year, and overall food consumption is US$477.4 million per year.

Table 3. Economic Impacts of Proposed Livestock Processing Facilities (Sales in US$)

	Direct	Indirect	Induced	Total
Mobile Processor				
Employment (FTEs)*	3	3	1	8
Output (Sales)	$807,000	$628,000	$95,000	$1,529,000
Stationary Facility				
Employment (FTEs)	7	8	2	19
Output (Sales)	$1,916,000	$1,427,000	$225,000	$3,568,000

* Full-time-equivalent employees

The key conclusion of these analyses is that the economic impacts of the proposed local beef processing alternatives are small, ranging from three to 15 direct employees per operation. Factoring in multiplier effects, eight to 30 jobs could be created. Although these analyses were conducted for the region (representing a cohesive economy), the overall magnitude of the income and job impacts depends on where the new proposed facility is located. The economic assessment suggests that if a facility is located in a rural community (e.g., Palouse, Washington, which has a population of approximately 1,000 people), the economic impact can be significant relative to the local economy. However, if a livestock processing facility is developed and located in one of the larger communities, such as Lewiston, Idaho (population 32,000) or Moscow, Idaho (population 24,000), the impacts will be much smaller relative to the economy. Regardless of the beef-processing alternative chosen (see Figure 2), the economic impacts will be small but not insignificant in the study area.

Scenario Results

In addition to the base and profile assessments, we conducted detailed analyses of the two most promising USDA-inspected processing scenarios: a mobile processing unit harvesting approximately 450–500 cattle equivalents per year, and a regional stationary facility to be located in a larger community such as Lewiston, harvesting approximately 1,100 cattle equivalents per year.

Composite budgets were created from the data sources cited earlier. The annual expenditures for the mobile processing unit are approximately US$300,000 or US$840,000, the latter amount including cost and value of the cattle equivalents at US$1,200 per head. The annual expenditures for the stationary facility are approximately US$620,000 or US$1,940,000, including cost and value of the cattle equivalents. These data were entered into the IMPLAN economic model and margins were applied where appropriate (see Table 3).[3]

The economic impacts of developing livestock processing on employment (full-time-equivalent employees) and on output (sales) are reported in Table 3. The mobile processing unit would directly create three FTEs and US$807,000 in direct expenditures (after adjustments). Including the indirect and induced effects, a total of eight jobs would be created and there would be approximately US$1,529,000 in output (sales) a year. The output multiplier for the mobile scenario is 1.90, meaning that for every one dollar of expenditures in final demand, a total of US$1.90 in output (sales) are created in the regional economy.

For the regional stationary facility, we estimate that seven FTEs would be directly created and the direct expenditures would be US$1,916,000 (after adjustments). Total impacts are 19 jobs (including the indirect and induced effects) and US$3,568

[3] Margins adjust the data from the purchaser perspective (purchaser prices) to what the producer receives (producer prices).

thousands in output. The output multiplier for the stationary scenario is 1.86.

We identify two major opportunities for economic development. The first is to develop an export market for locally grown and processed beef and other related value-added products to be sold out of the study region in cities such as Seattle, Washington, or Portland, Oregon. This could add considerable jobs and income to the region's economic base. A second, more intriguing opportunity represents an import-substitution approach that would develop a complete beef-related local food chain, from birth to home or restaurant. In this case, HRIs (hotels, restaurants, institutions) and retailers or vendors would be systematically brought into closer alignment with producers and processors, cutting down on overall costs to everyone's benefit.

Since modern agriculture has virtually eliminated local food chains, this will create more efficient local markets, building them from scratch. Developing a market for locally produced beef will assist in developing local food chains for *all* agricultural products. It will create brand loyalties among consumers, enhance and expand existing local markets such as food co-ops and farmers markets, and create economies of scale and scope in supply chain distributions. This approach could create a cluster effect of other complementary, locally produced products, including beef, other meats, and vegetables. The development of livestock processing could contribute to rural communities becoming more self-sufficient while building their local economies. Under certain conditions, an import substitution approach can be as economically beneficial to community development as export-led growth (Cooke & Watson, 2011).

Discussion and Conclusions

This study contributes to the growing body of literature exploring how to improve economic viability and environmental sustainability for small and medium-sized farmers. Several reports have been published in recent years evaluating the feasibility of developing slaughter and processing options for livestock producers as growing consumer demand for locally produced meat has created higher-profit and value-added niche markets. For example, small-scale livestock slaughter and processing feasibility studies have been conducted in Nevada (Curtis, Cowee, Lewis, & Harris, 2008; Curtis et al., 2006), eastern and New England states (Coleman, 2008; Mills, 2007), western Washington (Yorgey, 2008), and California (Schahczenski, 2009). Many commonalities can be identified across cases (e.g., producer willingness to participate in various options, seasonality, market demand, and sufficient livestock supply have been identified as constraining variables), yet most of this work has been conducted in areas with shorter travel distances and higher population densities than the current study.

Despite somewhat unique challenges, all aspects of our research supported the feasibility of developing additional livestock processing capacity. Beginning with market assessment, Ridley, Devadoss, and Shook (2014) found that consumers in northern Idaho and eastern Washington prefer locally raised beef, and that the locality of production was the most important attribute explaining consumer buying preferences. Consumers in the study region also indicated they are willing to pay 10 percent more for organic or all-natural varieties of beef over conventionally produced beef and beef products. This research indicates consumer demand in the region would support the development of USDA-inspected processing capacity that is needed to establish and strengthen a locally oriented beef economy.

For livestock producers in our study area, these growing niche markets provide higher-profit alternatives to selling animals at auction. Yet the agricultural trend of industrialization and concentration over the past decades has contributed to the loss of small, USDA-inspected livestock processing capacity in many rural areas (Ross, 2006; Worosz et al., 2008). Consistent with the broader literature, livestock producers in our study area described inadequate access to USDA-inspected processing options within a reasonable distance of their operation as a major limitation to fuller participation in and benefit from local and regional markets. Along with inadequate processing capacity, three additional themes emerged as significant constraints for area producers: the time required to direct market,

inadequate income to support multigenerational families, and a mismatch between when existing processors have underutilized capacity and the seasonality of available livestock production.

The custom-exempt processors who participated in this research were not interested in becoming USDA-inspected, but were supportive of working with producers to develop a new business model and new capacity. Forums, interviews, and surveys indicated that USDA-inspected mobile slaughter is the solution producers desired most, followed closely by building a stationary USDA-inspected facility. Any solution must address the key issue of smoothing out the seasonality of livestock production to ensure a steady supply for meat processors. Survey results demonstrated significant willingness on the part of producers to alter the birthing cycle for at least a portion of their herd if doing so would increase the feasibility of developing a USDA-inspected livestock processing facility. Substantial numbers of sheep, hogs, and goats are being raised in the area, and additional capacity exists to raise more. Developing a schedule that evens out the seasonality impacts associated with small-scale beef production in the area by processing significant amounts of other livestock could support a more balanced supply to processors while helping address the strongly expressed need for more processing options for sheep, goat, and other livestock.

Through all components of the project we found that consumer demand, livestock supply, and producer willingness to participate are not limitations to developing additional processing capacity in northern Idaho and eastern Washington. That producers have formed an independent group (the Greater Palouse Meat Producers) to take the next steps toward developing a cooperative is a strong indication of producers' motivation to participate. We found strong interest in developing a local-meat food system in all parts of the study area. However, given the general distribution of animals in the study area by county, data from the forums, interviews, and surveys, and feedback from producers and professionals, we focused on the southern portion of the study area as the most promising in terms of having adequate supply and demand for new processing capacity.

We estimate that 8,000 to 16,000 cattle equivalent[4] livestock are potentially available for a new processing operation in the southern portion of the study area. We present a wide estimate because many producers gave us a range of animals they would contribute based on which processing options ended up being developed. Some who would participate if the option includes mobile slaughter, for example, would still contribute animals, but not as many, to a fixed facility, and some would contribute none. Other available data fluctuated considerably from year to year, including animals sold at auction and animals sold through direct marketing. Given the number and complexity of "what if" options available, we give a range of minimum supply available — the lower boundary accounts for minimum animals available given minimum values for all ranges in the data, and the upper boundary accounts for more optimistic scenarios that include additional processing capacity or options and therefore more capital investment and risk.

In short, enough livestock is raised in the study area to support all processing options we examined. The largest volume scenario we examined requires 8,000 cattle per year to be sustainable. While enough supply to support this strategy exists, it would be a higher risk endeavor, requiring the most change in calving times and finishing options by local producers. Sufficient supply for processing options that require 3,000 animals or fewer exists throughout the study area. The most promising locations based on distribution of supply, need for additional infrastructure, and producer input are in the Pullman-Moscow and Lewiston-Clarkston areas in the southern portion of the study area. The Greater Palouse Meat Producers group is developing a feasibility study that will determine specific animal availability and costs of processing estimates for each option.

While not large, the economic benefits of developing new USDA-inspected processing capacity could be significant in small towns in the area. Impact will be greater in small towns rather than in the small cities identified by producers as

[4] One beef equals three hogs or six sheep.

the optimal location for a new facility. Multiple locations in the study area are suitable and well located for this type of economic development.

The Life Cycle Analysis by Roop et al. (in press) has showed that both small-scale and regional production and processing have slightly lower than average greenhouse gas emissions than the averages for national-scale systems and systems in other regions of the U.S. Developing additional USDA-inspected processing facilities in the study area will likely produce reduced environmental impacts compared to conventional livestock production and processing, potentially giving producers in the area a marketing edge over producers from other areas of the U.S. in markets valuing environmentally sustainable production.

Overall, this project found that developing additional small-scale, USDA-inspected livestock processing in northern Idaho and eastern Washington is economically, socially, and environmentally feasible. The newly formed producer steering group will build upon this project's research as they develop a detailed business plan, explore financing, and take other steps toward successful expansion of small-scale, USDA-inspected livestock processing as a rural economic development strategy in the area.

Acknowledgements

The authors would like to gratefully acknowledge funding support from the USDA Agriculture and Food Research Initiative. We wish to thank research assistants Danny Roop, Jennifer Boie, and interns Brita Carr, Nestor Guzman, Casey Hayward, and Sandy Kralik for their contributions to this project. We thank Christy Dearien and Debbie Gray for their involvement with data analysis, editing, and developing figures and tables. We also thank project advisors Steve Shook, Cinda Williams, and Ron Richards.

References

Agricultural Sustainability Institute. (2013). Community food system resources. Davis, California: University of California, Davis, Sustainable Agriculture Research and Education. http://www.sarep.ucdavis.edu/sfs/CFSresources

Boehlje, M. D., Hofing, S. L., & Schroeder, R. C. (1999). Value chains in the agricultural industries. West Lafayette, Indiana: Purdue University, Department of Agricultural Economics. Retrieved from http://www.centrec.com/assets/value_chains_in_ag_industry.pdf

Braak, W., Watson, P. & Rodriguez, A. (2010). Automated social account matrix release 3.06. Moscow, Idaho: University of Idaho. http://www.webpages.uidaho.edu/commecondev/asam.html

Brehm, J. M., & Eisenhauer, B. W. (2008). Motivations for participating in community-supported agriculture and their relationship with community attachment and social capital. *Southern Rural Sociology*, *23*(1), 94–115.

Brocklebank, A. M., Hobbs, J. E., & Kerr, W. A. (2008). *The North American beef industry in transition: New consumer demands and supply chain responses*. New York: Nova Science Publishers.

Carpio, C. E., & Isengildina-Massa, O. (2009). Consumer willingness to pay for locally grown products: The case of South Carolina. *Agribusiness*, *25*(3), 412–426. http://dx.doi.org/10.1002/agr.20210

Coleman, K. (2008). Demand and options for local meat processing: Finding the way from pasture to market in the CT River Valley. South Deerfield, Massachusetts: Community Involved in Sustaining Agriculture. http://www.buylocalfood.org/upload/resource/Slaughter.FeasibilityStudy2008.pdf

Cooke, S. C., & Watson, P. (2011). A comparison of regional export enhancement and import substitution economic development strategies. *Journal of Regional Analysis and Policy, 41*(1), 1–15.

Curtis, K., Cowee, M. W., Acosta, A. R., Hu, W., Lewis, S. R., & Harris, T. R. (2006). Locally produced livestock processing and marketing feasibility assessment (Technical Report 2006/07-13). Reno, Nevada: University of Nevada, Reno, University Center for Economic Development.

Curtis, K. R., Cowee, M. W., Lewis, S. R., & Harris, T. R. (2008). Financial potential for livestock slaughter and processing in Nevada (Special Pub. SP-08-01). Reno, Nevada: University of Nevada Cooperative Extension. Retrieved from http://www.researchgate.net/publication/242186177_Financial_Potential_for_Livestock_Slaughter_and_Processing/file/50463529ccfd7737a0.pdf

Darby, K., Batte, M. T., Ernst, S., & Roe, B. (2008). Decomposing local: A conjoint analysis of locally produced foods. *American Journal of Agricultural Economics*, *90*(2), 476–486. http://dx.doi.org/10.1111/j.1467-8276.2007.01111.x

Feenstra, G. W. (1997). Local food systems and sustainable communities. *American Journal of Alternative Agriculture*, *12*(01), 28–36. http://dx.doi.org/10.1017/S0889189300007165

Foltz, J. D., Jackson-Smith, D., & Chen, L. (2002). Do purchasing patterns differ between large and small dairy farms? Econometric evidence from three Wisconsin communities. *Agricultural and Resource Economics Review*, *31*(1), 28–38.

Food, Conservation, and Energy Act. (2008). Washington, D.C.: U.S. Government Printing Office. http://www.gpo.gov/fdsys/pkg/BILLS-110hr2419enr/pdf/BILLS-110hr2419enr.pdf

Hinrichs, C. C., & Welsh, R. (2003). The effects of the industrialization of US livestock agriculture on promoting sustainable production practices. *Agriculture and Human Values*, *20*(2), 125–141. http://dx.doi.org/10.1023/A:1024061425531

Holcomb, R., Flynn, K., & Kenkel, P. (2012). A feasibility template for small, multi-species meat processing plants. *Journal of Extension*, *50*(5).

Hultine, S. A., Cooperband, L. R., Curry, M. P., & Gasteyer, S. (2007). Linking small farms to rural communities with local food: A case study of the local food project in Fairbury, Illinois. *Community Development*, *38*(3), 61–76. http://dx.doi.org/10.1080/15575330709489829

IMPLAN. (2013). Software and Data Packages (input/output modeling). Retrieved June 2013 from http://implan.com/V3/Index.php

Johnson, R., Marti, D., & Gwin, L. (2012). Slaughter and processing options and issues for locally sourced meat (Report No. LDP-M-216-01). Washington, D.C.: USDA, Economic Research Service. http://www.ers.usda.gov/media/820188/ldpm216-01.pdf

Krause, J. (2006). Mobile meat processing plant helps small producers. Minneapolis, Minnesota: *BEEF*. Retrieved from http://beefmagazine.com/americancowman/small-farm/meat_processing

Lowe, M., & Gereffi, G. (2009). A value chain analysis of the U.S. beef and dairy industries. Durham, North Carolina: Duke University Social Science Research Institute, Center on Globalization, Governance & Competitiveness. Retrieved from http://cggc.duke.edu/environment/valuechainanalysis/CGGC_BeefDairyReport_2-16-09.pdf

Mammen, S., and Sano, Y. (2012). Gaining access to economically marginalized rural populations: Lessons learned from nonprobability sampling. *Rural Sociology*, *77*(3), 462–482. http://dx.doi.org/10.1111/j.1549-0831.2012.00083.x

McCann, N., & Montabon, F. (2012). Strategies for accessing volume markets in the beef industry: A review of three case studies. *Journal of Agriculture, Food Systems, and Community Development*, *2*(2), 37–49. http://dx.doi.org/10.5304/jafscd.2012.022.014

Miller, R. E., & Blair, P. D. (2009). *Input-output analysis: Foundations and extensions*. New York: Cambridge University Press. http://dx.doi.org/10.1017/CBO9780511626982

Mills, S. (2007). Report on the feasibility of a small-scale, small-animal slaughter facility for independent meat producers in North Carolina. Raleigh, North Carolina: North Carolina Department of Agriculture & Consumer Services. Retrieved from http://www.ncagr.gov/markets/shared-use_slaughter_report_final_without_appendices.pdf

National Restaurant Association. (2009). Chef survey: What's hot in 2009. Retrieved from http://www.restaurant.org/pdfs/research/2009chefsurvey.pdf

Orme, B. K. (2006). *Getting started with conjoint analysis: Strategies for product design and pricing research*. Madison, Wisconsin: Research Publishers.

Painter, K. (2008). Feasibility analysis of a mobile slaughter unit. Moscow, Idaho: University of Idaho. https://www.extension.org/mediawiki/files/6/6a/Mobile_Slaughter_Unit_Cost_Calculator_18May09.pdf

Ridley, W., S. Devadoss, S., & Shook, S. R. (2014). Estimations of consumer demand for local beef. *Journal of International Food & Agribusiness Marketing*, *26*(3), 20–36.

Ridley, W., S. Shook, S. R., & Devadoss, S. (2014). Evaluations of consumers' preference structure for locally-produced beef. *Journal of Food Products Marketing*, *21*(4), 1–18.

Roop, D. J., Shrestha, D. S., & Saul, D. A. (2013). Cradle-to-gate life cycle assessment of locally produced beef in the Palouse region of the northwestern U.S. *Transactions of the American Society of Agricultural and Biological Engineers*, *56*(5), 1933–1941.

Roop, D. J., Shrestha, D. S., Saul, D. A., & Newman, S. (in press). Cradle-to-gate life cycle assessment of regionally produced beef in the northwestern U.S. *Transactions of the American Society of Agricultural and Biological Engineers*.

Ross, N. J. (2006). How civic is it? Success stories in locally focused agriculture in Maine. *Renewable Agriculture and Food Systems*, *21*(2), 114–123. http://dx.doi.org/10.1079/RAF2005134

Schahczenski, J. (2009). *Final report: Natural livestock feasibility study*. Davis, CA: National Center for Appropriate Technology.

Selfa, T., & Qazi, J. (2005). Place, taste, or face-to-face? Understanding producer–consumer networks in "local" food systems in Washington State. *Agriculture and Human Values*, *22*(4), 451–464. http://dx.doi.org/10.1007/s10460-005-3401-0

Springer, J. D., Biermacher, J. T., Childs, M. D., Alkire, D. O., & Grooms, B. (2009). Attributes preferred and premiums offered for naturally produced beef cattle. Presented at the Southern Agricultural Economics Association Annual Meeting, Atlanta, Georgia. Retrieved from http://ageconsearch.umn.edu/bitstream/46859/2/SAEA%202009%20JB%20JS.pdf

U.S. Department of Agriculture [USDA]. (2009a). *2007 Census of agriculture, volume 1 chapter 2: County-level data: Idaho*. Washington, D.C.: USDA, Agricultural Statistics Service. Retrieved October 30, 2013, from http://www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1,_Chapter_2_County_Level/Idaho/

USDA. (2009b). *2007 Census of agriculture, volume 1 chapter 2: County-level data: Washington*. Washington, D.C.: USDA, Agricultural Statistics Service. Retrieved October 30, 2013, from http://www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1,_Chapter_2_County_Level/Washington/

USDA. (2009c). *Summary and state data, volume 1, geographic area series, part 51*. Washington, D.C.: USDA, Agricultural Statistics Service. Retrieved from http://www.agcensus.usda.gov/Publications/2007/Full_Report/usv1.pdf

Winter, M. (2003). Embeddedness, the new food economy and defensive localism. *Journal of Rural Studies*, *19*(1), 23–32. http://dx.doi.org/10.1016/S0743-0167(02)00053-0

Worosz, M. R., Knight, A. J., Harris, C. K., & Conner, D. S. (2008). Barriers to entry into the specialty red meat sector: The role of food safety regulation. *Southern Rural Sociology*, *23*(1), 170–207.

Yorgey, G. (2008). Local meat for local meals: An assessment of demand for a mobile slaughtering unit in Pierce, King, Kitsap and Thurston Counties, for the Puget Sound Meat Producers Cooperative. (master's thesis), University of Washington, Seattle, Daniel J. Evans School of Public Affairs. https://www.extension.org/mediawiki/files/d/d7/LocalMeatforLocalMeals_Puget_Sound_Meat_Coop.pdf

Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
www.AgDevJournal.com

Exurban farmers' perceptions of land use policy effectiveness: Implications for the next generation of policy development

Jill K. Clark,[a] * The Ohio State University

Shoshanah M. Inwood,[b] University of Vermont

Douglas Jackson-Smith,[c] Utah State University

Submitted March 6, 2014 / Revised May 20 and May 26, 2014 / Accepted May 27, 2014 / Published online October 16, 2014

Citation: Clark, J. K., Inwood, S. M., & Jackson-Smith, D. (2014). Exurban farmers' perceptions of land use policy effectiveness: Implications for the next generation of policy development. *Journal of Agriculture, Food Systems, and Community Development, 5*(1), 39–55.
http://dx.doi.org/10.5304/jafscd.2014.051.001

Abstract

Many local governments have enacted land use policies to address farmland loss and farm viability by protecting large blocks of farmland from residential growth. While the rate of suburban "sprawl" has slowed since the burst of the housing bubble in 2008, these policies remain the dominant approach to agricultural land use policy. Given the importance of exurban agricultural production, the growing diversity of exurban farms, and the increasing interest in local food systems by the public, it is time to revisit land use policy. Little is known about how farmers perceive land use policy environments, and whether diverse types of farmers have distinctive views on policy effectiveness. Therefore in this study we document land use policy environments of eight U.S. exurban counties. With farmer survey results we examine factors associated with farmers' perceptions of policy effectiveness. We find that the overall policy environment and differences in farmer and farm characteristics explain less variation in views of effectiveness than do farmers' perceptions of local community support, pressure from global markets, intensity of nonfarm development, and overall optimism about the future of agriculture. Farmers who market directly to consumers are particularly pessimistic about land use policies, as these policies were likely not designed with small farms in mind.

[a] * *Corresponding author:* Jill K. Clark, John Glenn School of Public Affairs; 1810 College Road; The Ohio State University; Columbus, Ohio 43210 USA; +1-614-688-5984; clark.1099@osu.edu

[b] Department of Community Development and Applied Economics, University of Vermont; Shoshanah.Inwood@uvm.edu

[c] Department of Sociology, Social Work and Anthropology, Utah State University; doug.jackson-smith@usu.edu

Results suggest that next-generation policy efforts to encourage the sustainability of exurban farming could be more effective by creating stronger ties between farm and nonfarm populations, adopting flexible policies that recognize the different ways in which farmers adapt to urbanization, and ensuring that the voices of diverse exurban farmers are included in a participatory policy-making process.

Keywords
exurban agriculture, land use policy, farmland preservation, urbanization, farmer perception

Introduction

Exurban areas are critical sites for the development and implementation of land use policy in the United States. Exurbia is often conceptualized as an area of transition between urban and rural, located between suburbs and truly rural areas and within commuting distance of a large, urbanized area (Audirac, 1999). Exurbia is operationalized as being outside of census urbanized areas, but within metropolitan counties (Berube, Singer, Wilson, & Frey, 2006). Research on farmland dynamics has indicated that while reductions in the amount farmland across the United States as a whole only represent only a small portion of total land, rates of land conversion are highest in exurban locations (Heimlich & Anderson, 2001; Oberholtzer, Clancy, & Esseks, 2010). As a result, most attempts to adopt local land use policies to protect agriculture and farmland from development have taken place in exurbia.

Meanwhile, production in metropolitan counties[1] contributes disproportionately to overall U.S. mainstream agriculture (nearly 37% of total U.S. farm sales occurred in just 20% of all counties in 2012), and accounts for a major share of the nation's fruit, vegetable, and horticultural, and dairy sectors (U.S. Department of Agriculture, National Agricultural Statistics Service [USDA, NASS], 2014). This diversity in production reflects farmer adaptations to the increasing parcelization and cost of land associated with growing competition from urban developers (Bryant & Johnston, 1992). In addition, exurban areas contain large concentrations of alternative agricultural activities that take advantage of urban markets. Examples include direct marketing to local consumers and institutional food providers, and value-added processing of farm products. The most recent agricultural census data shows that 84% of farms engaged in direct marketing to consumers (and 89% of all such sales) are in metropolitan counties or counties adjacent to a metropolitan area (Martinez et al., 2010). At any point in time in exurban spaces, one can find farms growing historic commodities, farms that are urban-oriented, farms producing higher-value-per-acre products, and any mix of these three in the same farm operation (Inwood & Sharp, 2012).

As a response to exurbanization (commonly referred to as "sprawl") and the resultant farmland loss, many communities instituted local planning and zoning policies and regulations in the 1990s to manage the impact of urban growth on farmland (Platt, 2004). Important goals of most of these programs were to support and protect existing farm enterprises by preventing nonfarm uses in productive areas, creating a "critical mass" of farmland and thereby favoring large, non–urban oriented farms (Daniels & Bowers, 1997). While the rate of sprawl may be slowing (Nelson, 2013), these policies are still in place. However, little research has been conducted to determine the effectiveness of these policies (Lynch & Musser, 2001). Even less is known about how exurban farmers perceive land use policies, and whether perceptions of local policy effectiveness differ by farm type, such as large, commodity-oriented farms versus smaller, direct sales farms.

Previous research has demonstrated how farmer perspectives on the viability of exurban agriculture vary based on the nature of the markets (e.g., direct vs. wholesale) with which they engage (Oberholtzer et al., 2010). Our paper extends this work to explore the factors that shape farmer perceptions and expectations about the effectiveness of local land use policies, focusing specifically at the time when exurbanization had just peaked in

[1] The United States Census Bureau defines metropolitan counties as those with a core urban area population of 50,000 or greater. Counties with high levels of commuting to this core urban area are also considered metropolitan. For more information visit http://www.census.gov/population/metro/

the U.S., just prior to the Great Recession of 2008-2012 (Nelson, 2013). Specifically, we examine three research questions: (1) Are farmers' perceptions of land use policy effectiveness correlated with their objective policy environments? (2) Do farmers' perceptions of land use policy effectiveness vary by farmer and farm operation characteristics? and, (3) Do farmers' perceptions of land use policy effectiveness vary given their subjective impressions of their broader environment? Effectiveness is measured by indicators of the perceived impacts on farmers' ability to keep land in farming and be commercially viable, and in general to facilitate entry of new farmers, and to keep residential development out of farming areas. We compare farmers in places with differing local policy contexts and explore differences in policy perceptions among farmers based on their material situations, the markets with which they are engaged, and their attitudes toward local conditions (other than land use policy).

As we look to develop a next generation of land use policy in exurban areas, having a better understanding of farmer perceptions of policy effectiveness can help shape the development of more responsive land use policy tools and approaches. This is especially true as urban communities look regionally for food supply as the local food movement increases in popularity.

Evolution of Exurban Land Use Policy

In the 1970s, farmland loss to urban uses and concerns about the long-term future of agriculture became a visible and controversial policy topic in the U.S. at both the local and national levels (Furuseth & Pierce, 1982). Aside from growing conflicts with nonfarm neighbors, increasing farmland values associated with urban sprawl made it harder for new farmers to enter into the industry, prevented farmers from expanding their land base, and encouraged farmers to sell land to realize capital gains (Johnston & Smit, 1985). It was during this time that Berry (1978) put forward his thesis on the "impermanence syndrome" suggesting that the aforementioned effects of urbanization would lead to a gradual on-farm disinvestment and then an exit from farming overall by farmers in affected areas. In response to these concerns, the USDA in the early 1980s conducted the National Agriculture Land Study (NALS), which documented the rapid loss of farmland in urbanizing areas and argued for more restrictive local land use policies as a mechanism to protect farmland and commercial agriculture in the urban shadow (NALS, 1981).

The stated purpose of most farmland preservation land use policies was to protect farm businesses and local farmland resources by increasing the production value of farming and decreasing the development or consumptive value of farmland, with the goal of eliminating land rent inflation due to speculation (Nelson, 1992). Policies pursued a broad range of goals, including protecting as many acres as possible, preserving the most productive farmland (based on soil quality), protecting a "critical mass" of farmland, and designating areas that would be devoted to farming or food production to protect farmers from conflicts with nonfarm neighbors (Daniels & Bowers, 1997; Furuseth & Pierce, 1982; Lynch & Musser, 2001; Tulloch, Myers, Hasse, Parks, & Lathrop, 2003).

The dominant approach of exurban land use policies in the U.S. has been to rely on the use of planning and zoning restrictions to protect farmland from housing development. Common land use policies included minimum lot size requirements, limitations on commercial businesses in farming zones, urban growth boundaries, delineation of urban service areas, and impact fees on new development (Daniels & Bowers, 1997). Additionally, incentive-based policies were sometimes used to offer incentives to exurban farmers to continue farming. Examples included the establishment of reduced ("use value") taxation of farmland, designated agricultural districts where farming is protected from nuisance lawsuits, and efforts to raise public funds to purchase agricultural easements or transfer development rights.

In practice, while preservation of agriculture was an initial goal, the implementation of local land use policies often reflected the priorities of a nonfarm public who cared more about protecting open space, landscape aesthetics, and protection of ecosystem services than actual contributions to the

viability of commercial farming operations (Kline & Wichelns, 1996, 1998; Nelson, 1992). Indeed, support for these policies was often pushed more by antidevelopment urbanites than by farmers (Furuseth, 1987).

The focus on protecting open space as a central goal led to policies that were primarily beneficial to larger, land-extensive farms engaged in conventional commodity production. For example, large-lot zoning assumes that farms all require over 40 acres (16 hectares), and agricultural easement program scoring systems often give priority to farms that operate larger acreages and raise conventional crops. Similarly, exclusive agricultural zoning typically excludes value-added processing activities or on-farm sales (Coughlin, 1991). However, recent research on farmers in exurban areas has demonstrated that small and medium-sized operations, and those engaged in direct local marketing of their products, are often more optimistic and successful than larger commodity farms in exurban areas (Oberholtzer et al., 2010).

More recently, there has been a notable rise in public awareness of how and where food is produced and growing demand for farm products supplied through community, local, and regional food systems (Ives & Kendal, 2013). Growth in the local foods movement has also led to a new form of local policy innovation, particularly the creation of local food policy councils and other organizations designed to stimulate local agricultural and food system activities (Scherb, Palmer, Frattaroli, & Pollack, 2012). These groups have helped organize farmers markets, farm-to-school projects, and the processing and labeling of local farm products.

Many in the planning community suggest that traditional farmland preservation tools can also be used to support these new local food system goals (American Planning Association [APA], 2007). An emerging research literature raises questions about this assumption (Paül & McKenzie, 2013). Recent work by Soma and Wakefield (2011) suggests that focusing on one aspect of food system planning, say farmland preservation, without addressing other aspects of food system planning, such as ensuring adequate farm income or supporting local markets for farm products, can fail to achieve the desired results. In some cases, traditional land use policy tools can actually create barriers to emerging forms of exurban agriculture. For example, zoning meant to protect farms from nonfarm development often prevents those same farmers from developing value-added, urban-oriented businesses on their farms to serve new urban markets.

Regardless of the approach, the effectiveness of local land use and food system policies in exurban environments hinges on farmers' awareness and of response to their policy environment (Fischer, 2003). The effectiveness of land use policy can vary depending on how inclusive policy making has been to farmer voices, on the awareness and attitudes of farmers toward these policies, and connections between policy perceptions and farmer decisions about making new investments in (or exiting from) the farm sector. Further, Bieirle and Konisky (2000) review literature demonstrating that the perceptions and trust of local governments held by stakeholders contributes to a more successful policy process, as well as broader community support. Recent research has demonstrated that well developed local land use policy and the presence of food policy councils is associated with higher levels of social capital between farmers and nonfarmers and more community organizations rallying around these issues (Sharp, Jackson-Smith, & Smith, 2011).

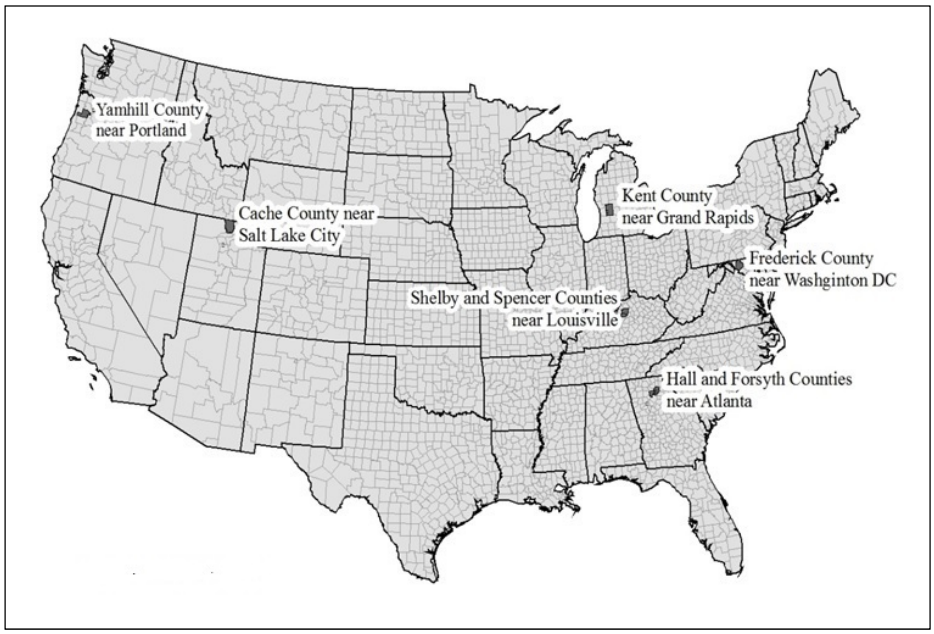
Given the importance of exurban agricultural production to the U.S. agricultural system, the growing diversity of exurban farms, and the increasing interest by the public in local and regional food systems, it is time to revisit the effectiveness of different approaches to exurban land use policy. This research focuses on perceptions of local land use policy effectiveness among exurban farmers in the U.S.

Methods

Study Site Selection

Our study is based on data collected in 2007 in eight exurban counties in six distinct U.S. regions (Figure 1). At this time in the U.S., exurbanization had just peaked. Therefore asking farmers what they thought of land use policies at this time is

Figure 1. Study Counties



useful and telling, as 2007 was height of the period when these very policies would be put to the test.

To be considered for our study, each county had to be near a major urban area and experiencing population growth to be deemed exurban. While these counties are not meant to represent all U.S. exurban counties, we did seek to engage in a variety of case study sites by focusing on regional diversity and selecting counties with a variety of historical agricultural commodity mixes (Table 1). In addition, we did not seek to select counties on the basis of having the most advanced land use or farmland preservation policies, but rather a wide variety of policies. The study counties included Cache County, Utah; Frederick County, Maryland; Forsythe and Hall counties in Georgia; Kent County, Michigan; Spencer and Shelby counties in Kentucky; and Yamhill County, Oregon.

Data Collection and Description

The data for this analysis were obtained in 2007 from key informant interviews, analyses of local planning and policy documents, and a random-sample mail survey of agricultural landowners in each case-study county. We conducted face-to-face semistructured interviews with purposively sampled key informants in each county during site visits. Informants included local elected officials, city and county planning staff, extension agents, farmers, agribusiness leaders, and local food system organizers.

The mail survey was sent to a random sample of 2,176 owners of agricultural land parcels larger than 10 acres (4 hectares) across the eight study counties. Agricultural landowners were identified

Table 1. Study Counties

				Farms (2007, year of survey)		
County	Population 2010	% Population Growth 2000–2010	Historic Commodity Mix	Number	Sales (1000s of $US)	Acres
Cache, Utah	113,419	23%	Cattle, dairy	1,195	136,064	251,550
Frederick, Maryland	196,563	19%	Dairy	676	27,957	98,278
Hall, Georgia	140,993	28%	Poultry	799	181,527	57,292
Forsyth, Georgia	115,797	76%	Poultry	306	39,972	19,799
Kent, Michigan	576,178	5%	Dairy, greenhouse	1,193	194,729	170,117
Shelby, Kentucky	33,574	26%	Crop, cattle, tobacco, horses	494	47,412	119,122
Spencer, Kentucky	11,911	44%	Cattle, tobacco	596	11,539	73,289
Yamhill, Oregon	85,198	17%	Greenhouse, vegetables	2,115	277,561	180,846

Note: 1 acre=0.4 hectare

from county tax assessor rolls. A total of 429 landowners were disqualified because they returned surveys indicating that they did not own any working agricultural land, leaving an adjusted sample size of 1,747 landowners. Across the eight study areas we received 856 useable responses for an overall response rate of approximately 49 percent. Survey respondents were asked about basic personal and household demographics and information about their farm operation (if any), including adaptations to urbanization and future business plans. They were asked about their perceptions of their community, such as political and community support for agriculture, land use policy effectiveness, and community cohesion and perceptions of industry pressures. This analysis utilizes only responses from persons indicating that their household was actively engaged in commercial farming activities at the time of the survey and for whom we had complete information on all analysis variables (n=448).

Characterizing the Local Policy Environment

Data from key informant interviews and reviews of written community plans and land use policies were used to characterize the local land use policy environment of each study county. Key components of a "strong" farmland land use policy environment were derived from the literature (Daniels & Bowers, 1997; Furuseth & Pierce, 1982; Lynch & Musser, 2001). We created measures of the presence and intensity of individual policy types using a 0 to 3 scale in which we assigned a score of 0 if a policy did not exist, and a score of 1 to 3 if the policy was evaluated as relatively weak (1), stronger (2), or strongest (3). Scores reflected the presence of a policy, not indicators for whether the policy was effectively implemented. Policy weights reflecting the relative importance of different, specific policies for effective farmland preservation (again based on the literature) were used to compute three subscales for regulatory, planning, and incentive-based policies (see Table 2). For example, Cache County had weak zoning for agriculture and growth (1 point x 2 weight = 2), weak subdivision regulations (1 point x 2 weight = 2) and stronger right-to-farm legislation (2 pt x 1 weight = 2). The total points for Cache County in this category are 6. This value is divided by the total weights of the "regulatory" subscale. The resultant value is 6 divided by 9 for a subscale score of 0.7. The same calculation is done for the "planning" and "incentive-based" subscales. All three subscales are averaged. For Cache County, the average of the subscales of 0.7, 1.5 and 1.1 equals an overall composite land use policy score of 1.1.

Cache County, Utah, is part of the Logan, Utah, Metropolitan area, which is a rapidly growing area located 90 miles (145 km) north of Salt Lake City. It is located in a semi-arid agricultural valley at 4,500 feet (1,372 meter) elevation that is the center of Utah's dairy industry. In the late 2000s, community-level land use policies to support agriculture were relatively underdeveloped. While county agricultural zoning placed modest restrictions on large subdivisions, most agricultural land was zoned for 1-acre lots; up to 5 parcels were allowed to be split off with little formal review. A county comprehensive plan that identified agricultural priority areas was passed in 2000, but serves as an advisory document and was not being used actively to guide land use decisions. Utah has a favorable property tax system that provides for reduced "use-value" tax rates on agricultural lands and a strong right-to-farm law, and allows for the designation of agricultural districts where farm uses are protected from nonfarm complaints. There are a few properties protected by agricultural easement in the county, but no local sources of agricultural protection program funding (current easements were paid from state and federal program funds).

Frederick County, Maryland, situated on the outskirts of Washington, D.C., stands in contrast to Cache County. This county is in a state that has a relatively long history of progressive farmland protection and growth management policies. In the late 1970s, Maryland established its voluntary agricultural district (temporary land protection) and voluntary purchase easement programs (permanent land protection). "Smart growth," or growth management, policies were instituted in 1997, with state financial resources targeted to support new development that utilizes existing infrastructure, in addition to protecting rural lands. Frederick County has organized its own agricultural advisory board and

Table 2. Policy Environment for Regulatory, Planning, and Incentive-based Policies for the 8 Case-Study Counties

	Policy Weight	Cache	Frederick	Forsythe	Hall	Kent	Shelby	Spencer	Yamhill
Regulatory	***1***	**0.7**	**1.9**	**0.9**	**1.1**	**1.1**	**0.9**	**0.8**	**2.6**
Urban Growth Boundaries	*3*	0	0	0	0	0	0	0	3
Zoning for Agriculture and Growth	*2*	1	3	1	1	2	2	1	3
Subdivision Regulations	*2*	1	3	1	2	2	1	1	3
Impact Fees	*1*	0	2	2	2	0	0	1	0
Right to Farm	*1*	2	3	2	2	2	2	2	2
Planning	***1***	**1.5**	**2.8**	**0.8**	**0.8**	**1.8**	**1.5**	**0.8**	**3.0**
Comprehensive Planning	*1*	2	3	2	2	2	2	1	3
Planning for Agriculture	*2*	1	3	0	0	2	1	0	3
Cross-jurisdictional Planning	*1*	2	2	1	1	1	2	2	3
Incentive Based	***1***	**1.1**	**2.7**	**0.6**	**0.6**	**1.4**	**0.9**	**0.4**	**0.7**
Ag Districts	*1*	1	2	0	0	0	2	2	0
Use Value/Tax Relief	*1*	2	2	2	2	2	1	1	2
Service Boundaries	*2*	1	3	1	1	1	0	0	0
Agricultural Easements/TDR	*3*	1	3	0	0	2	1	0	1
Overall Land Use Policy Environment		**1.1**	**2.5**	**0.7**	**0.8**	**1.4**	**1.1**	**0.7**	**2.1**

Note: Non-italicized, non-bold values under each county reflect the presence and intensity score of individual policy types: 0=policy did not exist; 1=relatively weak policy exists; 2=stronger policy exists, 3=strongest policy exists. Italicized "policy weights" rank each policy type within a subscale. Non-italicized bold subscale values are a sum of all individual policy weights*individual county's presence and intensity score. The "Overall Land Use Policy Environment" = regulatory + planning + incentive-based subscales.

actively funds its own purchase-of-agricultural-easement program designed to bridge the gap between the state easement program and local critical needs, and funds an economic development staff position devoted to agriculturally based economic development projects. In addition to incentive-based programs, Frederick County utilizes several types of agricultural zoning and subdivision regulations designed to manage the division of land. Frederick County's commitment to land use policy and agricultural economic development initiatives supports a climate of agricultural innovation and persistence. Despite the general pessimism surrounding the dairy sector due to low returns, dairy farmers are implementing innovative marketing efforts (e.g., taking advantage of new urban clientele) and value-added schemes (e.g., forming co-ops to process under locally grown labels).

Over the past couple decades, Hall and Forsyth counties in Georgia have experienced substantial urban development pressures. Overall, Georgia's state land use policies are relatively lax. Moreover, the state does not offer many resources to cities or counties for growth management or farmland protection. Specifically, we characterize Hall County's policy environment as "low" with few policies or plans for retaining farmland. Forsyth County is similar to Hall County policywise, but

categorized as "very low" because Forsyth has weaker subdivision regulations. Neither county identifies farmland as an important component of the future landscape in its planning documents. In the late 1990s and early 2000s, a lively debate took place in Hall County over what impact population growth might have on local agriculture, as a strong anti–population growth coalition took control of county council from 2001 to 2005 and proposed restrictive policies. This group was subsequently voted out of office. The leadership in Forsyth County at the time of this study had no intention of developing or administering policies to protect farmland, and there was no evidence of any group demanding these policies. Until 30 years ago, Forsyth County remained relatively isolated and closed off from adjacent counties. Its rapid population growth since 1990 has not generated much public debate over farmland preservation.

Kent County in western Michigan surrounds the city of Grand Rapids. Population growth has been relatively slow over the previous decade, in part due to Michigan's lagging manufacturing economy. Although its dairy sector is in decline, Kent remains one of the top five agricultural counties in the state of Michigan, primarily due to its orchards and nursery/greenhouse sectors. And although the apple market has been depressed by global competition, the "fruit ridge," a unique microclimate, provides a strong identifier for the region and has served as a key symbol for local farmland protection. Kent County's policy environment is complex as Michigan counties are subdivided into townships that have jurisdiction over land use, in addition to individual cities. This subdivision creates over 32 units of government. At the state level, Michigan has modest incentive-based land use policies for farmland protection. At the local level, some townships have pro–farmland protection planning and zoning policies, while others do not. In 2002, the county commissioners passed a purchase-of-agricultural-easement program; however, at the time of this study it remains unfunded. In the meantime some townships have independently funded their own purchase-of-agricultural-easement programs and have enacted their own transfer-of-development-rights programs (a market-based version of the purchase-of-agricultural-easement program). Finally, the city of Grand Rapids has an urban service area to guide growth, while a dedicated county Cooperative Extension program has worked to integrate land use policies across rural and urban areas.

Located on the eastern side of the Louisville, Kentucky, metro area, Shelby and Spencer counties have experienced changes in their agricultural sectors as their traditional mainstays (tobacco production and dairy farming) have both declined. Shelby County has become a major player in the Kentucky horse industry and is the recognized world center of Saddlebred horses. Those involved in the horse industry, however, are often viewed as outsiders by traditional commodity farmers. At the state level, Kentucky has some growth management and farmland protection policy frameworks for local governments, but they are not widely utilized. Since the mid-1990s, Kentucky has provided modest support for the purchasing of agricultural easements. Kentucky redistributed tobacco settlement money[2] back to farmers through a variety of grant, loan, and investment programs administered at the county level. Shelby County has preserved some farmland through the state program, and at the time of this study was conducting a feasibility analysis for a locally funded easement purchase program. Shelby County government is relatively pro-development, although they do have a plan to protect agriculture and have adopted restrictions on farm subdivisions that have led to the proliferation of large lots with limited access to public sewer services. The Spencer government does not actively plan to protect agricultural land and is skeptical about any regulatory policies that may interfere with private property rights.

Yamhill County is in the southwest corner of the Portland, Oregon, metro area. While experiencing pressure from relatively rapid population growth, Yamhill agriculture is on a positive growth trajectory, with increases in farm numbers, acres, and sales. The existence of a versatile microclimate

[2] In 1998 the four largest tobacco companies in the U.S. made an agreement with the majority of states to address tobacco-related healthcare costs. The agreement includes an annual sum of money paid to the state of Kentucky. In 2013, Kentucky received US$101 million.

in the valley has translated into a high incidence of urban- and tourism-oriented farms. Yamhill has among the most robust and intensive land use policy environments among our case study sites. Unlike the focus on incentive-based policies in Frederick County, the growth management and farmland protection policies in Yamhill are primarily regulatory. These strong regulatory policies have been developed and imposed by the state of Oregon. Local authorities are involved in their implementation by determining local urban growth boundaries (state policy requires new development to occur only within these areas) and designating other areas as exclusive agricultural zones (where agriculture is the only allowable use of the land). Because of this strong, state-based regulatory approach, incentive-based programs such as purchase of easements are not used to meet farmland preservation goals.

Other Key Variables

For all three of our research questions, our dependent variable is an index of farmers' perceptions of the effectiveness of local land use policies. This index was created by adding together responses to four questions from the farmer survey. The four questions were each measured on a 5-point Likert scale (from "strongly disagree" to "strongly agree") and asked about the respondent's agreement with statements about the ability of local land use policy in their area to (a) keep land in the county in farming; (b) maintain the viability of commercial farms in the county; (c) enable new farmers to get started in the county; and (d) keep residential development out of agricultural areas. The four items loaded onto a single factor using exploratory factor analysis and the summed index was internally reliable (Chronbach's alpha=0.85). To normalize the distribution of responses to this variable we used the cubed root of the summed index. Table 3 includes the descriptive statistics for each of the variables explained below. For dichotomous variables, the table provides the number of survey respondents coded as 1 for "yes" and 0 for "no"; the description of the remainder of variables includes the minimum, maximum, mean and standard deviation.

We captured variation in respondent characteristics with indicators of gender, education level, years of farm ownership, and dependence on

Table 3. Descriptive Statistics

Variables Used in Regression Analysis	Data Description*
Perceptions of effectiveness of land use policy	Min=4; Max=20; Mean=10.09; SD=3.82
Number of years owned farmland	Min=0; Max=180; Mean=28.52; SD=20.65
Proportion of total income from farm	Min=1; Max=5; Mean=3.48; SD=1.61
Education level achieved	Min=1; Max=5; Mean=3.24; SD=1.14
Male?	Yes=350 (coded 1); No=98 (coded 0)
Farm acres	Min=1; Max=8200; Mean=304.28; SD=637.98
Distance in km from urban area	Min=2.34; Max=1008.2; Mean=42.98; SD=22.71
Total farm receipts	Min=1; Max=7; Mean=3.40; SD=2.19
Majority of income from corn and/or soy?	Yes=17 (coded 1); No=431 (coded 0)
Majority of income from livestock?	Yes=196 (coded 1); No=252 (coded 0)
Majority of income from dairy?	Yes=57 (coded 1); No=391 (coded 0)
Farm selling local product?	Yes=208 (coded 1); No=240 (coded 0)
Perception of development pressure	Min=3; Max=15; Mean=8.82; SD=3.74
Perception of global competition	Min=3; Max=15; Mean=7.38; SD=3.57
Perception of nonfarm group support	Min=6; Max=30; Mean=16.58; SD=4.59
Perception of community support	Min=3; Max=15; Mean=10.68; SD=2.65
County optimism	Min=3; Max=21; Mean=8.83; SD=4.16

* Dichotomous variables include total number of "Yes" and "No" responses; all other variables include minimum (min), maximum (max), mean, standard deviation (SD).
Note: 1 acre=0.4 hectare

farming for their household income. Educational attainment was measured using a categorical variable on the survey and was coded 1=some high school; 2=high school diploma or GED; 3=some college; 4=bachelor's degree; or 5=advanced degree. Dependence on farming was measured using a five point scale: 1=all income is from farm sources; 2=more than half of income is from farm sources; 3=household income is evenly split between farm and off-farm sources; 4=less than half is from the farm, most income is from off-farm sources (wages, salaries, pensions, income from nonfarm businesses, or dividends and interest); 5=very little is from the farm; almost all income is from off-farm sources.

Farm characteristics were measured using indicators of farm size (in acres and sales volume), farm commodity type, distance from urban areas (in kilometers), and the nature of their engagement in local and global markets. For farm receipts, respondents could choose 7 categories: 1=Under US$10,000; 2=US$10,000 to US$24,999; 3=US$25,000 to US$49,999; 4=US$50,000 to US$99,999; 5=US$100,000 to US$249,000; 6=US$250,000 to US$499,999; or 7=US$500,000 and above. Three dummy variables were used to identify whether the majority of the respondent's farm income was from livestock, dairy, or row crops (coded 0 for "no" and 1 for "yes"). Similarly, respondents were coded "1" if they sold direct to consumers or to local institutions or businesses (e.g., restaurants, schools, grocery stores, hospitals) that marketed the product as "local." Distance from urban areas was calculated using GIS coverages and geospatial information about the location of the respondent's agricultural parcel. A logged form of farm size and urban distance is used in the analysis below to adjust for skewness. The extent to which the respondent felt pressure from global competition was measured using an additive index combining answers to three survey questions asking whether the respondent considered the following a problem for her or his farm: increased global competition in the farm sector; mergers among farm input suppliers; and consolidation in the farm processing sector (each question was measured using a five point scale; Cronbach's alpha=0.92).

Finally, four additive scales were constructed from survey items to capture respondents' perceptions of the broader farming context in their county. One scale summarized farmers' perceptions of development pressure using answers to two items indicating that "cost of farmland" and "new housing development near my farm is a problem." Lower scores indicated that development pressures pose less of a problem to the farm business, and higher scores indicated development pressures pose more of a problem to the farm business (Cronbach's alpha=0.75). An "optimism for the future of agriculture in the county" scale was created using answers to three questions (each measured on a scale of 1 to 7 where 1=very negative/very pessimistic and 7=very positive/very optimistic). The questions asked farmers: (a) Is population growth and development in the county having a positive or negative impact on farming in the county?; (b) Is population growth and development in the county having a positive or negative impact on the quality of life in the county?; and (c) Are you optimistic or pessimistic about the future of agriculture in the county? Lower scale scores indicate a more pessimistic and negative outlook, and higher scores indicate a more optimistic and positive outlook (Chronbach's alpha=0.80).

Following the work by Beierle and Konisky (2000), the last two scales measured levels of social capital as indicated by respondent perceptions of and trust in local government and the broader community. One scale is the sum of answers to six questions (measured on a scale from 0 to 4, where 0=not at all supportive and 4=very supportive) indicating perceived support for farming in the county from county government; city/municipal governments; economic development organizations; media (such as newspapers); the general public; and local environmental organizations. Higher scores indicate greater support for farming among nonfarm institutions and groups in the county (Chronbach's alpha=0.84). More broadly, respondents were also asked about the degree to which the local community supports farming. We combined three items in an additive scale (each measured on a 1-5 Likert scale, from 1=strongly disagree to 5=strongly agree): Most residents of the county agree that farming positively contributes to

the quality of life in the county; Overall, farmers and nonfarmers in this county get along well, and; In general, the citizens of this county are very supportive of farming in the county. Higher scores indicate greater perceived support for farming from the respondent's community (Chronbach's alpha=0.80).

Research Approach

We first examine if individual farmers' perceptions of land use policy effectiveness are correlated with their objective local policy environments across our study communities (Bowler & Ilbery, 1987). Our expectations are that the perception of effectiveness will vary between environments, with perceptions increasing as the quality of the policy environment increases. We used two methods to address this question. First, we used ANOVA with a post-hoc analysis to examine the relationship between a county's objective policy environment (Table 2) and the mean value of farmers' perceptions of the effectiveness of local land use policy.

Second, to examine this question using behavioral and cultural approaches, we estimated a set of nested regression models to explore the factors associated with individual respondent perceptions of land use policy effectiveness. In the first model, we explore a behavioral approach by adding measures of farm and farmer characteristics that have previously been linked to variation in farmer attitudes and behaviors (Johnston & Bryant, 1987). Specifically, we added independent variables to control for farmer characteristics (number of years farming, how reliant the farm household is on the farm income, gender) and farm characteristics (total farm receipts, what type of production the farm is engaged in, if the farmer is engaged in direct markets, farm acres, distance of farm from nearest urban area).

Research on attitudes toward farmland preservation policy often treat farmers as a monolithic stakeholder group (Kerselaers, Rogge, Vanempten, Lauwers, & Van Huylenbroeck, 2013). But given the diversity of farms in exurban areas, we would expect that perceptions of these policies might vary not just between policy environments, but between farmers themselves. In particular, we expect that farmers engaged in sales of local product (direct sales or intermediated sales) are more urban-oriented, have adapted to development pressure, and thus may not see traditional land use policies as serving their interests. Likewise, those farmers engaged in traditional commodity production and those operating larger acreages are expected to have more positive views toward local land use policy. Finally, we expect "livelihood" farmers (those getting a greater proportion of their income from farming) are more critical of land use policy, as they are concerned more about farm viability than simple open-space or farmland-preservation outcomes.

Finally, building on recent insights in agricultural geography (Evans, 2009), we use the second of the nested models to examine the "modified political economic" or cultural model that accounts for the importance of farmers' worldviews about their community and agriculture (in general). Cultural worldviews can serve as a filter that shape farmers' positionality in the landscape and perceptions of policy. Specifically, we add new variables that capture how farmers perceive the importance of global economic forces to their farms' survival, the level of support for agriculture from their local community, the amount of local housing development pressure, and their general degree of optimism about the future of agriculture. Farms experiencing greater pressure from global agricultural competition are expected to be more skeptical about the benefits of local land use policies. Those who perceive less community support, more local development pressure, and have a more negative outlook on the future of agriculture are also expected to have lower perceptions of local land use policy effectiveness.

Results and Discussion

Our first research question is whether farmers' perceptions of land use policy effectiveness are correlated with the objective policy environments across communities (in other words, whether perspectives vary by community). The results of our one-way ANOVA identify statistically significant differences in the mean value of the policy-effectiveness scale across the study areas (F-test significant at 0.05 level results in rejection of the null hypothesis that means of all groups are equal).

Further, pairwise comparisons conducted using the least significant difference (LSD) test are shown in Table 4. Counties are listed in ascending order according to the strength of their objective land use policy environment. Overall, there is a significant association between the objective and perceived indicators of land use policy (F-test significant a $p<.00$). However, the relationships do not appear to have a clear relationship, with relatively high perceived effectiveness scores found in the lowest, middle, and top-rated land use policy environments. Forsyth and Hall counties were statistically different from all other counties, ranking low on both the policy environment ranking and the mean perceived effectiveness. But perceived policy effectiveness scores among the rest of the counties, generally speaking, are not statistically significantly different. The lack of difference with Cache and Kent counties may reflect the impact of smaller sample sizes and a higher degree of variability among respondents within counties compared to differences across counties.

Table 4. ANOVA Results (counties listed in ascending order according to objective land use policy environment found in Table 2)

Counties	*n*	Policy Environment, Table 2	Dependent Variable, Mean	Pairwise Comparisons * **
Spencer	71	0.65	10.52	FO, H
Forsythe	74	0.74	9.92	C, FR, K, SH, SP, Y
Hall	78	0.81	9.89	C, FR, K, SH, SP, Y
Shelby	71	1.08	10.41	FO, H
Cache	22	1.10	7.94	FO, H
Kent	20	1.43	7.55	FO, H, Y
Yamhill	53	2.09	10.03	FO, H, FR, K
Frederick	59	2.45	11.40	FO, H, Y
	448	1.29	10.09	

F=3.63; p=0.00; * Sign<0.05
** C=Cache; FO=Forsythe; FR=Frederick; H=Hall; K=Kent; SH=Shelby; SP=Spencer; Y=Yamhill

To evaluate whether farmer and farm operation characteristics improve our ability to predict perceptions of land use policy effectiveness, we used ordinary least squares regression to estimate a model including both land use policy scores and measures of respondent characteristics (Model 1 in Table 5). Net of the effects of the other variables in the model, the objective county policy environment variable was positively and significantly related to individual perceived land use policy effectiveness. Most of the socioeconomic and demographic variables were not significant. However, farms that sell products to local markets had a significantly more negative perspective of their local land use policy effectiveness. This finding supports our thesis that farmers who sell to local markets may perceive farmland preservation policies as not geared toward their interests. The indicator of greater dependence on farm income was weakly and negatively related to perceived effectiveness, meaning that the greater the dependence on farm income as a proportion of household income, the lower the perception of land use policy effectiveness. Taken as a whole, this model only explains 4 percent of the variance of the dependent variable. Finally, it is surprising that both size of farm and distance to urban area were not significant in this model.

In Model 2, we introduce variables to capture respondents' perceptions of global competition, local development pressure, optimism for the future, and support from nonfarm organizations and the broader community. Inclusion of these variables increases the adjusted R^2 to 0.28, which is in line with other studies on values and attitudes (Ives & Kendal, 2013; Rauwald & Moore, 2003), meaning that 28 percent of the variation in perceptions of the effectiveness of land use policy can be explained by Model 2. In addition, Model 2 is a statistically significant improvement over the environmental/behavioral model or Model 1 (F change=29.71; p=0.00). Further, the residual sum of squares is lower for Model 2 than Model 1 (31.9 versus 21.5), suggesting that Model 2 better fits the data. Four of the five perception variables are significant (and the fifth — perception of global competition — is weakly significant) with coefficients that are in the expected direction. Farmers who feel less development pressure, who are

Table 5. Regression Results

	Model 1			Model 2		
Independent Variables	**Std. Beta**	**SE**	***p***	**Std. Beta**	**SE**	***p***
Intercept		0.10	0.00		0.11	0.00
Land use policy ranking	***0.14***	***0.02***	***0.01***	0.08	0.02	0.09
Number of years owned farmland	–0.03	0.00	0.55	–0.02	0.00	0.66
Proportion of total income from farm	0.13	0.01	0.07	***0.12***	***0.01***	***0.04***
Education level achieved	–0.06	0.01	0.28	–0.05	0.01	0.23
Male	0.07	0.03	0.16	0.05	0.03	0.24
Farm acres (LN)	–0.01	0.01	0.87	–0.02	0.01	0.77
Distance in km from urban area (LN)	–0.04	0.01	0.48	–0.03	0.00	0.49
Total farm receipts	0.02	0.01	0.81	0.02	0.01	0.72
Majority of income from corn and/or soy	–0.03	0.08	0.60	–0.02	0.07	0.61
Majority of income from livestock	–0.10	0.03	0.09	–0.05	0.03	0.33
Majority of income from dairy	–0.05	0.05	0.38	0.02	0.05	0.66
Farm selling local product	***–0.14***	***0.03***	***0.00***	***–0.11***	***0.02***	***0.01***
Perception of development pressure				***–0.19***	***0.01***	***0.00***
Perception of global competition				0.09	0.00	0.07
Perception of nonfarm group support				***0.11***	***0.00***	***0.04***
Perception of community support				***0.17***	***0.01***	***0.00***
County optimism				***0.27***	***0.00***	***0.00***
Adjusted R-square	0.04			0.28		
Residual sum of squares	31.86			21.45		
p	*0.01*			*0.00*		
F	*2.46*			*11.07*		
F change, p	*2.46 (.00)*			*29.71 (.00)*		

Note: Variables bold and italic are significant at $p<0.05$. Dependent variable=Perceptions of effectiveness of land use policy.

optimistic about the future of agriculture in their county, and who perceive higher levels of support from nonfarm groups and the larger community are more likely to think their land use policies are effective. Meanwhile, farms selling local products continue to be significantly more pessimistic about their local land use policies, while farms that rely more on agriculture for their livelihood are more positive. Interestingly, inclusion of the five new perception variables lowers the estimated size and significance of the impact of the objective policy environment. Overall, the modified political economic approach to exploring policy effectiveness explains the most variation in perceived policy differences.

Contrary to our expectations, the distance from a respondent's farm to the nearest urban area is not significantly related to perceived policy effectiveness, but the level of *perceived* development pressure is negatively related to policy perceptions. Since development pressure is usually related to urban proximity, this suggests that, overall, perceptions are more important than absolute location.

The social capital variables of community support and nonfarm group support are both significant and positive, consistent with recent work by Sharp, Jackson-Smith and Smith (2011) demonstrating that places with greater bridging capital between farm and nonfarm groups have richer policy environments and positive farm outcomes.

Finally, general farmer optimism about the future of agriculture in these environments of high urban pressure is the strongest predictor of perceived land use policy effectiveness. Oberholtzer et al. (2010) found that exurban farmers who direct marketed were less optimistic compared to those who produced for wholesale markets. Farmers

selling through wholesale markets were more satisfied with access to these markets and slightly more satisfied with the profitability of their markets. In our sample, those not selling local product (n=235) were more positive about local land use policies than farmers who focused on local markets (who are more "adapted" to deal with urban pressure; n=204).

Conclusion

Recent trends in exurbanization have resulted in a diverse urban agricultural landscape, with a production combination of commodity, high-value, lifestyle, and local market–oriented, sometimes taking place on the same farm (Inwood & Sharp, 2012). However, housing development in exurban areas has slowed due to the Great Recession, which may translate to slower rates of rural and exurban sprawl in the coming decades. Considering that anti-sprawl–era land use policies generally are still in place, the question becomes, what is the next generation of land use policy?

To inform this question, we addressed a gap in the literature by exploring the factors that are associated with exurban farmers' perspectives of land use policy effectiveness within six distinct regions of the U.S. We focused on a time period in which land use policy was being tested by exurbanization, looking for relationships between perceived policy effectiveness and the policy environment, farm and farmer characteristics, and farmers' relationships with their community. While future local land use policy objectives will likely differ from those of the past, our findings translate to policy development conversations of today — namely, that perceptions of effective policy are less about the objective policy environment and characteristics of the farmer and more about farmers' perceptions of community support and general optimism about their businesses' futures.

We find that indicators of the strength of the local land use policy environment have only a weak relationship to local farmers' perceptions about policy effectiveness. This is a meaningful finding in that the perception of effectiveness has more to do with the farmers' relationships with and position in the community and their market orientation than simply the strength of the enacted policy environment. Some of these differences reflect the fact that urban-oriented farmers who supply local markets have a more negative evaluation of traditional land use policy tools. More important is the finding that farmers' perceptions of support for agriculture from local nonfarm groups and the broader community are the most consistent drivers of perceived policy effectiveness. These findings imply that the policy instrument itself may not be as important as the policy-making process and how these diverse farmers are engaged in that process, since the effectiveness of local land use policies, in part, hinge on farmers' awareness and of response to their policy environment (Fischer, 2003).Some of the most pessimistic evaluations of land use policies in these landscapes come from farmers who have already adapted to take advantage of growing urban and local food markets. These farmers are more critical about the impacts or effectiveness of traditional land use policies than conventional commodity farms. In light of the diversity of production in exurban areas, and the awareness of growing interest by the nonfarm public in local food systems, it is clear that conventional land use policy tools may be inadequate to serve 21st century exurban communities. The protection of large commodity farms, which require a buffer from nonfarm development, may lead to policies that can make it more difficult for urban-adapted exurban farms to thrive, particularly when they prevent development of on-farm processing and marketing activities. This finding further raises the question about how to better integrate economic development policies with land use policies, as urban-oriented farms have a different market orientation. We are not suggesting that existing anti-sprawl land use policies should be eliminated. Instead, we are suggesting that we need to recognize which farms are not being well served or supported by current policies and should create policy that recognizes the different ways in which farms adapt to urbanization. Moreover, engaging diverse farmers in the policy-development process could result in not only policy instruments that are tailored to the diversity of farmer experiences, but in greater social capital between farmers and their community.

The results of this study suggest that "second

generation" approaches to local land use policies that emphasize development of strong social capital and connect farm and nonfarm communities (such as establishing local food policy councils and new agricultural and food economic development businesses) are critical to improving the outlook and sustainability of exurban farms. It is well within the reach of these types of organizations and local governments to create environments within which farmers and farm families feel more supported by nonfarming groups and the community at large, and can see a future for their businesses. In short, it is what has long been called for by Lyson (2000), a more civically engaged agriculture. Local support for farming may lead to greater patronage of locally oriented farm businesses. Given the public's growing interest in fresh, healthy, local food, future policy development that increases farmer perceptions of local support are likely to boost farmer optimism and confidence in local policy climates. Two possible directions would be to create greater opportunities for relationships between local farms and the broader public or to engage both farm and nonfarm groups in collaborative policy development. In this next-generation approach, it is important to consider the needs of exurban farms that are located on smaller lots, encompass more than just production (such as marketing, processing, etc.), are perhaps more urban-interactive and more tied into urban space, and operate on more expensive land.

But more so, it is critical to consider what voices are included in the process. Integrating farmers into policy discussions is not only about including the generic "farmer" representative, but is an opportunity to include the viewpoints of the diversity of exurban farmers. For example, local farm bureau or commodity groups are typically the first to be involved in local policy deliberations, while farmers who engage in nontraditional local food markets, especially newer farmers from nonfarm backgrounds, may not be as well organized and are more difficult to involve in political processes.

Finally, the results presented in the previous section emphasize the need to consider not just supportive *land use* policies for exurban agriculture, but also *economic development and market-based* policies that integrate opportunities for farmers to adapt to urbanization and take advantage of emerging local markets (both direct and wholesale). A recent case study of exurban farmland around Barcelona, Spain, emphasizes the need to couple local food and agricultural market development and land protection to maintain viability (Paül & McKenzie, 2013). So as we debate policy needs of today's farmers, we need to think more broadly about how we create policies so that they account for community food production goals, the different types of agriculture and farms, *and* the next types of challenges exurban farms will face. The forum for this deliberation may be in one of the many food policy councils sprouting up in the U.S.

Acknowledgments

Funding for this project was provided by the National Research Initiative of the Cooperative State Research, Education and Extension Service, USDA, grant #2005-35401-15272. The authors thank Jeff Sharp for his expertise and insights regarding this research project. The authors thank the editors and anonymous reviewers for their valuable feedback. Finally, we thank the many farm families, local leaders, and community members who so willingly gave of their time to share their experiences and knowledge.

References

American Planning Association [APA]. (2007, May 11). *Policy guide on community and regional food planning.* Retrieved from http://www.planning.org/policy/guides/adopted/food.htm

Audirac, I. (1999). Unsettled views about the fringe: Rural-urban or urban-rural frontiers. In J. F. Owen & M. B. Lapping (Eds.), *Contested countryside: The rural urban fringe in North America* (pp. 7–32). Brookfield, California: Ashgate.

Beierle, T. C., & Konisky, D. M. (2000). Values, conflict, and trust in participatory environmental planning. *Journal of Policy Analysis and Management, 19*(4), 587–602. http://dx.doi.org/10.1002/1520-6688(200023)19:4<587::AID-PAM4>3.0.CO;2-Q

Berry, D. (1978). Effects of urbanization on agricultural activities. *Growth and Change, 9*(3), 2–8. http://dx.doi.org/10.1111/j.1468-2257.1978.tb01024.x

Berube, A., Singer, A., Wilson, J. H., & Frey, W. H. (2006). Finding exurbia: America's fast-growing communities at the metropolitan fringe. Washington, D.C.: Brookings Institution.

Bowler, I. R., & Ilbery, B. W. (1987). Redefining agricultural geography. *Area, 19*(4), 327–332. http://www.jstor.org/stable/20002508

Bryant, C. R., & Johnston, T. R. R. (1992). *Agriculture in the city's countryside*. Toronto: University of Toronto Press.

Coughlin, R. E. (1991). Formulating and evaluating agricultural zoning programs. *Journal of the American Planning Association, 57*(2), 183–192. http://dx.doi.org/10.1080/01944369108975486

Daniels, T., & Bowers, D. (1997). *Holding our ground: Protecting America's farms and farmland*. Washington, D.C.: Island Press.

Evans, N. (2009). Adjustment strategies revisited: Agricultural change in the Welsh Marches. *Journal of Rural Studies, 25*(2), 217–230. http://dx.doi.org/10.1016/j.jrurstud.2008.10.002

Fischer, F. (2003). *Reframing public policy: Discursive politics and deliberative practices*. New York: Oxford University Press. http://dx.doi.org/10.1093/019924264X.001.0001

Furuseth, O. J. (1987). Public attitudes toward local farmland protection programs. *Growth and Change, 18*(3), 49–61. http://dx.doi.org/10.1111/j.1468-2257.1987.tb00080.x

Furuseth, O. J., & Pierce, J. T. (1982). A comparative analysis of farmland preservation programmes in North America. *The Canadian Geographer, 26*(3), 191–206. http://dx.doi.org/10.1111/j.1541-0064.1982.tb01448.x

Heimlich, R. E., & Anderson, W. D. (2001). *Development at the urban fringe and beyond: Impacts on agriculture and rural land*. Washington, D.C.: United States Department of Agriculture, Economic Research Service.

Inwood, S. M., & Sharp, J. S. (2012). Farm persistence and adaptation at the rural-urban interface: Succession and farm adjustment. *Journal of Rural Studies, 28*(1), 107–117. http://dx.doi.org/10.1016/j.jrurstud.2011.07.005

Ives, C. D., & Kendal, D. (2013). Values and attitudes of the urban public towards peri-urban agricultural land. *Land Use Policy, 34,* 80–90. http://dx.doi.org/10.1016/j.landusepol.2013.02.003

Johnston, T. R. R., & Bryant, C. R. (1987). Agricultural adaptation: The prospects for sustaining agriculture near cities. In W. Lockeretz (Ed.), *Sustaining agriculture near cities*. Ankeny, Iowa: Soil and Water Conservation Society.

Johnston, T., & Smit, B. (1985). An evaluation of the rationale for farmland preservation policy in Ontario. *Land Use Policy, 2*(3), 225–237. http://dx.doi.org/10.1016/0264-8377(85)90071-7

Kerselaers, E., Rogge, E., Vanempten, E., Lauwers, L., & Van Huylenbroeck, G. (2013). Changing land use in the countryside: Stakeholders' perception of the ongoing rural planning processes in Flanders. *Land Use Policy, 32*, 197–206. http://dx.doi.org/10.1016/j.landusepol.2012.10.016

Kline, J., & Wichelns, D. (1996). Public preferences regarding the goals of farmland preservation programs. *Land Economics, 72*(4), 538–549. http://dx.doi.org/10.2307/3146914

Kline, J., & Wichelns, D. (1998). Measuring heterogeneous preferences for preserving farmland and open space. *Ecological Economics, 26*(2), 211–224. http://dx.doi.org/10.1016/S0921-8009(97)00115-8

Lynch, L., & Musser, W. N. (2001). A relative efficiency analysis of farmland preservation programs. *Land Economics, 77*(4), 577–594. http://dx.doi.org/10.2307/3146942

Lyson, T. A. (2000). Moving toward CIVIC agriculture. *Choices: The Magazine of Food, Farm & Resource Issues, 15*(3), 42–55.

Martinez, S., Hand, M. S., Da Pra, M., Pollack, S., Ralston, K., Smith, T., . . . Newman, C. (2010). *Local Food Systems: Concepts, Impacts, and Issues*. Washington, D.C.: United States Department of Agriculture, Economic Research Service.

National Agricultural Lands Study [NALS]. (1981). *Executive summary of final report*. United States Department of Agriculture and President's Council on Environmental Quality. Washington, D.C.: U.S. Government Printing Office.

Nelson, A. C. (1992). Preserving prime farmland in the face of urbanization: Lessons from Oregon. *Journal of the American Planning Association, 58*(4), 467–488. http://dx.doi.org/10.1080/01944369208975830

Nelson, A. C. (2013). *Reshaping metropolitan America: Development trends and opportunities to 2030*. Washington, D.C.: Island Press. http://dx.doi.org/10.5822/978-1-61091-222-8

Oberholtzer, L., Clancy, K., & Esseks, J. D. (2010). The future of farming on the urban edge: Insights from fifteen U.S. counties about farmland protection and farm viability. *Journal of Agriculture, Food Systems and Community Development, 1*(2), 59–76. http://dx.doi.org/10.5304/jafscd.2010.012.003

Paül, V., & McKenzie, F. H. (2013). Peri-urban farmland conservation and development of alternative food networks: Insights from a case-study area in metropolitan Barcelona (Catalonia, Spain). *Land Use Policy, 30*(1), 94–105. http://dx.doi.org/10.1016/j.landusepol.2012.02.009

Platt, R. H. (2004). *Land use and society: Geography, law and public policy* (Revised Ed.). Washington, D.C.: Island Press.

Rauwald, K. S., & Moore, C. F. (2003). Environmental attitudes as predictors of policy support across three countries. *Environment and Behavior, 34*(6), 709–739. http://dx.doi.org/10.1177/001391602237243

Scherb, A., Palmer, A., Frattaroli, S., & Pollack, K. (2012). Exploring food system policy: A survey of food policy councils in the United States. *Journal of Agriculture, Food Systems, and Community Development, 2*(4), 3–14. http://dx.doi.org/10.5304/jafscd.2012.024.007

Sharp, J. S., Jackson-Smith, D., & Smith, L. (2011). Agricultural economic development at the rural-urban interface: Community organization, policy, and agricultural change. *Journal of Agriculture, Food Systems, and Community Development, 1*(4), 189–204. http://dx.doi.org/10.5304/jafscd.2011.014.002

Soma, T., & Wakefield, S. (2011). The emerging role of a food system planner: Integrating food considerations into planning. *Journal of Agriculture, Food Systems, and Community Development, 2*(1), 53–64. http://dx.doi.org/10.5304/jafscd.2011.021.006

Tulloch, D. L., Myers, J. R., Hasse, J. E., Parks, P. J., & Lathrop, R. G. (2003). Integrating GIS into farmland preservation policy and decision making. *Landscape and Urban Planning, 63*(1), 33–48. http://dx.doi.org/10.1016/S0169-2046(02)00181-0

U.S. Department of Agriculture, National Agricultural Statistics Service [USDA NASS]. (2014). 2012 Census of Agriculture: Desktop Data Query Tool 1.00 [On-line database]. Washington, D.C.: Author. Retrieved from http://www.agcensus.usda.gov/Publications/2012/

Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
www.AgDevJournal.com

The Farm Fresh Healthcare Project: Analysis of a hybrid values-based supply chain

Kendra Klein,[a] * San Francisco Bay Area Physicians for Social Responsibility

Ariane Michas,[b] Community Alliance with Family Farmers

Submitted February 25, 2014 / Revised May 26 and May 27, 2014 / Accepted June 2, 2014 / Published online November 7, 2014

Citation: Klein, K., & Michas, A. (2014). The Farm Fresh Healthcare Project: Analysis of a hybrid values-based supply chain. *Journal of Agriculture, Food Systems, and Community Development, 5*(1), 57–74. http://dx.doi.org/10.5304/jafscd.2014.051.003

Abstract

An emerging literature on values-based supply chains offers models for meeting both the scale-based requirements and values-based goals of farm-to-institution initiatives. These models seek to incorporate conventional supply chain norms of efficiency, standardization, and affordability while meeting the diverse social and environmental values motivating the local food movement. Values-based supply chain models to date have been derived largely from cases of farmer cooperatives and food hubs that have purposefully designed their operations to incorporate alternative agrifood movement values. A model that deserves more attention is *hybrid* values-based supply chains that incorporate both conventional and alternative resources, infrastructure, and markets. Of the few studies examining hybrid models, some point to benefits such as established supply chain relationships, expertise, and infrastructure that match the needs of institutional purchasers, while others argue that conventional intermediaries reproduce marginalizing structures of mainstream supply chains. This paper explores these tensions through analysis of the Farm Fresh Healthcare Project (FFHP), a farm-to-hospital initiative in the

* [a] *Corresponding author:* Kendra Klein, Senior Program Associate, San Francisco Bay Area Physicians for Social Responsibility; 2288 Fulton Street, Suite 307; Berkeley, California 94704 USA; +1-415-350-5957; Kklein@hcwh.org

[b] Ariane Michas, Bay Area Regional Food Systems Manager, Community Alliance with Family Farmers; 405 14th Street, Suite 209; Oakland, California 94612 USA; ariane@caff.org

Disclosures

Both authors represent nonprofit organizations that have been leaders in the development and execution of the Farm Fresh Healthcare Project; the outcome of this research is not connected to any benefit, financial or otherwise, for either author.

San Francisco Bay Area that engages a set of hospitals' existing regional produce distributors to supply products from local small and midscale family farmers. By engaging conventional intermediaries, the project benefited from existing supply chain infrastructure shaped by norms of efficiency, standardization, and affordability. This paper analyzes the extent to which FFHP actors succeed in embedding in their supply chains a range of non-economic values, including transparency, communication of qualities of provenance and production, decision-making equity, environmental stewardship, and social equity in the form of supporting small and midscale family farmers.

Keywords
agriculture of the middle, farm-to-hospital, farm-to-institution, local food movement, values-based supply chains

Introduction

Local food movement advocates are increasingly looking to institutional purchasers like hospitals, schools, and colleges as a means to scale up local food systems. Unlike the direct farm-to-customer models of farmers markets and community supported agriculture, institutional purchasers typically rely on supply chain intermediaries like distributors and processors in order to meet the logistical constraints of their foodservice operations, including the need for large and consistent volumes, preprocessed products, product standardization, and food safety requirements (Feenstra, Allen, Hardesty, Ohmart, & Perez, 2011; Vogt & Kaiser, 2008).

An emerging *values-based supply chain* (VBSC) literature offers various models for meeting both the scale-based requirements and values-based goals of farm-to-institution initiatives. These models seek to incorporate conventional supply chain norms of efficiency, standardization, and affordability while meeting the diverse values motivating the local food movement, such as mutual benefit between supply chain members, transparency, environmental stewardship, and social equity (Diamond & Barham, 2011; Feenstra et al., 2011; Stevenson & Pirog, 2008). While the local food movement literature has largely focused on civic values of trust, connection, and social equity (Lyson, 2004; Sage, 2003), the VBSC literature also incorporates industrial and commercial values of efficiency, standardization, and scale, which are key to addressing the challenges institutional procurement poses to the expansion of local food systems.

At the heart of redefining *value* in values-based supply chains is the incorporation of factors other than price in supply chain coordination, including social, health, and environmental values (Diamond & Barham, 2011; Feenstra et al., 2011; Stevenson & Pirog, 2008). Scholars and practitioners identify the key characteristics of a values-based supply chain as communication of qualities of provenance and production throughout the value chain; creation of strategic partnerships among supply chain members; and development of trust, transparency, and shared governance between supply chain members (King et al., 2010; Stevenson & Pirog, 2008).

Hybrid Values-based Supply Chains

A model that deserves more attention is the *hybrid* values-based supply chain, which incorporates both conventional and alternative resources, infrastructure, and markets to meet the economic and non-economic goals of farm-to-institution initiatives (Lerman, 2012). To date, VBSC models have largely been derived from cases of farmer cooperatives, food hubs, and food distributors that have purposefully designed their operations based on the goals and values of the alternative agrifood movement (Bloom & Hinrichs, 2011; Lerman, Feenstra, & Visher, 2012). In contrast, this paper examines a local food system network that employs distributors that did not originate in the alternative agrifood movement.

Many local food researchers and practitioners have looked to the development of new supply chain infrastructure such as food hubs, which manage the aggregation, distribution, and marketing of source-identified food from local and regional producers to help them meet wholesale, retail, and institutional demand (Barham, Tropp, Enterline, Farbman, Fisk, & Kiraly, 2019). Food hubs offer a high degree of assurance that their supply chains embody the underlying values of the

local food movement. However, many food hubs do not have the capital or capacity to offer the full range of services on which institutional foodservice operations rely. As one example, the majority of farm-to-institution efforts engaging cooperatives and food hubs have focused on whole products versus preprocessed products (Bagdonis, Hinrichs, & Schafft, 2009; Berkenkamp, 2006), yet preprocessed products such as sliced zucchini or prewashed lettuce are central to the functioning of most institutional foodservice operations, since they may not have the kitchen or staff resources to prepare all ingredients from scratch (for example, see Izumi, 2008; Klein, 2012; Sachs & Feenstra, 2008; Vogt & Kaiser, 2008).

By engaging conventional processors and distributors, hybrid VBSCs can offer a range of relationships, expertise, and infrastructure on which institutional purchasers depend. In addition to the capacity to offer fresh-cut and other minimally processed products, conventional intermediaries can provide other "wheel and mortar" benefits, such as extensive aggregation and distribution systems, storage and refrigeration capacity, and ability to respond to shortages in the availability of targeted local products with other products from their warehouses. Engaging existing intermediaries also allows local food systems to tap into other efficiencies, such as "back haul" systems on distribution routes in which trucks are both dropping off product to customers and picking up product from producers and therefore never running empty. They can provide other benefits as well, including relationships with farmers, food safety certification and assurances, insurance coverage, and information technology (IT) and invoicing systems. In addition, hospitals report that working with an established vendor is preferable to setting up a new vendor relationship due to in-house transaction costs, both in terms of the bureaucratic systems required to add an additional vendor and the ongoing labor required to manage ordering systems for multiple vendors (multiple interviewees, personal communication, 2013).

Yet engaging conventional intermediaries may pose challenges to the underlying goals and values of farm-to-institution efforts, given that they typically function according to dynamics of price competition, economic efficiency, and economies of scale. The central question becomes, to what extent can conventional supply chain intermediaries be leveraged to incorporate alternative agrifood values?

Within the VBSC literature, the few studies examining hybrid models come to contradictory conclusions as to whether the involvement of conventional intermediaries in values-based supply chains is beneficial or detrimental to the local food movement. King et al. (2010) and Conner et al. (2011) argue that conventional supply chain players can benefit value chain development by providing unique assets, such as processing and distribution infrastructure. Izumi, Wright, and Hamm (2010) also argue for the beneficial role of regionally based food distributors, in that that they have existing relationships with local and regional farmers that can re-embed the institutional foodservice market territorially. In contrast, Bloom and Hinrichs (2011) argue that when value chains incorporate mainstream businesses, they may reproduce equity imbalances that exist in conventional food systems, and that supply chain actors need a more deliberate commitment to non-economic goals in order to establish successful mechanisms of coordination.

The Farm Fresh Healthcare Project

This paper explores these tensions through a case study of a hybrid values-based supply chain called the Farm Fresh Healthcare Project (FFHP). The FFHP is a farm-to-hospital initiative in the San Francisco Bay Area that engages a set of existing regional produce distributors to supply product from local small and midscale family farmers. While acreage or gross annual sales may help determine what counts as a small or midscale farm, hospitals and nonprofit organizations participating in the FFHP are primarily interested in farm size as an issue of market and ownership structure. The concepts of farming-occupation farms or large family farms (Hoppe, Perry, & Banker, 2000), where farming is the chief source of income and primary occupation, are the most relevant definitions for FFHP goals aimed at supporting independent family farmers.

This study finds that the FFHP experienced both success and challenges in its aim to incor-

porate a range of local food movement ideals into existing supply chains. The project succeeded in sourcing produce from small and midscale family farmers, increasing transparency and traceability to convey farmer identities throughout the supply chain, putting values-based criteria such as organically produced ahead of price in some purchasing decisions, and increasing communication and trust between supply chain members. The greatest challenges the project encountered were difficulties in securing full transparency throughout the supply chain due to distributor IT systems and processing logistics, barriers to the enrollment of small family farmers posed by food safety and distribution route requirements, and questions about the long-term viability and replicability of the project given its dependence on nonprofit partners external to the supply chain and its reliance on a small set of foodservice champions within participating hospitals who were willing to take on additional responsibilities and costs associated with the project.

Methods

This analysis is based on evaluation of the first year and a half of the FFHP and included interviews, participant observation, and purchasing data. The lead author conducted 11 semistructured interviews with project participants, including five interviews with two produce distributors, two interviews with two farmers, and three interviews with two hospital food and nutrition services staff members. Interviews were recorded, transcribed, and coded according to these themes: participant motivations, transparency and communication; supply chain relationships; food safety; and factors related to institutional food procurement, such as processing, volume, consistency, and standardization. Participating hospitals and distributors provided purchasing data.

Both authors represent nonprofit organizations that have been leaders in the development and execution of the Farm Fresh Healthcare Project. This allowed us the opportunity for in-depth participant observation in internal conference calls, emails, meetings, and the ongoing logistics of implementing the project goals. We were guided by theories of participatory action research, which maintain that social science research can and should be conducted collaboratively with local stakeholders and with the goal of facilitating social change (Minkler & Wallerstein, 2008 and which understand science as a context-dependent, socially constructed process in which the researcher is not a neutral observer but an engaged participant (Greenwood & Levin, 2007). Participatory research theory provided important tools to guide a reflexive relationship to our in-depth involvement in the subject of this evaluation.

Background: The Farm Fresh Healthcare Project

The first meeting of the Farm Fresh Healthcare Project in August 2011 brought together nonprofit partners, hospital foodservice leaders, and produce distributors at Kaiser Permanente's Oakland Medical Center. Major goals identified were: (1) to work through the hospitals' existing produce distributors; (2) to increase transparency in existing supply chains by tracking farmer-identified products; (3) to secure fresh-cut local produce; and (4) to source from small and midscale local family farmers,

Table 1. Farms Participating in the Farm Fresh Healthcare Project

Farm	Acres (ha)	Miles from San Francisco (km)	Production	Notes
Coke Farm	300 (121)	92 (148)	Organic	Aggregates from 19 small-scale organic farms representing an additional 600 acres (243 ha)
Dwelley Farms	800 (324)	53 (85)	Mixed organic and conventional	Plans to expand organic production
Green Solar Farm	10 (4)	~90 (~145)	Organic	Product aggregated through Coke Farm
Greene & Hemly Farm	1,100 (445)	82 (132)	Mixed organic and conventional	Plans to expand organic production

Table 2. Farm Fresh Healthcare Project Sourcing, Summer 2012 through Spring 2013

Product	Cut	Amount	Producer(s)	Distributor(s)	Hospital(s)
Green beans	Trimmed & cleaned, 2" cut, ¼" cut	3,830 lbs (1,737 kg)	Dwelley Farms	Bay Cities Produce	John Muir Health, UCSF Med. Center
Butternut squash *organic production methods*[a]	1" cubed	120 lbs (54 kg)	Coke Farm	FreshPoint	SF VA
Strawberries *organic*	Whole	8,478 lbs (3,845 kg)	Coke Farm	Bay Cities Produce Fresh Point	John Muir Health, UCSF, SF VA
Stone fruit	Whole	1,440 lbs (653 kg)	Dwelley Farms	Bay Cities Produce FreshPoint	John Muir Health, UCSF, SF VA
Cherry tomatoes	Whole	1 flat	GreenSolar	FreshPoint	SF VA
Apples	Whole	220 lbs (99 kg)	Greene & Hemly	FreshPoint	SF VA
Pears	Whole	220 lbs (99 kg)	Greene & Hemly	FreshPoint	SF VA

[a] The butternut squash was grown on a certified organic farm; however, it was processed in a facility that is not certified organic, so the end product cannot legally be described as organic. See the discussion below for more details.

ideally those practicing environmentally beneficial production methods.

The FFHP is driven by a collaboration between two nonprofit organizations, Community Alliance with Family Farmers (CAFF) (http://www.caff.org) and San Francisco Bay Area Physicians for Social Responsibility (SF PSR) (http://www.CAhealthyfoodinhealthcare.org). In 2012, these organizations secured project funding through a Kaiser Permanente Community Benefit grant. Procurement began in the summer of 2012 with five hospitals: the University of California at San Francisco Medical Center (UCSF Med. Center), three campuses of John Muir Health, and the San Francisco Veterans Affairs Medical Center (SF VA). Four farms were selected to participate based on their capacity to meet the hospitals' demand for targeted produce items and their alignment with project goals (see the Project Rationale section). See Table 1 for information on participating farms.

This analysis focuses on the first year of procurement, from summer 2012 to spring 2013. Table 2 provides details on the amount of FFHP sourcing that was achieved during this time.[1] (See Klein, 2014a and 2014b, for recent data on FFHP procurement.)

Project Rationale

Healthy food in health care

The hospitals participating in the FFHP are leading members of the national Healthy Food in Health Care Program, which seeks to "harness the purchasing power and expertise of the health care sector to advance the development of a sustainable food system" (Health Care Without Harm [HCWH], 2014, "Strength in Numbers," para. 6). They are among nearly 550 hospitals nationwide that stand behind the *Healthy Food in Health Care Pledge,* which states that "for the consumers who eat it, the workers who produce it and the ecosystems that sustain us, healthy food must be

[1] By January 2014, one hospital had shifted its business to Bay Cities Produce, diminishing the importance of FreshPoint SF as a project participant. Three hospitals joined the project in 2013; however, two failed to procure significant volumes. Additional farms and crops enrolled were Durst Organic Growers (400 acres or 162 ha), Las Hermanas (60 acres or 24 ha; aggregated through Coke Farm), and Capay Organic (2,000 acres or 809 ha). Total produce sourced from project inception to January 2014 was 66,659 lbs (30,236 kg): 5,860 lbs (2,658 kg) organic butternut squash, 40,072 lbs (18,176 kg) organic strawberries, 1,900 lbs (862 kg) organic Satsuma mandarins, 2,832 lbs (1,285 kg) asparagus, 10,615 lbs (4,815 kg) green beans, 1,484 lbs (673 kg) stone fruit, and 3,500 lbs (1,588 kg) summer squash.

defined not only by nutritional quality, but equally by a food system that is economically viable, environmentally sustainable, and supportive of human dignity and justice" (HCWH, n.d.). SF PSR coordinates the *Healthy Food in Health Care Program* in California.

In 2006, the FFHP hospitals were among the founding members of the Bay Area Hospital Leadership Team coordinated by SF PSR, which seeks to put this vision of healthy food into practice by sharing information and pooling institutional purchasing power. Prior to the FFHP, they had already achieved success on alternative food procurement projects (e.g., see HCWH, 2012), and two of the hospitals had won national recognition for their leadership on local and sustainable food efforts (Harvie, 2008; Sirois, Pryor, Klein, & Thottathil, 2013).

The FFHP benefited from a great deal of prior learning and changes to systems of operation with the goal of incorporating local, seasonal foods into their menus. For a hospital, changes in food procurement hinge on menu planning, which typically involves a team of dietitians developing targeted diets for all of the hospital's patients. Changes can take weeks or months of planning and paperwork. One hospital representative noted their increased nimbleness in menu planning and related ordering processes as key to FFHP success, "In the past we've taken a whole quarter to incorporate seasonal produce. . .[but] only two weeks ago on a Tuesday I said, 'asparagus is coming on,' and by Friday, our executive chef was announcing menu changes. I was blown away. You keep at it, and finally there comes a day when, hey, we're pretty good at this now" (Interview #71, 2013). Another hospital representative noted that they had synchronized cafeteria menus with order guides, so that, when the executive chef changes the menus from, for example, winter squash to asparagus, it automatically triggers a change for the staff member coordinating online ordering (Interview #74, 2013).

Prioritizing local family farmers

Prior to and during the FFHP, participating hospitals were sourcing and tracking local produce through their produce distributors, Bay Cities Produce and FreshPoint San Francisco.[2] Both distributors developed local food programs in response to customer demand, but they rely solely on geographic distance in their definition. Bay Cities Produce uses a series of concentric zones it calls Local 1, 2, and 3: Local 1 (L1) refers to food produced within 100 miles (161 km) of the company's warehouse in San Leandro, California (CA); Local 2 (L2) extends the circle to 250 miles (402 km); and Local 3 (L3) refers to food produced within the state of California (Bay Cities Produce, n.d.). FreshPoint San Francisco defines two spatial zones: food produced within 150 miles (241 km) of their warehouse, and food produced within California.

The FFHP sought to incorporate a broader set of criteria than geographic distance in its definition of local food to "define local and sustainable purchasing in a much deeper way," according to one participating hospital representative (Interview #71, 2013). Definitions of local food that rely on geographic distance do not take into account ownership structure of farms or agricultural production methods. While buyers may envision supporting small-scale family farmers, local economies, and environmentally beneficial agricultural techniques, ascertaining the distance between food production and the end consumer is no guarantee that it embodies those values (Hinrichs, 2003; Selfa & Qazi, 2005). This is particularly true in California where a highly industrialized form of agriculture has been dominant for over a century (Guthman, 2004; Walker, 2004). California's US$43.5 billion agricultural economy produces nearly half of U.S.-grown fruits, vegetables, and nuts (California Department of Food and Agriculture, n.d.), making fresh produce grown on an industrial scale readily accessible. While *local* is often associated with an agrarian ideal, California boasts such local farms as Grimmway, the world's largest producer of carrots,

[2] Three FFHP hospitals use Bay Cities Produce and one uses FreshPoint San Francisco. Both distributors source from producers and wholesalers locally, nationally, and globally based on factors of cost and supply. Bay Cities Produce is an independent, family-run produce company founded in the Bay Area in 1947. FreshPoint SF is a subsidiary of the national food distributor Sysco. It was formerly the independent regional distribution company Lee Ray-Tarantino.

processing over 10 million pounds [4.5 million kg] weekly (Blatner, 2012).

During the initial planning phase of the FFHP, a collaboration between the hospital leadership team and nonprofit partners SF PSR and CAFF resulted in the following definitions of local food:

- *Tier 1 – Locally produced on small to midscale family farms:* Farms, ranches, and production and/or processing facilities located within a 250-mile (402-km) radius of the hospital facility.
- *Tier 2 – Sustainably grown:* Food that carries one or more independent third-party certification focused on sustainable production practices, is USDA Certified Organic, or is in transition toward achieving organic certification.
- *Ultimate goal:* Locally grown on small family farms using sustainable farming practices; free of toxic pesticides and genetically modified organisms (GMOs).

The threefold intent of the criteria was to support a segment of the agricultural sector that has been identified as threatened and in need of new market opportunities (Kirschenmann, Stevenson, Buttel, Lyson, & Duffy, 2008), to support agricultural practices that are more environmentally sustainable, and to prioritize organic produce in order to decrease farm worker and hospital patrons' exposure to potentially harmful pesticides.

Choosing a hybrid supply chain structure

The hybrid supply chain structure of the FFHP is the result of a learning process within a network of farm-to-institution actors in the San Francisco Bay Area. In particular, it can be understood as a response to the experience of a food hub called the Growers' Collaborative (GC) and a result of the maturation of existing regional distributors' interest in local food sales.

In response to the experience of the GC, the FFHP set out not to "reinvent the wheel," but to retrofit the existing supply chain to become shorter, more flexible, and more transparent. With some of the participating hospitals sourcing up to 90 percent of their fresh fruits and vegetables in processed form (e.g., sliced green beans and cubed squash), the FFHP also sought to engage intermediaries that could help "crack the nut" of supplying fresh-cut product in addition to whole product.

The history of the GC points to some of the logistical and capital challenges associated with developing new supply chain infrastructure (Abellera, Del Signore, Derden-Little, Michas, Runsten & Sabato, 2014)). CAFF founded GC in 2004 in an effort to scale up the local food system.[3] The decision to create new food system infrastructure was influenced by a desire for transparency, traceability, and the ability to incorporate participating farmers' stories into product marketing, factors which were not perceived as possible through existing distributors at the time.

Even at the height of its operation, GC struggled with structural inefficiencies like a limited number of vehicles, which restricted aggregation capacity, and sub-par storage facilities with inadequate refrigeration space, poor drainage, and insufficient access for trucks. In addition, GC could not draw on the economies of scale and professional savvy of larger farms and could not offer the full complement of a year-round product list that its customers were accustomed to. As one participating farmer remarked, "[GC] might take two cases of tomatoes, but you need to have a bunch of other products to spread out the costs. Does it warrant the gas, the cost of the employee to deliver? [GC] was a fantastic concept, but unless you're able to provide a wide range of products like a wholesale distributor, you lose that efficiency" (Interview #78, 2013). Ultimately, the challenges of scale and structure associated with setting up a parallel distribution business from scratch were insurmountable for the Growers Collaborative.

Despite its shortcomings, GC built enthusiasm, demand, and knowledge about local food within institutional foodservice in the regions it

[3] GC was founded through a USDA Value Added Producer grant. By 2006 it served the Ventura Unified School District, Kaiser Permanente medical centers, corporate and university cafeterias administered by Bon Appetit Management Company, the campuses of the University of California, Davis, and University of California, Berkeley, two additional school districts, and Revolution Foods.

served. In addition, GC demonstrated to regional produce distributors that there was a high level of demand for local produce in their customer base. A number of these distributors began to develop local sourcing programs, in many cases approaching CAFF for technical assistance.

Discussion

The Farm Fresh Healthcare Project can be understood as an example of a values-based supply chain aiming to meet both the scale-based requirements and values-based goals of participating hospitals. By engaging conventional intermediaries, the project was able to benefit from existing supply chain infrastructure shaped by norms of efficiency, standardization, and affordability. The central question this analysis seeks to clarify is to what extent FFHP actors succeeded in embedding a range of non-economic values in their supply chains, including transparency, communication of qualities of provenance and production throughout the supply chain, decision-making equity between supply chain members, environmental stewardship, and social equity in the form of supporting small and midscale family farmers.

Among the benefits of engaging conventional distributors were taking advantage of existing distribution routes; the regularity of the distribution schedule (both distributors deliver up to five times weekly to the hospitals); ability of both distributors to respond immediately to shortages in targeted produce with other products; infrastructure that included refrigerated trucks, warehouses with necessary refrigeration, and Bay Cities' in-house processing capacity; avoiding the need for hospitals to create new vendor accounts; and food safety assurances. Bay Cities' customers commented that their high level of trust in the company's food-safety practices influenced their desire to have local produce come through that channel. Food-safety certification is a top priority for hospitals due to the immune-compromised patient population they serve and the strict foodservice inspections administered by the state, in accordance with standards set by the Centers for Medicare and Medicaid Services, to which they must adhere. Bay Cities Produce has developed state-of-the-art food-safety systems in its processing facilities and warehouse, including microbe testing of each batch of cut product, a practice that is currently far beyond the industry standard.

As the following discussion demonstrates, the FFHP experienced both success and challenges as it sought to incorporate a broad range of social, health, and environmental values into existing supply chains.

Supply Chain Transparency

One of the underlying tenets of the FFHP and the alternative agrifood movements from which it emerged is that the qualities of a food's production, processing, and distribution have implications for the health of people, communities, and the environment. While conventional supply streams are coordinated predominantly by price and economic efficiency, the FFHP and similar farm-to-institution initiatives prioritize food with a history that embodies a broader range of values and goals. Thus mechanisms of transparency are central to values-based supply chain models in order to communicate such crucial characteristics as local provenance, conservation techniques, or ethical standards to final consumers (Cohen & Derryck, 2011; King et al., 2010; Lerman, 2012). This information is typically not readily available to buyers in conventional supply chains, which focus on price and measurable quality characteristics such as weight or pack size as the predominant factors of relevance (Feenstra et al., 2011).

Although FFHP hospitals had previously been sourcing local produce through their regional distributors, prior to the project they knew little about the source of the products beyond geographic distance and had no mechanism for prioritizing certain growers. As one hospital representative stated, "We can now order directly through our produce company for a specific farm, we never had that before, we could only know after the fact [on invoices] if it was locally sourced, and we didn't know anything about the farm or the farm practices" (Interview #74, 2013).

Embedding the product with information all the way through the supply chain is central to the ability of hospitals to "pull" product through the system by prioritizing a specific farm when they're ordering, to track their purchasing progress, and to

know when the product is in-house so they can "tell the story" of the product to patients, staff, and visitors.

Existing Mechanisms of Transparency

There were some important systems of transparency already in place in relation to each distributor's definition of "local" based on geographic distance from their facilities. In response to customer demand for local products, Bay Cities offers a fresh-cut blend of root vegetables from farmers in the Brentwood region labeled as a Brentwood Mix on ordering sheets and packaging. Bay Cities also includes demarcation of its three local zones, L1, L2, and L3, on invoices. Upon customer request, it will produce a local purchasing report based on these zones.

FreshPoint SF publishes a weekly "hot sheet" of locally produced items. More recently, FreshPoint SF has become a business member of CAFF's Buy Fresh Buy Local program. Marking products with the Buy Fresh Buy Local logo demarcates them as products grown by CAFF member farmers. The hot sheet lists item codes, cost, product name, farm name, farm location, and distance to the FreshPoint SF warehouse. Customers can not request product from particular farmers, but if customers order a product on the hot sheet, they can trust that it was produced by the listed farmer. FreshPoint SF's invoices include demarcation of *L* for items produced within 150 miles for their facility, *CA* for items produced within California, and *O* for organic products. Upon request FreshPoint SF staff will run sales reports using specific product codes and will run general local purchasing reports for customers.

The Need for New Technology Systems

Achieving the level of transparency aimed for by FFHP hospitals and nonprofit partners in terms of identifying farm names throughout the supply chain — at point of sale, on invoices, and on packaging for fresh-cut produce — would require significant changes in tracking systems, with the biggest stumbling block being distributor IT systems. Although distributors already trace every batch of whole and processed product to the farm out of concern for food safety, they do not have systems in place to incorporate that information into hospitals' ordering sheets or onto packaging for processed products.

Currently, Bay Cities Produce and FreshPoint SF assign a product code according to product type; for example, all ¾" (1.9 cm) cut green beans have the same code. Creating an individualized product code for farm-identified products, like Dwelley Farms green beans, was bound up with a host of system changes. One distributor representative remarked that, "The in-house frustrations, the difficulties with order entry, they are just monumental" (Interview #72, 2013). The challenges were due in large part to the fact that the current information technology (IT) systems were built around an assumption that farm name does not matter. Without access to updated IT systems for the duration of the FFHP, all the necessary changes had to be done manually. For example, Bay Cities created overrides in its computer system so that when the FFHP hospitals ordered green beans, it would automatically show that they wanted Dwelley Farms green beans.

The type of software that can handle farmer identification exists. It has been developed by intermediaries that see value in communicating qualities of provenance and production. One example is Veritable Vegetable, an organic produce distributor in San Francisco. This company has developed a proprietary software system that lists farm names on order sheets, allowing customers to weigh factors like farm origin in addition to price. Other examples are Local Orbit, a company that provides software platforms and business management to "re-link the food chain" (Local Orbit, n.d.) and Market Maker, an interactive database that connects food producers to new markets supported by partnerships between land-grant institutions and state departments of agriculture in 10 states.

Both distributors state that they plan to invest in software that could track farm names or other relevant characteristics throughout the system. In the meantime, FFHP participants have brainstormed ways to ensure transparency while incurring fewer transaction costs. One distributor suggested that rather than create individualized product codes, he might share his production log with hospitals and nonprofit partners weekly or

allow them to spontaneously request to see purchase slips for a given day. Yet this after-the-fact reporting doesn't allow the hospitals to choose one product over another based on provenance, farm scale, and production practices. Having that choice is central to institutions' ability to influence change within the food system.

SF PSR and CAFF initiated conversations around creating a *Buy Fresh Buy Local* product line that would operate like Bay Cities' Brentwood Mix. This would be a shift from tracking a specific farm's product through the processing room to using an identified line of product sourced from farmers who meet the criteria of the project, in this case CAFF member farmers participating in the FFHP.[4] This would allow greater ease in relation to the distributors' ordering and processing systems, potentially allowing a more rapid expansion in the number of farmers and products incorporated in the FFHP.

Transparency and Fresh-cut Produce

During the pilot year of the project, the FFHP succeeded in supplying hospitals with fresh-cut green beans labeled by farm name at point of sale and on the product package. This represents a significant improvement in transparency and was achieved with a great deal of effort. Typically, once product enters the processing facility it becomes anonymized. In order to fulfill a set of orders for cut green beans, a processor may combine product from a number of farmers. Tracking a specific farms' product all the way through processing resulted in different challenges for each distributor, based on the structure of their operations. Bay Cities was more nimble as a result of having an in-house processing room, but having to organize processing and labeling around set batches of Dwelley Farms green beans resulted in high transaction costs:

> You've got to stop all the presses and make different labels, get them on the bag, see who gets what — is UCSF going to get the DF label today? Is John Muir? If I have to create labels for all of these farms, you can imagine. If it's just beans it's not that bad, but for me, beans represents an easy dozen items that I need to process — my different blends, cleaned and trimmed, half-inch [1.3 cm], two-inch [5 cm], three-inch [7.6 cm] — all of those labels have to be changed if we run out of that lot and have to go to another lot. (Interview #72, 2013)

FreshPoint SF is purely a distribution company, not a processor-distributor. To supply customers with cut produce, it sources from other facilities across the country. The majority of its green beans, for example, come from a processing facility in Ohio. It wasn't able to make the logistics of dealing with a local processor work successfully in order to supply its FFHP hospital with fresh-cut Dwelley Farms green beans. However, as discussed below, it renewed its efforts in the winter with butternut squash and was able to make the mechanics of the arrangement work, albeit in small volume.

Telling the Story to Hospital Staff and Patrons

Participating hospitals kept the story of the FFHP produce intact all the way through to the end consumer. The hospitals were interested in conveying their involvement in the FFHP to patients, staff, and cafeteria visitors as a way to advertise and promote the extra effort they are making to undertake values-based purchasing and to educate hospital patrons about local and seasonal foods. One hospital representative remarked, "We don't want to just say we purchase local, we want to tell stories about great farmers. By telling those stories within a great institution, we can lead; because we are who we are, people look up to us and study what we're doing" (Interview #71, 2013). In order to ensure that the story of the FFHP did not stop at the plate, CAFF produced posters, farmer profiles, and tray cards for the participating hospitals. The materials used the Buy Fresh Buy Local branding and included information about FFHP farmers and the motivations behind the project.

[4] In November 2013, Bay Cities Produce became a CAFF business member and began working on a line of Buy Fresh Buy Local fresh-cut blends incorporating FFHP produce, a root vegetable mix, braising mix, and stir-fry mix.

Supporting Small and Midscale Family Farmers

The FFHP specifically aimed to support small and midscale family farmers with its stated ultimate goal being support for smaller-scale farmers practicing conservation-based production methods. The process of identifying farmers for the FFHP provides insight into the tensions between conventional and alternative values and goals that were negotiated within the project.

Aligned with recent literature on the agriculture of the middle, which predicts that midscale farms have a comparative advantage over small farms in terms of supplying product to institutional buyers (Kirschenmann, Stevenson, Buttel, Lyson, & Duffy, 2008), the FFHP found that midscale farmers were the most likely to meet the volume, pack and grade standards, and food-safety criteria required by distributors and hospitals while also embodying the social and environmental values driving the project. This supports the theory put forward by the Agriculture of the Middle Project that institutional buyers can serve as an important market for midscale farms (Lyson, Stevenson, & Welsh, 2008). Midscale farmers are typically too large to survive on direct marketing like farmers' markets, but struggle to succeed in highly consolidated commodity markets, making them the most threatened segment of the farm sector (Kirschenmann et al., 2008).

CAFF initially identified two midscale family farms for the project that were food-safety certified and carried a range and volume of products that made it worthwhile for the distributors to send a truck to the farms for pick-up. As one distributor representative remarked, "It costs me US$80 to US$100 to stop my truck, so there's got to be some scalability" (Interview #75, 2013). Likewise, another distributor representative noted the importance of scale in terms of fuel efficiency: "The freight thing we were able to work out to where we were able to pick up enough items in that general area so that I didn't waste a truck all the way out to grab a pallet. That's huge for my Green Certificate; if I run a truck out for 60 boxes and it holds 1,200, I'm really high on my carbon footprint" (Interview #72, 2013).

The need for distribution efficiencies acted as a barrier to smaller-scale farmers. Yet the FFHP succeeded in sourcing cherry tomatoes from one very small-scale farm, 10-acre [4-ha] Green Solar Farm. This was achieved as a result of Coke Farm acting as an aggregator for 19 smaller farms, including Green Solar, allowing the distributors to source from those operations without making additional trucking runs.

Food safety is a central criteria for hospitals, and Bay Cities Produce and FreshPoint SF both require the majority of their farms and products to be food-safety certified by a third party. This, too, can act as a barrier to smaller farms. While the cost of becoming third-party food-safety certified does not constitute a huge business expense (costing approximately US$3,000), the ensuing documentation processes are time- and labor-intensive, representing many tens of thousands of dollars in farm employee time. Most small farms struggle to afford this additional cost. Midscale farms must find a way to absorb the cost in order to fully market their harvests, since food-safety certification is increasingly essential to entry for wholesale markets. One participating midscale farmer explained that over the past four years, his farm had taken on multiple food-safety certifications to reach different markets: "There's the small farm GAP program, and then there's Primus, and there's SQF2000 Global, so you can send your product anywhere in the world, and that's where we are now" (Interview #78, 2013). Multiple FFHP supply chain members have a commitment to help small and midscale farmers get food-safety certified. Both Bay Cities Produce and FreshPoint SF offer scholarship programs to interested farms, and CAFF has a food-safety expert on staff who works with small farms to implement food-safety plans.

Product specifications also acted as a barrier. The FFHP attempted to supply cut butternut squash from Coke Farm through Bay Cities Produce, but Bay Cities found the squash was too small for efficient and cost-effective processing and declined to use it. One hospital representative remarked that Bay Cities' specifications for product size impacts their method of identifying farms to source from: "Now the approach is not so much to pick a farm we want to work with as much as ask Bay Cities who they're working with who fits our objectives" (Interview #71, 2013). Although the

FFHP may be able to identify other farmers who meet both the hospitals' and distributors' needs, this points to the ways in which the logistical needs of institutional foodservice operations may limit the type of farmer who is able to benefit from farm-to-institution procurement initiatives.

During the evaluation process it became evident that the incorporation of farm scale in FFHP definitions of local food produced interesting tensions in relation to farmer-distributor relationships. One distributor representative stated, "My alliance is to the people who helped get us started, even though they could be huge now. My first goal is to support those who supported us — loyalty" (Interview #72, 2013). While the FFHP criteria related to farm scale align with alternative agrifood goals, the distributor's hesitation to displace business to new farmers demonstrates one way the FFHP definition could conflict with another value prevalent in the VBSC literature: durable relationships marked by mutual benefit.

Decision-making Equity

While the VBSC literature envisions decision-making equity between all supply chain members, the hospitals in the FFHP retained the highest degree of decision-making power, while farmers were engaged more as suppliers than as equal members and distributors were tasked with meeting hospitals' new demands.

The strength of the hospitals was greatly increased by their collaboration through the Hospital Leadership Team, in which they combined their purchasing power for a set of mutually agreed upon products. Along with pooling purchasing power, ongoing collaboration through the Hospital Leadership Team coordinated by SF PSR includes conference calls and roundtable discussions between the hospitals on challenges, implementation strategies, and alternative food purchasing goals. In the case of the FFHP, this collaboration also provided gentle peer pressure among the hospitals that helped to encourage all facilities to commit to price increases, particularly in relation to organic strawberries, as discussed below.

Together, the FFHP hospitals represented the majority of health care customers of one of the distributors and approximately 15 percent of his total green bean sales. Noting the importance of this type of combined demand, one hospital representative stated, "If everyone is independent, no one is going to be able to drive this huge system forward, but if we have three or four hospitals, that's a game changer. All of a sudden, our distributor is listening to everything we have to say" (Interview #71, 2013). As a result, hospitals held the greatest decision-making power in the FFHP, by pulling products through the system.

Communication and Relationship-building Between Supply Chain Members

The FFHP resulted in increased communication and contact along the supply chain, leading to greater understanding of the needs of other supply chain members. Communication took the form of conference calls and in-person meetings facilitated by SF PSR and CAFF, and farm visits coordinated by one hospital representative and one distributor. CAFF also played a crucial role in facilitating communication along the supply chain through an extensive amount of one-on-one calls with distributors and hospitals, conveying information back and forth.

A representative of Coke Farm noted the importance of increased communication with hospitals in relation to crop planning. Based on hospital commitment to purchasing her organic strawberries, she was able to manage her production schedule for the coming year to meet that demand. She also learned about the constraints facing hospital foodservice staff, remarking that, "It opened up my eyes to how much time it takes them to plan and to get something on the menu and how many factors they have to think about, like compatibility with all the different nutritional requirements for patients" (Interview #73, 2013).

Relationships between supply chain members were further facilitated by a series of farm visits. Initially, one hospital representative was inspired by the project to take personal trips to participating farms, sharing photos and stories with other hospital members. In the second year of the project, Bay Cities organized a trip to Dwelley Farms for all of its hospital customers, including several that were not already FFHP members, three school districts, and two high-tech company cafeterias.

Bay Cities' willingness to take on this extra project signals recognition of its customers' increasing interest in building connections with specific farmers. On the farm tour, hospital representatives learned about issues of farmland preservation, farmworker concerns, food-safety practices, and the impacts of weather on production. Afterwards, they reported having a stronger sense of why their long-term commitment to individual farmers matters. Through a VBSC lens, this is a significant success as personal relationships come to take precedence over, or at least stand alongside, price in purchasing decisions.

The distributors reported the value of the nonprofit organizations' involvement in the FFHP and the local food movement in general. "What's really helpful to me [about the project] is the connecting, the networking, the flow of information; CAFF has tipped me off to farmers, that's valuable information," stated one distributor representative (Interview #76, 2013). Another commented on the benefits of what he perceives as local food advocates' increasing understanding of issues of scale and standardization:

> CAFF has realized that food safety is a real deal. They understand that they can't put me in a position of being vulnerable, because I'm only as strong as my weakest link. They understand that they can't send me a farm that, number one isn't large enough to sustain volume and that doesn't have some sort of good agricultural practice — this is a huge transformation. (Interview #72, 2013)

These examples point to the value of communication for building trust between supply chain members, as well as the relevance of taking the time to understand the needs and constraints facing other members. For farm-to-institution initiatives in general, and for hybrid values-based supply chains specifically, this type of mutual learning is central to effectively combining local food ideals with conventional supply chains values and practices.

Prioritizing Organic

During the planning phase of the FFHP, participating hospitals indicated a high level of interest in organic produce given the growing body of data linking pesticides used in conventional agricultural production to a host of adverse health and environmental impacts (Alavanja, Hoppin, & Kamel, 2004; Sutton, Wallinga, Perron, Gottlieb, Sayre, & Woodruff, 2011). One hospital representative explained the connection he sees between organic produce and the role of health care organizations by referring to the "Dirty Dozen" list of produce most heavily contaminated with pesticide residues generated by the Environmental Working Group (http://www.ewg.org). "I would like to get our foodservice department to line up behind a commitment to not buy the twelve most heavily sprayed produce items. Strawberries are on that list. Right now, organic strawberries are so expensive, but we are making that kind of statement as a medical center" (Interview #71, 2013).

The FFHP hospitals paid up to twice as much for Coke Farm's organic strawberries as they would have for conventionally grown berries. The hospitals' willingness to pay additional costs for products that met their health and environmental values aligns with other findings on farm-to-institution initiatives, which show that these programs are growing in number and popularity despite higher costs (Feenstra et al., 2011). The 8,748 pounds [3,968 kg] sourced from Coke Farm represented the four pilot hospitals' total demand for strawberries over the course of the summer growing season.

The hospitals' commitment to Coke Farm resulted in a greater proportion of local sales for the farm and an increase in its strawberry acreage. Rather than sell to established customers in locations like Denver and Chicago, the farmer shifted sales to the local hospitals. In addition, Coke Farm increased its acreage of strawberries by approximately thirty percent for the next summer growing season in order to meet the demand of FFHP hospitals, stating that, "in California the markets can be saturated with so many farms, so diversifying the customer base is really great. Both distributors [involved in the FFHP] are now buying a little more of my product across the board, and they were really supportive of the strawberry growing season" (Interview #73, 2013).

The FFHP hospitals passed price premiums on to customers or absorbed them in their budgets. One facility, for example, found ways to save on its foodservice linen budget in order to cover the increased cost of the FFHP strawberries. This points to one challenge to the expansion of the FFHP, since budgets can only be reworked to find hidden savings so many times. In addition, covering the additional cost of the FFHP strawberries was possible only because they represented a relatively small proportion of hospitals' overall budgets, raising questions about the hospitals' ability to expand this type of purchasing.

Project Stability and Replicability

In addition to these budgetary concerns, two aspects of the FFHP raise questions about its long-term viability and replicability. First, if in-hospital champions leave before new procedures are institutionalized, conventional market forces are likely to reassert their dominance. Second, the external expertise and investment of nonprofit partners was necessary to keep the project moving. As Cohen and Derryck (2011) found, the involvement of nonprofit organizations in values-based supply chains can be "key to creating a food production and distribution system that engages a wide range of stakeholders, fosters shared governance and transparency, empowers consumers, and benefits regional farmers" (p. 85). In locations where nonprofit organizations are not present or not able to raise funds for farm-to-institution projects, the FFHP model may not be applicable.

The process of securing cut butternut squash illustrates the central role that nonprofit partners played in the success of the FFHP. In this case, a number of logistical challenges arose that created inefficiencies that the distributors would not willingly take on without a good deal of external pressure. Although hospital foodservice members of the FFHP had the desire to make the purchasing arrangements happen, they did not have the time to continue following up and pressuring distributors. Ultimately, the FFHP succeeded in providing cubed, organically grown butternut squash from Coke Farm to the SF VA through FreshPoint SF. Although the total volume sourced was quite small (120 pounds or 54 kg in total), the success lay in creating supply mechanisms that could be replicated with other products, as was the case with cut summer squash during the summer of 2013.

Since FreshPoint SF does not have in-house processing, it worked with Legacy, a local processor, to cut butternut squash for the SF VA. Although the squash was organically grown, Legacy is not an organic-certified processor, so the final product could not legally be labeled organic. To maintain the organic integrity of the product, Legacy agreed to only process Coke Farm's squash first thing in the morning before other product had gone through the clean equipment. Another challenge involved liability and ownership of the product. Due to issues of liability, FreshPoint SF had to transfer ownership of the product to Legacy and then buy it back before selling it to the hospital. It took many weeks to wrangle this arrangement, by which time winter squash season was winding down. Coke Farm's representative perceived that her product would likely have not reached the SF VA without CAFF's involvement, commenting that "I'm afraid that [they] really have been the grease to keep it going, to keep people on task and to keep them motivated and see the bigger picture. I am a little bit worried about that" (Interview #73, 2013).

The FFHP represents a departure from business as usual and therefore has required the development of new relationships, systems, and mechanisms of coordination. It remains to be seen whether FFHP purchasing patterns will continue once CAFF and SF PSR are no longer funded for this particular project. The organizations' goal is to help build supply chain relationships and mechanisms that will guarantee ongoing success even without their external support. One hospital representative sees this as a possibility, stating, "I see this as a strategy where eventually we get so good at lining ourselves up that we come across a great farmer and our distributor knows what to do. We'll open up a communication channel for the next season and we'll move together in sync" (Interview #71, 2013).

Conclusion

As the local food movement seeks to expand in order to reach institutional buyers like hospitals

and schools, researchers and practitioners will increasingly need to understand how best to engage supply chain intermediaries that are able to meet the needs of institutional foodservice operations while (re)building local and regional food system infrastructure. While continuing to pursue the development of new supply chain infrastructure such as food hubs and cooperatives, increasing attention should be turned to creating and analyzing hybrid values-based supply chains that use both conventional and alternative resources, infrastructure, and markets to achieve a broad set of value chain goals.

As an example of a hybrid values-based supply chain, the Farm Fresh Healthcare Project experienced both successes and challenges in its aim to incorporate a range of local food movement ideals into existing supply chains. The project succeeded in sourcing produce from midscale family farmers as well as one small-scale farmer; increasing transparency to convey farmer identities throughout the supply chain; putting values-based criteria such as organically produced ahead of price in some purchasing decisions; and increasing communication and trust between supply chain members.

The greatest challenges to transparency that the project encountered were the lack of distributor IT systems capable of communicating farm names on order sheets and invoices, as well as the logistical hurdles of segregating farm-specific products to send through the processing room, whether it was in-house (Bay Cities) or outsourced to a local processor (FreshPoint SF.) Both distributors involved in the project express plans to purchase and implement updated IT systems in the future, demonstrating that initiatives like the FFHP have an opportunity to impel conventional intermediaries to learn from and adopt the technologies and mechanisms that have been developed within alternative agrifood supply chains.

The greatest challenges to meeting the hospitals' desire to source from small-scale farmers were distributors' need for distribution efficiencies, processor production specifications, and hospital and distributor food safety requirements.

Like the hybrid value chains examined by Conner et al. (2011) and Cohen and Derryck (2011), advocacy organizations played a key role in ensuring the incorporation of alternative agrifood goals in the FFHP. This poses a potential challenge to the replicability and long-term durability of the FFHP, since nonprofit participation depends on external funding.

Other challenges to long-term durability are the extent to which the project relied on a small set of foodservice champions within participating hospitals. In order to achieve project goals, the hospital members of the FFHP were willing to deal with certain inefficiencies and to work through processes of trial and error. Aligned with Feenstra et al.'s (2011) analysis of the factors that affect the sustainability of farm-to-institution initiatives, FFHP hospitals were willing to try new procedures even if they were messier and were willing to adjust for price increases. If these purchasing priorities and procedures are not institutionalized, conventional market forces are likely to reassert their dominance once FFHP advocates are no longer managing foodservice decisions in participating hospitals. Finally, hospital budget constraints make FFHP purchasing patterns tenuous without encouragement and continuous commitment from within the hospitals, from peer hospitals, and from nonprofit partners.

Although it is beyond the scope of this paper, it is important to note that there may be broader food-system benefits to engaging existing regional intermediaries in the local food movement. Due to trends of consolidation in the food system, the intermediaries that could give local and regional farmers wider access to retail, institutional, and commercial foodservice markets are being squeezed out, leaving an increasingly bifurcated system that favors small-scale direct markets and large-scale commodity markets (Gereffi, Lee, & Christian, 2009; Kaufman, Handy, McLaughlin, Park, & Green, 2000; Martinez, 2007; Perrett, 2007). Although farmers often take center stage as the beneficiaries of the local food movement, supporting independent regional intermediaries may be just as important to achieving goals related to community building and supporting local economies.

References

Abellera, D., Del Signore, D., Derden-Little, E., Michas, A., Runsten, D., & Sabato, M. (Eds.). (2014). *Making the invisible visible: Looking back at fifteen years of local food systems distribution solutions.* Retrieved from the Community Alliance with Family Farmers website: http://caff.org/wp-content/uploads/2010/07/CAFF-Lessons-Local-Distribution-102814.pdf

Alavanja, M. C., Hoppin, J. A., & Kamel, F. (2004). Health effects of chronic pesticide exposure: Cancer and neurotoxicity. *Annual Review of Public Health, 25*, 155–197. http://dx.doi.org/10.1146/annurev.publhealth.25.101802.123020

Bagdonis, J. M., Hinrichs, C. C., & Schafft, K. A. (2009). The emergence and framing of farm-to-school initiatives: Civic engagement, health and local agriculture. *Agriculture and Human Values, 26*(1–2), 107–119. http://dx.doi.org/10.1007/s10460-008-9173-6

Barham, J., Tropp, D., Enterline, K., Farbman, J., Fisk, J., and Kiraly, S. (2009). *Regional food hub resource guide.* Washington, D.C.: U.S. Department of Agriculture, Agricultural Marketing Service. http://dx.doi.org/10.9752/MS046.04-2012

Bay Cities Produce. (n.d.). Local food purchasing. Retrieved June 6, 2013, from http://www.baycitiesproduce.com/about-us/local-food-purchasing

Berkenkamp, J. (2006). *Making the farm/school connection: Opportunities and barriers to greater use of locally-grown produce in public schools.* Department of Applied Economics, University of Minnesota. Retrieved from http://www.iatp.org/files/258_2_96621.pdf

Blatner, D. J. (2012). 20 things you didn't know about baby carrots [Web log post]. Retrieved from Huffington Post Healthy Living: http://www.huffingtonpost.com/dawn-jackson-blatner-rd-cssd-ldn/facts-baby-carrots_b_2162178.html

Bloom, J. D., & Hinrichs, C. C. (2011). Moving local food through conventional food system infrastructure: Value chain framework comparisons and insights. *Renewable Agriculture and Food Systems, 26*(1), 13–23. http://dx.doi.org/10.1017/S1742170510000384

California Department of Food and Agriculture. (n.d.). California agricultural production statistics. Retrieved July 17, 2013, from http://www.cdfa.ca.gov/statistics/

Cohen, N., & Derryck, D. (2011). Corbin Hill Road Farm Share: A hybrid food value chain in practice. *Journal of Agriculture, Food Systems, and Community Development, 1*(4), 85–100. http://dx.doi.org/10.5304/jafscd.2011.014.011

Conner, D. S., Nowak, A., Berkenkamp, J., Feenstra, G. W., Kim, J. V., Liquori, T., & Hamm, M. W. (2011). Value chains for sustainable procurement in large school districts: Fostering partnerships. *Journal of Agriculture, Food Systems, and Community Development, 1*(4), 55–68. http://dx.doi.org/10.5304/jafscd.2011.014.005

Diamond, A., & Barham, J. (2011). Money and mission: Moving food with value and values. *Journal of Agriculture, Food Systems, and Community Development, 1*(4), 101–117. http://dx.doi.org/10.5304/jafscd.2011.014.013

Feenstra, G., Allen, P., Hardesty, S., Ohmart, J., & Perez, J. (2011). Using a supply chain analysis to assess the sustainability of farm-to-institution programs. *Journal of Agriculture, Food Systems, and Community Development, 1*(4), 69–84. http://dx.doi.org/10.5304/jafscd.2011.014.009

Gereffi, G., Lee, J., & Christian, M. (2009). US-based food and agricultural value chains and their relevance to healthy diets. *Journal of Hunger & Environmental Nutrition, 4*(3–4), 357–374. http://dx.doi.org/10.1080/19320240903321276

Greenwood, D. J., & Levin, M. (2007). *Introduction to action research: Social research for social change.* Thousand Oaks, California: Sage Publications.

Guthman, J. (2004). *Agrarian dreams: The paradox of organic farming in California.* Berkeley, California: University of California Press.

Harvie, J. (2008). *Menu of change: Healthy food in health care.* Reston, Virginia: Health Care Without Harm. Retrieved from http://www.healthyfoodinhealthcare.org

Health Care Without Harm [HCWH]. (n.d.). Healthy food in health care: A pledge for fresh, local, sustainable food. Retrieved from https://noharm-uscanada.org/sites/default/files/documents-files/637/Healthy_Food_in_Health_Care.pdf

HCWH. (2012, March 1). Bay Area hospitals aggregate demand to push the market for certified-humane, cage-free eggs [Press release]. Retrieved from https://noharm-uscanada.org/articles/press-release/us-canada/bay-area-hospitals-aggregate-demand-push-market-certified-humane

HCWH. (2014, May 20). Farm Fresh Healthcare Project how-to guide details innovative model to increase local, organic produce in hospitals [Press release]. Retrieved from https://noharm-uscanada.org/articles/press-release/us-canada/farm-fresh-healthcare-project-how-guide-details-innovative-model

Hinrichs, C. C. (2003). The practice and politics of food system localization. *Journal of Rural Studies, 19*(1), 33–45. http://dx.doi.org/10.1016/S0743-0167(02)00040-2

Hoppe, R., Perry, J., & Banker, D. E. (2000). *ERS farm typology for a diverse agricultural sector* (Agriculture Information Bulletin No. AIB-759). Washington, D.C.: United States Department of Agriculture [USDA], Economic Research Service. Retrieved from http://www.ers.usda.gov/publications/aib-agricultural-information-bulletin/aib759.aspx

Izumi, B. T. (2008). *Farm to school programs in public K-12 schools in the United States: Perspectives of farmers, food service professionals, and food distributors* [Doctoral dissertation, UMI No. 3331933]. Michigan State University, Ann Arbor, Michigan.

Izumi, B. T., Wright, D. W., & Hamm, M. W. (2010). Farm to school programs: Exploring the role of regionally-based food distributors in alternative agrifood networks. *Agriculture and Human Values, 27*(3), 335–350. http://dx.doi.org/10.1007/s10460-009-9221-x

Kaufman, P. R., Handy, C., McLaughlin, E. W., Park, K., & Green, G. M. (2000). *Understanding the dynamics of produce markets: Consumption and consolidation growth* (Agriculture Information Bulletin No. AIB-758). Washington, D.C.: USDA Economic Research Service. Retrieved from http://www.ers.usda.gov/publications/aib-agricultural-information-bulletin/aib758.aspx

King, R. P., Hand, M. S., DiGiacomo, G., Clancy, K., Gomez, M. I., Hardesty, S. D., . . . McLaughlin, E. W. (2010). *Comparing the structure, size, and performance of local and mainstream food supply chains* (Economic Research Report No. ERR-99). Washington, D.C.: USDA Economic Research Service. Retrieved from http://www.ers.usda.gov/publications/err-economic-research-report/err99.aspx

Kirschenmann, F., Stevenson, S., Buttel, F., Lyson, T. A., & Duffy, M. (2008). Why worry about agriculture of the middle? In F. Kirschenmann, S. Stevenson, F. Buttel, T. A. Lyson, & M. Duffy (Eds.), *Food and the mid-level arm: Renewing an agriculture of the middle* (pp. 3–22). Cambridge, Massachusetts: MIT Press. http://dx.doi.org/10.7551/mitpress/9780262122993.003.0001

Klein, K. (2012, October 12). A new prescription for the local food movement. *The Nation.* http://www.thenation.com/article/170526/new-prescription-local-food-movement

Klein, K. (2014a). *The Farm Fresh Healthcare Project: A how-to guide*. San Francisco, California: San Francisco Bay Area Physicians for Social Responsibility, Health Care Without Harm, and Community Alliance with Family Farmers. Retrieved from https://noharm-uscanada.org/documents/farm-fresh-healthcare-project-how-guide

Klein, K. (2014b, October 22). From farm to patient tray: Retrofitting the supply chain to meet hospitals' demand for local food [Online article]. Retrieved from https://goodfoodweb.com/articles/from-farm-to-patient-tray-retrofitting-the-supply-chain-to-meet-hospital

Lerman, T., Feenstra, G., & Visher, D. (2012). *A practitioner's guide to resources and publications on food hubs and values-based supply chains.* Davis, California: University of California [UC] Sustainable Agriculture Research and Education Program. Retrieved from http://russellranch.ucdavis.edu/resources/publications/KYF%20grey%20literature%20review%20GF%204-15%20FINAL_wcover.pdf

Lerman, T. (2012). *A review of scholarly literature on values-based supply chains.* Agricultural Sustainability Institute, Davis, California: UC Sustainable Agriculture Research and Education Program. Retrieved from http://www.sarep.ucdavis.edu/sfs/VBSCLiteratureReview.Lerman.5.31.12_compressed.pdf

Local Orbit. (n.d.). *Local Orbit* [Home page]. Retrieved from http://localorbit.com/

Lyson, T. A. (2004). *Civic agriculture: Reconnecting farm, food, and community*. Lebanon, New Hampshire: Tufts University Press.

Lyson, T. A., Stevenson, G. W., & Welsh, R. (2008). *Food and the mid-level farm: Renewing an agriculture of the middle.* Cambridge, Massachusetts: MIT Press. http://dx.doi.org/10.7551/mitpress/9780262122993.001.0001

Martinez, S. (2007). *The U.S. food marketing system: Recent developments, 1997–2006*. Washington, D.C.: USDA Economic Research Service.

Minkler, M., & Wallerstein, N. (2008). Part one: Introduction to CBPR: New issues and emphases. In M. Minkler & N. Wallerstein (Eds.), *Community-based participatory research for health: From process to outcomes* (2nd Ed., pp. 3–23). San Francisco, California: Jossey-Bass.

Perrett, A. (2007). *The infrastructure of food procurement and distribution: Implications for farmers in western North Carolina*. Asheville, North Carolina: Appalachian Sustainable Agriculture Project. Retrieved from http://asapconnections.org/downloads/growing-local-expanding-the-western-north-carolina-food-and-farm-economy-full-report

Sachs, E., & Feenstra, G. (2008). *Emerging local food purchasing initiatives in northern California hospitals*. Davis, California: UC Sustainable Agriculture Research and Education Program. Retrieved from http://www.sarep.ucdavis.edu/sfs/files/Farm_To_Hospital_WebFinal.pdf

Sage, C. (2003). Social embeddedness and relations of regard: Alternative 'good food' networks in south-west Ireland. *Journal of Rural Studies, 19*(1), 47–60. http://dx.doi.org/10.1016/S0743-0167(02)00044-X

Selfa, T., & Qazi, J. (2005). Place, taste, or face-to-face? Understanding producer-consumer networks in "local" food systems in Washington State. *Agriculture and Human Values, 22*(4), 451–464. http://dx.doi.org/10.1007/s10460-005-3401-0

Sirois, E., Pryor, K., Klein, K., & Thottathil, S. (2013). *Menu of change: Healthy food in health care (A 2013 Program Report with Highlights, Awards and Survey Results)*. Reston, Virginia: Health Care Without Harm. Retrieved from http://noharm-uscanada.org/sites/default/files/documents-files/883/Menu%2520Of%2520Change%2520Report%25202013_R3.pdf

Stevenson, G. W., & Pirog, R. (2008). Values-based supply chains: Strategies for agrifood enterprises of the middle. In A. Author & B. Author (Eds.), *Food and the mid-level farm: renewing an agriculture of the middle* (pp. 119–146). Cambridge, Massachusetts: MIT Press

Sutton, P., Wallinga, D., Perron, J., Gottlieb, M., Sayre, L., & Woodruff, T. (2011). Reproductive health and the industrialized food system: A point of intervention for health policy. *Health Affairs, 30*(5), 888–897. http://dx.doi.org/10.1377/hlthaff.2010.1255

Vogt, R. A., & Kaiser, L. L. (2008). Still a time to act: A review of institutional marketing of regionally-grown food. *Agriculture and Human Values, 25*(2), 241–255. http://dx.doi.org/10.1007/s10460-007-9106-9

Walker, R. A. (2004). *The conquest of bread: 150 years of agribusiness in California*. New York: The New Press.

Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
www.AgDevJournal.com

A framework for site assessment guides for urban impacted soils: A Vancouver case study

Melissa Iverson,[a] Maja Krzic,[a]* and Arthur Bomke [a]
University of British Columbia, Vancouver

Submitted December 2, 2013 / Revised May 22 and July 14, 2014 / Accepted July 14, 2014 / Published online November 21, 2014

Citation: Iverson, M., Krzic, M., & Bomke, A. (2014). A framework for site assessment guides for urban impacted soils: A Vancouver case study. *Journal of Agriculture, Food Systems, and Community Development, 5*(1), 75–85. http://dx.doi.org/10.5304/jafscd.2014.051.006

Abstract

Urban agricultural activities, such as community gardening and urban farming, are becoming popular in many North American cities, including Vancouver, British Columbia (BC). Currently, demand for urban agricultural land in Vancouver is mainly met by reclaiming brownfields (vacant and often neglected tracts of land) and land owned or managed by schools, religious institutions, hospitals, and private residents, into gardens and urban farms. Before urban sites can be reclaimed, they need to be assessed for suitability for food production; however, many cities, including Vancouver, do not have locally adapted site assessment guides (SAGs). This paper describes the development of a framework for a SAG for Vancouver soils. The framework consists of the following five phases: (1) initial selection of properties and assessment approaches; (2) stakeholder feedback and subsequent revision of the properties identified in Phase 1; (3) additional feedback, revision, and finalization of the SAG; (4) distribution of the guides; and (5) ongoing updates and support. As part of framework development, we identified relevant site characteristics (e.g., soil properties, aspect, slope, amount of sunshine) for Vancouver and developed a Vancouver soil map. Distribution and promotion of the SAG through local organizations and societies started in 2010, and ongoing efforts regarding these initiatives are underway. The SAG framework used in Vancouver may be useful to other cities that wish to empower their citizens to create spaces for urban agriculture safely and successfully.

[a] Faculty of Land and Food Systems, University of British Columbia, Vancouver, British Columbia V6T 1Z4 Canada.

* *Corresponding author*: Maja Krzic, Associate Professor, Faculty of Land and Food Systems, University of British Columbia; 2357 Main Mall; Vancouver, British Columbia V6T 1Z4 Canada; +1-604-822-0252; maja.krzic@ubc.ca

Keywords
urban soil, brownfields, community gardens, urban agriculture, site assessment, soil quality

Introduction

At present, half the world's population lives in cities, and according to some projections two out of every three people will be city-dwellers by the year 2030 (Hynes & Howe, 2004). The increasingly urbanized general public has a limited understanding of the food system, as food is often grown thousands of kilometers away (Brown, 2009). Urban agriculture offers opportunities for citizens to become aware of, and engage in, overall food issues. Many cities around the world are experiencing an increase in the popularity of community gardens and urban farms (Turner, Henryks, & Pearson, 2011). These gardens and farms are commonly developed on urban brownfields (i.e., vacant tracts of marginalized land that are in derelict condition due to neglect and are thought to be contaminated) (De Kimpe & Morel, 2000) as well as on parks and land owned or managed by schools, religious institutions, hospitals, and private residents. In order for these gardens and farms to thrive, knowledge of the soils on these lands is essential (Hazelton & Murphy, 2011).

Urban farms and community gardens provide many benefits to city-dwellers. Here we have defined the term "community garden" as a garden that has been developed on land to which communities have legally been granted access and have a governance system and a structure (either allotment or communal) that has been decided and agreed upon by the community, and we have defined "urban farm" as a food-growing commercial enterprise located within a city's limits. Community gardens and urban farms provide local sources of produce that has not traveled long distances using large amounts of fossil fuels; they also provide spaces that allow citizens to strengthen social interactions, encourage physical activity, beautify the neighborhoods, and much more (Alaimo, Reischl, & Allen, 2010). Community gardens and urban farms also provide opportunities for people to learn how to grow food. People who grow their own food not only have better access to fresh produce, but are also more likely to adopt a healthier diet (Alaimo, Packnett, Miles, & Kruger, 2008).

Some larger Canadian cities struggle to find available land for community gardens and urban farms. In Toronto and particularly in Vancouver an expansion of urban agriculture is occurring mainly on brownfields (Kaethler, 2006; Patel & MacRae, 2012), although it also occurs on land owned or managed by schools, religious institutions, hospitals, and private residents. In Vancouver, brownfields are prevalent because they exist on land that (a) has not yet been developed; (b) once was occupied by structures that have since been torn down; or (c) is on a right-of-way, such as the area adjacent to the railway or under the SkyTrain, Vancouver's rapid transit system. Whatever the origin, underutilized urban land, which can collect litter and lower community morale, can serve as a valuable resource to cities and their citizens if they can be reclaimed into spaces for urban agriculture.

Those interested in starting urban farms and community gardens face certain hurdles, including the task of addressing the soil-quality issues of their potential farm or garden sites. Soil compaction, contamination, and low fertility are common issues on urban soils, limiting their suitability for gardening. These issues underscore the importance of site assessment protocols for urban soils that are to be reclaimed into community gardens or urban farms (De Kimpe & Morel, 2000; Hazelton & Murphy, 2011). For example, Toronto Public Health (2013) has developed the *Guide for Soil Testing in Urban Gardens* that provides advice on the decision-making process in relation to soil contamination, including whether or not to test the soil.

A valuable example of how to address the challenge of assessing urban soils on sites intended for urban agriculture can be found in the process of developing "Soil Quality Cards" or "Soil Health Cards" for agricultural land in the U.S. (Romig, Garlynd, Harris, & McSweeney, 1995). "Soil Quality Cards" are qualitative assessment tools that have been used by U.S. farmers since early 1990s to evaluate the current status of soil quality and, when used over time, to determine changes in soil quality that are affected by land management. As outlined by Tugel, Seiter, Friedman, Davis, Dick, McGrath, & Weil (2001) "Soil Quality Cards" need to be: (1)

locally adapted; (2) developed through participatory partnerships among farmers, scientists, and extension specialists; and (3) simple and user-friendly. An assessment tool possessing these three characteristics, altered to be relevant to the urban environment, would empower urban farmers and community gardeners to safely and successfully grow food within city limits.

The rapid development of community gardens and urban farms that the city of Vancouver experienced in the early 2000s (City of Vancouver, 2013) highlighted the fact that the city did not have a user-friendly protocol to aid the conversion of various types of land, including brownfields, into land for food production. Consequently, stakeholders were burdened with the challenge of determining how to approach site assessments on their own. The objective of this study was to develop a framework for a locally adapted site assessment guide (SAG) for urban impacted soils that are to be reclaimed for urban agriculture, using Vancouver as a case study. The SAG is useful for all urban impacted soils, but its relevance is the greatest for brownfield soils due to their high probability of contamination and low soil quality.

Methodology and the Vancouver Study Case

Project Principles

Drawing from the process of developing "Soil Quality Cards" (Ditzler & Tugel, 2002; Tugel et al., 2001) carried out by the Soil Quality Institute of the United States Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS), we approached the development of the SAG by using the principles of soft systems inquiry, community-based action research, and locally led urban environmentalism.

Understanding the views and values of community stakeholders is an integral component of the SAG-creation process. Direct stakeholder involvement ensures that the SAG is tailored to the needs of a particular community or region. A soft systems inquiry approach focuses on exploring these views and values (Checkland & Scholes, 1999). We used a community-based action research approach (Stringer, 1999) while conducting workshops and seeking additional stakeholder feedback. This approach promotes participant-led workshop facilitation techniques, where facilitators and participants are seen as equal partners during educational exchanges. By conducting learner-centered interactive workshops with community gardening groups, the project team was able to identify common areas of concern and interest expressed by community stakeholders.

Locally led urban environmentalism is based on the principle that local communities possess the specialized knowledge necessary to identify and resolve local environmental issues (Tugel et al., 2001). Each city will present its own unique set of environmental challenges. By informing the project team of these specific environmental issues, local stakeholders provide the focus for the SAG, allowing their needs to be better addressed.

Case Study: Vancouver

The city of Vancouver is located on the western half of the Burrard Peninsula, bordered to the north by English Bay and the Burrard Inlet and to the south by the Fraser River. With its population of 603,502 (according to the 2011 census) Vancouver is the largest city in B.C. and the eighth largest in Canada (City of Vancouver, 2013a).[1] Vancouver is located on lag and littoral materials that overlie glacial till and fine textured marine, glaciomarine, and alluvial deposits, and on soils that belong to Humo-Ferric Podzols (Iverson, Holmes & Bomke, 2012). The area is characterized by a humid, maritime climate, with warm, dry summers and mild, wet winters. Mean annual precipitation in Vancouver is 1200 mm (47 inches), 70 percent of which falls between October and May (Environment Canada, 2014).

Currently, there are 75 community gardens in Vancouver, which represents a 30 percent increase relative to the early 2000s (City of Vancouver, 2013b). This notable increase was enabled through an initiative to green the city (i.e., increase the number of environmental initiatives and create more green spaces) led by the municipal government, facilitating the development of 2,010 garden

[1] The Greater Vancouver metropolitan area, which includes the neighboring cities of Burnaby, Richmond, and Surrey, is the third largest in Canada.

plots by the time Vancouver hosted the 2010 Winter Olympics. The municipal government has also fostered urban agriculture through several other initiatives. Among these is the current Greenest City initiative, with a goal of making Vancouver a global leader in urban food systems by 2020. Even with these priorities, the city of Vancouver had no locally adapted site assessment guides to help community gardeners and urban farmers assess sites for food-growing potential.

Creating a Locally Adapted SAG for Urban Soils in Vancouver

The framework for SAGs (Table 1) includes the following five phases: (1) initial selection of properties and assessment approaches; (2) stakeholder feedback and subsequent revision of the initial properties and approaches; (3) additional feedback, revision, and finalization of the SAG; (4) distribution of the guide; and (5) ongoing updates and support.

During the initial development of a SAG (Phase 1), a list of commonly used assessment approaches for local contaminated sites is compiled. In addition, site characteristics (e.g., soil properties, aspect, slope, amount of sunshine) that might be of relevance for SAG are identified. This helps situate the SAG in an urban context while tailoring it to the specific conditions of the local environment. Information on local soil types and properties is usually found in soil surveys and maps; however, such information often does not exist for urban areas that have been paved over long before surveys were conducted. Vancouver was not an exception; hence, as part of Phase 1 of the SAG development, we conducted a detailed inventory of soils in the Vancouver area based on the interpretation of surficial geology (Armstrong & Hicock, 1976), elevation and topography, combined with an extrapolation of known soils series from mapped areas in the Lower Fraser Valley near Vancouver (Luttmerding, 1984) and established corresponding soil management groups (Iverson et al., 2012) for Vancouver.

The list of selected site characteristics and their methods of determination (e.g., soil texture determined through hand texturing) are presented to stakeholders to gather feedback related to clarity and feasibility (Phase 2). This approach is commonly employed as part of community-based action research (Stringer, 1999). The feedback is collected through participatory workshops. The role of the workshop facilitator is not to impose his or her own ideas, but to enable participants to make informed decisions and to assist in implementing those decisions. Based on feedback from our stakeholders (Environmental Youth Alliance, n=10; Cedar Cottage Community Garden Society,

Table 1. The Five Phases of the Framework for the Urban Site Assessment Guide (SAG)

Phase	Activity	Description
1	Initial selection of properties and assessment approaches	• Compile a list of site assessment approaches commonly used on local contaminated sites. • Identify soil and microclimate properties to be included into assessment.
2	Stakeholder feedback and subsequent revisions of the initial properties and assessment approaches	• Present selected soil and microclimate properties and their methods of assessment to stakeholders for feedback. • Revise initial selection of soil and microclimate properties based on the feedback.
3	Additional feedback, revision, and finalization	• Collect a second round of stakeholder feedback and revise SAG as needed. • Finalize SAG.
4	Distribution	• Distribute SAG through a variety of avenues (e.g., websites of local government, nongovernmental organizations, field days, workshops).
5	Ongoing updates and support	• Ensure ongoing updates of SAG by employees and/or volunteers at the organizations that distribute the SAG. • Support and backing provided by various groups and organizations.

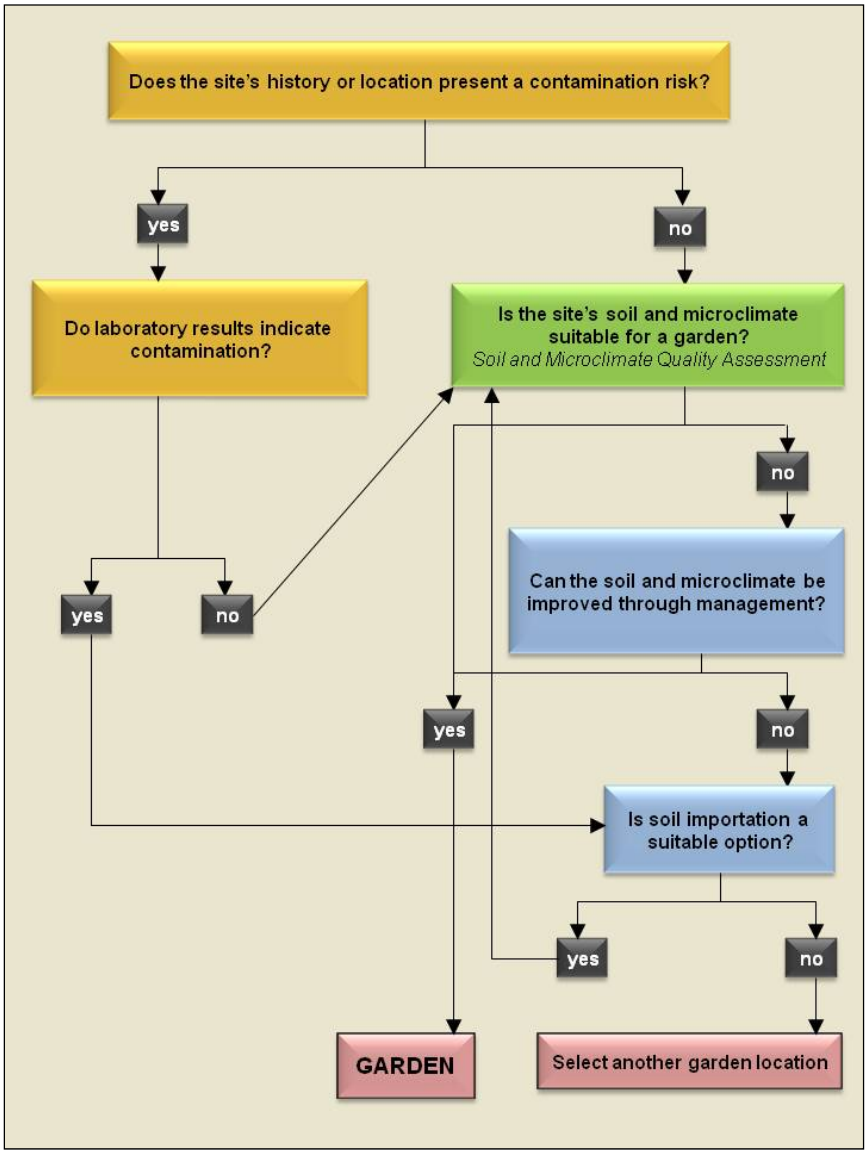
n=5; Sustainable Living Arts School, n=15) the project team revised the initial list of soil and microclimate indicators.

Adhering to the cyclical nature of participatory action research, a second round of stakeholder feedback is collected, allowing for additional SAG revision before finalizing the guide (Phase 3). The stakeholders who took part in the second round of feedback were community members involved in activities such as community garden development and organization, youth engagement in urban agriculture, and soil science and agriculture education.

To ensure that a SAG is accessible to a wide range of stakeholders, a variety of avenues for its distribution need to be put in place (Phase 4). Those avenues may include local environmental and urban agricultural organizations, and/or the social planning department of the city government. The Vancouver SAG is available on the websites for two local nongovernmental organizations: the Society Promoting Environmental Conservation and City Farmer. Ongoing updates are necessary and must be implemented by employees or volunteers at an organization that distributes the SAG (Phase 5).

Figure 1. The Decision Tree from the Final Version of the Site Assessment Guide (SAG) for the City of Vancouver, British Columbia

The chart is presented at the beginning of the SAG (*Starting a Community Garden: A Site Assessment Guide for Communities*) and is intended to guide users through the site assessment process.



Results and Discussion

Features of the Locally Adapted SAG for Vancouver

By implementing Phases 1 through 5, a SAG for urban soils in Vancouver, entitled *Starting a Community Garden: A Site Assessment Guide for Communities*, was completed in 2010. The SAG includes the following sections: (1) determining soil contamination; (2) soil and microclimate assessment; and (3) management practices and soil importation. A decision tree (Figure 1) depicts the structure of the SAG. This decision tree consists of five boxes, each containing a question or activity that users complete to determine the suitability of their site. Each question also serves as a chapter heading; the

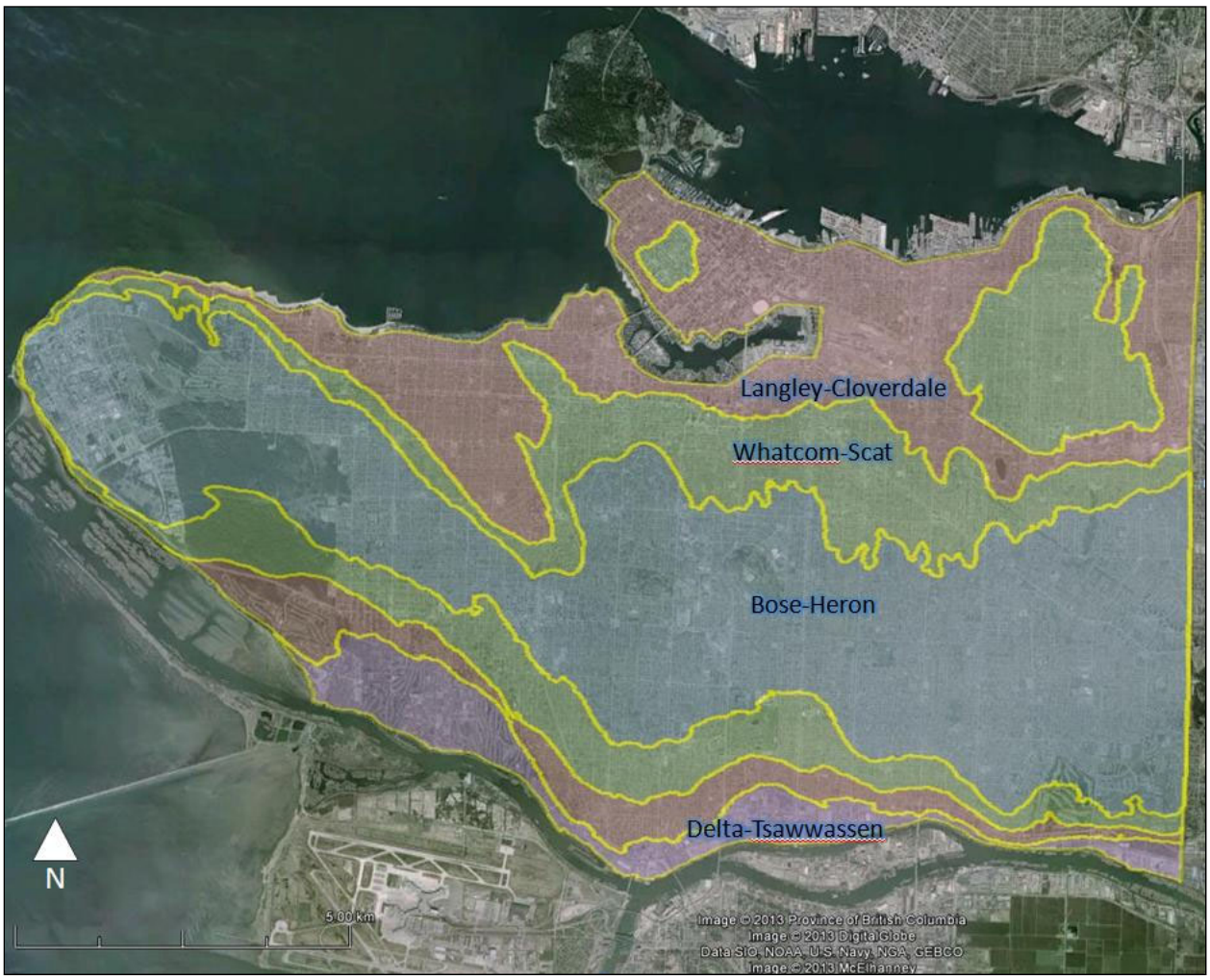
chapters provide users with background information and guidance on how to answer the specific question listed in the SAG decision tree. The goal of each section of the SAG is to identify barriers presented by soil contamination or inadequate soil and/or microclimate, and address them through either management practices or soil importation.

Development of the SAG (Phase 1) started by compiling a list of site characteristics of potential relevance for urban soils in general, and for Vancouver soils in particular. It is difficult to generalize about the properties of urban soils, which can vary tremendously even within a single site. The heterogeneity of urban soils is caused by the large variety of human activities and interventions that shape anthropogenic soils. Modification activities, such as soil stripping, filling, mixing, compacting, and importing or exporting of topsoil, at varying levels of

Table 2. Site Characteristics of Relevance to Urban Soil Assessment in the City of Vancouver, British Columbia

Property	Implication for Soils	Potential Modifications by Human Activities
Presence of anthropogenic and other contaminants	Negatively affect drainage and aeration as well as plant growth.	Remnants of past land use and/or neglect.
Soil texture (particle size)	Amount of clay, silt, and sand determine soil's water- and nutrient-holding capacity, drainage, and aeration.	Modified by cutting and filling (especially topsoil removal).
Coarse fragments (diameter > 2 mm)	Inherited from parent material and impact cultivation, trafficability and soil volume available for root growth.	Brought closer to the surface by topsoil removal. Coarse fragments are also sometimes removed from the soil by stone picking.
Soil compaction	Impacts root growth, drainage, and aeration, which in turn affect activity of soil organisms.	Created by human and mechanized traffic.
Soil structure	Impacts pore size distribution and in turn drainage and aeration.	Destroyed by human and mechanized traffic, leading to surface crust formation and compaction.
Rooting depth	Affects plant growth.	Reduced by topsoil removal and scraping, or restricted by some naturally occurring dense layers.
Soil organic matter	Impacts soil's capability to retain water and nutrients. Source of nutrients such as nitrogen, sulfur, and phosphorus.	Soil organic matter quantity and quality are modified by cutting and filling (especially topsoil removal). It could also be affected by additions of various organic residues and amendments.
Soil reaction (pH)	Impacts plant growth, soil organisms, and nutrient availability.	Modified by liming, construction rubble burial, and dust and ash deposition.
Cation exchange capacity	Soil's capability to retain and supply nutrients in available forms to plants and soil organisms.	Human activities that lead to loss of organic matter and extreme changes of pH will change cation exchange capacity and interrupt nutrient cycling.
Soil organisms (e.g., earthworms)	Decompose organic matter and release available forms of nutrients. Improve soil aeration and drainage.	Negatively affected by human activities that cause contamination, compaction, loss of organic matter, and extreme changes of pH.
Shading	Direct impact on plant growth.	Caused by small lot size and presence of nearby buildings; in turn reduces photosynthetic radiation and ambient temperatures.
Soil temperature	Affects plant growth and activity of soil organisms, as well as soil chemical reactions.	Impacted by shading of the nearby buildings.
Topography (aspect, slope, elevation)	Impacts soil processes such as drainage, soil creep and deposition, and erosion.	Changed by scraping, cutting, and filling.

Figure 2. Map of Vancouver, British Columbia, Indicating the Four Soil Management Groups: Delta-Tsawwassen, Bose-Heron, Whatcom-Scat, and Langley-Cloverdale



intensity, are often practiced on urban sites (Evans, Fanning, & Short, 2000). Nonetheless, urban soils can possess some similar properties; those of relevance to Vancouver's soils are shown in Table 2.

One common characteristic of urban soils, particularly those on brownfields, is the probability of soil contamination from sources that are metallic (e.g., cadmium, copper, lead, nickel, or zinc) or organic (e.g., polychlorinated biphenyls or polycyclic aromatic hydrocarbons). To identify these possible hazards, users of Vancouver's SAG are asked to establish the risk level associated with their site. This can be done by determining the past land uses of the site (i.e., the site history). A site history can be obtained by speaking with neighbors, investigating the site at the city archives, and observing site artifacts (e.g., litter, remnants of past structures). The SAG provides users with information to help them determine if the site history indicates the possibility of soil contamination. For example, the presence of a Laundromat on the site, neighbor reports of illegal dumping, or large quantities of litter are evidence that a site should be placed in the "high risk" category. If the site history is unclear, or if there are indications that a site might be contaminated, soil sample collection and analysis in a soil-testing laboratory is recommended. Further guidance on soil sampling and interpreting laboratory results is also provided in the SAG. Similar approaches are recommended by Toronto

Table 3. Properties of the Top Mineral Horizon of the Four Soil Management Groups Encountered within the City of Vancouver, British Columbia

Property	Soil management group			
	Bose-Heron	Whatcom-Scat	Langley-Cloverdale	Delta-Tsawwassen
Textural class	Gravelly loamy sand–loamy sand	Silty loam–silty clay	Silty clay–silty clay loam	Silty loam–sandy loam
Soil reaction (pH)	5.6–6.1	5.4–5.6	5.6–5.9	4.6–5.6
Organic carbon (g kg^{-1})	9.3–12.8	13.9–50.4	5.0–7.0	7.0
Total nitrogen (g kg^{-1})	0.5	0.6–2.0	0.5–0.7	—
Cation exchange capacity ($cmol_c/kg$)	17.2–21.3	33.7–46.1	26.3–35.4	16.2–31.5
Implications for urban agriculture	• Moderate capability for urban agriculture. • Drainage issues due to naturally occurring dense layer at about 50 cm depth. Could be too dry in summer due to coarse texture. • Less able to hold and release nutrients due to coarse texture.	• Good capability for urban agriculture. • Drainage issues during wet months due to fine texture.	• Moderate to good capability for urban agriculture. • Drainage issues during wet months due to fine texture. • Susceptible to compaction.	• Moderate to good capability for urban agriculture. • Drainage issues during wet months due to fine texture. • Susceptible to compaction.

Modified after Luttmerding (1984).

Public Health and the U.S. Environmental Protection Agency (EPA) (Toronto Public Health, 2013; U.S. EPA, 2011), both of which provide in-depth resources on detecting soil contamination on land being converted into food-producing gardens.

To convey specific information about Vancouver's soils to community gardeners, a soil map for the city was created (Iverson, Holmes & Bomke, 2012) (Figure 2). The city of Vancouver is now a member of a very select group of cities worldwide that has a soil map of its urban area. Soil maps of urban areas are rare because many urban centers were developed before a soil inventory was carried out. The Vancouver soil map is composed of four soil management groups, Bose-Heron, Whatcom-Scat, Langley-Cloverdale, and Delta-Tsawwassen, modeled after the soil management groups for the Lower Fraser Valley (Bertrand, Hughes-Games, & Nikkel, 1991). Each group is characterized by its own set of properties, summarized in Table 3. These properties are described in detail in the SAG, outlining the advantages and disadvantages of each group for food production.[2] Practical suggestions on how to overcome each soil management group's shortcomings are also provided, allowing stakeholders to identify the most suitable management strategy for their garden or farm.

The stakeholder feedback gathered in Phases 2 and 3 allowed us to refine the guide's content and format. Feedback-gathering workshops varied in formality and content depending on the needs and desires of the specific community group. Some workshops adopted a casual question-and-answer format, while others incorporated predetermined topics, informative handouts, and hands-on activities (e.g., a demonstration of soil sampling). Workshop participants provided valuable suggestions about the SAG format. For example, participants

[2] Further information on the Vancouver soil map and its associated soil management groups can be found at http://www.vancouversoils.ca

at two of the three workshops we conducted indicated that the SAG should include detailed instructions for site observations and soil sampling. They also requested that these instructions be explained using easy-to-understand terminology (i.e., using a limited amount of science-specific vocabulary) and that the number of assessment methods not be too excessive so a person with limited training would be able to complete them in a reasonable time frame.

Common participant-introduced themes at all workshops included properties of urban soils, overview of Vancouver's soils, potential sources of urban soil contamination, logistics of soil sampling and laboratory analyses, and interpretation of soil data. It also become evident that workshop participants shared some similar concerns, and one issue that clearly stood out was the desire to install raised beds, regardless of contamination test results. These concerns were also brought up outside the workshops by the coordinators of two Vancouver-based community gardens. These concerns are consistent with those expressed in studies by De Sousa (2003, 2006) carried out in Toronto on real and perceived barriers to greening brownfields. De Sousa (2003) reported that survey participants identified "lack of knowledge about the impacts of soil contamination on human health" as one of the greatest hindrances to reclaiming urban brownfields. Installing raised beds due to perceived soil contamination adds unnecessary cost to garden development and advances the disconnect between urbanites and the native soil. Based on the feedback received during the community workshops, we refined the initial list of selected soil properties by removing those that were too complicated to understand (e.g., cation exchange capacity) or required assessment methods that proved difficult or time-consuming to perform (e.g., earthworm counts).

Use and Reliability of SAG

The SAG can be used by Vancouver's urban agriculture organizations to assess brownfield sites, and can also be used by homeowners, schools, and religious institutions who wish to assess the suitability of their lots for food production. At present, the SAG for Vancouver is made available to these interested parties through the websites of several Vancouver-based environmental organizations, as previously detailed, and is also distributed at workshops and field days as hard copies. Continued efforts are required to make this document more accessible to interested stakeholders and to obtain backing of various groups (the city's parks and health departments, foundations, etc.) to raise awareness of and trust in the SAG.

The SAG is not designed for rigorous data collection that requires total objectivity, precision, and accuracy. Regular annual assessments are still recommended to allow gardeners and urban farmers to monitor soil changes over time. Furthermore, assessments are most reliable when completed by the same person, at the same time of the year, at the same location, and under similar moisture levels (Doran & Parkin, 1996). The initial assessment for each site becomes a baseline condition that serves as a reference point for future annual assessments that will guide management decisions.

The SAG will allow participants in urban agriculture to conduct site assessments and identify the benefits and barriers of growing food on specific sites in the city and to address these restrictive issues so they will not hinder the success of the farm or garden. In some cases, conversion of a particular site into food production may not be advisable, and efforts and financial resources can therefore be put elsewhere. Moreover, health risks associated with growing food on contaminated land could be avoided. Reclaiming urban sites for community gardens and urban farms is a substantial task, with benefits that affect the larger community. People willing to assume such an undertaking may rely on a SAG to provide guidance, making their goal more easily obtainable.

Conclusions

Drawing on the principles of soft systems inquiry, community-based action research, and locally led urban environmentalism, we developed the framework for a locally adapted SAG for Vancouver soils. The framework included the following five phases: (1) initial selection of properties and assessment approaches; (2) stakeholder feedback and subsequent revision of the initial list; (3) addi-

tional feedback, revision, and finalization of the SAG; (4) distribution of the guides; and (5) ongoing updates and support. As part of the framework development, we have identified key site indicators of relevance for Vancouver and developed a soil map of the city with associated soil management groups to provide urban gardeners and farmers with information on key soil properties relevant for food production. Distribution and promotion of the SAG though local organizations and societies started in 2010 and will require ongoing efforts. Vancouver's SAG provides urban agriculturalists with a valuable tool for making informed decisions about the suitability of particular sites for conversion into community gardens and food production. The framework, however, might also be useful to other cities that wish to create their own SAGs and empower their citizens to create spaces for urban agriculture and enjoy the numerous benefits associated with growing food in the city.

Acknowledgments

This work was supported by the Vancouver Coastal Health Authority and the University of British Columbia, Vancouver. The technical advice and assistance of Dr. Les Lavkulich, Mr. Christian Evans, Dr. Will Valley, and Mr. Chris Thoreau in the field and laboratory are greatly appreciated. We would like to give special thanks to the Cedar Cottage Community Garden, the Environmental Youth Alliance, the Sustainable Living Arts School, Mr. David Tracey, and the city of Vancouver.

References

Alaimo, K., Packnett, E., Miles, R. A., & Kruger, D. J. (2008). Fruit and vegetable intake among urban community gardeners. *Journal of Nutrition Education and Behavior*, *40*(2), 94–101. http://dx.doi.org/10.1016/j.jneb.2006.12.003

Alaimo, K., Reischl, T. M., & Allen, J. O. (2010). Community gardening, neighborhood meetings, and social capital. *Journal of Community Psychology*, *38*(4), 497–514. http://dx.doi.org/10.1002/jcop.20378

Armstrong, J. E., & Hicock, S. R. (1976). Surficial geology, Vancouver, British Columbia, Map 1486A [Soil map]. Retrieved from http://geogratis.gc.ca/api/en/nrcan-rncan/ess-sst/afe5a80d-32ef-50a1-9491-5e0553576498.html

Bertrand, R. A., Hughes-Games, G. A., & Nikkel, D. C. (1991). *Soil management handbook for the Lower Fraser Valley*. Abbotsford, British Columbia, Canada: Soils and Engineering Branch, British Columbia Ministry of Agriculture, Fisheries and Food.

Brown, L. R. (2009). *Plan B 4.0: Mobilizing to save civilization*. New York: Norton.

Checkland, P., & Scholes, J. (1999). *Soft systems methodology in action*. Chichester, West Sussex, England: Wiley.

City of Vancouver. (2013a, December 16). *Green Vancouver*. Retrieved November 26, 2012, from http://vancouver.ca/green-vancouver/geo.aspx

City of Vancouver. (2013b, December 16). *People and programs*. Retrieved November 26, 2012, from http://vancouver.ca/people-programs/community-gardens.aspx

De Kimpe, C. R., & Morel, J. L. (2000). Urban soil management: A growing concern. *Soil Science*, *165*(1), 31–40. http://dx.doi.org/10.1097/00010694-200001000-00005

De Sousa, C. A. (2003). Turning brownfields into green space in the City of Toronto. *Landscape and Urban Planning*, *62*(4), 181–198. http://dx.doi.org/10.1016/S0169-2046(02)00149-4

De Sousa, C. A. (2006). Urban brownfields redevelopment in Canada: The role of local government. *The Canadian Geographer*, *50*(3), 392–407. http://dx.doi.org/10.1111/j.1541-0064.2006.00148.x

Ditzler, C. A., & Tugel, A. J. (2002). Soil quality field tools. *Agronomy Journal*, *94*(1), 33–38. http://dx.doi.org/10.2134/agronj2002.0033

Doran, J. W., & Parkin, T. B. (1996). Quantitative indicators of soil quality: A minimum data set. In J. W. Doran & A. J. Jones, *Methods for assessing soil quality* (pp. 25–37). Madison, Wisconsin: Soil Science Society of America.

Environment Canada. (2014). National climate data and information archive: Canadian climate normals 1971–2000 station data. Retrieved from http://climate.weather.gc.ca/climate_normals/results_e.html?stnID=889&lang=e&StationName=Vancouver&SearchType=Contains&stnNameSubmit=go&dCode=1

Evans, C. V., Fanning, D. S., & Short, J. R. (2000). Human-influenced soils. In R. B. Brown, J. H. Huddleston, & J. L. Anderson (Eds.), *Managing soils in an urban environment* (pp. 33–67). Madison, Wisconsin: Soil Science Society of America. http://dx.doi.org/10.2134/agronmonogr39.c2

Hazleton, P. & Murphy, B. (2011). *Understanding soils in urban environments*. London: Earthscan.

Hynes, H. P., & Howe, G. (2004). Urban horticulture in the contemporary United States: Personal and community benefits. *Proceedings of the International Conference on Urban Horticulture, 643*, 171–181.

Iverson, M. A., Holmes, E. P., & Bomke, A. A. (2012). Development and use of rapid reconnaissance soil inventories for reclamation of urban brownfields: A Vancouver, British Columbia, case study. *Canadian Journal of Soil Science*, *92*(1), 191–201. http://dx.doi.org/10.4141/cjss2010-029

Kaethler, T. M. (2006). *Growing space: The potential for urban agriculture in the City of Vancouver*. Vancouver, British Columbia: School of Community and Regional Planning, University of British Columbia.

Luttmerding, H. A. (1984). *Soils of the Langley-Vancouver map area*. Kelowna, British Columbia: British Columbia Ministry of Environment.

Patel, S., & MacRae, R. (2012). Community supported agriculture in the city: The case of Toronto. *Journal of Agriculture, Food Systems, and Community Development*, *2*(4), 85–100. http://dx.doi.org/10.5304/jafscd.2012.024.003

Romig, D. E., Garlynd, M. J., Harris, R. F., & McSweeney, K. (1995). How farmers assess soil health and quality. *Journal of Soil and Water Conservation*, *50*(3), 229–236.

Stringer, E. T. (1999). *Action research*. Thousand Oaks, California: Sage Publications.

Toronto Public Health. (2013). *Guide for soil testing in urban gardens*. Retrieved from http://www.tcgn.ca/wiki/uploads/DonationsTradesSharing/TPH_Summary_JAAv3.pdf

Tugel, A. J., Seiter, S., Friedman, D., Davis, J., Dick, R. P., McGrath, D., & Weil, R. R. (2001). Locally led conservation activities: Developing a soil quality assessment tool. In D. E. Stott, R. H. Mohtar, & G. C. Steinhardt (eds.), *Sustaining the global farm: Selected papers from the 10th International Soil Conservation Organization Meeting* (pp. 529–534). West Lafayette, Indiana: International Soil Conservation Organization.

Turner, B., Henryks, J., & Pearson, D. (2011). Community gardens: Sustainability, health and inclusion in the city. *Local Environment: The International Journal of Justice and Sustainability*, *16*(6), 489–492. http://dx.doi.org/10.1080/13549839.2011.595901

U.S. Environmental Protection Agency [EPA]. (2011). *Brownfields and urban agriculture: Interim guidelines for safe gardening practices*. Retrieved from http://www.epa.gov/brownfields/urbanag/pdf/bf_urban_ag.pdf

Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
www.AgDevJournal.com

Examining farmers markets' usage of social media: An investigation of a farmers market Facebook page

Yue Cui *
Michigan State University

Submitted February 26, 2014 / Revised May 15 and 16, June 30, and July 24, 2014 / Accepted August 12, 2014 / Published online December 1, 2014

Citation: Cui, Y. (2014). Examining farmers markets' usage of social media: An investigation of a farmers market Facebook page. *Journal of Agriculture, Food Systems, and Community Development, 5*(1), 87–103. http://dx.doi.org/10.5304/jafscd.2014.051.008

Abstract

Social media are transforming communication between organizations and their audiences, and even changing the organizations themselves. Social media's low cost and low requirements for technical skills needed to both use and maintain an online presence allow small businesses with limited marketing budgets to use the same marketing strategies as bigger businesses with large marketing budgets. In addition, social media provides businesses direct and interactive ways to reach out and retain customers. This case study analyzes Cedar Park Farmers Market (CPFM)'s use of its Facebook page. Using Facebook Graph API Explorer, we extracted data regarding posts and fans of CPFM's Facebook page since the page was created. We then examined the data to explore the social networks, including farmers market organizers, vendors, and customers, within CPFM's Facebook page and how the market used its Facebook page, by looking at the Facebook page layout, composition of fans, post intensity, post ownership, media type, and degree of engagement. We found that (1) the market organizers, customers, vendors, and local communities were all engaged with the CPFM Facebook page; (2) the CPFM used Facebook as a marketing platform to publish timely information (e.g., available products or upcoming events) and to reach and retain customers and vendors; and (3) the CPFM's Facebook page functioned as a cyber–social hub to connect and engage the local community.

Keywords

Facebook, farmers market, social media, marketing, social hub

* Dr. Yue Cui, Assistant Professor, Department of Community Sustainability, Michigan State University; 130 Natural Resource Building; East Lansing, Michigan 48824 USA; +1-517-897-0550; cuiyue.msu@gmail.com

Introduction

As public concern about the quality of food in the conventional and commercial food system grows, so does the enthusiasm for local foods (Hinrichs, Gillespie, & Feenstra, 2004). The momentum behind the local food movement has grown in recent years with rising support for, and awareness of, local farmers markets, making them increasingly popular destinations among food shoppers (Kaufman, 2004). The past two decades in particular have seen a phenomenal growth rate in the number of markets in the United States; the number increased by 364 percent from 1996 to 2013, totaling 8,144 markets (USDA, n.d.a).

The growth in the number of farmers markets also means that market organizers face more intense competition for both customers (demand) and vendors (supply). Therefore appropriate marketing strategies to recruit and retain both customers and vendors are key to the success of a farmers market. For example, an extension study from Nevada (Cowee, Curtis, & Gatzke, 2009) found that farmers market organizers have traditionally reached their customers and vendors using one-way, passive communication approaches, such as word of mouth, local television, radio, newspaper, roadside signs, and websites (Cowee et al., 2009). With the emergence of social media, communication methods between markets, vendors, and customers have fundamentally changed as increasing numbers of farmers markets adopt social media. This study is motivated by the need to understand how farmers markets are using Facebook as one avenue to establish a social media presence, and how Facebook allows farmers markets to interact and engage with customers, vendors, and communities.

The inherent attributes of the farmers market make social media an ideal marketing tool. Farmers market's products and events change from week to week, making timeliness more important in marketing. The interactions within farmers markets are not limited to customers and the market; they are among the market organizers, customers, and vendors. Most farmers markets are resource-limited and cannot afford traditional unidirectional marketing strategies (e.g., radio, television, newspaper). Social media require little in the way of special skills to build social media sites, and the cost to use and maintain a social media site is relatively low (Jussila, Kärkkäinen, & Aramo-Immonen, 2014). These attributes make social media affordable marketing platforms for small businesses like farmers markets.

In 2013, the USDA Farmers Market Directory Update form was expanded to allow market managers to list their social media tools, such as Facebook and Twitter, as part of their market communication tools (in addition to their websites). This revealed that Facebook is already a major form of social media that farmers markets use, as over 2,000 markets provided a Facebook link, far more than any other form of social media, such as Twitter, Pinterest, FourSquare, or Instagram (USDA, n.d.b).

Unlike for its personal profiles, Facebook allows people to view posts on an organization's Timeline (previously called the Wall) without logging into their account. The posts on the Facebook page, the number of fans a page has, and the ways in which people interact on Facebook (e.g., likes, comments and shares) are accessible at no cost. This provides researchers an opportunity to observe who, how, and what people and/or businesses communicate on Facebook pages in a natural environment without influencing their behavior Using the Cedar Park Farmers Market's Facebook page (CPFM, n.d.) as an example, this study collected all the posts and daily fan counts from the date its Facebook page was created until December 22, 2013. By observing people talking and interacting on CPFM's Facebook page, this study found that farmers markets' Facebook pages serve multiple purposes. The Facebook page is a marketing platform for farmers market's organizers and vendors to publish timely information about market operations, available products, and upcoming events, as well as an effective way of reaching and retaining customers and vendors through multilateral interaction and engagement. The CPFM's Facebook pages also function as a social hub to connect vendors, customers, and the local community, and as a public bulletin board to share resources, ideas, and interests and to provide forums to educate, promote healthy living, support agriculture, and resolve conflicts.

Value of Farmers Market Participation in Social Media

There are many conceptions of what constitutes a farmers market. Since 2000, researchers have offered different definitions for farmers markets: "specialist markets trading in 'locally produced' products, and food must be sold by the producers" (Holloway & Kneafsey, 2000, p. 286); "recurrent markets at fixed locations where farm products are sold by farmers themselves" (Brown, 2001, p. 658); "a common facility or area where multiple farmers/growers gather on a regular recurring basis to sell a variety of fresh fruits, vegetables and other farm products directly to customers" (Payne, 2002, p. 173); and public spaces "where people come to buy locally or regionally produced goods and engage in community life on a regular basis (Francis & Griffith, 2011, p. 262). Although these authors describe farmers markets differently, the definitions have common features, such as direct marketing, the characteristic of being recurring, fresh and healthy products, locally grown, and community linkages. These concepts of farmers markets also reflect the major functions of a farmers market: the provision of staple foods (La Trobe, 2001) and, more marginally, the consumption of ancillary or amenity items (Hergesheimer & Kennedy, 2010; Smithers, Lamarche, & Joseph, 2008). As a direct marketing channel, vendors and customers interact face-to-face in a farmers market. Most of the studies regarding the social network in a farmers market setting describe this social network as being composed of customers, vendors, and the community (Abel, Thomson, & Maretzki, 1999; Alia, Freedman, Brandt, & Browne, 2013; Gerbasi, 2006). Each of these groups participates in the farmers market and draws value from it.

In terms of market participation, factors driving customers to visit farmers markets include procuring local, fresh and healthy foods (Andreatta & Wickliffe, 2002; Guthrie, Guthrie, Lawson, & Cameron, 2006; Hinrichs et al., 2004; Hunt, 2007; Sadler, Clark, & Gilliland, 2013; Sanderson, Gertler, Martz, & Mahabir, 2005) and enjoying the shopping experience (Feagan & Morris, 2009; Guthrie et al., 2006; La Trobe, 2001; McGrath, Sherry, & Heisley, 1993; Sadler et al., 2013). Vendors have both economic and social reasons for participating in farmers markets (Hinrichs et al., 2004; Lyson, Gillespie, & Hilchey, 1995). Griffin and Frongillo (2003) indicated that farmers markets act as a marketing channel for vendors as well as a means to increase profit margin. In addition, scholars (Hunt, 2007; Morris & Buller, 2003) have found that vendors report a sense of contribution to the local community by participating in farmers markets. Aside from the major function of providing staple foods, the farmers market is a material and symbolic space for local communities. It provides a sense of security and connects surrounding communities (Hergesheimer & Kennedy, 2010; Madison, 2002). The social benefits of farmers markets for local communities include increased social vitality (Conner, Colasanti, Ross, & Smalley, 2010), reinforcement of local values (Cummings, Kora, & Murray, 1999), and provision of space to promote social activity and human capital development (Brown & Miller, 2008; Farmer, Chancellor, Gooding, Shubowitz, & Bryant, 2011). The resurgence of farmers markets exemplifies the city landscape as a space for leisure, relaxation, and community development (Farmer et al., 2011; Oberholtzer & Grow, 2003).

Social Media, Facebook, and Their Applications for Organizations

"Social networking" refers to the use of social media to turn communication into interactive, multidirectional exchanges that create engagement and build relationships and communities (Boyd & Ellison, 2007). Social networking services such as Facebook and Twitter are primarily used to connect communities of individuals who share similar interests. People use social media to share and discuss their daily experiences, socialize with friends, receive information, and entertain themselves (He, Zha, & Li, 2013; Kaplan & Haenlein, 2010; Keckley & Hoffmann, 2010). In business applications, social media allow organizations to connect with many more people more frequently than using phone calls, emails, or meetings allows (Luke, 2009). The cost for development and support of social media has fallen drastically and the technical skills required to use social media are low and easily

learned. Using social media creates opportunities for organizations to communicate directly, quickly, and frequently with individual customers, and to disseminate information about products and services (Palmer & Koenig-Lewis, 2009). As an increasing number of users connect on social networks, social media are becoming increasingly used by the Internet audience (Khan & Boehmer, 2013). One of the major social media platforms in the United States, Facebook, was launched on February 4, 2004, and has become one of the most popular websites in history (Parsons, 2013; Sage, 2013). Facebook provides various features including profiles, pages, groups, advertising, and email (Facebook, n.d.a). It enables individual users to present themselves in a profile and gather friends who can interact on each others' pages. For businesses, it enables individuals and other organizations to affiliate themselves as fans and to interact with the business. Once a user is a fan of a business on Facebook, that user can share information about that particular business with their friends. Facebook allows organizations to use pages at no cost, which is a significant advantage for low-cost businesses like farmers markets.

Facebook pages have a fixed format and design theme for all users. Users personalize their page by inputting their own content including a profile picture, photos, Timeline posts, and links. This structured format, in addition to having a low cost and low requirement for technical skills, means that small businesses on Facebook have the same marketing opportunities as larger businesses (Khan & Boehmer, 2013). Social media use public posts and comments to generate high interactivity. This transparent interactivity describes and prescribes the manner in which conversational interaction as an iterative process leads to jointly produced meaning (Rafaeli & Sudweeks, 1997). In a marketing setting, another concept close to interactivity is engagement, which is "the intensity of an individual's participation in and connection with an organization's offerings and/or organizational activities, which either the customer or the organization initiate" (Vivek, Beatty, & Morgan, 2012, p. 4). On Facebook pages, this engagement can be expressed through behaviors such as commenting on posts, "liking" them, and sharing information (Khan & Boehmer, 2013). Studies on the social media phenomena started with individuals' behavior (Sage, 2013). Recently, scholars have steered their research to look at what businesses and organizations are actually doing within social media. So far, most of this organization-related social media research focuses on large companies, such as airlines (Leung, Schuckert, & Yeung, 2013), and chain stores (He et al., 2013). Sufficient research has not been done on small businesses, even though prior studies claim that small businesses have the same competitive "position" as big companies on social media such as Facebook. In addition to the lack of research on small businesses, no research has been conducted on how farmers markets use Facebook.

Research Questions

Research Question 1: In physical space, the social network of a farmers market comprises the market organizer, vendors, customers, and the local community. This study will examine how the roles physically played in farmers markets communicate and engage on a farmers market's Facebook page, and whether the social network of Facebook reflects the actual social atmosphere of farmers markets.

Research Question 2: How do farmers markets use their Facebook pages? Given that the major function of farmers markets is the provisioning of staple foods, this study will investigate how a farmers market uses Facebook as a marketing platform to advertise available products and upcoming events, and the relationship management strategies employed by a farmers market on Facebook to engage customers, vendors, and the local community. In addition, this study will investigate a farmers market's marginal functions such acting as a social hub through Facebook pages.

Data and Methods

To select a case study market, we focused on finding an urban market that supported at least 50 vendors and that had a reasonably mature Facebook presence (more than 2 years). We also sought a market that operated year-round. This assured substantial numbers of participants and content to inform the study. This study used Cedar Park

Farmers Market's Facebook page (CPFM, n.d.) as a case study to identify how farmers markets use Facebook as a marketing platform and social hub. CPFM is located in the city of Cedar Park, near Austin, Texas. It is organized under F2M Texas, a nonprofit corporation that provides Central Texas farmers and ranchers with direct-marketing opportunities. CPFM provides central Texans with a wide variety of locally produced foods in convenient locations (CPFM, n.d.). It is a year-round market open Saturdays from 9 AM to 1 PM. CPFM created its Facebook page on February 2, 2010. As a business page, CPFM's Facebook Timeline posts can be viewed by anyone. We used the Facebook Graph API (Cross, 2011) to crawl all feeds posted on CPFM's Facebook page from February 2, 2010, to December 22, 2013. The post objects related to this study include post owner (FROM), creation time, media type, text message, and interactions such as likes, comments, and shares. In addition, the number of fans of the CPFM Facebook page was counted every day starting with its creation.

Four classifications of posts were used in this study to understand Facebook usage: post owner, media type, posting intention, and posting intensity (the posts by the days of week). We used information on post owners (CPFM, customer, vendor, and others, including businesses and organizations) to respond to research question 1. The post owner was identified by the name and categories in the "FROM" variable. Businesses and organizations provided their business category beside their name. Vendors were identified by the business name. The vendors list provided by CPFM in the "About" page was used as reference to separate the vendors from all organization posts. Customers were identified by individual "profile" users without a business category. In addition to post owners, the media type, posting intentions, posting intensities, and degree of engagement were used to answer research question 2. The media type was classified as Text-Only (status), Link, Photo, and Video through the post type attribute. Posting intentions were used to understand the usage of Facebook pages in many social media studies. For example, Cvijikj and Michahelles (2011) categorized posts for marketing purposes by post intention as suggestions and requests, affect expression, sharing, information inquiry, complaints and criticism, gratitude, or praise. Leung et al. (2013) classified the Facebook posts of three budget airlines into six categories. They include promotions, sharing, announcement, invite engagement, celebrities at destination, and user involvement. The posting intentions classification was used in this study to understand how the farmers market uses Facebook. The posts were manually coded into five categories:

(1) Announcement: CPFM used Facebook to announce information, including market operation, vendor information, events, etc. (e.g., Posts 1–4):

Post[1] 1:
CPFM: *Local Business FRESH, NEVER FROZEN chicken this week plus new batch of lamb, fresh farm eggs and pork for their CPFM customers.*
Post 2:
CPFM: *VENDOR NAME will add Sweet Potato Pie to her goodies this Saturday.*
Post 3:
CPFM: *HIGH SCHOOL FFA is selling transplants of tomatoes and a variety of peppers. The proceeds go to pay for trips and attendance at judging contests at various colleges…*
Post 4:
Vendor: *Thanks to all who come to the markets to support our community and to help the victims of the recent wildfires...we will be giving a percentage of our sales tomorrow to buy much needed items for the families along with donations collected by the market…come by and see us SFC Farmers' Market*
Customer: *I guess I need to give you my order!… See you in the morning!*
Vendor: *Thanks…I also have some yummy pb oat flax dog cookies for donations to BUSINESS NAME.*

[1] Persons' names, business names, website names, and URL links have been removed for privacy purposes. Posts have been copied as posted, so any misspellings, slang and/or abbreviations are in the original posts.

(2) Inviting Engagement: Post owners attempt to invite others to become involved in discussion by asking questions to solicit responses from vendors, customers, and the community (e.g., Post 5):

Post 5:
CPFM: A shopper complained to a farmer last week about bug holes in some of the produce at the market. I want to make sure you all understand that if it your produce lacks holes, you should complain because that means pesticides are being used! NUF SAID, right?
Customer 1: *It's pretty sad when people don't know what real food is supposed to look like.*
Customer 2: *I think I brought home a small worm of some kind and a wasp. I was pretty thrilled! Must be good stuff if they thought it was yummy enough to live in.*
Customer 3: *aww, i remember when i saw my first bug in my farmer's market food, i was scared too, but now im get excited when i see them! lol*
Customer 4: *I bought a basket of tomatoes, only one had a worm in it! I was actually wondering if one should bring that to the farmer's attention? Not because I'm mad that there's a worm, but more to make them aware?...*
Customer 5: *But now I know it's a sign of a healthy environment and to cut the bad out.*
Vendor 1: *As a farmer we try to protect our vegetables from bugs by using free range chickens to control the bug population and by covering the leafy greens when the bugs are more than the chickens can handle. I actually like the bug holes as proof of spray and chemical free farming practices.*
Vendor 2: *We always say, "better BUGS than chemicals!"*

(3) Market Experience: The farmers market, vendors, and customers share their experiences of the market day on Facebook (e.g., Post 6):

Post 6:
CPFM: *Thanks to every last one of you who braved these Texas elements to get your food. This market has really evolved into a close little community of people who care about their families and themselves...and others.*
Customer 1: *Beautiful. I get such the most pleasant feeling of peace and community at the market. I had stuffed portabella mushrooms for lunch w/ my family. Thank you all for your contributions!*
Customer 2: *I visited the market for the first time today. I really enjoyed it. I felt like a kid in a candy store!!*
Customer 3: *How crazy that today felt warmer than last week? Wonderful market day!*
Customer 4: *Local food deserves to be supported year round! Farming doesn't stop for the weather and neither do the bills! Thanks to everyone of the vendors for braving the weather.*
Customer 5: *Local food is awesome and so are all the vendors!!! Love it when we get to make the market and sad when our schedule prohibits it!*
Customer 6: *I looooove the market! BTW, any word on whether the Tomato Guy will be coming back and how he's healing up?*
Customer 7: *The market has become part of the week that I look forward to now. Love chatting with the vendors that truly care about what they are providing to the community. Looking forward to summer fruit...*
CPFM: *Tomato guy, VENDOR NAME1 is still healing and hopes to return this spring. It has been about 6 weeks since I last spoke with him. Good reminder to call and check on him! Also fruit...strawberries are coming in the next couple of weeks from VENDOR NAME2. Did you know that VENDOR NAME3 had asparagas?*

(4) Inquiry Market Information: Customers, vendors, and others ask questions regarding market operations through posts (e.g., Posts 7–8):

Post 7:
Customer 1: *Does anyone every have emu or ostrich eggs?*
Customer 2:**ever not every*
CPFM: *Nope. Sorry.*
Customer 3: *This place in BUSINESS NAME has them — URL LINK, just a few minutes east of Hutto*

Post 8:
Customer: *We missed VENDOR NAME this weekend. Please tell me they will be back!*
CPFM: *VENDOR NAME did a benefit on Friday to raise money for the Louisana Coast. They hail from Louisana and came here after the hurricane. Good for them, huh? We are proud to have them as a part of our market! They will be back this week.*
Customer: *yea!*
Vendor: *Thank you, we are sooo very proud to be a part of this grand market. Can't wait to be back!*

(5) Share: external link sharing, photo and video sharing, and profile updates for any content other than market experience (e.g., Post 9):

Post 9:
CPFM: *Should we ALL be on the WEBSITE NAME? There are a few things we can learn from these little buggers...URL LINK*

Post 10:
Others: *20 acres are currently burning in Leander between Bagdad and 183. Please keep those in your thoughts.*

Next, we conducted a posting intensity analysis based on the post's creation time. Due to the farmers market's recurring nature, we grouped posts by day of the week (Monday to Sunday) and measured the intensity of different days. To understand the relationship between post activity and market operation day, the posts were further grouped to Pre-market Days (Thursday and Friday), Market Days (Saturday), After-market Days (Sunday and Monday), and Other Days (Tuesday and Wednesday). We also examined fan interactions and engagement on CPFM's Facebook page. Facebook Insights (Facebook, n.d.b) provides precise metrics for the reach and engagement of posts. However, due to privacy issues, only the Facebook page owner (CPFM) was able to access the Insights details. The available interaction and engagement measures for public Facebook posts are likes, comments, shares, and number of fans, which are widely used by scholars (Cvijikj, Spiegler, & Michahelles, 2011). In this study, the degree of engagement for CPFM's Facebook posts were measured using Equation (1) below:

$$\textit{Degree of engagement} = (\#\ \textit{likes} + \#\ \textit{comments} + \#\ \textit{shares})/\textit{total fans at that day} \quad (1)$$

Results and Discussion

As of December 22, 2013, there were 6,369 posts on CPFM's Facebook Timeline; since the creation of CPFM's Facebook page, it has accumulated 8,265 fans. Figure 1 shows that the number of posts and fans grew steadily over time.

Header and Profile of the CPFM Facebook Page

The header and profile on top of the Facebook Timeline give visitors the first impression of a business page. Figure 2 is a screenshot of CPFM's Facebook page header.

CPFM used a banner (cover) image to display products, e.g., fresh vegetables, to attract

Figure 1. Cumulative Distribution of Number of Posts and Number of Fans on CFPM's Facebook Page (February 4, 2012–December 22, 2013)

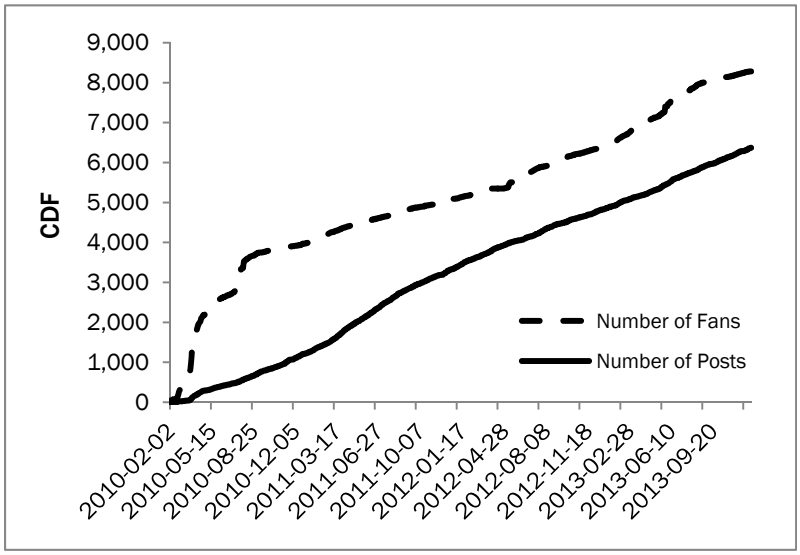


Figure 2. Header of Cedar Park Farmers Market's Facebook Page (Captured on December 22, 2013)

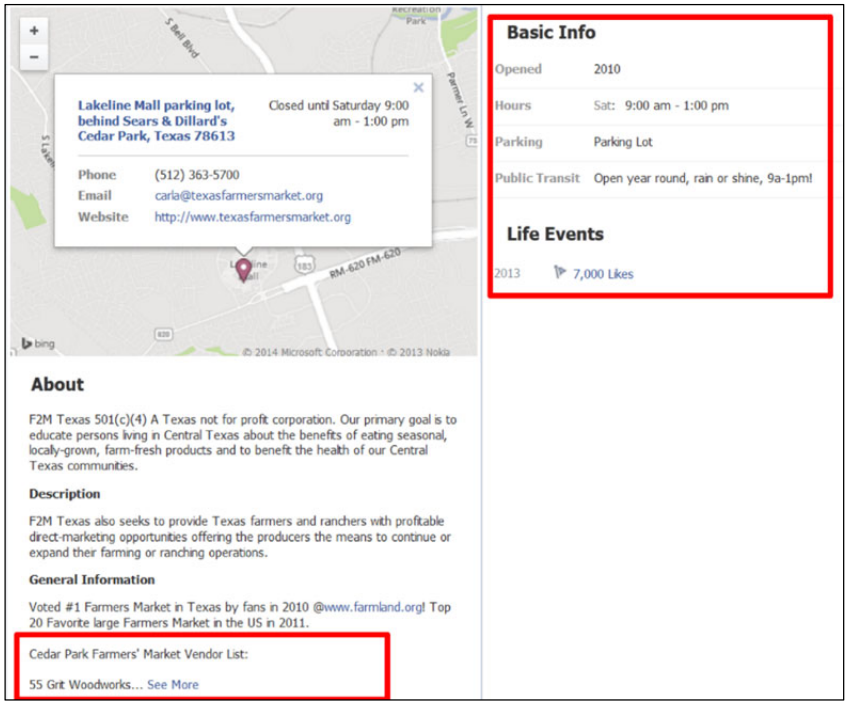
customers and advertise what is available at the market. The header also highlighted CPFM's logo, photos, videos, number of page likes (fans), a map of its actual location, events, notes, and the option to join the email list. There was an About link to provide more detailed information about CPFM. The screenshot of the About section is shown in Figure 3.

The About page displayed business location, phone number, email, website, operation hours, and parking information, as well as displaying CPFM's mission statement. It also listed market vendors, which is valuable to both customers and vendors. The header actually depicted the directory and fixed operation information for the market and served as the "brick and mortar" of the CPFM operation.

CPFM's Social Network on Facebook

To explore CPFM's cyber social network and understand who is active on CPFM's Facebook, we categorized posts by owners (CPFM, customers, vendors, others). Figure 4a is the distribution of posts by owners. Among all the messages on the Timeline, about 60 percent were posted by the CPFM. The other two-fifths were posted by vendors (25 percent), customers (13 percent), and others (2 percent). In terms of the composition of the CPFM's fans, customers made up 95 percent, while the remaining 5 percent of the fans were identified as organizations. A similar method was used to classify the "organization fans" by the business category in their profiles, as businesses (e.g., 365 Things To Do In Austin), nonprofit organizations (e.g., Texas Organic Farmers and Gardeners Association), governments (e.g., City of Cedar Park), and other famers markets (e.g.,

Figure 3. About Page of Cedar Park Farmers Market's Facebook (Captured December 22, 2013)



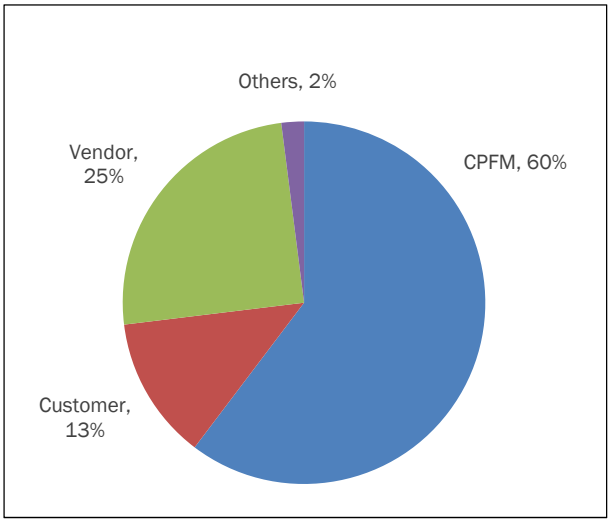
Mueller Farmers Market). The distribution of organization fans is shown in Figure 4b. It is no surprise that customers and vendors were the major players in the farmers market's social network, as this is consistent with findings from other studies in physical space (Alia et al., 2013; Gerbasi, 2006). In addition, Figure 4b displays the others members in the farmers markets' network: local communities, government, and organizations that have not been examined by previous studies. These two figures display the structure of the cyber social network of the CPFM and provide evidence that the Facebook page is a hub to gather customers, vendors, and communities.

The Usage Pattern of CPFM's Facebook Page

We measured usage of the CPFM Facebook page by post owner, posting intention, media type, posting intensity, and degree of engagement. Table 1 lists the distribution of posts by posting intention and post owner. In general, about two thirds of the posts were Announcements, while five percent were Inquiring Market Information. The rest of the posting intentions are as follows: Inviting Engagement (11.5 percent), Market Experience (14.0 percent), and Share (11.8 percent).

Figure 4. Composition of the Social Network for Cedar Park Farmers Market's Facebook Page

(a) Distribution of Posts by Post Owner



(b) Distribution of Organization Fans (*N*=8,265)

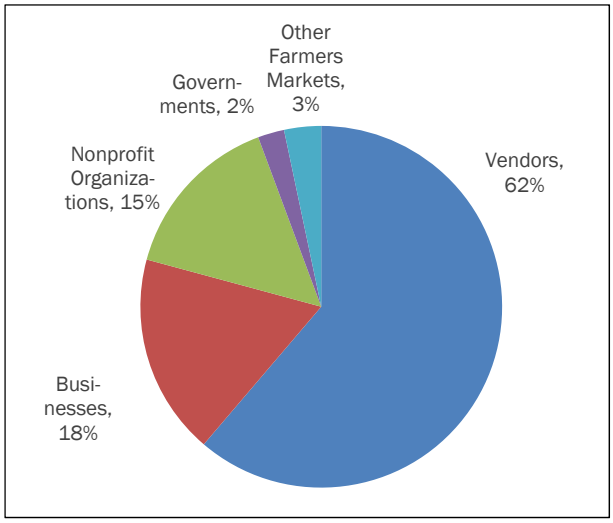


Table 1. Distribution of Posts (*N*=6,369) by Post Owner, Posting Intentions and Media Type

Classification	Categories	Post Owners (%)				
		CPFM	Customer	Vendor	Others	Total [a]
Posting Intention	Announcement	63.7	0.8	32.9	2.6	100.0
	Inviting Engagement	76.3	10.5	10.8	2.3	100.0
	Market Experience	36.8	38.2	24.9	0.1	100.0
	Inquiry Market Information	2.5	93.5	4.0	0.0	100.0
	Share	84.0	7.6	6.7	1.7	100.0
All posts		60.5	12.7	24.8	2.0	100.0

[a] Total by rows. Columns might not add up to 100% due to rounding.

CPFM (63.7 percent), vendors (32.9 percent), and others (2.6 percent) posted Announcements on CPFM's Facebook. We further examined the contents of the Announcements and found that CPFM posted general market-day and product information (e.g., post 1) as well as highlighted specific vendors to increase excitement and generate exposure for what will be the market's attractions that week (e.g., post 2). This indicates that CPFM's Facebook page was serving not only as a marketing channel for farmers markets, but also as a marketing channel for vendors and as a public bulletin (e.g., post 10) for the community. The results of analyzing the posting intentions suggests that the major role of CPFM's Facebook was as a marketing platform to disseminate information about market day and hours, products, events, and community-related messages (e.g., posts 1–4). In terms of communication between customers and CPFM, similar to other businesses' Facebook pages (Cvijikj & Michahelles, 2011; Ramsaran-Fowdar & Fowdar, 2013), customers were most likely to interact with businesses on Facebook for product and service information: 93.5 percent of Inquiring Market Information posts belonged to customers, who most often asked questions regarding operating hours and location, but also asked for individual vendor's attendance (e.g., post 8). The owner of the CPFM Facebook page posted most of its messages with the intent to engage fans: Inviting Engagement (76.3 percent) and Share (84.0 percent). Customers (38.2 percent), CPFM (36.8 per-

Table 2. Distribution of Posts (*N*=6,369) by Post Owner, Posting Intention, and Media Type

Classification	Categories	Media Type (%)				
		Text-only	Link	Photo	Video	Total [a]
Post Owners	Farmers Market	48.7	33.9	16.5	0.9	100.0
	Customer	88.2	6.1	5.7	0.0	100.0
	Vendor	81.2	7.3	11.1	0.3	100.0
	Others	44.0	48.0	1.6	6.4	100.0
Posting Intention	Announcement	70.1	19.9	9.6	0.4	100.0
	Inviting Engagement	53.0	34.5	11.8	0.7	100.0
	Market Experience	61.6	8.8	29.1	0.4	100.0
	Inquiry Market Information	99.1	0.3	0.6	0.0	100.0
	Share	13.2	62.7	21.0	3.1	100.0
All posts		61.7	24.1	13.5	0.7	100.0

[a] Total by rows. Columns might not add up to 100% due to rounding.

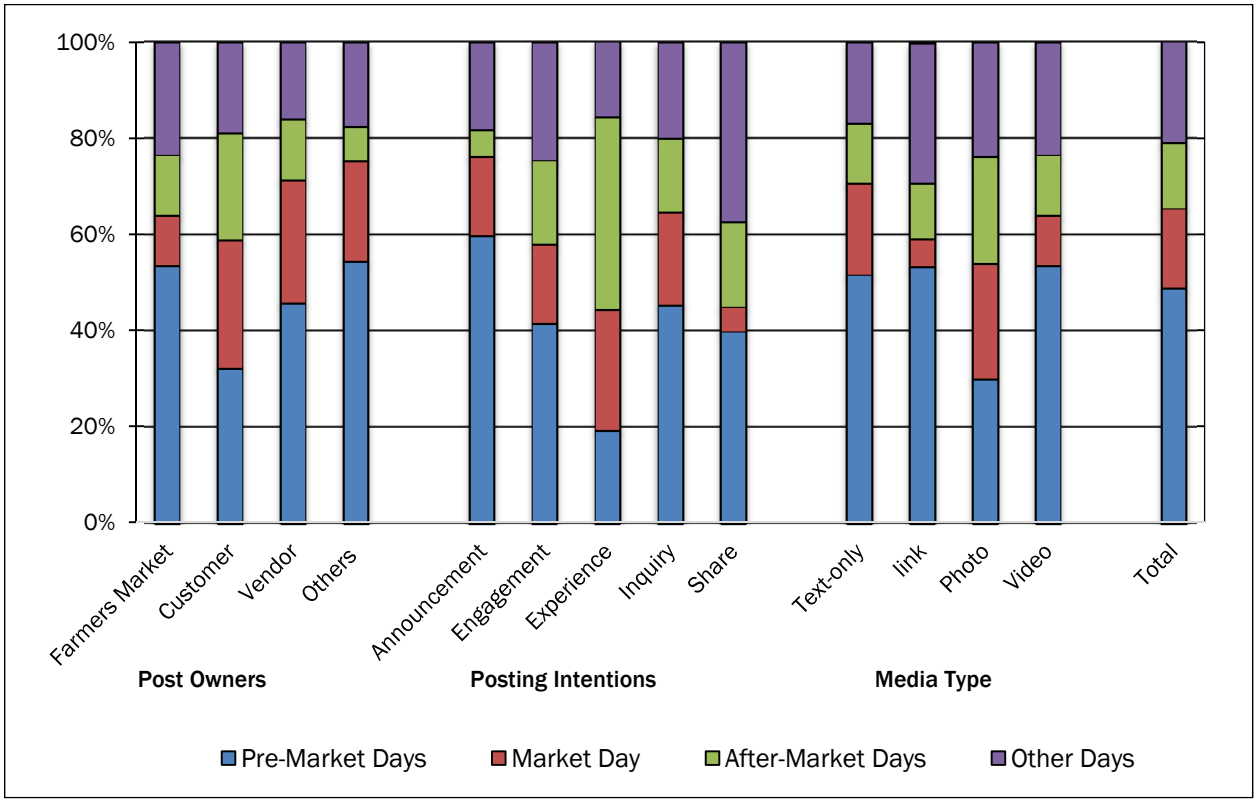
cent), and vendors (24.9 percent) all posted enthusiastically about market experiences. Other than being a marketing platform, the messages for Announcement purposes demonstrated that the CPFM Facebook page was a hub: the CPFM and others posted their announcements of community events and news (e.g., Post 3) and the Facebook page acted as a public bulletin board to disseminate information for local community, businesses, and nonprofit organizations.

Table 2 is a cross-tab of media type by post owner and posting intention. For the media type classification, the major type used on CPFM's Facebook page were Text-Only posts (61.7 percent); the remaining were Link (24.1 percent), Photo (13.5 percent), and Video (0.7 percent). The relationship between post owner and media type show that customers (88.2 percent) and vendors (81.2 percent) mainly posted Text-Only information. Others, including local businesses and organizations, mainly used Text-Only messages (44.0 percent) and Links (47.2 percent). CPFM's posts were more diverse when it comes to media (48.7 percent for Text-Only, 32.1 percent for Link and 16.5 percent for Photos). This suggests that CPFM aimed to use Facebook as a marketing tool by utilizing a variety of media opportunities to attract and engage customers and vendors.

The cross-tab by posting intention and media type shows that about 70.1 percent of announcements and 99.1 percent of Inquiring Market Information were Text-Only messages, making the accessibility of this information easy and efficient. Shares (63.1 percent) and Inviting Engagement (34.1 percent) had a higher percentage of Links included in the posts, while one-third of Market Experience posts included Photos. The result is consistent with other social media marketing research (Cvijikj et al., 2011; He et al., 2013) in terms of media type, and suggests that the CPFM used its Facebook page efficiently and effectively as a communication tool to disseminate information and engage customers and vendors.

Next, we examined variations of posting

Figure 5. Distribution of Posts (*N*=6,369) by Day of the Week Corresponding to Market Days



intensity on CPFM's Facebook page by day of the week. They were further grouped by Pre-market Days (Thursday and Friday), Market Day (Saturday), After-market Days (Sunday and Monday), and Other Days (Tuesday and Wednesday). In general, about 66 percent of the messages were posted on Pre-market Days and Market Days. Fourteen percent of the posts were on After-Market Days and 21 percent were posted on Other Days. Figure 5 illustrates posting intensity by different post classifications. The distribution of posts by day of the week shows that CPFM's Facebook page functioned as an advertising outlet on Pre-market days in an attempt to attract customer attention. Over half of CPFM's posts were on Pre-market days, informing customers about what to expect at the market that Saturday, while the Market Day itself has only 16.9 percent of the overall posts (since customers and vendors might be physically at the market). Our further examination of posting intensity and posting intention found that the majority of Announcements (76 percent) and Inquires for Market Information (64 percent) were posted on Pre-market Days or Market Day. In contrast, the market experience posts were published on Market Day and After-market Days (65 percent). In terms of post owners, CPFM posted more on Pre-market Days (54 percent), making various announcements. This suggests that CPFM and vendors used the CPFM Facebook page to reach customers right before market day.

To measure the interaction and engagement of fans and CPFM on the Facebook page, posts were labeled as engaged posts based on the attention they received (likes, comments, and shares) and the degree of engagement (Equation 1). A chi-squared analysis was applied to test the variations between different types of posts for each classification (post owner, posting intention, media type, and posting intensity). The distribution of the percentage of engaged posts is listed in Table 3. In general, 83.1 percent of posts become engaged (receiving likes,

Table 3. Distribution of Engaged Posts (*N*=6,369 and Degree of Engagement by Post Classifications

Classifications	Categories	% of engaged posts [a]	Average degree of engagement [b]	Standard degree of engagement
Post Owner	CPFM	90.5	0.0017	0.0029
	Customer	76.9	0.0007	0.0013
	Vendor	69.4	0.0005	0.0010
	Other	71.2	0.0005	0.0007
Posting Intention	Announcement	84.0	0.0011	0.0019
	Inviting Engagement	85.6	0.0024	0.0044
	Market Experience	77.2	0.0012	0.0023
	Inquiry Marketing Info	89.2	0.0007	0.0012
	Share	80.8	0.0012	0.0020
Media Type	Text-only	82.2	0.0012	0.0025
	Link	82.0	0.0009	0.0016
	Photo	90.5	0.0019	0.0031
	Video	78.3	0.0009	0.0011
Day in Week	Pre-market Days	84.1	0.0010	0.0019
	Market Days	84.8	0.0012	0.0023
	After-market Days	81.8	0.0017	0.0035
	Other Days	86.7	0.0014	0.0026
Average		83.1	0.0012	0.0024

[a] Pearson chi-squared tests with p value <0.01 for different types of posts in each classification
[b] One-way ANOVA tests with p value<0.01 for different types of posts in each classification

comments, and/or shares). The chi-squared test results show that there are significant differences between the engaged posts and non-engaged posts for types of posts for each classification. In term of post owner classification, CPFM (90.5 percent)'s posts received more attention overall, which may be suggestive of CPFM's efforts to create opportunities for using the page and for enhancing engagement using various types of posts. For the posting intention classification, Inquiry Market Information (89.2 percent) received the most attention. Customer posts categorized as inquiries elicited the most comments, suggesting that customers were quick to receive responses to questions they posed. Active engagement is a sure way to encourage fans to continue participating on CPFM's Facebook page. Of the media type classification, Photos (90.5 percent) received the most attention from fans. The majority of interactions with the photos were likes. This finding is consistent with the results of other studies (Cvijikj et al., 2011).

For degree of engagement, we conducted one-way ANOVA tests to explore the variations between different types of posts for each classification. The results indicate that the average degree of engagement is significantly different between post types for each classification (Table 3). For post owner classification and media type classification, the higher the percentage of engaged posts, the higher the degree of engagement. However, under the classification of posting intention, Inquiry Market Information posts received the lowest degree of engagement, while the percentage of engaged posts were the highest. This is because customers were able to receive the answers to their questions fairly quickly, and there was no longer a need for interaction on the post. Furthermore the purpose of Inviting Engagement posts is to invite discussions and solicit answers. It is not surprising that the engagement ratio of Inviting Engagement posts was twice that of other types of posts due to the back and forth among the CPFM and its fans. For posting intensities, the engagement ratio on days other than Pre-market Days and Market Day was higher. This suggests that CPFM made more of an effort to engage fans and build a relationship with the customers when there was not intense posting of announcements and market experiences on the wall.

Conclusions

Social media reach people on a larger scale and a faster speed than previous communication media have allowed. Social media platforms have been adopted by small and large businesses alike for marketing and communication purposes with the standardized format, low need for special technical skills, and low cost. Farmers markets, being small businesses, have taken advantage of Facebook as a marketing channel. Using Cedar Park Farmers Market as a case study, the data supports the conclusion that CPFM's Facebook page is an efficient and effective marketing platform for both the farmers market and its vendors due to the dynamic characteristics of products and events at the farmers market. CPFM used the header and profile (photos, tabs, and links) at the top of its Facebook page to highlight its market and provide the basic and fixed market operation information. At the same time, CPFM used its Facebook page to publish market operation information, advertise products and vendors, and promote upcoming events, all before each Market Day. Customers also posted their inquiries before Market Day and got quick responses from the CPFM. After the Market Day, customers, vendors, and the CPFM itself all posted their market experiences on the page. During the Other Days, CPFM invited fans to engage in various topics of interest, such as food safety and nutrition (e.g., Post 5), sharing recipes and resources (e.g., Post 9), etc. This strategy successfully attracted and retained customers and vendors. As a result, the number of fans of CPFM's Facebook page has increased steadily since the page was created (Figure 1). In addition to its function as a marketing tool, Facebook is a cyber community (Zhang, Tang, & Leung, 2011) for people to gather, interact, develop friendships, and share information, photos, experiences, and more. Farmers markets are also social hubs, both physically and symbolically. The same people who like to get together and talk during the farmers markets might also like to share ideas during the

rest of the week. Facebook provides a convenient forum for "fans" of farmers markets to get together online. Our study found that the CPFM Facebook page acted as a hub to provide a platform that allows natural sharing of ideas, thoughts, and concerns, and facilitates people's engagement in conversations of various topics. On CPFM's Facebook page, the market organizer announced information for the local community, engaged fans with community issues, and shared community information, as well as allowing community members to post their messages on CPFM's Facebook page. The Facebook page works as a hub, reflecting the peripheral functions of the actual market experience as discussed in previous sections.

Management and Research Implications

With an increasing number of food consumers utilizing various forms of social media to identify, research, and buy local foods, farmers markets and other local food retailers (e.g., food hubs, CSAs) can benefit from social media for relationship marketing. Communicating fresh and imaginative content employing social media can affect both long-term (e.g., CSA subscriptions) and more immediate decisions (e.g., whether to visit and what to purchase at a farmers market today) concerning food purchases and preparation. The integration and targeting of social media offers local food providers new and effective opportunities for branding, sales promotions, and loyalty and relationship development. Therefore farmers markets that utilize Facebook need to understand who their fans are and how and when they interact and engage their farmers markets' page. The content that is posted should be continuously refreshed and emphasize the benefits to consumers and communities associated with sustainable local food. It is also important that farmers markets regularly respond to reviews posted on their Facebook page since reputation is critical and a portion of negative reviews can become positive if they secure a response. Markets should further consider providing customers with take-home information with every purchase (e.g., labeling, business cards) that includes their Facebook web address.

Local food providers should also consider employing social media as a means of collecting data on their customers and identifying their actual behavior. Social media provide new platforms for researchers to observe directly the interaction of different roles at farmers markets through their dialogues, likes, and what they share, without any interruption. This works as a method of cyber ethnography. In addition, the Facebook Graph API Explorer provides a "friendship" graph to visualize social networks (Cross, 2011). While previous studies have attempted to understand the social networks related to farmers markets, there is no clear picture of how this network is connected, especially for local food access, such as from farm to farmers market. Since organization-level fans provide their business description and locations on Facebook, the cyber social network could be mapped to a spatial social network in reality. This might not be possible through the direct observation and interview methods of observing physical farmers markets.

Limitations and Future Work

A limitation of this study was the lack of access (due to privacy issues) to the CPFM's Facebook page actual use data, such as traffic count, impression, demographics of fans, active fans, and number of people who browsed the page on a particular day. This made some measurements problematic. For example, the degree of engagement (Equation (1)) will decrease as the number of fans increases over time since we used the total number of fans as the denominator. As the page owner, CPFM could gather the number of fans on the page or the number of people who saw the post on a particular day. Utilizing these two variables as the denominator in Equation (1) would make the measurement of the degree of engagement more precise and accurate because these two variables measure the actual traffic count of the Facebook page on that particular day. We suggest that farmers market Facebook page owners track their page's visits and fan demographics to inform an effective marketing strategy to disseminate timely information and engage customers, vendors, and community members. In addition, scholars and practitioners realize the population on social media

does not reflect the population in reality. Similar to other social space, social media spaces might reproduce cliques, foster inward referencing, and generally fail to reach out across diverse groups. For example, a typical user of Facebook tends to be young and female compared to the total population (Sage, 2014). Moreover, not all people interact on farmers market Facebook pages. Our study successfully detected the interaction between farmers market customers and vendors (e.g., Post 5). However, unlike the findings from physical markets (Gerbasi, 2006), we did not find any conversations among vendors on CPFM's Facebook page; it might be unnecessary for two vendors to have a conversation on a third party's page. Another limitation is the semi-manual coding methods used to categorize the posts that could result in a misclassification of posts and post owners. For example, if the vendors or businesses used their personal profile instead of their business page to join CPFM's Facebook page, they were categorized as customers, not organizations. For future studies, data-mining tools will need to be introduced for message classification, topic detections and content analysis. This study is the author's first attempt to explore how farmers markets use Facebook. The study subject, CPFM, is a large, year-round market residing in an urban area. Fans are very active on its page. There are another 2,000 farmers markets on Facebook who are large and small, seasonal or year-round, urban or rural, patronized by affluent customers or those from low-income communities. Future research will extend the subjects from CPFM to all farmers markets reporting their Facebook page in USDA's Farmers Market Directory to understand more about how farmers market use social media.

References

Abel, J., Thomson, J., & Maretzki, A. (1999). Extension's role with farmers' markets: Working with farmers, consumers, and communities. *Journal of Extension, 37*(5), 150–165.

Alia, K. A., Freedman, D. A., Brandt, H. M., & Browne, T. (2013). Identifying emergent social networks at a federally qualified health center-based farmers' market. *American Journal of Community Psychology, 53*(3-4), 335–345. http://dx.doi.org/10.1007/s10464-013-9616-0

Andreatta, S., & Wickliffe, W. (2002). Managing farmer and consumer expectations: A study of a North Carolina farmers market. *Human Organization, 61*(2), 167–176.

Boyd, D. M., & Ellison, N. B. (2007). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication, 13*(1), 210–230. http://dx.doi.org/10.1111/j.1083-6101.2007.00393.x

Brown, A. (2001). Counting farmers markets. *Geographical Review, 91*(4), 655–674. http://dx.doi.org/10.2307/3594724

Brown, C., & Miller, S. (2008). The impacts of local markets: A review of research on farmers markets and community supported agriculture (CSA). *American Journal of Agricultural Economics, 90*(5), 1298–1302. http://dx.doi.org/10.1111/j.1467-8276.2008.01220.x

Cedar Park Farmers Market [CPFM]. (n.d.). Cedar Park Farmers Market [Facebook page]. Retrieved December 22, 2013, from https://www.facebook.com/CedarParkFM?ref=br_tf

Conner, D., Colasanti, K., Ross, R. B., & Smalley, S. B. (2010). Locally grown foods and farmers markets: Consumer attitudes and behaviors. *Sustainability, 2*(3), 742–756. http://dx.doi.org/10.3390/su2030742

Cowee, M. W., Curtis, K. R., & Gatzke, H. (2009). *Marketing farmers' markets: Ideas for market vendors & managers in Nevada.* Reno, Nevada: University of Nevada Cooperative Extension.

Cross, S. (2011). *Introducing the Graph API Explorer.* Retrieved December 22, 2013, from https://developers.facebook.com/blog/post/517

Cummings, H., Kora, G., & Murray, D. (1998). Farmers' markets in Ontario and their economic impact. Ontario, Canada: University of Guelph.

Cvijikj, I. P., & Michahelles, F. (2011). Understanding social media marketing: A case study on topics, categories and sentiment on a Facebook brand page. *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments*, 175–182. http://dx.doi.org/10.1145/2181037.2181066

Cvijikj, I. P., Spiegler, E. D., & Michahelles, F. (2011). The effect of post type, category and posting day on user interaction level on Facebook. *Privacy, Security, Risk and Trust (PASSAT) and 2011 IEEE Third Inernational Conference on Social Computing (SocialCom)*, 810–813. http://dx.doi.org/10.1109/PASSAT/SocialCom.2011.21

Facebook. (n.d.a). *Popular features*. Retrieved December 22, 2013, from https://www.facebook.com/help/393277774048285

Facebook. (n.d.b). *Page insights*. Retrieved December 22, 2013, from https://www.facebook.com/help/390967410974308?sr=1&query=insights&sid=03OBXPjLFsRSdnUJh

Farmer, J. R., Chancellor, C., Gooding, A., Shubowitz, D., & Bryant, A. (2011). A tale of four farmers markets: Recreation and leisure as a catalyst for sustainability. *Journal of Park and Recreation Administration, 29*(3), 11–23.

Feagan, R. B., & Morris, D. (2009). Consumer quest for embeddedness: A case study of the Brantford Farmers' Market. *International Journal of Consumer Studies, 33*(3), 235–243. http://dx.doi.org/10.1111/j.1470-6431.2009.00745.x

Francis, M., & Griffith, L. (2011). The meaning and design of farmers' markets as public space: An issue-based case study. *Landscape Journal, 30*(2), 261–279. http://dx.doi.org/10.3368/lj.30.2.261

Gerbasi, G. T. (2006). Athens farmers' market: Evolving dynamics and hidden benefits to a southeast Ohio rural community. *Focus on Geography, 49*(2), 1–6. http://dx.doi.org/10.1111/j.1949-8535.2006.tb00160.x

Griffin, M. R., & Frongillo, E. A. (2003). Experiences and perspectives of farmers from Upstate New York farmers' markets. *Agriculture and Human Values, 20*(2), 189–203. http://dx.doi.org/10.1023/A:1024065526440

Guthrie, J., Guthrie, A., Lawson, R., & Cameron, A. (2006). Farmers' markets: The small business counter-revolution in food production and retailing. *British Food Journal, 108*(7), 560–573. http://dx.doi.org/10.1108/00070700610676370

He, W., Zha, S., & Li, L. (2013). Social media competitive analysis and text mining: A case study in the pizza industry. *International Journal of Information Management, 33*(3), 464–472. http://dx.doi.org/10.1016/j.ijinfomgt.2013.01.001

Hergesheimer, C., & Kennedy, E. H. (2010). *Farmers markets, local food systems and the social economy: A thematic literature review*. Port Albern, British Columbia: Canadian Centre for Community Renewal.

Hinrichs, C. C., Gillespie, G. W., & Feenstra, G. W. (2004). Social learning and innovation at retail farmers' markets. *Rural Sociology, 69*(1), 31–58.

Holloway, L., & Kneafsey, M. (2000). Reading the space of the farmers' market: A case study from the United Kingdom. *Sociologia Ruralis, 40*(3), 285–299. http://dx.doi.org/10.1111/1467-9523.00149

Hunt, A. R. (2007). Consumer interactions and influences on farmers' market vendors. *Renewable Agriculture and Food Systems, 22*(1), 54–66. http://dx.doi.org/10.1017/S1742170507001597

Jussila, J. J., Kärkkäinen, H., & Aramo-Immonen, H. (2014). Social media utilization in business-to-business relationships of technology industry firms. *Computers in Human Behavior, 30,* 606–613. http://dx.doi.org/10.1016/j.chb.2013.07.047

Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of social media. *Business Horizons, 53*(1), 59–68. http://dx.doi.org/10.1016/j.bushor.2009.09.003

Kaufman, J. L. (2004). Introduction. *Journal of Planning Education and Research, 23*(4), 335–340. http://dx.doi.org/10.1177/0739456X04264897

Keckley, P. H., & Hoffmann, M. (2010). *Social networks in health care: Communication, collaboration and insights*. Washington, D.C.: Deloitte Development.

Khan, M. L., & Boehmer, J. (2013, October). *Small business use of Facebook for marketing: The case of a family owned Mediterranean restaurant.* Paper presented at the 78th Annual Association for Business Communication International Conference, New Orleans, Louisiana.

La Trobe, H. (2001). Farmers' markets: Consuming local rural produce. *International Journal of Consumer Studies, 25*(3), 181–192. http://dx.doi.org/10.1046/j.1470-6431.2001.00171.x

Leung, R., Schuckert, M., & Yeung, E. (2013). Attracting user social media engagement: A study of three budget airlines Facebook pages. In L. Cantoni & Z. Xiang (Eds.), *Information and communication technologies in tourism 2013: Procedings of the International Conference in Innsbruck, Austria, January 22–25, 2013* (pp. 195–206). Berlin, Germany: Springer Berlin Heidelberg. http://dx.doi.org/10.1007/978-3-642-36309-2_17

Luke, K. (2009). Marketing the new-fashioned way: Connect with your target market through social networking sites. *Journal of Financial Planning, 22*(Nov./Dec. Practice Management Solutions), 18–19.

Lyson, T. A., Gillespie, G. W., & Hilchey, D. (1995). Farmers' markets and the local community: Bridging the formal and informal economy. *American Journal of Alternative Agriculture, 10*(3), 108–112. http://dx.doi.org/10.1017/S0889189300006251

Madison, D. (2002). Farmers' markets: Making big connections. *Phi Kappa Phi Forum, 82*(3), 15–18.

McGrath, M. A., Sherry Jr, J. F., & Heisley, D. D. (1993). An ethnographic study of an urban periodic marketplace: Lessons from the Midville farmers' market. *Journal of Retailing, 69*(3), 280–319. http://dx.doi.org/10.1016/0022-4359(93)90009-8

Morris, C., & Buller, H. (2003). The local food sector: A preliminary assessment of its form and impact in Gloucestershire. *British Food Journal, 105*(8), 559–566. http://dx.doi.org/10.1108/00070700310497318

Oberholtzer, L., & Grow, S. (2003). *Producer-only farmers' markets in the Mid-Atlantic region: A survey of market managers*. Arlington, Virgina: Henry A. Wallace Center for Agricultural and Environmental Policy at Winrock International.

Palmer, A., & Koenig-Lewis, N. (2009). An experiential, social network-based approach to direct marketing. *Direct Marketing: An International Journal, 3*(3), 162–176. http://dx.doi.org/10.1108/17505930910985116

Parsons, A. (2013). Using social media to reach consumers: A content analysis of official Facebook pages. *Academy of Marketing Studies Journal, 17*(2), 27–36.

Payne, T. (2002). U.S. farmers' markets 2000: A study of emerging trends. *Journal of Food Distribution Research, 33*(1), 173–175. http://purl.umn.edu/27625

Rafaeli, S., & Sudweeks, F. (1997). Networked interactivity. *Journal of Computer-Mediated Communication, 2*(4). http://dx.doi.org/10.1111/j.1083-6101.1997.tb00201.x

Ramsaran-Fowdar, R. R., & Fowdar, S. (2013). The implications of Facebook marketing for organizations. *Contemporary Management Research, 9*(1), 73–84. http://dx.doi.org/10.7903/cmr.9710

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

Sage, A. (2013). The Facebook platform and the future of social research. In C. A. Hill, E. Dean & J. Murphy (Eds.), *Social media, sociality, and survey research* (pp. 87–106). Hoboken, New Jersey: John Wiley. http://dx.doi.org/10.1002/9781118751534.ch4

Sanderson, K., Gertler, M., Martz, D., & Mahabir, R. (2005). *Farmer's markets in North America: A background document*. Saskatoon, Saskatchewan, Canada: Community-University Institute for Social Research.

Smithers, J., Lamarche, J., & Joseph, A. E. (2008). Unpacking the terms of engagement with local food at the Farmers' Market: Insights from Ontario. *Journal of Rural Studies, 24*(3), 337–350. http://dx.doi.org/10.1016/j.jrurstud.2007.12.009

U.S. Department of Agriculture [USDA]. (n.d.a). *Farmers markets directory search*. Retrieved January 15, 2014, from http://search.ams.usda.gov/farmersmarkets/

USDA (n.d.b). *National count of farmers market directory listing graph: 1994–2014*. Retrieved January 15, 2014, from http://www.ams.usda.gov/AMSv1.0/ams.fetchTemplateData.do?template=TemplateS&leftNav=WholesaleandFarmersMarkets&page=WFMFarmersMarketGrowth&description=Farmers%20Market%20Growth

Vivek, S. D., Beatty, S. E., & Morgan, R. M. (2012). Customer engagement: Exploring customer relationships beyond purchase. *The Journal of Marketing Theory and Practice, 20*(2), 122–146. http://dx.doi.org/10.2753/MTP1069-6679200201

Zhang, Y., Tang, L. S. T., & Leung, L. (2011). Gratifications, collective self-esteem, online emotional openness, and traitlike communication apprehension as predictors of Facebook uses. *Cyberpsychology Behavior and Social Networking, 14*(12), 733–739. http://dx.doi.org/10.1089/cyber.2010.0042

Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
www.AgDevJournal.com

Mapping the cost of a balanced diet, as a function of travel time and food price

Nathan Hilbert,[a] Jennifer Evans-Cowley,[b] Jason Reece,[c] Christy Rogers,[c] Wendy Ake,[c] Casey Hoy[d] *
The Ohio State University

Submitted April 30, 2014 / Revised July 18 and August 20, 2014 / Accepted August 24, 2014 /
Published online December 6, 2014

Citation: Hilbert, N., Evans-Cowley, J., Reece, J., Rogers, C., Ake, W., & Hoy, C. (2014). Mapping the cost of a balanced diet, as a function of travel time and food price. *Journal of Agriculture, Food Systems, and Community Development, 5*(1), 105–127. http://dx.doi.org/10.5304/jafscd.2014.051.010

Abstract

We present a new method for analyzing spatial variation in the cost of a balanced diet, as an alternative to food desert classification. Our specific hypothesis is that the cost of a balanced diet varies according to where one lives, as a function of travel and food item costs. We collected price data for the USDA Thrifty Food Plan from approximately 30 percent of food retail outlets of various kinds in the three Gulf Coast counties of Mississippi, and these prices were extrapolated to the remaining stores. Transportation costs were calculated for both driving by automobile and the combination of walking and public transportation by bus, accounting for both the shoppers' time and the cost of automobile mileage. We developed a "traveling purchaser problem" algorithm to estimate the lowest-cost combination of travel and food costs for purchasing all items in the Thrifty Food Plan for each residential parcel in the study area, and mapped the resulting costs and examined their variation. Estimated costs varied more because of transportation costs than food prices, and ranged from US$109 to US$215 for automobile travel and from

[a] Agroecosystems Management Program, The Ohio State University, Ohio Agricultural Research and Development Center, Wooster, Ohio. Current address: 7600 Wisconsin Avenue, Bethesda, Maryland, USA; nathan@gisrs.net

[b] City and Regional Planning Section, Austin E. Knowlton School of Architecture; The Ohio State University; 275 West Woodruff, Columbus, Ohio, USA; +1-614-292-0479; cowley.11@osu.edu

[c] The Kirwan Institute for the Study of Race and Ethnicity, The Ohio State University, Columbus, Ohio

[d] Agroecosystems Management Program, Ohio Agricultural Research and Development Center, The Ohio State University, Wooster, Ohio

* *Corresponding author:* Casey Hoy, Agroecosystems Management Program, The Ohio State University, Ohio Agricultural Research and Development Center, 1680 Madison Avenue, Wooster, Ohio 44691 USA; +1-330-263-3611; hoy.1@osu.edu

US$111 to US$439 for a combination of walking and public transportation. In general, costs were lowest in the more populated areas near the coast and higher in more rural areas further inland. Results of this analysis demonstrate that the cost of acquiring a balanced diet varies considerably and more or less continuously. Food is not equally cheap for all; it depends on where one lives. For any given location, an estimate of the cost of a balanced diet, including both food price and transportation, is more useful than a classification as food desert or not in understanding access issues and needs. Furthermore, policy alternatives that are intended to influence access should be evaluated based on how much they influence costs, and for whom, depending on where people live.

Keywords
economics, food access, food desert, optimization, policy, spatial analysis, traveling purchaser problem

Introduction

In the past 15 years, interest in and concern about food deserts, food environments, and food access for public policy, community development, and community health policy have grown. Food price, diet, and health outcomes are clearly linked (e.g., Duffey, Gordon-Larsen, Shikany, Guilkey, Jacobs, & Popkin, 2010; Sharkey, 2008). From a policy perspective, ensuring affordable, healthy food may improve social equity and foster community development. The concept of a food desert, where healthy and affordable food is relatively scarce, has emerged as a way of communicating the geographical disparities in food access, particularly as they relate to income. A plethora of methods and definitions have been used to identify food deserts at multiple geographic scales in many different research fields, as demonstrated in recent literature reviews (Charreire, Casey, Salze, Simon, Chaix, Banos, Badariotti, Weber, & Oppert, 2010; McEntee, 2009; McKinnon, Reedy, Morrissette, Lytle, & Yaroch, 2009). However, classification imposes arbitrary binary or ordinal criteria on an essentially continuously varying challenge: variation among locations (typically locations of households) in the challenge of acquiring a healthy diet. This paper first reviews methods for classifying food deserts and areas of low access to food, then proposes an innovative method to address some of the shortcomings of the classification methods. Our proposed method does not classify or label, but rather estimates and maps the cost of acquiring a balanced diet for any household location as a continuous variable. In this way we avoid the pitfalls of describing food access as a pathological state in need of a cure for a particular place (Shannon, 2014); instead, we estimate one of the critical patterns of variation with which people must contend in relating to their neighborhoods. Our assumption is not that cost alone governs diet, but rather that it is one very important consideration in shaping what people eat and how they acquire it (Alkon, Block, Moore, Gillis, DiNuccio, & Chavez, 2013). Therefore we offer one very important step beyond food desert classification and toward a more complete understanding of disparities in food access.

The term "food desert" has been defined in various ways in the recent literature. The term was popularized by a British study suggesting that millions of households did not have adequate access to grocery stores, resulting in undernourishment (Cummins & Macintyre, 2002). The U.S. government formalized the definition in the 2008 Farm Bill as follows: "an area in the United States with limited access to affordable and nutritious food, particularly such an area composed of predominately lower income neighborhoods and communities" (2008 Farm Bill, Title VI, Sec. 7527). Ambiguities in the definition include what constitutes "nutritious food" and "limited access" (Bitler & Haider, 2011). In one study, the area classified as a food desert varied from 17 percent to 87 percent of the study area depending on how the term was defined (Rose, Bodor, Swalm, Rice, Farley, & Hutchinson, 2009).

This study focuses on an alternative to food desert classification to overcome its shortcomings; we estimate the variation among residents in the cost of acquiring food, as a relatively continuous variable that can be mapped. Food access depends at least in part upon the affordability or price of a complete and balanced diet, the distance or cost of transportation to acquire it, and information about what healthy food is and where it can be acquired

and at what price (McEntee, 2009; McEntee & Agyeman, 2010). Bitler and Haider (2011) provide an economic perspective by separating the issues into demand- and supply-side issues. Most studies solely focus on the supply side (Alkon et al., 2013), asking what area is served by a given set of stores. Others, described below, have focused on the demand side in terms of affordability and access to consumer information, by comparing income levels to prices paid at stores. One study has included elements of both the demand and supply sides by looking at both the price that given households would pay for a balanced diet and the cost of transportation to acquire it (Rose et al., 2009), which would have to be combined to calculate the full cost to the household while ignoring any additional costs such as information about prices. Even when food desert classification is accepted as a valid representation of food access disparity, the quality of methods used varies widely among studies (Beaulac, Kristjansson & Cummins, 2009).

A community's diet is associated with the food in its environment, but changing the available food may not immediately change the community's diet (Ver Ploeg et al., 2009). Some question whether the food environment is the outcome of market forces (i.e., businesses providing goods and services that consumers demand) rather than a systemic issue of businesses that are unwilling to offer healthy food in certain areas. Some researchers question the value of examining the food environment at all, because providing access to a particular set of food items does not guarantee that the surrounding population will acquire them (Apparicio, Cloutier & Shearmur , 2007; McEntee 2009). Perception is a challenge as well, as households may not have the access to information to know what adequate food access entails (Morton & Blanchard, 2007). In a systematic review of 38 studies of food environment and diet, however, Caspi, Sorensen, Subramanian, and Kawachi (2012) found that both food availability and price were associated with diet and that inconsistency in studies of the relationships between food access and diet stemmed from arbitrary and varying use of often overly simplified classification techniques, such as distance buffers.

Most researchers have agreed that food access issues and food deserts are associated with physical places (Leete, Bania, & Sparks-Ibanga, 2012; Sparks, Bania, & Leete, 2011), despite the challenges of identifying or placing boundaries on those places. Geographical information systems (GIS) are a useful tool to measure and better understand food access and the food environment. Researchers have embraced GIS and have effectively analyzed multiple variables associated with food over many geographic areas (Charreire et al., 2010), although their methods have varied. Charreire and colleagues note that the ideal GIS study would measure proximity, diversity, availability, affordability, and perception (2010). If these were examined along with the demand and supply dimensions raised by Bitler and Haider (2011) and McEntee's (2009) core components of food access, then a more comprehensive analysis of food access would be available. Based on the conceptual issues raised in the studies described above, we pose four questions regarding spatial variability, transportation costs, store variety, and overall cost calculations that should be resolved in improved methods:

1. How well do buffers (the area encompassed by a particular radius around a point or grid cell) or network service areas reflect the transportation cost of acquiring a healthy diet for a household, considering differences between rural and urban areas and between walking and driving?

In the review of 29 GIS studies on food access issues by Charreire et al. (2010), 18 of the studies used buffers around store locations as an indicator of store accessibility. Of these 18 cases, 11 used a circular buffer or "as the crow flies" distance, and seven used the network service area (Charreire et al., 2010). The network service area restricts the representation of distance to travel along a road network only. The assumption is that the buffers or service areas allow one to classify particular places as meeting (within a buffer or service area) or not meeting (outside of all buffers or service areas) as a criterion of availability. In addition, there were 16 cases in which the distance from a particular place to the nearest store that sold food (i.e., not necessarily a grocery store) was taken as a measure or classifier of availability. A few studies highlight the use of these different methods. Block

and Kouba (2006) used the circular buffer method around independent grocery stores in comparing two neighborhoods in Austin, Texas. They examined concentric buffers of ¼ (.4 km), ½ (.8 km), ¾ (1.2 km), and 1 mile (1.6 km), and found that 74 percent, 92 percent, 97.3 percent, and 98.7 percent, respectively, of the population of Austin have access to an independent grocery store. The authors conclude that walkable access was acceptable for a majority of the population. Apparicio, Cloutier & Shearmur (2007) used a network service buffer method as one of three measurements of food access. The method drew a 1 km (.6 mile) network service area using the street network around the center of each of the census blocks examined and counted the number of stores that fell within this area. An average of 1.220 supermarkets were found within 1 km of all of the census blocks examined, although in this case the variance or percentage of blocks with no supermarkets may be more meaningful than the average. Mulangu & Clark (2012) used a similar method and found that approximately 75 percent of the rural Ohio population fell outside any buffer or service area and, therefore, are more than 1 mile (1.6 km) from a grocery store. An alternative to classifying locations as being within or outside a buffer or service area is to simply calculate the distance from a given point, representing a household or population center, to the nearest supermarket or grocery store. Ver Ploeg and colleagues used the 2010 U.S. census data nationwide and distance to store measures to calculate that 41.2 percent of the population was at least one mile away from a supermarket. Similarly, Morton & Blanchard (2007) found that nearly half of the U.S. population lives more than 10 miles (16 km) from the nearest large food store. In sum, studies that use the circular buffer, network service, or distance measures to the nearest store all represent the single aspect of proximity, thus not accounting for diversity, availability, affordability, and perception. Many of these studies did include other variables to complement the proximity measure. For example, Block and Kouba (2006) examined the price of a market basket of items to explore affordability; Apparicio, Cloutier, and Shearmur (2007) used average distance to the three closest supermarkets to examine diversity; and Morton and Blanchard (2007) used interviews to note perception. In each case, however, the various components of access were addressed separately and tradeoffs among them could not be explored.

Sparks, Bania, and Leete (2011) demonstrated that the circular buffer and network service methods provide similar results. Based on a lack of differences resulting from the two methods, they concluded that researchers should use whatever method is easily accessible to them. Unfortunately, the comparison was entirely within an urban data set, where road networks are more uniform and dense than in a rural setting, where physical barriers like lakes, farms, and mountains can dramatically increase driving time. Therefore the importance of the network service area approach outside of urban areas, for regional or national analyses for example, remains a subject of research (Ver Ploeg et al., 2009). And ultimately these measures of distance alone have been very inconsistently associated with dietary outcomes (Caspi et al., 2012).

2. Does the price of transportation need to be included in the total cost of acquiring food?

Bitler and Haider (2011) have called for more accurate measures of affordability by including the price of transportation for households; omitting the cost of transportation has been noted as a major limitation of some studies (McEntee & Agyeman, 2010; Mulangu & Clark, 2012; Ver Ploeg et al., 2009). As noted earlier, Rose et al. (2009) is the only study reviewed that calculated both the cost of transportation, using available transportation and network distance to the nearest supermarket to calculate cost, and the availability of food item categories within a given network distance, to improve the description of food access to encompass a balanced diet. If parts of a balanced diet are not available within a given distance, however, they still need to be acquired. The distance measures discussed above are likely correlated with cost, but the transportation cost of a balanced diet would need to include the cost, given available transportation, to the nearest set of stores at which the entire diet can be acquired, or transportation to the set of stores at which the entire diet can be acquired at lowest cost with transportation

included. Transportation cost should include vehicle mileage and public transportation fares paid, and it should also factor in time spent in transit. This cost varies depending on the modes of transportation available to each household and its location. Based on 2010 census data, 2.2 percent of the U.S. population live more than 1 mile (1.6 km) away from a supermarket and do not own a vehicle (Ver Ploeg, Breneman, Dutko, Williams, Snyder, Dicken, & Kaufman, 2012). This population may spend a great deal of time walking to acquire food and may be limited in how much and of what they can procure by the weight and bulk of the items purchased. Again, based on the 2010 Census, 0.3 percent of the population use public transportation and 4.8 percent use taxis or share rides to a grocery store, while another 4.8 percent walk (Ver Ploeg et al., 2009). Data was not available to determine the distance to grocery stores for these groups. Nevertheless, people use various means of transportation that have different costs in terms of actual dollars and time expended, which should be considered in estimating the full cost of obtaining a balanced diet.

3. What types of stores should be included in measurements of food access?

Supermarkets of greater than US$2 million dollar revenue have been the accepted proxy for availability of fresh, healthy food in a neighborhood (Apparicio, Cloutier, & Shearmur, 2007; Hubley, 2011; Leete et al., 2012; Sharkey & Horel, 2008). Fresh produce has been shown to cost less and be more broadly available in supermarkets (Hubley, 2011). In fact, in Buffalo, New York, a set of food items representing a balanced diet was found to cost US$132.64 on average if purchased in supermarkets and US$162.47 if purchased in convenience stores (Raja, Ma, & Yadav, 2008). However, small grocery stores offered prices similar to supermarkets, US$133.39 (Raja, Ma, & Yadav, 2008). In addition, these small grocery stores tend to be found more often in low-income areas, and could be missed in food accessibility measures if only supermarkets are considered (Block & Kouba, 2006; Raja, Ma, & Yadav, 2008; Ver Ploeg et al., 2009). Based on national census data, 75 percent of food is purchased in supermarkets and supercenters that on average have 10 percent lower prices than smaller food stores, and low-income households only spend 2 to 3 percent of their food dollars at convenience stores (Ver Ploeg et al., 2009). Farmers markets have been noted to have an effect on increasing accessibility and lowering the average price for fresh produce, but are rarely used in food environment studies (Larsen & Gilliland, 2009). Although supermarkets provide a good and simple estimate for most people, such alternative outlets as farmers markets and smaller grocery stores could be critically important for some populations and locations. Furthermore, preferences for particular stores, based on a range of characteristics from food quality to characteristics of the surrounding neighborhood, may be as important as store type (Caspi et al., 2012). In any case, obtaining accurate data can be challenging. For example, a research group in Texas verified the locations of food stores by driving every road in their study area. They found a total of 208 food stores, including convenience, small grocery, and superstores, although only 169 food stores were in publically listed databases (Sharkey & Horel, 2008).

4. How can food access be measured as a combination of transportation cost and price of all food items needed for a balanced and healthy diet?

None of the studies described above takes the critical step of combining the various costs and calculating the cost of what people would need to do to acquire a balanced diet, which is to acquire balanced food items consistently regardless of how far or how many outlets are needed to do so. This question goes beyond a simple classification of locations into food deserts and not food deserts. Our hypothesis is that the total cost of a balanced diet varies considerably depending upon where people live, the resources they have available to them, and how they use those resources, and that the distribution of costs is a better measure of the variance in food access than a bivariate classification. Note that this cost would include both supply- and demand-side elements of food access, that is, both the availability of food items and their spatial distribution and cost of purchase, and the steps and behaviors taken by a given household to

acquire them. For this study, we had access to data for the first four measures proposed by Charreire et al. (2010), allowing us to focus on how to combine these data in an improved measure of food access. We seek better methods to incorporate consumer choice and perception as called for by McEntee (2009) and to better understand why food access varies, not just where food deserts exist according to a particular definition (Bitler & Haider, 2011). Furthermore, the typical policy objective is to improve access by lowering the cost of a balanced diet. But many outcomes in terms of changes in the distribution of costs could be possible, from decreasing cost equally everywhere for everyone, to much larger decreases in costs but only in some places or times or for some people. For food desert classification to be useful as a policy evaluation tool, it would need to distinguish among these possible outcomes, but changes in the size and shape of classified food deserts may do little to distinguish between them. Our ultimate goal is a more continuous measure of total cost of a balanced diet that allows policy-makers to conduct cost-benefit analyses of options for improving food access for a given population in a given area.

Methods

We used GIS and optimization techniques to estimate the lowest cost of acquiring all food items required for a balanced diet, including transportation cost and the cost of the food items. This case study for the proposed method was conducted in a three-county area of Mississippi. Transportation costs included walking, public transportation, and private automobile transportation in conjunction with parcel centroids, road networks, and verified store locations. Cost of the items at each store was based on the USDA Thrifty Food Plan pricing data collected from a sample of the stores in the study area. First we will describe the study area, then we will outline the data acquired and used in the analysis, and finally we will describe the optimization techniques used to estimate the lowest-cost combination of transportation and stores.

The Mississippi Gulf Coast includes three coastal counties: Hancock, Harrison, and Jackson. The three counties have a combined population of 330,702 people, based on the 2010 census (U.S. Census Bureau, 2010). Much of the population is concentrated south of Interstate Highway 10, but there are also significant rural populations in the northern areas of the counties. In 2005, Hurricane Katrina destroyed many of the food stores that were located closest to the coast. Due to changes in insurance prices, many of these stores chose not to rebuild, leaving newly formed gaps in food access that have been slow to be filled. In the rural areas, there are limited numbers of grocery stories, meaning that many residents' closest food sources are convenience stores. Food access became a pressing issue emphasized in a number of the post-hurricane plans (Evans-Cowley, 2011).

Food environment studies commonly use population blocks, including census tracts, census blocks, counties, and 0.5 km (.3 mile) grid cells (Leete et al., 2012; Morton & Blanchard, 2007; Ver Ploeg et al., 2009). Parcel maps were available from the Southern Mississippi Planning and Development District for the three-county area and were used as the basic unit for mapping food access cost. Parcels identified as industrial, public use, right-of-way, school, parking lot, office, institutional, and parks were excluded from the data set, leaving 36,732 residential parcels, corresponding to at least one household at each residential parcel for which food would be acquired at a cost unique to that parcel.

The road network was obtained from 2010 U.S. Census Tigerline data (U.S. Census Bureau, 2012). Two road network data sets were developed using ArcGIS 10, one for driving and one for a combination of walking and public transportation. The driving network used road classifications to attribute speed limits to all the roads. For the walking/public transportation network, major highways with an "A1" classification were ignored; we assumed they did not have walkable sidewalks. The bus route was digitized into a separate shapefile and walking and bus transportation were compiled as a multimode network. According to the managing authority of public transportation, buses in the area will pick up and drop off passengers anywhere along the route. Therefore, we assumed that individuals would walk to the nearest point on the nearest bus route, or to the nearest store if it was closer. Buses were assigned an

average speed of 20 miles per hour (MPH), and the rest of the walking/public transportation network was assigned a speed of 3 MPH.

Transportation networks were used to calculate the total cost of transportation, based on distance traveled, and would account for assumed consumer behavior and the value of their time. For the driving network, cost was determined by multiplying US$0.585 (based on a recent federal mileage reimbursement figure) by the number of miles traveled plus the driving time (assuming speed limits were strictly observed) multiplied by a standard value for time (US$10.00/hour). Variables that were calculated incidentally and could be useful in other research included the number of hours in transit and total distance traveled. For the walking/public transportation network, the only cost assumed was time spent (at US$10.00/hour). The US$1.50 bus fare for public transportation was assumed to be negligible in the calculations and was ignored. Supplemental variables that were calculated for the walking network included the number of hours traveled and the distance traveled by bus.

The optimization algorithm required a matrix of transportation costs between all parcels and stores and between all stores. Two origin-destination (OD) cost matrices were developed using ArcGIS 10 Network Analyst. The OD cost matrix calculates the cheapest route along the network from each of the input origin values to each of the destination values. The first calculation created a 6.1 million value (36,732 parcels by 167 stores) matrix for the total cost of transportation from each parcel to each store. The second calculation created a 167 x 167 matrix for the total transportation cost from each store to each of the other stores. These cost matrices were constructed for both the driving and the walking/public transportation network data sets.

The store data was obtained through a multi-step process. First the telephone business directory was examined to create an initial list of potential stores. This was then matched with store data from ESRI's Business Analyst Database. This list was then visually confirmed through a review of Google Satellite Imagery to make sure that a store appeared on the site. A number of the businesses listed were no longer at the location due to the hurricane. The refined list was then sent to a sample of city planning officials who reviewed the list for their community to determine if any were missing or should be removed. A letter was sent to each store on the list requesting permission to visit their store to conduct the pricing survey. A total of 45 stores indicated willingness to be surveyed. Teams of two students per store completed the store audits during March 2011. The students entered the store and asked to speak to the store manager. They requested permission of the store manager to conduct the survey. Two stores declined to participate upon the visit by the students. Each student team completed the USDA Thrifty Food Plan (TFP) survey instrument for each store visited. In sum, 43 of the 167 identified stores were surveyed, including 24 convenience stores, 13 grocery stores, and 6 superstores. The surveyed stores were also geocoded using the Google Geocoding Service into an ArcGIS shapefile, and then verified once more using aerial imagery and the Google Map Business Listing.

The TFP includes a set of 87 food items that were judged to provide a healthy and complete low-cost diet for a family of four (Cohen, 2002). The TFP is assumed to represent a typical American diet, and does not consider variations based on ethnicity. We assume that the variation in cost of these items would be similar for other balanced diets, such as those representing other ethnic preferences, although this would be worth examining in future research. Where more than one brand or quantity was available for a given item, the lowest unit price was recorded. If the product was not available, the price was recorded as zero, signifying that the item was not available. The prices of goods were calculated for a standardized unit. The weekly cost for each of the items was calculated according to recommended consumption of 28 categories of the 87 TFP food items for two adults and two children (Carlson, Lino & Fungwe, 2007). Recommended amounts were multiplied by price per unit to estimate the total cost of each food item for one week for a family of four at a given store. Stores that were not surveyed included 98 convenience stores, 22 grocery stores, and 4 superstores. Following Rose et

al., the price for each item in unsurveyed stores was selected at random from the range of prices for that item among the surveyed stores in the same category.

The algorithm to estimate the lowest-cost combination of transportation and food prices for the entire diet was based on the traveling purchaser problem (TPP), which has been well documented in operations research (Boctor, Laporte, & Renaud, 2003; Laporte, Riera-Ledesma & Salazar-González, 2003). Given a set of markets and the prices of goods within each of the markets, the objective function is to minimize the overall cost of purchasing a complete set of items from any of the markets in the set. No restrictions were assumed on which items could be purchased from a given store, other than that the item must be available at the store. For the sake of simplicity, supplies of the items in each of the stores were assumed to be unlimited, making this an uncapacitated TPP (Boctor et al., 2003). Once the item has been purchased, however, we assumed that the item would not be purchased in any other market (Riera-Ledesma & Salazar-González, 2005). The cost of the TFP for any given household and set of stores was calculated as the sum of the price of each of the purchased items, given the prices in the stores at which those items were purchased, plus the cost of transportation from the starting parcel to and among each of the stores required to acquire all items and back to the starting point. The objective function was solved when the combination of transportation and food costs had been minimized for any given parcel.

A number of algorithms have been presented over the past 20 years to solve the TPP problem with either global or approximate, near-optimum solutions. A global solution, the absolute minimum of the objective function, requires intensive calculations that are not feasible for more complex applications of the TPP. For example, we estimated that our optimization problem would take 127 days with a relatively fast personal computer to solve by evaluating all possible combinations of stores and routes from each starting point in our study area. Laporte, Riera-Ledesma, and Salazar-González (2003) proposed a global-solution algorithm that reduced the number of calculations required by using the branch-and-cut method, which branches and calculates many solutions, preserving the minimum and cutting the branches that yield solutions greater than the minimum until no additional branches are possible. Near-optimum solutions rely on heuristics to more quickly find a solution that is close to the global minimum. Voß (1996) presented a dynamic tabu search as a heuristic approach to solve problems with many markets and items. The dynamic tabu search keeps a record of all combinations of markets and items and randomizes the combinations many times, skipping any combinations that were already calculated, while calculating, storing, and ranking the value of the objective function for each combination. The iterations stop after a specific number of iterations or when new combinations become infrequent. More recent algorithms have used biomimicry, such as ant-colony optimization techniques that mimic ants following pheromone trails to optimize paths to food sources (Bontoux & Feillet, 2008). Goldbarg, Bagi, and Goldbarg (2009) used a transgenetic algorithm that merges two near-optimal parents many times, keeping only the offspring of those parents that represent improved solutions.

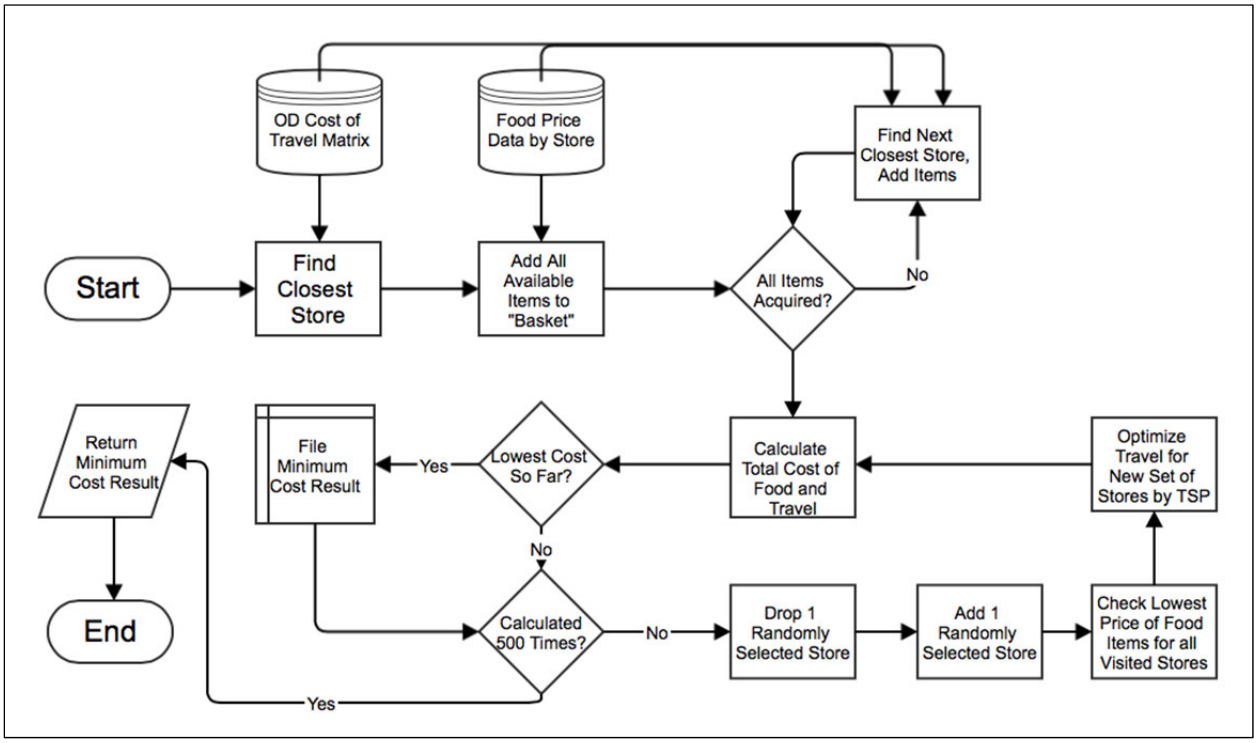
For our problem of 167 stores each with 87 food items to be procured 73,464 times (36,732 parcels run once for walking/public transportation and again for driving), relatively fast heuristics were required to estimate solutions. Our algorithm followed Boctor, Laporte, and Renaud (2003), heuristics of market exchange for an uncapacitated TSP, with modifications. Boctor et al. (2003) first calculated the minimum cost of all commodities and the cost of transportation in an initiation phase. They then used an improvement phase by first dropping one market from the feasible solution if it yields a cost savings, then adding unvisited markets that minimize the travel cost. If through the series of dropping and adding markets the solution is less than the original feasible solution, they then used the new solution and repeated the drop/add market functions. Finally, they ran the traveling purchaser problem heuristic on each of the feasible solutions to minimize total travel cost. Multiple perturbation heuristics were used, including an added parameter to weight the travel cost against

the commodity cost, removing two markets and replacing them with one, and varying the criterion for stopping the search for a solution, which was the number of successive iterations with no improvements.

We initialized our algorithm (Figure 1) by first selecting the nearest stores until the market basket was full, then selected the store from which each item was obtained based on the prices among all stores visited, following Riera-Ledesma and Salazar-González (2005). Starting from the centroid of each parcel, all available food items were purchased from the nearest store, then the algorithm repeated the process of searching for the next closest store and purchasing all available items still required until a complete set of the 87 food items had been purchased.

Following Boctor, Laporte, and Renaud (2003), after the initial feasible solution was found with the nearest store search, we used market drop and add functions to search for a lower-cost solution. This function removed one store, selected at random, from the set of stores that led to the current estimated solution to the objective function. Then a market add function was used to restore the full set of food items by searching the 30 closest stores to the removed store that were not already included in the solution to test whether inserting one or more of these alternate stores into the solution set would lower the overall cost. The order of the closest stores was randomized to remove the possibility of calculating the same solution repeatedly. All sequences generated using this randomization technique were recorded using a dynamic tabu method, where each subset of the stores is included in calculating the value of the objective function. If a new sequence of stores resulted in a lower total cost, then it became the new estimated solution for the objective function. The minimum prices were verified by reviewing the selection of the lowest cost of each food item in all of the stores visited. A traveling salesman problem algorithm using simulated annealing and the hill climb method (Lundy & Mees, 1986) was then used to ensure the optimal route to each of the visited stores and back to the parcel. The algorithm

Figure 1. Flow chart for the algorithm used to determine the lowest-cost combination of travel and food item cost to purchase all items in the USDA Thrifty Food Plan for each residential parcel in the study area



stopped after 500 substitutions of stores into the initial solution, or if no additional substitutions were possible. It then returned the approximate minimum for the total cost of all food items plus the transportation.

We compared the results of this analysis with food desert classification using a network service area defined by 15 minutes of travel time, consistent with Apparicio, Cloutier, and Shearmur (2007). For all 36,732 parcels in the study area, we then counted the total number of times that, according to the optimal cost algorithm, the shoppers from those parcels would have left the assumed network service area to purchase an item for a complete and minimal-cost TFP. The percentage of parcels from which one would never need to leave the assumed service area to purchase a complete and low cost-diet was taken as an estimate of how well the network service area buffers, based on time of travel alone, represented the cost of food access.

Results

As hypothesized, the minimized-cost algorithm resulted in a wide distribution of total costs for the TFP among parcels in the study area for both the driving and walking/public transportation methods, as shown in Figures 2 and 3. Figures 4 and 5 show the spatial pattern of variation in the estimated minimum cost of obtaining the TFP during spring 2011, including both transportation and the cost of the food items. This image was generated using the inverse distance-weighted interpolation function of ArcGIS based on cost data for travel from parcel centroids. For either driving or walking/public transportation, the minimum total cost of obtaining the TFP was less in the more populated areas along the coast, and quickly increased as food store density declined in the rural areas and transportation distances increased. For either mode of transportation, the cost of a minimum balanced diet shows a skewed distribution, with most parcels having a minimum cost near the average but with variation leading to longer tails of the distribution on the higher-cost side (Figures 2 and 3). Most of the residential parcels are in areas with high population densities, for which the same set of stores would be used and the transportation differences among parcels would be relatively small. A smaller percentage of parcels, in the tails of the distribution, would be found either very close to supermarkets or at great distances from a set of stores from which the entire food plan could be purchased. Those parcels that are at the greatest distances or must visit the most stores to acquire the entire diet were estimated to have 1.5 to 3 times the average minimum cost of the TFP, depending on mode of transportation.

In this three-county area, stores are located close to population centers, suggesting that there may be a difference in the minimum total TFP cost between the urban and rural areas. Figures 6 and 7 display histograms of the frequency of food costs alone for all parcels and show that the distributions of food costs are similar for either mode of transportation. Comparing rural and urban populations using walking and public transportation (Table 1) and focusing on the food cost alone, the maximum food cost was the same, US$193.39, whereas the rural population's minimum food cost was slightly lower, US$95.43, than the urban population's minimum cost, US$97.88. Time required to obtain all items in a balanced diet, however, was approximately four times greater on average for rural than urban areas (Table 1), and travel costs were substantially different between rural and urban parcels. To achieve minimum cost of transportation, we estimated that 24.5 percent of the rural population and 49.9 percent of the urban population would travel by bus. The remaining population was estimated to find lower cost by walking, although taking a median of approximately 2 hours and 45 minutes in urban areas and 8 hours and 30 minutes in rural areas. The time requirements to gather a TFP appeared more feasible in the driving model, with about 45 minutes round-trip required for rural areas and 15 minutes for urban areas. Differences between rural and urban areas in median estimated total cost (transportation plus food items) were much greater for those walking and taking public transportation than for those with access to an automobile (Table 1). For the walking/public transportation mode, the cost of transportation was 41.0 percent of the estimated median minimal cost of obtaining the TFP in rural areas and 18.4 percent in urban areas. For the driving mode of transportation the costs were 15.2 percent and 6.0

Figure 2. Variation in total cost of the USDA Thrifty Food Plan in the Gulf Coast counties of Mississippi, during spring 2011, assuming that all items are purchased and the shopper uses an automobile for transportation and achieves the lowest cost for the combination of food price and travel.

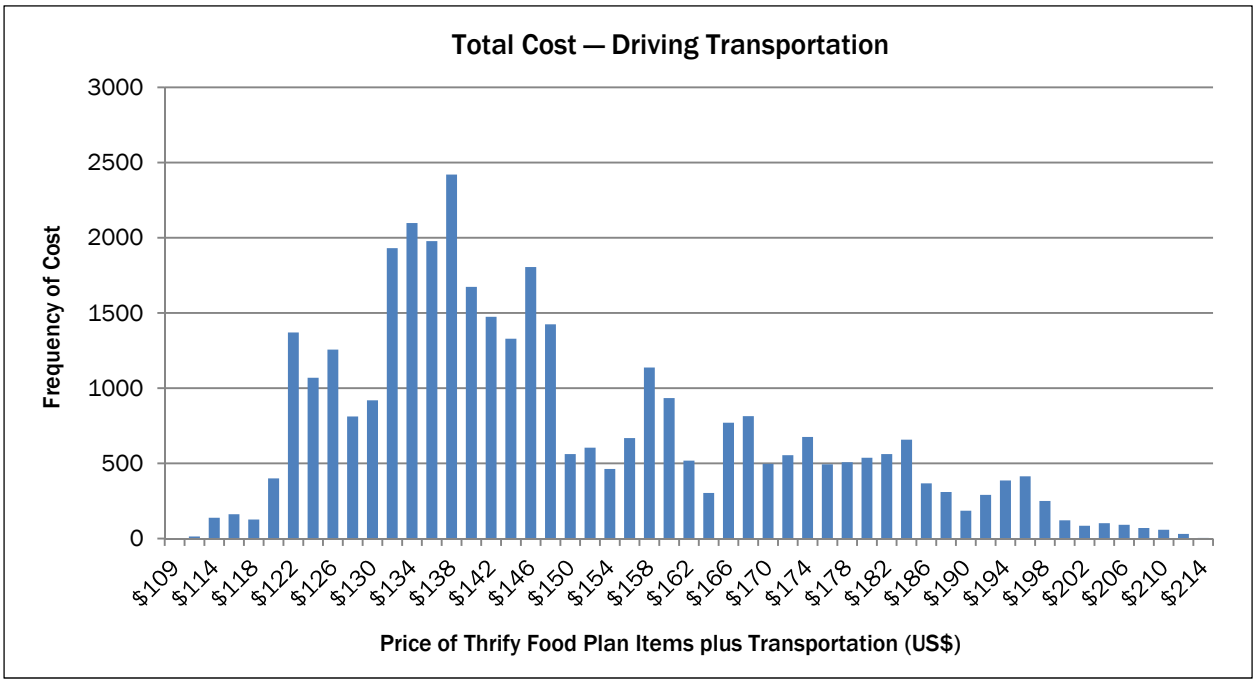


Figure 3. Variation in total cost of the USDA Thrifty Food Plan in the Gulf Coast counties of Mississippi, during spring 2011, including both the cost of the food items and transportation to acquire them, assuming that all items are purchased and the shopper uses a combination of walking and public transportation by bus to achieve the lowest cost for the combination of food price and travel.

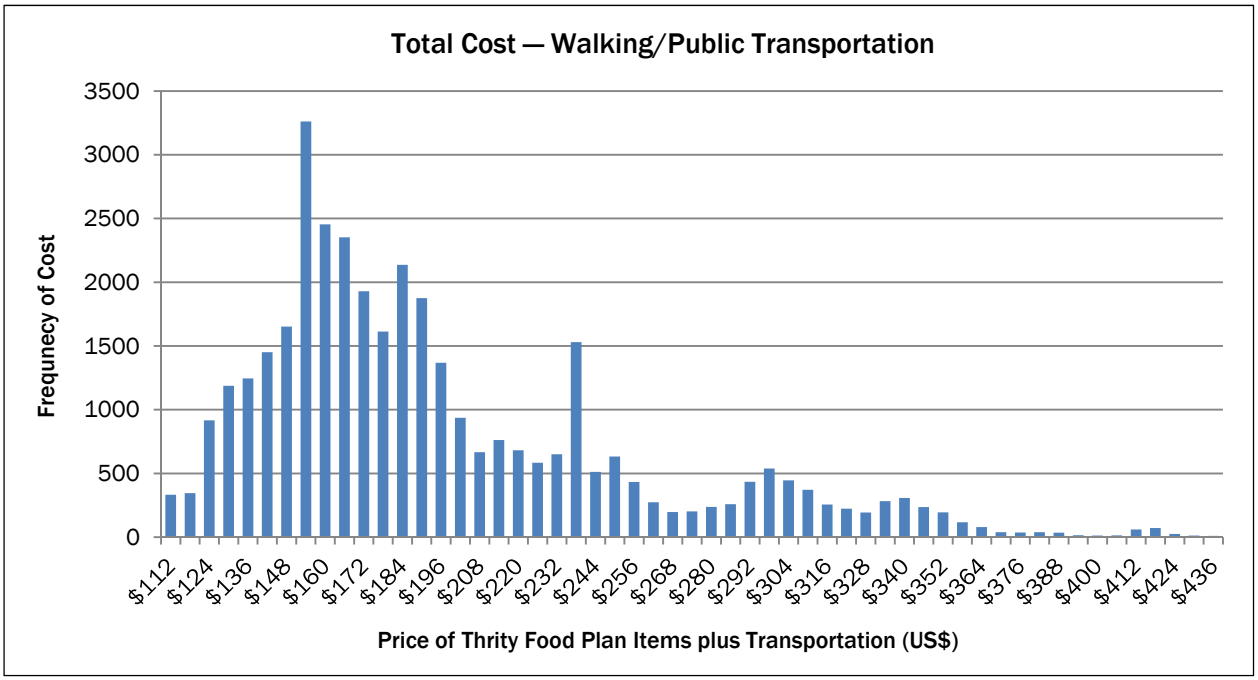


Figure 4. Map of the minimum total cost of the USDA Thrifty Food Plan in the Gulf Coast counties of Mississippi, during spring 2011, including both the costs of the food items and transportation by automobile to acquire them.

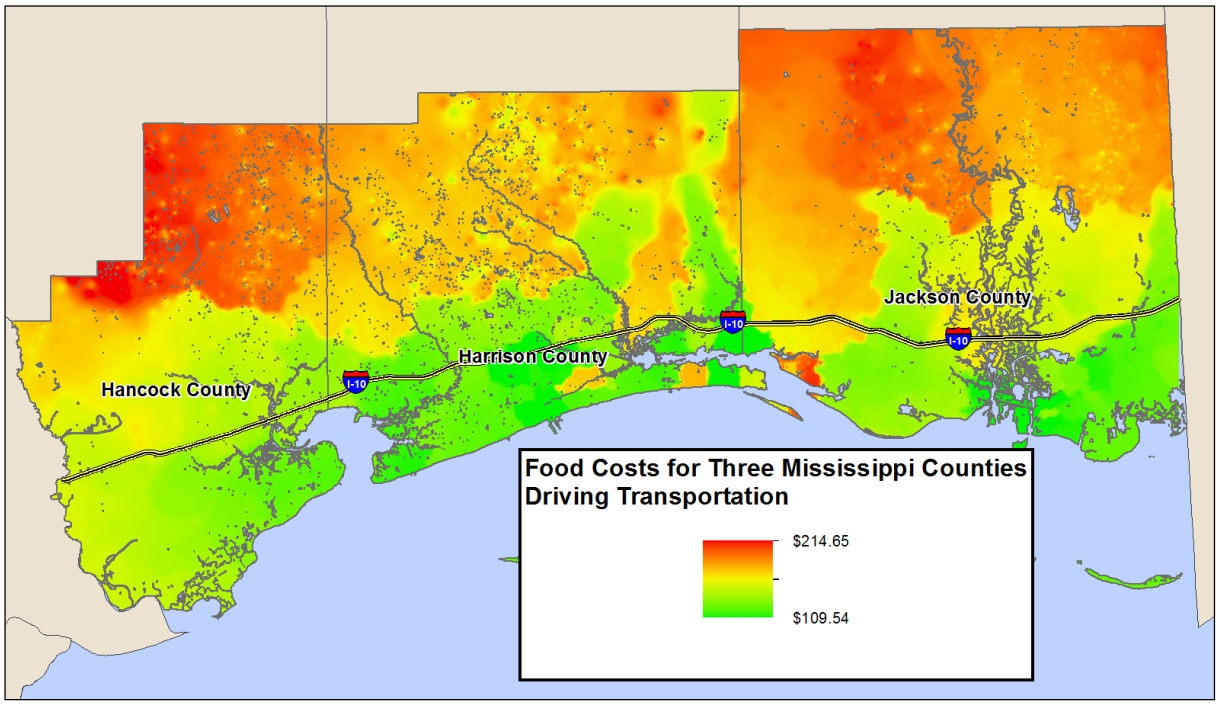


Figure 5. Map of the minimum total cost of the USDA Thrifty Food Plan in the Gulf Coast counties of Mississippi, during Spring 2011, including both the costs of the food items and transportation by a combination of walking and public transportation by bus to acquire them.

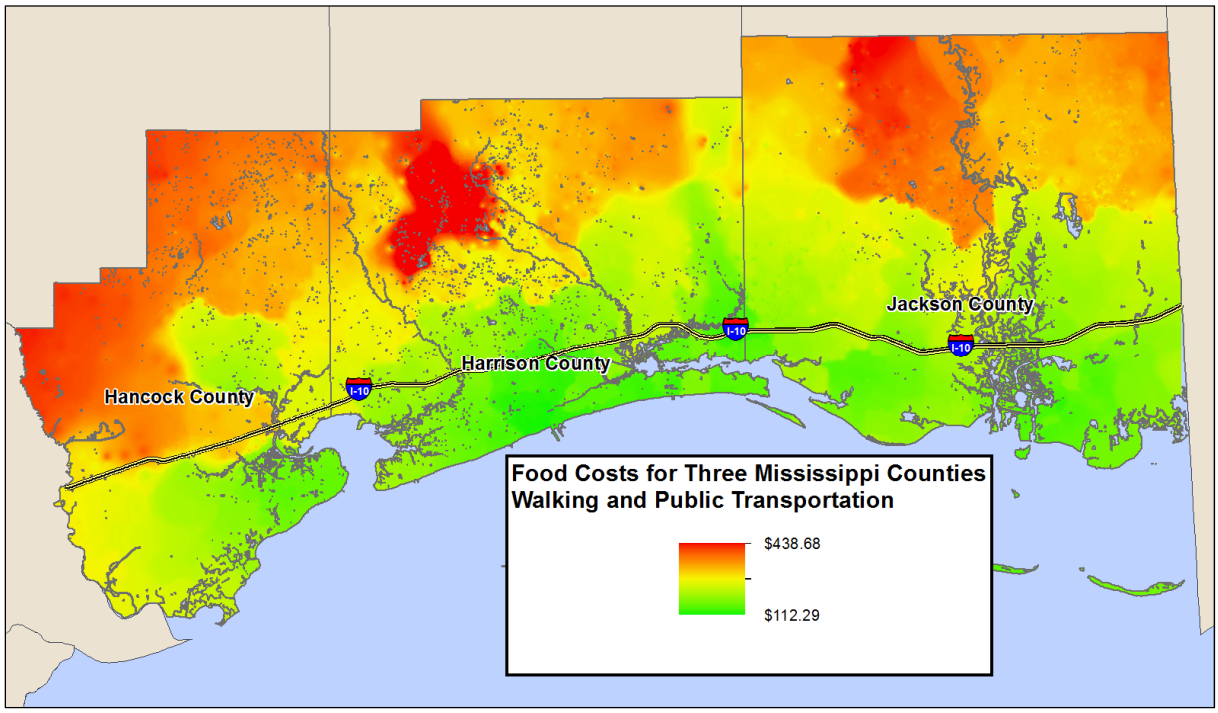


Figure 6. Variation in total cost of the USDA Thrifty Food Plan for the food items alone in the Gulf Coast counties of Mississippi, during spring 2011, assuming that all items are purchased and the shopper uses stores that provide the lowest cost combination of food price and transportation cost by automobile.

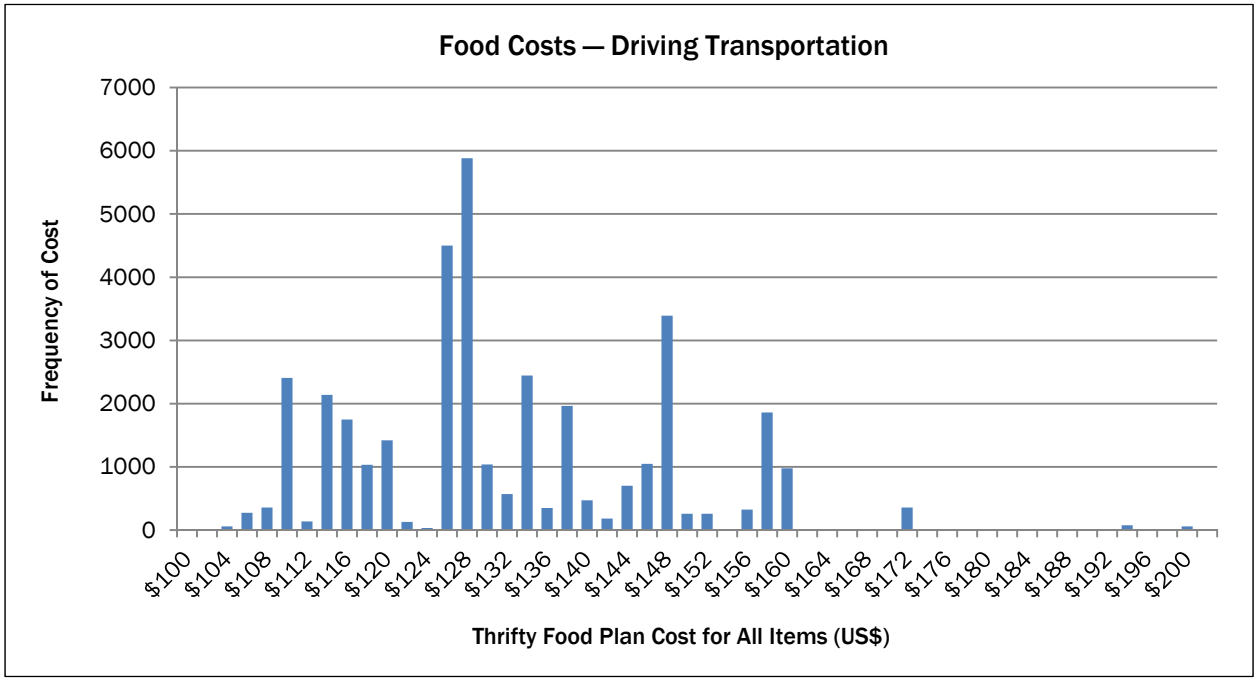


Figure 7. Variation in total cost of the USDA Thrifty Food Plan for the food items alone in the Gulf Coast counties of Mississippi, during Spring 2011, assuming that all items are purchased and the shopper uses stores that provide the lowest cost combination of food price and transportation cost by walking and public transportation by bus.

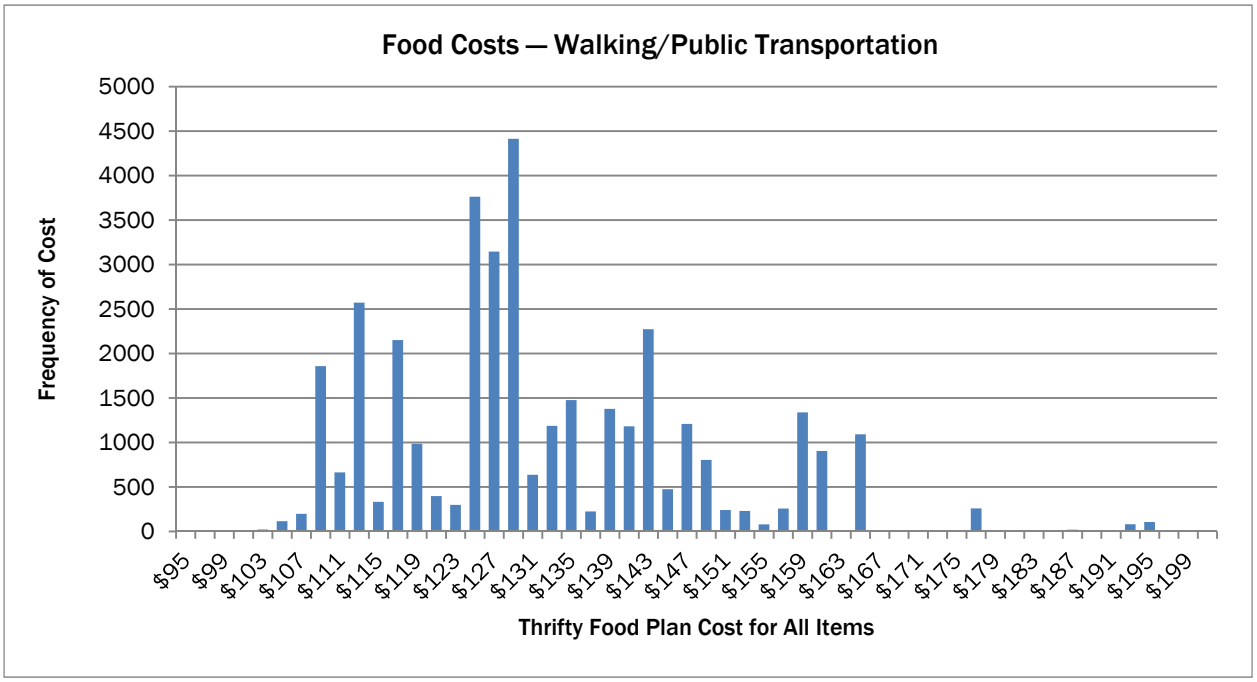


Table 1. Average minimum costs of the USDA Thrifty Food Plan in rural and urban areas in the Gulf Coast Counties of Mississippi during spring 2011, considering both the cost of the food items and the cost of transportation to acquire them (all costs in US$).

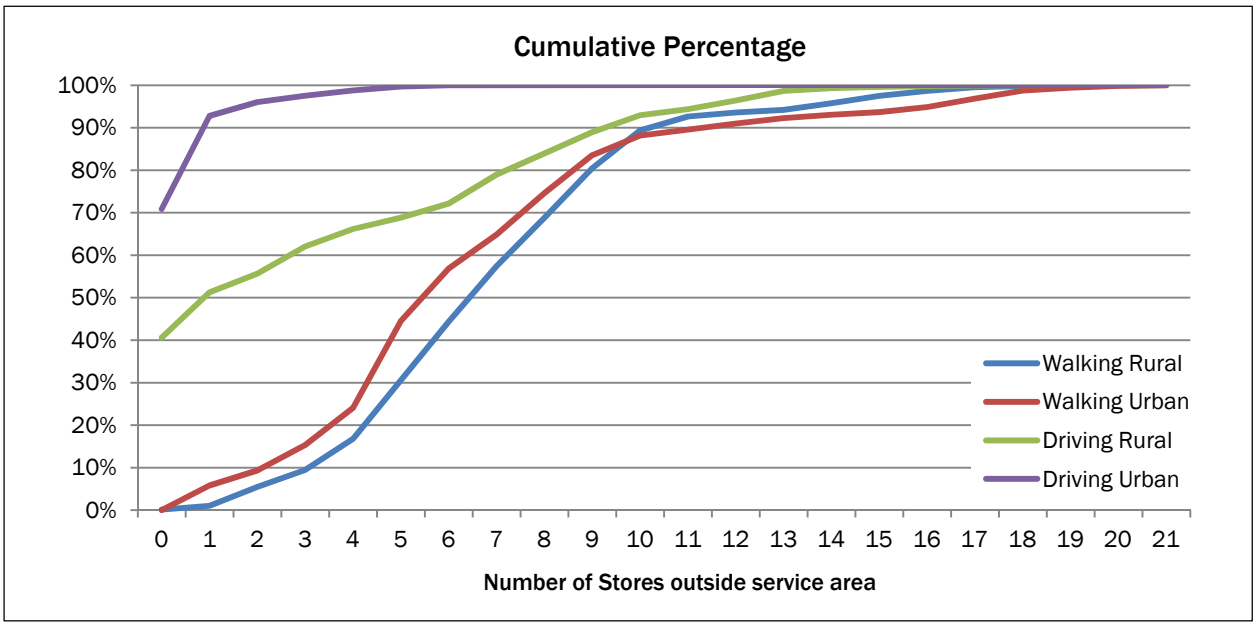
Driving	Maximum	75%	Median	25%	Minimum
Total Cost					
Urban	$204.63	$144.03	$135.22	$127.91	$108.71
Rural	$214.65	$178.96	$157.42	$142.02	$115.86
Travel Cost					
Urban	$58.21	$14.04	$9.63	$6.65	$.02
Rural	$80.24	$42.99	$25.88	$16.12	$.63
Time Spent (hours)					
Urban	1.5	.37	.24	.17	.01
Rural	2.1	1.0	.71	.42	.02
Food Cost					
Urban	$199.88	$133.41	$127.06	$115.39	$100.51
Rural	$199.88	$146.90	$133.41	$124.97	$102.67
Walking/Public Transportation					
Total Cost					
Urban	$291.82	$177.53	$155.76	$143.24	$111.36
Rural	$439.26	$288.22	$224.67	$186.71	$121.46
Bus Usage (miles)					
Urban	38.1	10.2	0	0	0
Rural	34.44	0	0	0	0
Time Spent (hours)					
Urban	17.4	3.9	2.6	1.64	.01
Rural	30.82	14.55	8.52	5.32	.05
Food Cost					
Urban	$193.39	$136.21	$127.06	$115.89	$97.88
Rural	$193.39	$146.90	$132.54	$124.97	$95.43

percent of the median values for rural and urban residents, respectively. Based on the assumptions inherent in our algorithm and the available data, the median cost of walking and public transportation in our three-county research area is US$35.31 more than the median cost of driving to acquire all items in the TFP at the lowest cost, assuming the shoppers' time is worth US$10/hr.

Assuming that a typical service area is defined by a 15 minute travel time from the centroid of a given parcel (Apparicio, Cloutier, & Shearmur, 2007), service areas enclosed an area within 0.75 mile (1.2 km) for walking/public transportation and 10 miles (16 km) for driving at 40 MPH along the area road network. Our results showed that approximately 30 percent of urban residents and 60 percent of rural residents with access to an automobile would have to travel outside this service area to acquire the entire TFP (Figure 8). Without an automobile, very few or no residents would be able to acquire the entire TFP within a 0.75 mile service area. However, we did not calculate the number or proportion of the TFP that residents would be able to acquire within this service area because the items making up this proportion could vary widely. Based on the available data describing what items were available at which stores, large percentages of residents, particularly those without access to an automobile and those in rural areas, would have to visit as many as 10 stores outside of their service area to acquire all items in the TFP. Those walking and using public transportation in

Figure 8. Percentage of residential parcels from which a shopper would have to visit up to a given number of stores that are outside of an assumed service area to acquire all items in the USDA Thrifty Food Plan at the lowest cost.

The shopper from each parcel is assumed to acquire all items in the Gulf Coast counties of Mississippi, during spring 2011, and use the combination of stores that provide the lowest cost combination of food price and transportation cost. The assumed service area, based on Apparicio et al. (2007), was 15 minutes in travel time from the centroid of the parcel, which equals approximately 0.75 mile (1.2 km) for walking or 10 miles (16 km) for driving at 40 miles per hour (64 km/hour) along the road network in the area.



an urban area would need to visit fewer stores outside the assumed service area than those in rural areas, but the differences are fairly small and the overall pattern is the same: most residents would have to travel to several stores outside the service area that has been assumed in previous food desert studies. For urban residents with access to an automobile, most could acquire the TFP at the lowest cost by visiting only a few additional stores outside of their assumed service area. For those without an automobile and those in rural areas, however, up to approximately 10 percent would have to travel to more than 10 stores to acquire the entire TFP at lowest cost, probably reflecting much greater frequency of small food retail outlets with a relatively limited selection of items in the TFP.

Table 2. Percentage of items purchased by residents using driving and walking/public transportation according to store category and location.

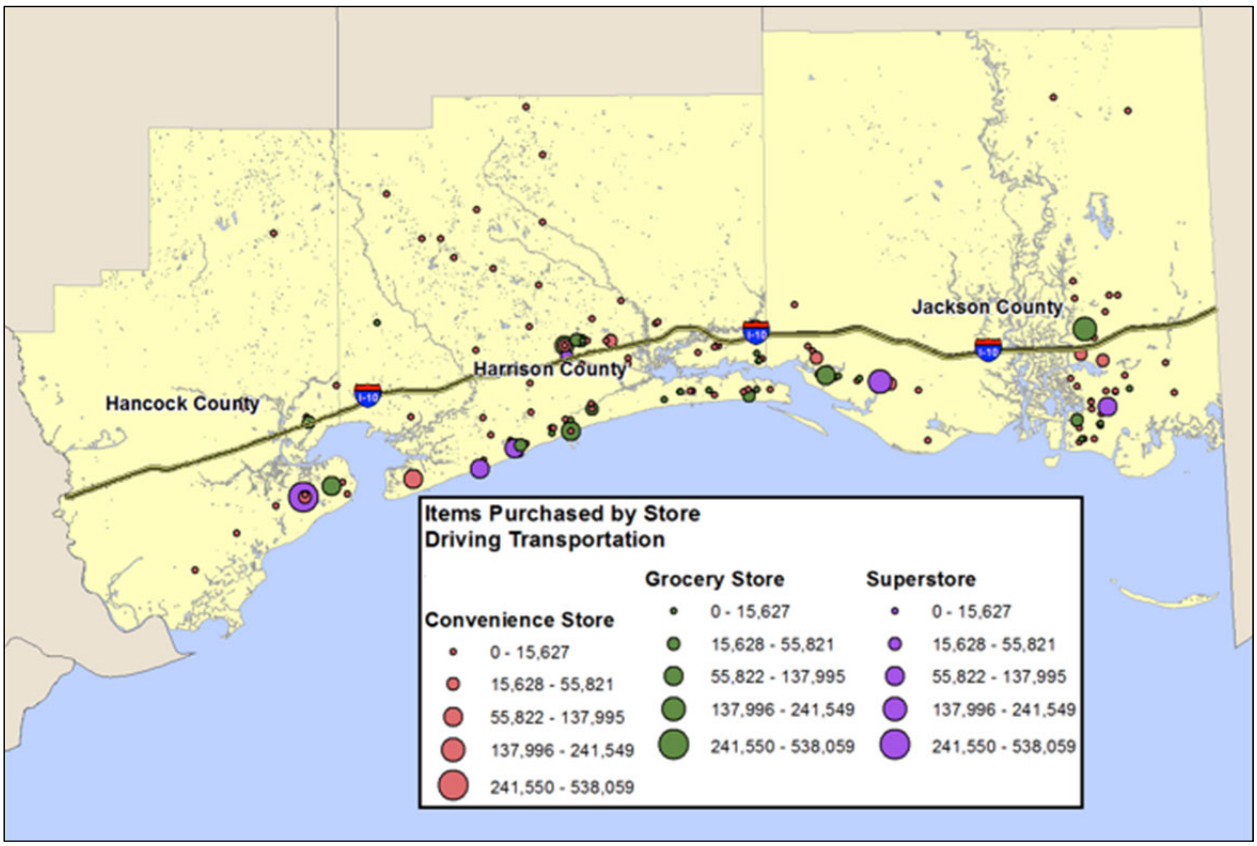
	Driving	Walking/Public Transportation
Store type/location	**% of the TFP**	**% of the TFP**
Convenience Store	28.64	26.58
Rural	6.52	6.48
Urban	22.12	20.10
Grocery Store	31.19	35.04
Rural	0.34	1.65
Urban	30.85	33.39
Superstore	40.17	38.39
Urban	40.17	38.39

The contribution of stores and store types to the minimum cost TFP, recorded as the percentage of items in the TFP that would be acquired from all parcels at each store, according to the least-cost algorithm, varied among store types and locations (Table 2, Figures 9 and 10). Mode of customer transportation, driving or walking and public transportation, made little difference in the percentage of items that would be purchased at the different store types and locations to achieve the minimum-cost TFP. Regardless of mode of transportation, and perhaps not surprisingly, the largest percentage

of items would be purchased at urban superstores and the smallest percentage at rural grocery stores. Urban superstores, however, still account for only approximately 40 percent of items in the least-cost TFP, suggesting that it is less expensive to get 60 percent of the items elsewhere. Convenience stores in urban areas accounted for almost as large a percentage of items as grocery stores in urban areas, but those in rural areas contributed a relatively small percentage (Table 2). Most of the items purchased by residents in the study area would be expected to be purchased in stores in the more populated areas close to the Gulf (Figures 9 and 10).

We recognize that using the heuristics approach resulted in approximate solutions for each parcel, because there were random selections of stores that were dropped or added to test for an improved solution. To examine the variation in solutions returned by the algorithm, we performed 100 estimations for eight parcels selected from areas with high store density, medium store density, and low store density throughout the research area. For six of the eight parcels, the standard deviation of the estimates was less than one dollar, indicating that the algorithm consistently returned a near-optimal solution to the objective function (Table 3). The two parcels for which the solutions varied by more than one dollar were in rural areas and were roughly equidistant to two clusters of stores. In these cases, the estimated solutions varied according to which cluster was included first, after which the other cluster tended to be ignored because the travel cost would increase for travel between the two clusters. In these cases the average solution values tended to be closer to the maximum than the minimum of the range of solutions, suggesting that in some cases the heuristic algorithm could miss relatively rare

Figure 9. Map of the stores and their estimated frequency of usage (number of items purchased per store) by residents in the Gulf Coast counties of Mississippi, if they were to purchase all items in the USDA Thrifty Food Plan during spring 2011 at the lowest cost, including both the costs of the food items and transportation by automobile to acquire them.



lower-cost solutions (by as much as US$27 for the parcels examined) that did not fit the mechanics of the algorithm well.

Discussion

The method we have described does what we initially expected it to do; it provides an estimate of

Figure 10. Map of the stores and their estimated frequency of usage (number of items purchased per store) by residents in the Gulf Coast counties of Mississippi, if they were to purchase all items in the USDA Thrifty Food Plan during spring 2011 at the lowest cost, including both the costs of the food items and transportation by a combination of walking and public transportation by bus to acquire them.

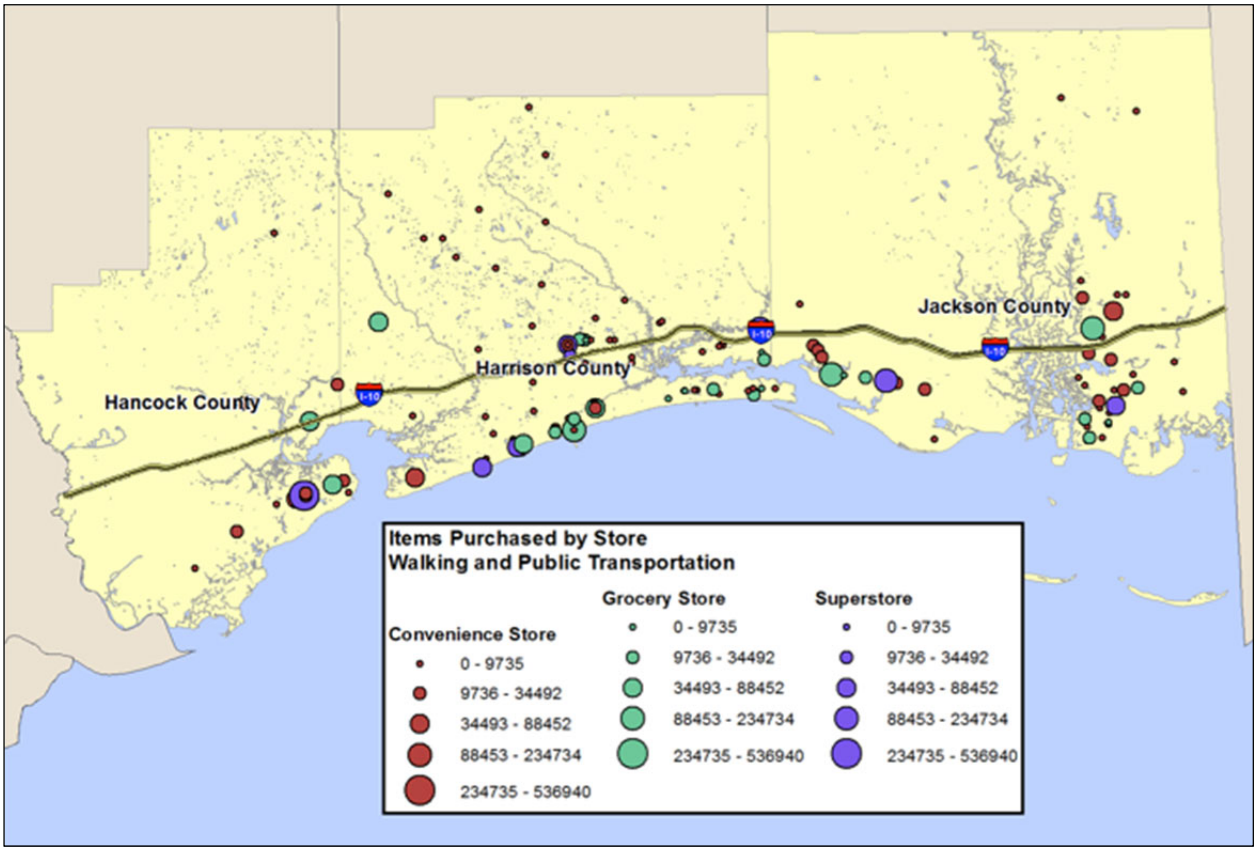


Table 3. Analysis of variation in heuristic algorithm solutions for an objective function of the minimum total cost of the USDA Thrifty Food Plan for selected residential parcels in the Gulf Coast Counties of Mississippi during spring 2011, considering both the cost of the food items and the cost of transportation to acquire them (all in US$).

Parcels	Maximum Estimate of Total Cost	Minimum Estimate of Total Cost	Average of Total Cost Estimates	Std Dev of Total Cost Estimates
A	$133.69	$132.93	$133.66	$0.13
B	$119.96	$119.96	$119.96	$0.00
C	$206.66	$172.59	$199.41	$10.35
D	$174.15	$172.07	$173.74	$0.72
E	$182.34	$160.22	$178.95	$4.72
F	$116.35	$116.35	$116.35	$0.00
G	$153.64	$153.64	$153.64	$0.00
H	$134.17	$133.50	$133.82	$0.33

the minimum cost to procure a balanced diet for a given household, given the household's location, mode of transportation, and assuming that all food items are purchased according to an optimal or near-optimal shopping strategy. The resulting map gives more detailed information about food cost than previous food access classifications, based on approximate minimum cost of a balanced diet. Challenges in using this method include the availability of detailed price information and item availability for specific stores, both of which could be dynamic in time. We expect the variation in prices over time to have little impact on the spatial variation among residential parcels in the cost of a balanced diet that these methods estimate, unless the variation is large and aggregates at spatial scales that would significantly shift the optimal set of stores and associated transportation costs for residents.

Data on prices for individual stores, acquired by administering the USDA Thrifty Food Plan Survey in person, required a considerable investment in time and only a limited number of stores were willing to participate. We did not have data for all stores, which would be preferable, but rather estimated the prices for stores that were not sampled. The food price data set was sufficient to demonstrate the methodology and glean useful insights from the results, but a means of collecting these data across all stores in a particular area is needed. Furthermore, food prices can be volatile over time as stores and their suppliers frequently change the price of particular items, according to supply and demand and with the objective of attracting shoppers and maximizing sales revenue. Therefore, access to instantaneous price information, as well as its variation over time, would be ideal. Crowdsourcing, using mobile phone applications that allow shoppers to scan items and input current prices, may be one such opportunity to generate current data in real time, although with quality control depending entirely on the users of the application themselves. If the TPP could be solved in real time, using an algorithm such as the one proposed, then it might suggest alternative shopping strategies that would lower food costs for residents of a given place, and those strategies could be especially important to those with low income and low food security.

Issues that, based on recent literature, have not been addressed using typical representations of food access were better resolved using the methods we have demonstrated. Three important findings were revealed by our study:

(1) The use of the service area buffer does a poor job of representing access to a balanced diet for anyone in the study area, with the exception of urban residents who have an automobile.
(2) Residents of areas conventionally classified as low-access areas, i.e., falling outside all assumed store service areas, may actually be able to purchase the TFP at lower cost than some residents who are not in areas classified as low access.
(3) People may have to travel much farther than previously assumed to purchase a balanced diet, even if they do not live in an area classified as a food desert.

The network service areas are most appropriate as indicators of food access for residents of urban areas who drive, and most previous food-access mapping studies have focused on this demographic (Charreire et al., 2010). However, our analysis suggests that even for urban residents who drive, approximately 30 percent would need to leave their assumed service area to acquire the TFP at lowest cost. Therefore, the service area classification would generally underestimate the areas with limited or more expensive food access, as suggested by Breyer and Voss-Andreae (2013).

In addition to improving on the methods for mapping food-access issues, even this limited demonstration of the method has contributed new insight into disparity in food costs. Residents of urban areas with access to an automobile generally have lower costs of obtaining a balanced diet than rural residents or those without an automobile, but urban populations with automobile access have been the subject of the most research on food access. Urban residents who drive would spend only 6.0 percent (US$8.16) of the total cost of obtaining the TFP on transportation, and this component of the cost would have relatively little

bearing on the affordability of food. But for those without access to an automobile or who live in rural areas, the transportation component was estimated to cost from more than two to almost 10 times that of urban drivers, and that kind of additional cost might influence the affordability of food items for many households. Although previous survey data showed that low-income households spend less on the same items as moderate and high-income households (Broda, Leibtag, & Weinstein, 2009), the cost of transportation may be the more important cost. Therefore, studies that attempt to examine food-access issues for the most vulnerable populations must include transportation cost, which is not a simple function of distance to the nearest grocery store, in addition to food cost and the dietary balance of available food items.

It was surprising that the median cost of the food items was similar between rural and urban areas, despite the differences in stores and number of stores in the sample. The variation in cost is probably more important than the median, however, because it identifies disparities. Based on histograms of cost (Figures 2 and 3), the range of estimated costs varied for those with access to an automobile was approximately US$100, but for those without access to an automobile the estimated costs for a significant percentage of parcels was greater than US$300, over US$150 greater than the median estimated cost. Calculating these costs as a percentage of income would be more enlightening, although we would need more complete price data to place confidence in such an analysis.

No restriction was placed on travel time or number of stores visited, resulting in unrealistic walking times of up to 30 hours to obtain one complete set of items in the TFP for a total cost of US$439.26, at US$10 per hour of travel. In reality, people are not likely to spend that much time walking to procure all items in the TFP. A family waiting at a bus stop with their bags of groceries, for example, described to the surveyors that once a month they spend four hours round-trip to walk and ride the bus to go to Walmart (and another grocery store across the street) to stock up on the key food items typically found on the TFP. Because of the time required for this trip, their daily and weekly needs had to be met mostly by convenience stores. Therefore an alternative heuristic approach would be to begin the algorithm by starting at the store with the most items within a maximum radius, or the closest supermarket rather than the closest store of any type. This approach may lead to different estimated minimal costs, a hypothesis that could be tested in future studies. Additional possibilities for modifying the analysis but using essentially the same algorithm include restricting the items procured in the TFP to the more essential items (e.g., ignoring items such as ice cream sandwiches or some of the spices) or placing limits on time spent or distance traveled and examining the proportion of the TFP that could be procured at minimal cost given those limits.

Including more complex rules for consumer behavior is another potential extension of the algorithm. In reality, shoppers do not have perfect information on the price of all items and most stores attempt to attract them with low prices on a limited set of sale items. Therefore, preference for particular stores could be altered in the algorithm as a function of distance, brand, advertising, perceived quality of fresh items, etc. For example, one convenience store manager in a rural area reported that consumers didn't want to have to spend US$7 on gas, using one gallon each way, to get to Walmart. Instead they chose for much of their daily shopping needs to shop at her convenience store. To help meet consumer demand she would go to Walmart once per week and pick up the most commonly demanded items and offer them in her store with a markup over the price she paid at Walmart. This combination of retail outlet practice and consumer behavior is difficult to model because it would require detailed data on characteristics of individual stores and preferences of consumers. Access to food that is not retail market–based could be included in the analysis to examine the relative cost and importance of retail purchase compared with other avenues for food access. Rural residents in particular have been observed to access a large proportion of their diet from alternative sources (Morton, Bitto, Oakland, & Sand, 2008), influenced by access to friends, family, land and knowledge of gardening, fishing, hunting, and gathering. Emergency food supplies

likely have an important bearing on how and where people acquire food, as well as ethnic diets and food preferences. Likewise, ready access to fast-food restaurants, or availability of prepared food in general, is assumed to strongly influence diet (Burns & Inglis, 2007). Preferences for particular stores or for particular qualities of the purchased items was not included in the algorithm presented here, but could be added with additional weighting factors on price.

More complex scenarios for transportation, such as limitations on what people can carry either when walking or taking public transportation, could be incorporated into the algorithm's transportation costs. Likewise, limitations on how much people have to spend on food at any given time could place restrictions on how much can be acquired within a given period of time. The algorithm was used to estimate the cost of one purchase of each of the items in the TFP. With data on variation in price over time and consumption rates of the items in the TFP, the analysis could be extended to calculate the cost of maintaining the TFP diet, or other diet, over time. Such an extension of the analysis could identify additional disparities in cost of food access over both time and space. Because the price data we had was incomplete, we did not present results of our cost estimate comparisons with U.S. census variables such as race, ethnicity, age, income, and vehicle access. Calculating these costs by these grouping variables would provide insight into important issues such as structural racism and the actual variation in food cost as a percentage of income.

Of even greater concern in terms of both food access and public health, however, is the likelihood that people forego important parts of a balanced diet in patterns of food purchase, with cost being an important but not the only driver of these choices. These behaviors open a wide range of possible contributing operational factors that determine what food is actually acquired and where. These patterns of acquisition could be quite complex but could be incorporated into our algorithm using a complex set of weighting factors and limits on purchases that varies stochastically among households, perhaps as a function of income or other demographic factors. An alternative would be to use the algorithm's cost estimates as inputs to an agent-based model (e.g. Rice, 2012; Widener, Metcalf & Bar-Yam, 2013) that describes how individuals respond to the food costs they experience in acquisition, diet, and health outcomes. The ultimate goal of our research is to develop this more detailed and nuanced model of the relationships between the food environment, food access, diet, and health.

In this study we have demonstrated methods to more directly address where access to a balanced diet may be limited due to the cost of both the food itself and the transportation cost to obtain it. This methodology can be used to identify places where access is restricted by these economic constraints. Furthermore, the same methods could be used to examine the impact of policy or investment intended to improve food access. Examples could include incentives for new grocery store locations, public transportation, or direct support to particular consumers living in particular places. By comparing the estimated costs of a balanced diet both with and without policy interventions, the impact on costs both areawide and for individuals, neighborhoods, and groups could be estimated. Therefore, use of the proposed methods to evaluate policy and public or private investment should be the focus of additional research.

Conclusions

Methods described in this paper represent a significant step toward an objective measure of food access, defined as the spatially explicit cost of a balanced diet. The example provided in this paper demonstrates that the variation in these costs is large and effectively continuous among residential parcels in the study area. Although examples of clear and sharp boundaries between areas of low and high cost can be found (shifts from green to red over short distances in figures 4 and 5), the gradations are typically much more subtle and diffuse, challenging the notion of discrete food deserts. Further development and implementation of the methods proposed, for improved models to relate the food environment to health outcomes and for better estimates of the impact of policy on food access, could help eliminate disparities and improve public health.

Acknowledgments

This work was supported by The Ohio State University Agroecosystems Management Program, The Ohio State University Food Innovation Center, state and federal funds appropriated to the Ohio Agricultural Research and Development Center, and the U.S. Department of Housing and Urban Development Regional Sustainability Planning grant program. We thank the students who participated in data collection: Brittany Kubinski for her work in identifying stores and requesting permission to visit stores, and Ben Wilson for his work on the data sets.

References

Alkon, A. H., Block, D., Moore, K., Gillis, C., DiNuccio, N., & Chavez, N. (2013). Foodways of the urban poor. *Geoforum, 48,* 126–135. http://dx.doi.org/10.1016/j.geoforum.2013.04.021

Apparicio, P., Cloutier, M.-S., & Shearmur, R. (2007). The case of Montréal's missing food deserts: Evaluation of accessibility to food supermarkets. *International Journal of Health Geographics, 6,* 4. http://dx.doi.org/10.1186/1476-072X-6-4

Beaulac, J., Kristjansson, E., & Cummins, S. (2009). A systematic review of food deserts, 1966–2007. *Preventing Chronic Disease, 6*(3), A105. http://www.cdc.gov/pcd/issues/2009/jul/08_0163.htm

Bitler, M., & Haider, S. J. (2011). An economic view of food deserts in the United States. *Journal of Policy Analysis and Management, 30*(1), 153–176. http://dx.doi.org/10.1002/pam.20550

Block, D., & Kouba, J. (2006). A comparison of the availability and affordability of a market basket in two communities in the Chicago area. *Public Health Nutrition, 9*(7), 837–845. http://dx.doi.org/10.1017/PHN2005924

Boctor, F. F., Laporte, G., & Renaud, J. (2003). Heuristics for the traveling purchaser problem. *Computers & Operations Research, 30*(4), 491–504. http://dx.doi.org/10.1016/S0305-0548(02)00020-5

Bontoux, B., & Feillet, D. (2008). Ant colony optimization for the traveling purchaser problem. *Computers & Operations Research, 35*(2), 628–637. http://dx.doi.org/10.1016/j.cor.2006.03.023

Breyer, B., & Voss-Andreae, A. (2013). Food mirages: Geographic and economic barriers to healthful food access in Portland, Oregon. *Health & Place, 24*, 131–139. http://dx.doi.org/10.1016/j.healthplace.2013.07.008

Broda, C., Leibtag, E., & Weinstein, D. E. (2009). The role of prices in measuring the poor's living standards. *Journal of Economic Perspectives, 23*(2), 77–97. http://dx.doi.org/10.1257/jep.23.2.77

Burns, C. M., & Inglis, A. D. (2007). Measuring food access in Melbourne: Access to healthy and fast foods by car, bus and foot in an urban municipality in Melbourne. *Health & Place, 13*(4), 877–885. http://dx.doi.org/10.1016/j.healthplace.2007.02.005

Carlson, A., Lino, M., & Fungwe, T. V. (2007). *The low-cost, moderate-cost, and liberal food plans, 2007* (Report CNPP-20). U.S. Department of Agriculture, Center for Nutrition Policy and Promotion. http://purl.umn.edu/45850

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

Charreire, H., Casey, R., Salze, P., Simon, C., Chaix, B., Banos, A., Badariotti, D., Weber, C., & Oppert, J. M. (2010). Measuring the food environment using geographical information systems: A methodological review. *Public Health Nutrition, 13(*11), 1773–1785. http://dx.doi.org/10.1017/S1368980010000753

Cohen, B. E. (2002). *Community food security assessment toolkit* (ERS Report No. E-FAN-02-013). Washington, D.C.: U.S. Department of Agriculture, Economic Research Service. Retrieved from http://ers.usda.gov/publications/efan-electronic-publications-from-the-food-assistance-nutrition-research-program/efan02013.aspx

Cummins, S., & Macintyre, S. (2002). "Food deserts"—Evidence and assumption in health policy making. *British Medical Journal, 325*(7361), 436–438. http://dx.doi.org/10.1136/bmj.325.7361.436

Duffey, K. J., Gordon-Larsen, P., Shikany J. M., Guilkey, D., Jacobs Jr,, D. R., & Popkin, B. M. (2010). Food price and diet and health outcomes: 20 years of the CARDIA Study. *JAMA Internal Medicine, 170*(5), 420–426. http://dx.doi.org/10.1001/archinternmed.2009.545

Evans-Cowley, J. S. (2011). Evaluating food systems in comprehensive planning: Is the Mississippi Gulf Coast planning for food? *Journal of Agriculture, Food Systems, and Community Development, 2*(1), 105–126. http://dx.doi.org/10.5304/jafscd.2011.021.009

Goldbarg, M. C., Bagi, L. B., & Goldbarg, E. F. G. (2009). Transgenetic algorithm for the Traveling Purchaser Problem. *European Journal of Operational Research, 199*(1), 36–45. http://dx.doi.org/10.1016/j.ejor.2008.10.027

Hubley, T. A. (2011). Assessing the proximity of healthy food options and food deserts in a rural area in Maine. *Applied Geography, 31*(4), 1224–1231. http://dx.doi.org/10.1016/j.apgeog.2010.09.004

Laporte, G., Riera-Ledesma, J., & Salazar-González, J.-J. (2003). A branch-and-cut algorithm for the undirected Traveling Purchaser Problem. *Operations Research, 51*(6), 940–951. http://dx.doi.org/10.1287/opre.51.6.940.24921

Larsen, K., & Gilliland, J. (2009). A farmers' market in a food desert: Evaluating impacts on the price and availability of healthy food. *Health & Place, 15*(4), 1158–1162. http://dx.doi.org/10.1016/j.healthplace.2009.06.007

Leete, L., Bania, N., & Sparks-Ibanga, A. (2012). Congruence and coverage: Alternative approaches to identifying urban food deserts and food hinterlands. *Journal of Planning Education and Research, 32*(2), 204–218. http://jpe.sagepub.com/content/32/2/204

Lundy, M., & Mees, A. (1986). Convergence of an annealing algorithm. *Mathematical Programming, 34*(1), 111–124. http://dx.doi.org/10.1007/BF01582166

McEntee, J. (2009). Highlighting food inadequacies: Does the food desert metaphor help this cause? *British Food Journal, 111*(4), 349–363. http://dx.doi.org/10.1108/00070700910951498

McEntee, J., & Agyeman, J. (2010). Towards the development of a GIS method for identifying rural food deserts: Geographic access in Vermont, USA. *Applied Geography, 30*(1), 165–176. http://dx.doi.org/10.1016/j.apgeog.2009.05.004

McKinnon, R. A., Reedy, J., Morrissette, M. A., Lytle, L. A., & Yaroch, A. L. (2009). Measures of the food environment: A compilation of the literature, 1990–2007. *American Journal of Preventive Medicine, 36*(4 Supplement), S124–S133. http://dx.doi.org/10.1016/j.amepre.2009.01.012

Morton, L. W., Bitto, E. A., Oakland, M. J., & Sand, M. (2008). Accessing food resources: Rural and urban patterns of giving and getting food. *Agriculture and Human Values, 25*(1), 107–119. http://dx.doi.org/10.1007/s10460-007-9095-8

Morton, L. W., & Blanchard, T. C. (2007). Starved for access: Life in rural America's food deserts. *Rural Realities, 1*(4), 1–10. http://www.ruralsociology.org

Mulangu, F., & Clark, J. (2012). Identifying and measuring food deserts in rural Ohio. *Journal of Extension, 50*(3), 3FEA6. http://www.joe.org/joe/2012june/a6.php

Raja, S., Ma, C., & Yadav, P. (2008). Beyond food deserts: Measuring and mapping racial disparities in neighborhood food environments. *Journal of Planning Education and Research, 27*(4), 469–482. http://dx.doi.org/10.1177/0739456X08317461

Rice, K. (2012). The utility of multilevel modeling vs. agent-based modeling in examining spatial disparities in diet and health: The case of food deserts. In A. Desai (Ed.), *Simulation for policy inquiry* (pp. 63–82). New York: Springer New York. http://dx.doi.org/10.1007/978-1-4614-1665-4_4

Riera-Ledesma, J., & Salazar-González, J. J. (2005). A heuristic approach for the travelling purchaser problem. *European Journal of Operational Research, 162*(1), 142–152. http://dx.doi.org/10.1016/j.ejor.2003.10.032

Rose, D., Bodor, J. N., Swalm, C. M., Rice, J. C., Farley, T. A., & Hutchinson, P. L. (2009). *Deserts in New Orleans? Illustrations of urban food access and implications for policy.* Ann Arbor, Michigan: University of Michigan National Poverty Center/USDA Economic Research Service Research. Retrieved from http://npc.fordschool.umich.edu/news/events/food-access/rose_et_al.pdf

Shannon, J. (2014). Food deserts: Governing obesity in the neoliberal city. *Progress in Human Geography, 38*(2), 248-266. http://dx.doi.org/10.1177/0309132513484378

Sharkey J. R. (2008). Diet and health outcomes in vulnerable populations. *Annals of the New York Academy of Sciences, 1136,* 210–217. http://dx.doi.org/10.1196/annals.1425.020

Sharkey, J. R., & Horel, S. (2008). Neighborhood socioeconomic deprivation and minority composition are associated with better potential spatial access to the ground-truthed food environment in a large rural area. *Journal of Nutrition, 138*(3), 620–627. http://jn.nutrition.org/

Sparks, A. L., Bania, N., & Leete, L. (2011). Comparative approaches to measuring food access in urban areas: The case of Portland, Oregon. *Urban Studies, 48*(8), 1715–1737. http://dx.doi.org/10.1177/0042098010375994

U.S. Census Bureau. (2010). *State and county QuickFacts*. Retrieved December 1, 2014, from http://quickfacts.census.gov/qfd

U.S. Census Bureau. (2012). *2010 TIGER/Line Shapefiles* [Machine-readable data files].

Ver Ploeg, M., Breneman, V., Farrigan, T., Hamrick, K., Hopkins, D., Kaufman, P., ... & Tuckermanty, E. (2009). *Access to affordable and nutritious food: Measuring and understanding food deserts and their consequences: Report to Congress* (Administrative Publication No. AP-036). USDA Economic Research Service. Retrieved from http://www.ers.usda.gov/publications/ap-administrative-publication/ap-036.aspx

Ver Ploeg, M., Breneman, V., Dutko, P., Williams, R., Snyder, S., Dicken, C., & Kaufman, P. (2012). *Access to affordable and nutritious food: Updated estimates of distance to supermarkets using 2010 data* (Economic Research Report No. ERR-143). Washington, D.C.: USDA, Economic Research Service. Retrieved from http://www.ers.usda.gov/publications/err-economic-research-report/err143.aspx

Voß, S. (1996). Dynamic tabu search strategies for the traveling purchaser problem. *Annals of Operations Research, 63*(2), 253–275. http://dx.doi.org/10.1007/BF02125457

Widener, M. J., Metcalf, S. S., & Bar-Yam, Y. (2013). Agent-based modeling of policies to improve urban food access for low-income populations. *Applied Geography, 40,* 1–10. http://dx.doi.org/10.1016/j.apgeog.2013.01.003

Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
www.AgDevJournal.com

Bridging the gap between farmers and food service directors: The social challenges in farm to school purchasing

Brandi Janssen*
University of Iowa

Submitted August 19, 2014 / Revised October 15 and November 5, 2014 / Accepted November 10, 2014 / Published online December 9, 2014

Citation: Janssen, B. (2014). Bridging the gap between farmers and food service directors: The social challenges in farm to school purchasing. *Journal of Agriculture, Food Systems, and Community Development, 5*(1), 129–143. http://dx.doi.org/10.5304/jafscd.2014.051.012

Abstract

Farm to school programs in which primary and secondary schools purchase locally grown products for school lunches aim to increase children's consumption of fresh foods while creating new markets for local food producers. However, the institutional purchasing of local foods can be fraught with difficulties. Many scholars have explored the structural challenges of local purchasing associated with cost, supply, and distribution. Less well examined are the ways that the different viewpoints and knowledge of farm to school participants affect procurement. This reflective essay provides a case study of local food purchasing at one medium-sized Midwestern public school district. Ethnographic examination of this process shows that local food farmers and school food service buyers have vastly different approaches to food production and handling. Attending to the social barriers of farm to school purchasing may improve participation by both farmers and food service directors.

Keywords

farm to school, farm to institution, local food, ethnography, school lunch, school procurement

Introduction

In recent decades, scholars and activists have mounted numerous criticisms against the current model of large-scale, industrialized agriculture, which is the basis of the centralized American food

* Brandi Janssen, Ph.D., Clinical Assistant Professor, Department of Occupational and Environmental Health; 145 Riverside Drive; S329 CPHB; University of Iowa; Iowa City, Iowa 52242 USA; +1-319-335-4190; brandi-janssen@uiowa.edu

Note

This research was funded by the Wenner-Gren Foundation and The University of Iowa Center for Global and Regional Environmental Research. Portions of this paper were presented at the American Anthropological Association Annual Meeting in San Francisco in 2012.

Disclosure

Since 2011, the author has worked with the school district described here to develop procurement strategies for local products. There has been no financial benefit to the author.

system (e.g. Goldschmidt, 1978; Kloppenburg, 1991; Pollan, 2006). In conjunction with such critiques, a number of alternative production and distribution strategies have developed. These include fair trade arrangements, which aim to empower small producers around the globe (Murray & Raynolds, 2000), as well as more sustainable systems of production, such as organic farming (Belasco, 2007). Most recently, "local food" has become the fastest growing segment of the natural food industry and an important part of the sustainable agriculture movement (Ikerd, 2011). The term "local food" refers to agricultural products that are minimally processed and grown near the final point of sale. The phrase also refers to the various marketing strategies used by farmers to eliminate distributors, or "middle men," and sell their agricultural products directly to consumers, often via farmers markets or community supported agriculture (CSA) models.

Nationally, both farmers market attendance and CSA memberships have been growing at a steady rate. The national CSA directory, http://www.LocalHarvest.org, currently includes nearly 6,000 CSA farms. In 1994, when the United States Department of Agriculture (USDA) first began tracking and publishing numbers of farmers markets, there were 1,755 farmers markets in the U.S.; by 2012, there were 7,864 (USDA, 2014). These direct-marketing strategies are responsible for the basic framework of the current local food movement, in which communities are socially and economically enhanced by the practice of an embedded, "civic" agriculture (Kloppenburg, Lezberg, De Master, Stevenson, & Hendrickson, 2000; Lyson, 2004; Swenson, 2009; Winter, 2003).

Institutions such as schools, hospitals, and retirement communities are also increasingly purchasing locally grown products (Friedmann, 2007). Schools are particularly important, both because of their consistent demands for food and because they are a primary food service outlet for children, who may benefit significantly from more healthy food offerings (Vogt & Kaiser, 2008). Farm to school (sometimes called F2S) programs have seen remarkable growth nationwide. Farm to school typically includes an array of programs at the primary and secondary school level, including purchasing local foods for use in school lunches and snacks, school gardening initiatives, farm tours and agricultural literacy education, and nutrition education. Farm to school programs have garnered support from both state and federal legislative efforts. Supporters note that the phenomenon has opened new markets for farmers and increased children's exposure to healthier foods (National Farm to School Network, n.d.).

Despite the growing interest in farm to school programming, numerous challenges arise when public schools attempt to purchase unprocessed foods from local farmers. Cost is often cited as the key barrier to local procurement (Cooper & Holmes, 2006; Joshi, Misako-Azuma, & Feenstra, 2008). In addition, supply, packaging, and delivery represent significant barriers (Roche & Kolodinsky, 2011). In this reflective essay, I examine some of the challenges of local food procurement from the perspective of both food service buyers and several farmers in a midsized Midwestern public school district. The case explored here supports many of the key barriers examined by other scholars. In addition, it elucidates that food service personnel and farmers have vastly different knowledge and beliefs about food and food handling. Local food farmers have developed strategies based on farmers markets and CSA models. In these interactions, the variability in size and seasonal availability of produce is seen as an opportunity to educate the individual consumer, who appreciates the personal, hands-on approach of the producer. However, a school food service buyer values consistency in both size and availability and appreciates attention to procedural details and documentation that ensure food safety. These social differences should be considered when attempting to overcome barriers in farm to school purchasing.

Methods

The information I present here is part of a larger ethnographic research project among local food producers in the Midwest, conducted from 2008 through 2012. Ethnography provides a close look at real situations in everyday life, and often ones in which the researcher has himself or herself been an integral part. Ethnographic attention to farming systems in the U.S. has been fruitful. Some ethnog-

raphers (e.g., Fink, 1998; Horwitz, 1998; Rich, 2006) have worked in industrial hog barns and meat-packing plants. These researchers have been able to place their interviews and document analyses in the context of their observations of working conditions. They also have provided information about the social strategies of workers in industrial settings. Others (e.g., DeLind, 1999; Janssen, 2010) have used their experiences doing farm work on small farms to better understand the social processes that support, or do not support, the development of alternatives to industrial agriculture. Ziegenhorn (2000) combined ethnographic training with his experience as a farmer and as the owner of a small seed company to expose the methods by which large seed corporations innovate and market new varieties and the extent to which knowledge of these processes is kept from farmers. Others, such as Grey (2000), Ziegenhorn (1996), and Stull (2000) assisted farmers' groups and municipalities in writing grants or policy responses to the encroachment of industrial agriculture. Likewise, during this study I have played the part of both researcher and engaged volunteer. The methods of this study include 25 in-depth, semistructured interviews with farmers, attendance at several agricultural conferences, and participant observation on multiple small farms. My connections with farmers led to my involvement in several emergent farm to school programs. Since 2011, I have helped develop procurement strategies for the midsized district written about here.

The study presented here provides a clearer understanding of the various challenges associated with scaling up local food systems in general. The interactions between farmers and food service directors reveal that the two groups approach food production and procurement from significantly different perspectives, particularly in their approach to food handling. As a result, purchasing local foods can be difficult at nearly every stage of the process. First, there are significant time, equipment, and labor constraints in an institutional kitchen. Second, farmers and food service buyers may not use the same terminology to calculate product amounts. Third, the production and post-harvest handling practices of farmers may not be acceptable to food service buyers, whose standards are based on different concerns. Finally, when purchasing local foods the food service buyer has no barrier to institutional liability between him- or herself and the food production site. In more conventional purchasing arrangements, a large corporate distributor protects the buyer from liability. In the case study that follows, we see that local food is acceptable to the school food buyer only after some of the elements of these more familiar transactions can be recreated.

Farm to School Overview

The National Farm to School Program traces its beginnings back to a few small pilot initiatives in Berkeley, California, and North Florida during the mid-1990s. By 2000, the USDA's Initiative for Future Agricultural and Food Systems (IFAFS) funded the National Farm to School Program to enable program and policy development and research. Members of the new National Farm to School Program attempted to gain more legislative support for farm to school by including a geographic preference clause in the 2002 farm bill. This clause allowed school food service directors to include a geographic preference for local foods in their bid specifications. In 2004, a federal farm to school grant program was established as part of the 2004 Child Nutrition Reauthorization Act, which amends the original Richard B. Russell National School Lunch Act every five years. However, funds were not appropriated for the program that year. Later, the 2010 Child Nutrition Reauthorization passed as the Healthy, Hunger-Free Kids Act and included funding for farm to school programs. Beginning in October 2012 US$5 million per year was allocated to support farm to school programs at the local level. These funds have been disbursed nationwide as start-up grants for new farm to school chapters and project expansion grants for established programs.

The legislative mandates enacted in 2004 and 2010 related to farm to school "have dovetailed with the sustainable agriculture movement's ongoing interest in developing institutional markets and with national-level farm to school advocacy work by the National Farm to School Network, the Community Food Security Coalition and other groups" (Bagdonis, Hinrichs, & Schafft, 2009, p.

108). The goals of farm to school programs may contribute to more extensive fresh fruit and vegetable offerings in schools as well as broader education about food production (Story, Nanney, & Schwartz, 2009). Public health professionals also promote farm to school programs as an early intervention for obesity prevention (Hamm, 2008).

Farm to School Challenges

In their overview of the literature on farm to school programs, Joshi, Misako-Azuma and Feenstra (2008) cite cost as the primary reason more school officials do not embrace local purchasing. The cost of ingredients is only partially responsible; the authors point out that costs are higher for the additional kitchen labor that is required, along with additional training for new production, delivery, and invoicing procedures (2008, p. 243). However, Izumi, Alaimo, and Hamm (2010) interviewed participating school food service professionals and found that local prices were often competitive with their typical distributors. In particular, they indicate the benefits of shortening the supply chain to eliminate transportation and handling costs of long distribution chains (Izumi, Alaimo, & Hamm, 2010, p. 87). Limiting packaging may also reduce costs, as large-scale distributors may line cardboard boxes with inserts or foam liners to protect the product. Local products, which are transported and handled less, may be packed loosely in food-grade boxes, further reducing costs. Flexible packaging options can, however, become problematic. A food service director from a small district reported to me in an interview that a producer once delivered green beans in a laundry basket, necessitating an explanation of the importance of food-grade packaging.

While the cost of local food may be either a barrier or a benefit, depending on the specific local situation, there are other features of institutional cooking that more clearly impede the ability of schools to use local products. Food safety concerns, in particular, may inhibit food service buyers from purchasing local food. Children younger than nine are considered a high-risk population for food-borne illness. All schools that participate in the National School Lunch Program are required to use food safety procedures based on the Hazard Analysis and Critical Control Point (HACCP) system. A significant portion of HACCP procedures involve careful monitoring and recording of food, oven, and walk-in cooler temperatures. In particular, foods should be kept out of the "danger zone," which falls between 41 and 135 degrees Fahrenheit. Cold foods should remain below 41 degrees; hot foods should always be above 135 degrees.

Fears of food-borne illness, *E. coli* in particular, affect both meat and produce purchasing decisions and have, to some extent, been responsible for the tendency to use precooked ground beef patties and crumbles in school kitchens (Poppendieck, 2010). Fresh produce is a "raw agricultural product" that is also likely to have pathogens present and, when served raw, there is no "kill step" to eliminate contaminants. Large distributors provide assurances about the safety of the food they sell and buffer food service buyers from the responsibility of ensuring food safety practices during production and processing. However, when food service buyers purchase directly from farms, they become responsible for ensuring that the food was produced in a safe environment in addition to overseeing HACCP regulations in their kitchens.

The complicated regulations for school food procurement create another challenge. In some states, school food buyers are required to solicit at least three bids for any purchase that will be reimbursed with federal funds. Procurement procedures may be by either formal or informal bids. Federal regulations require a formal bid process whenever the spending is greater than US$100,000, which requires publicly advertised bid requests, followed by sealed, written submissions from vendors. Local purchases usually remain small enough to require only an informal bid. In that case, buyers must still solicit and document at least three bids, but they do not have to be submitted sealed or in writing. Federal requirements stipulate that the buyer accept the lowest bid submitted, although he or she can accept a higher bid if the reason is documented. The geographic preference clause, for example, may be used as justification for accepting a higher bid.

Applying procurement regulations to local products becomes problematic when the food service buyer does not know which growers to con-

tact for specific products. At a 2010 workshop on farm to school facilitated by the state's departments of education and agriculture, many food service directors, as well as the representatives from the state department of agriculture (SDA), had questions about how to apply procurement regulations to local purchasing. In particular, the staff members and SDA representatives were unsure how to proceed if there were not three vendors available who grow the requested item. The presenter, a representative from the Department of Education, cautioned the audience to carefully follow the procurement rules. One audience member questioned, "How much do you have to know about the grower? If they don't meet the specs [specifications], is that OK, or does it look like you're purposely not following the rules?" The presenter responded that the food service buyer is responsible for finding out if the grower fits the specification. An exasperated food service employee sitting nearby exclaimed, "How?!" One suggestion was to use on-line price guides as bids. In an informal bid process, a buyer can look at public price listings of distributors or from the Chicago Board of Produce to compare prices with those of local growers. The mention of the Chicago Board of Produce caused a wave of protests from the SDA representatives, who pointed out that local growers likely cannot compete with commodity pricing.

The interactions that follow elucidate many of the barriers already identified to local procurement, including concerns about supply and delivery, food handling, and, in the Midwest, the temperamental spring weather. More importantly, this example also shows the different, sometimes oppositional, positions taken by food service buyers and farmers with regard to food handling and production. Their divergent views on what constitutes "safe" food become a significant procurement challenge. Ultimately, local food is acceptable to the institution only after elements of conventional distribution models are recreated.

Farm to School in a Midwestern Community School District

In January 2011, I started working with a farm to school program in a medium-sized Midwestern school district, initially as a volunteer. My connections with farmers resulting from my larger project led to my involvement with school food procurement. A parent volunteer, whom I will call Amy,[1] directed the district's farm to school program. The group also included a food systems planner, a local grocery store manager, producer Neal Jackson[1] and the district's food service director Carol Hendel-Patterson.[1] Because the group initially had little idea of what local items Carol might want or be able to use, the first meetings were planned to better understand the lunch system in the district and to find out what local products might be useful to her.

The Midwestern Community School District[1] (MCSD) consists of 24 schools: three high schools, three junior high schools, and 18 elementary schools. The district serves 12,000 students, who eat 6,500 school lunches and about 1,000 breakfasts each day. There are five production kitchens in the district: one at each of the three junior high schools and one in each of the two larger high schools. All of the elementary school lunches, as well as lunch for the alternative high school, are prepared in these five kitchens. Lunches are delivered in the mornings via a total of seven delivery routes, which are repeated in the afternoons to pick up leftovers, food carts, and trays.

Labor time and cost are important issues for the food service department. Carol, who has been the district food service director since 1986, pointed out to us that in the past she always purchased lettuces, carrots, and celery whole and her staff did the work to get them ready to eat. In an interview, I asked her about the reasons for the shift to pre-cut vegetables and found that they were complex. For one, she pointed out that when she started, the district had only 19 buildings (15 elementary schools, two high schools and two junior high schools) and served about 4,000 meals, as opposed to the 6,500 served currently. Carol noted, "essentially our facilities are still the same. We just added more serving sites." The increase in the number of lunches served also requires more food to be purchased, which puts storage space at

[1] Names of subjects and the school district have been changed to maintain their anonymity.

a premium. Carol pointed out that whole lettuce, for example, takes up more cooler space than precut lettuce. She said, "that would actually be one of the first issues of getting lettuce in — we get produce in once per week, do we have room for all these uncut items?"

Finally, the regulations controlling what is offered in a school lunch have changed over time. When Carol started her job, there was no "offer versus serve," meaning that students were served a tray of food with one entrée, one fruit, one vegetable, and one grain serving. Now, she is required to offer two choices of fruit and two choices of vegetable. Carol noted, "hopefully, with the choices, that encourages them to take something they like"; however, it further adds to her preparation work. She told me that one of the major benefits of the pre-cut lettuce is that it gives her staff more time to prepare the other sides. "If you have lettuce that's ready to go, you can make the cole slaw, make the potato salad, do some of those other things — macaroni salads, fresh vegetable salads — some of those things that have a recipe and take a little more time." Add to all these issues the fact that her base labor cost is US$11.15 per hour, and it becomes clearer why ready-to-eat items provide a significant benefit.

Meeting with Carol

These issues are just a few of the things the committee learned during their meetings with Carol; the group was also introduced to the nuances of school food procurement. Carol did not seem at all opposed to purchasing local foods; in fact she had purchased apples from a local orchard during the fall of 2010. Unfortunately, the grower could only supply three menus worth of apples before he risked diminishing supply for his regular customers. Carol pointed out her large supply needs; one day's requirement of apples, lettuce, or melons may be more than some growers produce in a single season. On the other hand, because of food safety concerns she was not open to purchasing local meat products. She purchases pre-cooked ground beef patties or crumbles. Using raw meat would require her staff to thaw it, then cook it, then cool and re-heat it before the delivery, as there would not be time to cook from scratch and deliver the meat the morning it would be served. This process would put the meal repeatedly in the temperature danger zone that might encourage bacteria growth.

The group left those first meetings with a lot of new information, but with no concrete plan to proceed. However, Amy hoped that a proposal for serving a local product in school lunches could be developed before the end of the year. She knew this was ambitious, particularly since the school year ended in early June and only a few items are abundantly ready in the early spring in the region. The group brainstormed several possibilities, such as radishes, peas, lettuce, spinach, or strawberries. Radishes seemed like a risky item to serve to children, and peas are often an expensive specialty item. Strawberries, even early bearers, likely would not be ready in time. That left lettuce and spinach — usually the first items to be found at markets in the early spring and something that many producers grow. The group agreed that a salad of mixed greens and spinach would be a suitable side for the school lunch menu. One of the group members, Neal Jackson, grew greenhouse sprouts; these were added to the list of possible additions to the salads. In addition, the chapter had received a US$900 start-up grant from the SDA that could be applied to the cost of the lettuce. The committee planned to publicize the "Spring Greens Day" well and thought it would be a good way for the farm to school chapter to conclude its first school year. At this point, however, there was no information about how much mixed lettuce Carol would require for 6,500 salads or how much she would expect to pay for it. In addition, it was unclear if the kitchen staff would process the lettuce or if it would have to be delivered to the schools already washed and cut. The group did not know if they should seek out baby greens or mesclun mix, which because of its smaller size would presumably require less chopping, or look for head lettuce. With this "plan," which seemed to have as many questions as answers, the committee prepared for the next meeting with Carol.

Amy opened the next meeting by explaining the plan for the Spring Greens Day, and stated that she hoped to have a mix of lettuces and spinach and possibly sprouts. "No sprouts," Carol interrupted, shaking her head emphatically, "we don't

do sprouts." As a potentially hazardous food (PHF), sprouts are often avoided in food service kitchens. Amy continued, discussing promotion and explaining that there would be press releases along with promotional materials in the cafeterias. Carol provided the group with the quantities she would need: 365 pounds (166 kg) of washed, bagged and ready-to-eat lettuce for one day. The lettuce she typically uses comes in 25-pound (11 kg) cases, each case holding five five-pound (2.3 kg) bags. The staff only had to open the bag and pour it into a tray; the students served themselves as they went through the line. The cost of the lettuce she usually buys is US$473 for all 365 pounds, or US$1.30 per pound. Carol said, "my guess is that we're not going to find local lettuce for a dollar a pound."

At this point, Amy brought up the US$900 SDA grant, which we planned to use to offset any extra cost. Carol noted that she could not build a sustainable purchasing system by relying on grants. Further, she argued, even if producers gave us a break on cost, "we can't get a one-time 75 percent discount [on the lettuce] and let the public assume that now we'll always have local lettuce." While Carol was not opposed to using the SDA grant funding, she was understandably concerned about public perception and the development of a long-term local procurement system. Paying more for the lettuce, allowed by the grant, could become problematic if parents assume that local lettuce would suddenly become standard. On the other hand, it was equally unreasonable to assume that producers would be willing to meet her typical price point, even for a one-time event.

The next question for Carol was about the "ready-to-eat" designation: would the kitchen staff be able to do any preparation? Carol pointed out that she pays over US$11.00 per hour for labor and they already offer four fruit and vegetable choices each day. They cut their own apples and oranges, so when they can get fresh produce, like lettuce, washed and ready to eat, that helps her labor cost significantly. Cutting the lettuce in the kitchen would certainly increase her labor costs by requiring additional staff or increased hours. If it were possible to get the lettuce inexpensively, she might be able to have her staff prepare it; however, she would prefer to have it ready to eat.

The group left that meeting with Carol's permission to contact growers for bids, roughly targeting a mid- to late May date for serving the lettuce. In addition, Carol indicated that "it would be fun" to visit farms that might supply the product. Finally, Carol wanted the producers to fill out a Grower Checklist for food safety, developed by the state land grant university, to keep in her files. These all seemed like straightforward, manageable requests, and so began the process of requesting bids and setting up farm visits.

Contacting Producers

I was asked to put together a bid letter to email to producers; this was sent out to eight growers and one local distributor in late March. Three producers did not respond to the email. The distributor requested more information about the bid deadline but did not have product available, and two growers indicated that their CSA businesses were too busy at that time of year. Three growers responded with interest, although one quoted a price of US$5.50 per pound, well out of our price range. The other two growers indicated interest and flexibility on price, our target being between US$2.00 and US$2.50 per pound to fit within the constraints of the US$900 grant. We were somewhat disappointed with the low number of responses to the bid request; however, conversations with other food service directors suggest that this is not unusual. For example, one food service director from a small district reported in an interview that she sent out 40 bid requests and received only two responses.

The two growers, David Evans[2] of Century Farms and Rob Duncan, both felt they could meet the price constraints, though David noted that he "probably [wouldn't] make any money." David also pointed out that he would appreciate the publicity that his farm would receive from the project and that he was generally supportive of getting local foods into schools. Rob was more interested in having the business and was excited to have the opportunity to sell to the school district. Because

[2] Names of farmers and farms have been changed to maintain their anonymity.

the farm to school group was still unsure whether the school kitchen staff would be able to cut head lettuce, or if we could use baby greens that would not require chopping, we indicated an interest in either product. Both growers operate CSA farms and sell to a nearby cooperative grocery store. Both were also used to selling their head lettuce by the head, rather than by the pound. Our request for a price per pound was problematic for both of them, as they would have to estimate the final weight of their head lettuce to ensure that we ended up with enough product. In addition, we would have to calculate the weight of the core of the lettuce, which would be cut away, and subtract it from their totals to ensure that we had enough finished, cut lettuce to deliver.

Food Service Director Meets Farmer

With this information in mind, we scheduled farm visits with both of them. Carol, Amy, and I traveled to Century Farms to get a look at our potential lettuce. David first took us through the packing shed, where in the summer months his crew would fill CSA boxes and prepare products for wholesale delivery. When we saw it, however, it was used for storing his tractor, potting soil, and several pallets. He warned us to watch our steps as we picked our way through the equipment and he described his process for washing mixed greens. He uses a product called Tsunami 100, which is a sanitizer approved for use in organic production. After harvest, the mixed greens are first submerged in cold water to quickly cool the leaves and maintain their freshness. They are then put into a solution of Tsunami 100 and water and finally rinsed again in clean water. David then spins the greens dry in a washing machine before packing them. He had plans to purchase a new salad harvester that would go on the back of the tractor. A band-saw blade would cut the leaves off just above soil level and they would be pushed into a basket. David noted that baby greens are incredibly labor intensive, particularly when harvested by hand. He was hopeful that the new harvester would improve his profitability on a product that is often, for him, a loss leader. He grows it because his customers are happy with the early spring salads, but he is still unable to charge enough to make a profit on it, even at the farmers market where he asks for US$3.50 per pound.

David took us out to his fields, where tiny lettuce plants were just beginning to emerge. He cautioned us about the weather challenges that could make our mid-May date impossible. He also pointed out that he was growing head lettuce, which he could sell to us at our projected price. As we walked back to the car, we passed David's wife, Jessica, and three others cutting seed potatoes. Jessica indicated that she had some concerns about the Grower Checklist, which I had sent to her in advance of our visit. She also pointed out that the bid request specified ready-to-eat lettuce, and she reminded us that the farm is not licensed for processing. Thus none of its products should have been considered ready to eat; it should all be washed before consumption.

Jessica had not filled out the form and was not comfortable with several of the questions. She noted that many of the questions were vague and some important considerations, like liability insurance, were not addressed at all. For example, one question asked, "are storage and packing facilities located away from growing facilities?" Jessica wondered how far is far enough? Additionally, the question, "are wells protected from contamination?" was problematic for her. She said, "well, I hope so," but she wondered what, exactly, they should be protected from and what kind of protection is being suggested in the question — a fence, distance from livestock areas, a basic cap? Jessica wanted more information from Carol about her criteria for purchasing from a farm. Carol indicated that she would like to see temperature records on the walk-in cooler, as this is a standard procedure for food service personnel. These records are not maintained at Century Farms.

Carol noted that, based on David's explanation of the farm, she could see that they had put considerable thought into their post-harvest handling procedures. She liked that the produce came in on one side of the packing shed and was loaded out on the other side, minimizing the risk of clean product coming into contact with dirty product. Carol also liked David's description of the new salad harvesting procedure, as it would be done by machine and not be handled significantly. To this,

Jessica responded that every item on the farm was harvested by hand, using a knife, without gloves. She leaned forward and raised a hand to emphasize her point. To Jessica, the handling of the produce was a benefit to her customers, as they knew each item was handled with care, rather than impersonally run through machine. Carol's food safety perspective led her to appreciate the mechanization of larger scale agriculture, where food was handled less and was, presumably, cleaner. Jessica, whose CSA shareholders and co-op customers desired "food with a face on it," the handling of produce signified the hands-on attention that set local food systems apart from industrialized agriculture.

Two days later, Carol, Amy, and I drove north to visit Rob Duncan. Rob was fixing equipment when we arrived and he told us that he has two main jobs: "growing stuff and breaking stuff." Rob had planted extra lettuce as soon as he heard about the Spring Greens event and also said that he had been thinking about processing possibilities. Like David Evans, he was not licensed to process, so his greens would not be ready to eat. However, if we had access to a commercial kitchen, perhaps at a hotel, we could get the product to meet the specifications. Rob recommended that the district purchase head lettuce, rather than baby greens or mesclun mix. Despite the fact that he sold a lot of small salad mix to restaurants, he was somewhat ambivalent about it. He noted that the mesclun is "burgie"[3] and that head lettuce was easier and more sustainable for him to grow, particularly from a labor standpoint. Additionally, he pointed out that chopped head lettuce might be more familiar to the elementary school kids, which might increase their consumption.

We walked through the fields first, where garlic, onions, and peas were already sprouting. Rob had six high tunnels, mobile plastic hoop structures that significantly increase production in the early spring and late fall. In one tunnel, he had lettuce, bok choy, spinach, and kale, some of which had been planted in the fall and overwintered in the tunnel.

In the packing area, Rob showed us his new walk-in cooler. He pointed out the stainless steel racks that let him keep product off the floor. Carol asked if he kept temperature records; he did not but said that he would be happy to keep them for her. He asked how often she would like them recorded and suggested that he could do it as often as hourly. Carol responded that her staff writes them three times per day, once in the morning, at midday, and before leaving in the afternoon. Carol also asked about hygiene standards for his employees. He noted that there was a flush toilet available and he had demonstrated the proper hand-washing procedure and nail-brush use. He also told us that he did not have any smokers on staff at the time, which is helpful because he did not have to explain to them why they are required to wash their hands after a smoke break.

Carol had mixed feelings about both farm visits. The lack of processing licensure on the farms made purchasing a ready-to-eat product impossible. Further, she was concerned that there were no current well-water tests available for either farm and that Century Farms did not document the manure schedule (although it was explained during the farm visit). In addition, the use of the washing machine to dry lettuce at Century Farms concerned her and she planned to ask her contact at the health department about that following the visit. Storing equipment in the packing shed at Century Farms was also a concern; she said, "I *assume* that it's clean and free of farm equipment during the summer, but I would like to see it being used." She noted that it would be "scary" to buy from Century Farms right now. "Well, not 'scary,'" she corrected herself, "but I would have concerns."

The next step was to figure out a way to get the lettuce ready to eat. Neal Jackson's greenhouse was licensed for processing, as his microgreens are sold as packaged and are officially designated as ready to eat. He offered the use of his space, even though the district would not be purchasing from him for the event. As we left Rob's farm, Carol commented that the "critical step" would be talking to Neal and learning more about his processing practices. However, while we worked to secure a date to visit Neal's facility, Carol made contact with the county department of public health. Her con-

[3] Rob used this term to indicate that the mesclun mix is somewhat "bourgeois" or elitist, and is primarily a high-priced status item.

tact questioned whether either of the farmers we visited could be considered an "approved vendor" by the health department for the school district. Inn an email to the group and to the state farm to school representatives at SDA, Carol reiterated her concerns about the farms:

> Lack of documentation for walk-in cooler temperatures, date of application of manure; lack of well water testing certificate; and [the] fact [that] neither farmer can meet the bid request which was ready-to-eat cut mixed greens since neither is a licensed processor… The other issue is whether or not the USDA requirement of trying to obtain 3 competitive bids is being met. At this time it appears there are only two growers with capacity to supply enough product, yet it is my sense pricing/ cost is still somewhat unclear. Until all these concerns can be addressed, I am hesitant to move forth with a Field Green menu day in June.

The email led Amy to assume that the project had reached a dead end. However, despite her concerns, Carol was still willing to visit Neal's greenhouse and discuss processing, so we planned to meet there the following week for a tour by Neal. He had put some thought into the purchasing process for the Spring Greens day. He noted that since his business would be the official processor for the lettuce, he would have to purchase it from David and Rob, and then sell it to the school.

When Carol arrived, he explained this to her, and she agreed. He would officially purchase the product, making his business liable should there be any problems with it. Neal showed Carol his processing area and went over his licensure. He was inspected by the State Department of Inspections and Appeals; the certification was posted above one of the refrigerators. Neal explained how the salads would be cut on the long stainless steel table and sanitized in a solution of Tsunami 100. Neal explained that the volunteers would be trained in the same way that he trains his employees. He uses what he calls a "no hands" policy, meaning that workers always wear gloves when they handle the product and long hair was always tied back.

Carol had very few questions about the process. She nodded a lot as Neal explained the process and when he was finished, she said, "that should all work fine." She did inquire about his liability insurance; his policy includes US$1 million in liability, and he offered to fax her a copy of it. She indicated that would not be necessary and required no paperwork from him at all. For the rest of the group, this was remarkably anticlimactic, particularly considering the tone of some of the emails exchanged before the meeting. Neal's licensure ultimately erased the on-farm concerns, a process that Amy later referred to as "magic," and allowed us to move forward with the project. As Amy pointed out, the farms still lacked manure application records and well-water tests, two of Carol's major concerns. Neal's washing procedure was nearly identical to David's; both rinsed the greens in three separate water baths, using the exact same sanitizing product. The only significant procedural difference involved drying the lettuce: David used a washing machine where Neal had two industrial, food-grade salad spinners (which looked remarkably like washing machines). Neal also carried the documented blessing of the Department of Inspections and Appeals, which, from Carol's perspective, provided her with the institutional security of an officially inspected facility. Conducting the transaction with Neal's business, rather than directly with the farms, also provided a barrier between the school district and the site of production. Neal would ultimately be liable for any problems with the product.

Never Again Lettuce

This experience led Amy to quip at a statewide farm to school meeting that she would never again attempt to serve local salads to the entire school district. After all the work, the product fortunately was well received by the students. On the day the salads were served, Amy recruited volunteers to attend lunch in all the district's elementary schools to post signs and talk to students about the lettuce. The volunteers reported that many students had several servings of salad and responded positively. I visited two elementary schools and noticed that our lettuce was competing with fresh watermelon, canned peaches and hash-brown potatoes shaped like smiley faces. However, we later learned that

just over half the lettuce we delivered was consumed and that the district disposed of the rest. Since it was served during the last week of school, there was no time to use the leftovers. Carol assured the group that had it been delivered a week earlier, she could have used the rest of the product in subsequent menus.

Discussion

What seemed like a relatively straightforward process — the purchase of one local item for school lunch — became extremely complicated. Even finding an appropriate item to serve, given the kitchens' labor and time constraints and the risky spring weather, was difficult. The initial desire to purchase lettuce from several producers was unrealistic, as only two were willing and able to both sell the required quantity and meet the budget. The growers were used to calculating their prices based on each head of lettuce. They had to estimate the final weight of their lettuce plants to provide the school with a total product weight. Carol's experience at the farms only heightened her concerns about local produce and on-farm food safety issues. While she was generally complimentary about the farms and impressed by the variety of food they were producing, she had many concerns about serving the food in her kitchens. In particular, she noted the lack of documentation of water quality, manure application, and walk-in cooler temperatures. In her job, documentation is critical to maintaining good records that, in case of a food-borne illness or other issue, can illuminate the source of a problem. Carol was especially surprised at the lack of temperature records for the walk-in coolers, as this is a basic procedure in her kitchens. Rosati and Saba assert that individuals tend to be more "worried about those food hazards that [are] well known to them" (2004, p. 499). In Carol's job setting, a cooler that is not holding food at the proper temperature may put products in the HACCP temperature "danger zone" and increase the risk of a food-borne illness. The producers' inattention to this basic hazard, regardless of whether her products would actually be in the coolers, signaled to her an overall lack of understanding of the food safety protocols she required.

In addition, the mechanization of agriculture, often maligned by producers who value the personal attention their food receives, was perceived as a benefit to Carol, who would prefer that the food she serves be touched by human hands as infrequently as possible. Carol's complimentary statements about the lettuce harvesting at Century Farms, where the greens would be sliced directly into a basket rather than be cut by hand, were surprising to Jessica, who extolled the benefits of her hand-picked products. That her family and employees took the personal care to harvest products by hand sets her farm apart from large-scale, mechanized production where planting, weeding, and harvesting is managed entirely by machine or chemically. Interestingly, Carol did not question whether the blade that would cut the salad or the basket into which it would fall was of food-grade material. Public health professionals, including dieticians, often cite human hands as the number-one contaminant (Curtis, 2003; Lillquist, McCabe, & Church, 2005) and view machines, even those stored in farm equipment sheds, as inherently cleaner and safer.

Many food activists have suggested that small, localized food systems are safer than the industrial system (Hewitt, 2010; Pollan, 2006; Schlosser, 2001), in which centralized production and national distribution can result in lightning-fast spread of food-borne illnesses. Poppendieck notes, "product liability is at the manufacturer level" (2010, p. 96). Thus food that is prepared, or "manufactured," elsewhere, buffers the school from potential liability. However, with local food systems, where production is visible and raw agricultural products require further steps before becoming edible, the risks associated with food consumption are more apparent.

Carol's concerns about the on-farm food handling show how with more visibility, came an increase in her perception of the risk associated with local food. After having visited the farms, Carol contacted her regular suppliers to inquire about their requirements for growers. Interestingly, she learned that they do not have any of the information from growers that she was requiring from the local farmers (such as water testing information and chemical application schedules). However, their corporate assurances, coupled with significant

liability insurance, effectively alleviated the potential risks associated with food production. Ultimately, when purchasing from a large distributor, Carol as food service director does not bear the entire responsibility for the safety of the food. She still must oversee the processes in her kitchens and ensure that her employees are following all food safety protocols (e.g., wearing gloves and hairnets and using good hygiene practices), but her distributor is responsible for the food-handling practices prior to delivery. Using local food requires that Carol also take responsibility for the processes on the farm, which has previously not been under her purview. The ultimate success of the project was based on our ability to use Neal's facility to process the lettuce and his willingness to take on the burden of distribution and liability. When he purchased and resold the lettuce to the school, in effect becoming the "manufacturer," he relieved Carol of the potential liability involved in directly purchasing and processing the lettuce in her own kitchens. Neal's business model closely resembles the vendors Carol typically works with, despite its small size. He has official paperwork from the Department of Inspections and Appeals, which validates his commitment to food safety. He documents cooler temperatures in the greenhouse and in the refrigerated truck and his liability insurance is adequate. His procedure is nearly identical to that of growers who are not inspected or certified, but the official inspection status validates his process to other institutions.

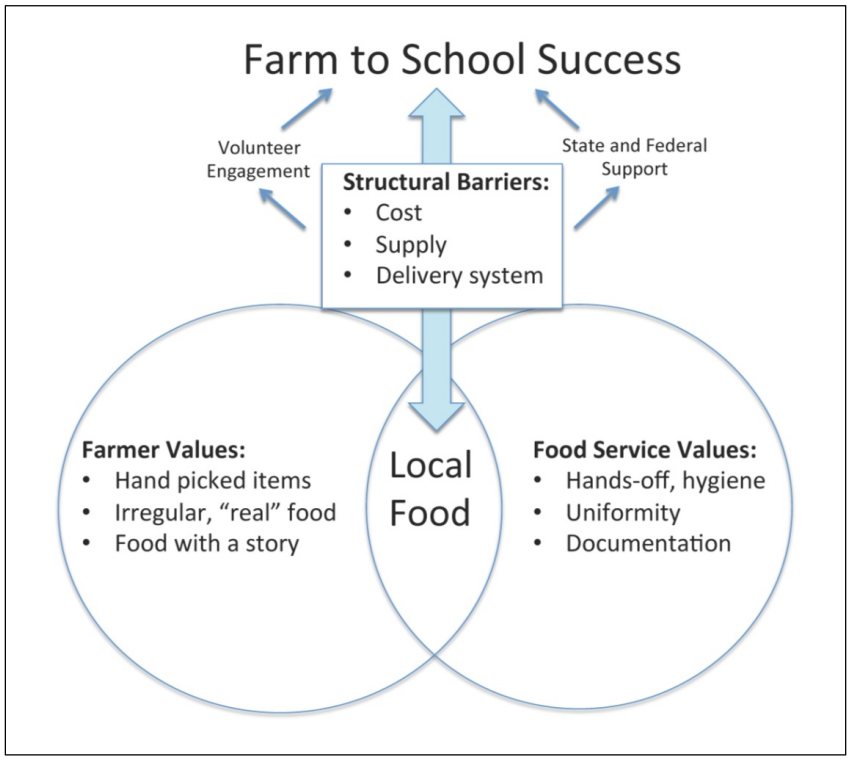
In summary, the key challenges in this project turned out not to be related to the more structural barriers of cost, supply, or delivery systems. The group had access to state funding and was able to fairly quickly identify growers who could provide the necessary quantity. The growers were able to be flexible with delivery and, despite differences in methods, were able to calculate the required quantity in advance. Finally, the project was able to offset the school's labor expenses by finding volunteers to wash and chop the lettuce. It was more difficult to overcome the different approaches to food handling and procedure. While all parties valued the inclusion of fresh, local food in school lunches, there were divergent opinions on the characteristics of the food. In this case, the local food farmer promoted the individual story of his or her hand-picked produce, whereas the food service director emphasized hygiene, uniformity, and documentation (see Figure 1).

Conclusions

Recording experiences of interactions like these helps us better understand the often complicated process of making local foods acceptable for institutions. The consistent, high volumes required by

Figure 1. System for Farm to School Success

Though many of the structural barriers to farm to school programs are being addressed by public funding and volunteer engagement, addressing divergent values of participants has proven more difficult.



schools can potentially increase local food capacity. Many scholars have explored the structural barriers to local purchasing related to cost, supply, and distribution. These tangible barriers have also received the most attention and intervention. Grant programs from USDA along with state support and funding have provided financial resources and logistical support to school districts to build sustainable procurement systems. In addition, the popularity of farm to school has resulted in high volunteerism and community engagement around farm to school projects.

Nevertheless, the social interactions of various actors are also highly relevant and it is critical that farm to school practitioners recognize the extent to which different viewpoints about best practices can affect the purchasing process. Farmers and school food buyers may have vastly different approaches to food handling. Local food farmers have developed marketing strategies that emphasize individuality and personal handling of their products. School food service personnel, however, emphasize regularity and precise record-keeping, which ensures appropriate quantities and validates the safety of the food.

Farm to school practitioners can address some of these challenges by facilitating communication between farmers and food service directors whenever possible. Inviting farmers into school kitchens to observe the procedures and requirements of institutional kitchens will help them understand the high priority placed on food safety and documentation. Likewise, improving the agricultural literacy of food service personnel may reduce some of the fears about purchasing directly from farmers. Food service buyers who have no farming experience, like Carol in this case study, may be surprised by the fast-paced, and dirty, realities of growing and harvesting produce. Enhancing the farm to school component of the USDA Produce Safety University course with a farm field trip, or farmer guest speakers, could improve agricultural knowledge among food service staff. Ultimately, farm to school advocates will be best served by addressing knowledge gaps for *both* farmers and food service buyers.

More qualitative research in this area would be welcome. Additional data from interviews and focus groups with both farmers and food service directors could provide further insight into the challenges of introducing unprocessed, local products into institutional kitchens. In addition, ethnography, which attends to what participants both say and do, can illuminate subtle social barriers. Surveys and supply chain analyses may suggest that local purchasing is valued and feasible; however, close observation of participants' interactions reveals the ways that differences in knowledge, training, and point of view can create barriers for farm to school programs. Most beneficial may be a combination of methods in order to take a truly systemic approach, in which tangible barriers such as cost and supply are assessed along with qualitative attention to the knowledge and viewpoints of farmers, food service personnel, and farm to school volunteers (such as parents or teachers). Comparative studies across regions would improve our understanding of how farm to school programs are successful, or not, in different environmental and social contexts. Enhanced qualitative research in farm to school programs will shed further light on the dynamics of these interactions and could lead to a meaningful middle ground on which the farmer and the food service director can meet.

References

Bagdonis, J. M., Hinrichs, C. C., & Schafft, K. A. (2009). The emergence and framing of farm-to-school initiatives: Civic engagement, health and local agriculture. *Agriculture and Human Values, 26*(1–2),107–119. http://dx.doi.org/10.1007/s10460-008-9173-6

Belasco, W. J. (2007). *Appetite for change: How the counterculture took on the food industry* (2nd updated ed.). Ithaca, New York: Cornell University Press.

Cooper, A., & Holmes, L. M. (2006). *Lunch lessons: Changing the way we feed our children.* New York: Harper Collins Publishing.

Curtis, V. (2003). Talking dirty: How to save a million lives. *International Journal of Environmental Health Research, 13*(Supplement 1), S73–S79. http://dx.doi.org/10.1080/0960312031000102822

DeLind, L. B. (1999). Close encounters with a CSA: The reflections of a bruised and somewhat wiser anthropologist. *Agriculture and Human Values, 16*(1), 3–9. http://dx.doi.org/10.1023/A:1007575521309

Fink, D. (1998). *Cutting into the meatpacking line: Workers and change in the rural Midwest*. Chapel Hill: The University of North Carolina Press.

Friedmann, H. (2007). Scaling up: Bringing public institutions and food service corporations into the project for a local, sustainable food system in Ontario. *Agriculture and Human Values, 24*(3), 389–398. http://dx.doi.org/10.1007/s10460-006-9040-2

Goldschmidt, W. (1978). *As you sow: Three studies in the social consequences of agribusiness*. Montclair, New Jersey: Allanheld, Osmun.

Grey, M. A. (2000). "Those bastards can go to hell!" Small-farmer resistance to vertical integration and concentration in the pork industry. *Human Organization, 59*(2), 169 –176. http://sfaa.metapress.com/content/113218/

Hamm, M. W. (2008). Linking sustainable agriculture and public health: Opportunities for realizing multiple goals. *Journal of Hunger and Environmental Nutrition, 3*(2–3), 169–185. http://dx.doi.org/10.1080/19320240802243241

Hewitt, B. (2010). *The town that food saved: How one community found vitality in local food*. New York: Rodale.

Horwitz, R. P. (1998). *Hog ties: Pigs, manure, and mortality in American culture*. New York: St. Martin's.

Ikerd, J. E. (2011). Local food: Revolution and reality. *Journal of Agricultural and Food Information, 12*(1), 49–57. http://dx.doi.org/10.1080/10496505.2011.540557

Izumi, B. T., Alaimo, K., & Hamm M. W. (2010). Farm-to-school programs: Perspectives of school food service professionals. *Journal of Nutrition Education and Behavior, 42*(2), 83–91. http://dx.doi.org/10.1016/j.jneb.2008.09.003

Janssen, B. (2010). Local food, local engagement: Community-supported agriculture in eastern Iowa. *Culture and Agriculture, 32*(1), 4–16. http://dx.doi.org/10.1111/j.1556-486X.2010.01031.x

Joshi, A., Misako Azuma, A., & Feenstra, G. (2008). Do farm-to-school programs make a difference? Findings and future research needs. *Journal of Hunger and Environmental Nutrition, 3*(2–3), 229–246. http://dx.doi.org/10.1080/19320240802244025

Kloppenburg, J., Jr. (1991). Social theory and the de/reconstruction of agricultural science: Local knowledge for an alternative agriculture. *Rural Sociology, 56*(4), 519–548. http://dx.doi.org/10.1111/j.1549-0831.1991.tb00445.x

Kloppenburg, J. R. Jr., Lezberg S., De Master, K., Stevenson, G. W., & Hendrickson, J. (2000). Tasting food, tasting sustainability: Defining the attributes of an alternative food system with competent, ordinary people. *Human Organization, 59*(2), 177–186. http://sfaa.metapress.com/content/113218/

Lillquist, D. R., McCabe M. L., & Church, K. H. (2005). A comparison of traditional handwashing training with active handwashing training in the food handler industry. *Journal of Environmental Health, 67*(6), 13–16.

Lyson, T. A. (2004). *Civic agriculture: Reconnecting farm, food, and community*. Medford, Massachusetts: Tufts University Press.

Murray, D. L., & Raynolds, L. T. (2000). Alternative trade in bananas: Obstacles and opportunities for progressive social change in the global economy. *Agriculture and Human Values, 17*(1), 65–74. http://dx.doi.org/10.1023/A:1007628709393

National Farm to School Network. (n.d.). *The benefits of farm to school*. Retrieved from http://www.farmtoschool.org/Resources/BenefitsFactSheet.pdf

Pollan, M. (2006). *The omnivore's dilemma: A natural history of four meals*. New York: Penguin Books.

Poppendieck, J. (2010). *Free for all: Fixing school food in America*. Berkeley, California: University of California Press.

Rich, R. (2006). "This little piggy went to market; this little piggy stayed home": Contracts and live-hog markets in Illinois, 1993–2000. *Culture and Agriculture, 28*(1), 45–63. http://dx.doi.org/10.1525/cag.2006.28.1.45

Roche, E., & Kolodinsky, J. M. (2011). Overcoming barriers to providing local produce in school lunches in Vermont. *Journal of Agriculture, Food Systems, and Community Development, 1*(3), 89–97. http://dx.doi.org/10.5304/jafscd.2011.013.012

Rosati, S., & Saba, A. (2004). The perception of risks associated with food-related hazards and the perceived reliability of sources of information. *International Journal of Food Science and Technology, 39*(5), 491–500. http://dx.doi.org/10.1111/j.1365-2621.2004.00808.x

Schlosser, E. (2001). *Fast food nation: The dark side of the all-American meal*. New York: Harper Perennial.

Story, M., Nanney, M. S., & Schwartz, M. B. (2009). Schools and obesity prevention: Creating school environments and policies to promote healthy eating and physical activity. *Milbank Quarterly, 87*(1), 71–100. http://dx.doi.org/10.1111/j.1468-0009.2009.00548.x

Stull, D. D. (2000). Tobacco barns and chicken houses: Agricultural transformation in western Kentucky. *Human Organization, 59*(2), 151–161. http://sfaa.metapress.com/content/113218/

Swenson, D. (2009). *Investigating the potential economic impacts of local foods for southeast Iowa*. Ames, Iowa: Leopold Center for Sustainable Agriculture, Iowa State University. Retrieved from http://www.leopold.iastate.edu/pubs-and-papers/2010-01-local-foods-southeast-iowa

U.S. Department of Agriculture [USDA]. (2014). *National count of farmers market directory listing graph: 1994–2014*. Retrieved Dec. 3, 2014, from http://www.ams.usda.gov/AMSv1.0/FARMERSMARKETS

Vogt, R. A., & Kaiser, L. L. (2008). *Still* a time to act: A review of institutional marketing of regionally-grown food. *Agriculture and Human Values, 25*(2), 241–255. http://dx.doi.org/10.1007/s10460-007-9106-9

Winter, M. (2003). Embeddedness, the new food economy and defensive localism. *Journal of Rural Studies, 19*(1), 23–32. http://dx.doi.org/10.1016/S0743-0167(02)00053-0

Ziegenhorn, R. (1996). An alternative model: Swine producer networks in Iowa. In K. M. Thu & E. P. Durrenberger (Eds.), *Pigs, profits, and rural communities* (pp. 170–182). Albany, New York: State University of New York Press.

Ziegenhorn, R. (2000). The commodification of hybrid corn: What farmers know. In A. Haugerud, M. P. Stone, & P. D. Little (Eds.), *Commodities and globalization* (pp. 135–150). Lanham, Maryland: Rowman and Littlefield.

Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
www.AgDevJournal.com

Gardeners, locavores, hipsters, and residents: An alternative local food market's potential for "community" building

Yuki Kato*
Tulane University

Submitted March 15, 2014 / Revised July 2 and August 4, 2014 / Accepted September 1, 2014 / Published online December 10, 2014

Citation: Kato, Y. (2014). Gardeners, locavores, hipsters, and residents: An alternative local food market's potential for "community" building. *Journal of Agriculture, Food Systems, and Community Development, 5*(1), 145–159. http://dx.doi.org/10.5304/jafscd.2014.051.013

Abstract

The term *community* is frequently cited in the mission statements of alternative food projects, though what it signifies in vision and practice is rarely made explicit. This case study examines an alternative food market in a New Orleans neighborhood that operates a market that is modeled after CSA and on-site community gardens. Based on ethnographic observation and interviews with community gardeners, market staff, volunteers, customers, and local residents, this paper explores different views of "community" in relation to the market's practices. Data analysis identified four communities in relation to the organization: community gardeners, conspicuous locavores, hipsters, and local residents. The paper shows how each community has a distinct set of expectations for the organization's role in the community and demonstrates that some of them value enhancement of social connections through their involvement with the organization more than others. The findings do not demonstrate a unified community emerging around this organization; none of the communities has staked a claim yet on the organization. Some missed opportunities for bridging these communities can be attributed to the operational and physical structures of the organization, some of which, ironically, were intended to enhance community involvement. On the basis of these findings, I conclude that the alternative food movement may not necessarily create a unified community with shared goals, but this should not necessarily be considered a failure of community building. I also call for alternative food scholarship and praxis to examine the movement's impact on individuals and groups beyond the core, committed members.

Keywords

alternative food networks, community development, community gardening, community supported agriculture, CSA, food justice, urban agriculture

* Yuki Kato, Department of Sociology, Tulane University; 220 Newcomb Hall; New Orleans, Louisiana 70118-5698 USA; +1-504-862-3010; ykato@tulane.edu

Introduction

The last decade has witnessed the rising popularity and visibility of alternative food networks (AFNs) and various urban agricultural activities, such as urban gardening, farmers markets, and community-supported agriculture programs (CSAs) in the United States. Some scholars who have examined AFNs have focused on the meaning of "community" in relation to urban agriculture (e.g., Alkon & McCullen, 2011; Lyson, 2004; Macias, 2008; Schmelzkopf, 1995). Lyson (2004) advocates "civic agriculture" as a way of reconstituting the relationship between agricultural production and consumers in order to have more direct and locally oriented food production and distribution. DeLind (2002) builds on this notion of community engagement and encourages development of nonmarket aspects of the grower-consumer relationship.

In practice, AFN organizations often cite "community" in their mission statements, despite the multifaceted definitions of this term (Kurtz, 2001; Nettle, 2014). Studies have explored which operational structures of AFNs enhance interactions among the participating individuals (Kurtz, 2001; Macias, 2008) and how a sense of community is experienced by community gardeners, CSA members, or farmers market patrons (Glover, 2004; Ostrom, 2007; Saldivar-Tanaka & Krasny, 2004). Other studies have investigated the extent to which community engagement motivates AFN participants to become socially active (Cox, Holloway, Venn, Dowler, Hein, Kneafsey, & Tuomainen, 2008) or how the social impact of AFN activities may extend beyond gardening or distributing food and enable mobilization toward other social issues faced by the community (Armstrong, 2000; Nettle, 2014; Ohmer, Meadowcroft, Freed, & Lewis, 2009).

In many studies of AFNs' community-building potential, the focus has been on the AFN's impact on those who are committed to the movement as organizers, volunteers, or even consumers (e.g., Kingsley & Townsend, 2006; Kurtz, 2001; Nettle, 2014) and less on those who are less involved or simply in geographic proximity to these activities. In this paper, I investigate how individuals on the periphery of the movement may view and anticipate AFN activities' impact on their communities, with particular attention to the movement's potential for bridging disparate communities. Based on interviews and ethnographic observation at an alternative local food market with on-site gardens in New Orleans, I identify four distinct communities in relation to the organization. In the concluding section, I return to the way that AFN scholarship has defined and assessed the movement's community-building capacity and propose a broader definition of community that focuses on the movement's effects on the values and actions of the less committed participants.

AFNs' Community-Building Potential

Studies of AFNs' capacity for community development thus far have conceptualized community as two general constructs: as a community of involved participants centered around a particular AFN project, such as a community garden or CSA, or as a residential unit or a social group with whom the AFN project's mission statement aims to engage. Overall, the literature suggests that not all AFN activities have community-building capacities, though some AFN projects have been more effective than others in fostering social capital or a sense of community among the participants. This section reviews the previous research on the factors that affect an AFN's community-building potential and examines how these studies define and measure "community."

Regarding the conceptualization of community as a group of involved participants, scholars have examined the social connections and values ascribed to the relationships among the organizers and committed supporters of AFN activities, such as community gardeners and CSA members (e.g., Allen, Alaimo, Elam, & Perry, 2008; DeLind, 1999; Nettle, 2014). "Community development" in these studies is often defined as the quality and quantity of social capital that the activity produces (Glover, 2004; Kingsley & Townsend, 2006; Macias, 2008), although this way of defining and identifying community in relation to an AFN may not fully capture the complexity of the concept as it is understood and negotiated by the participants (Kurtz, 2001; Nettle, 2014). Social capital, as operationalized by Putnam (2000), refers to social connections that foster civic engagement, while Bourdieu's (1984) use of the term highlights how

an individual's social ties inform his or her cultural practices, which serve as a mechanism of social distinction. Both definitions are relevant to AFN participants' social ties because social capital serves as the motivation of their engagement with the movement, yet these connections may occur in an insular circle of like-minded people.

The extent to which these individuals develop social capital depends in part on the project's operational structure. For example, studies of CSAs find that without an explicit commitment structure, member participation as volunteers on the farm or in other aspects of the operation tends to be low, especially among those whose enrollment was motivated by subsidized membership and not ideological commitment (Andreatta, Rhyne, & Dery, 2008; Hinrichs & Kremer, 2002). But among strongly committed CSA members, direct contact with the farmers and other members, many of whom are middle-class and highly educated, could foster strong relationships (Cox et al., 2008; Macias, 2008; Ostrom, 2007). Among AFN activities, community gardens are associated with stronger social capital development (Glover, 2004; Nettle, 2014; Saldivar-Tanaka & Krasny, 2004) because gardeners work in the same space and share tools and responsibilities (Macias, 2008). Nevertheless, some of these connections may be experienced only within the context of gardening and not in the participants' general social activities (Kingsley & Townsend, 2006). While farmers markets can provide a place for direct interactions between farmers and consumers (Alkon & McCullen, 2011; Macias, 2008), thus creating a strong sense of community, the racial and class exclusivity of these markets (Alkon & McCullen, 2011; Guthman, 2008; Slocum, 2007) could hinder participation by non-White, lower-income consumers, thus limiting the potential to build connections across racial and class lines. In addition to the operational structure, the physical structure of an AFN project could affect the level and quality of social interactions among the participants. Tending individually assigned garden beds results in less interaction with other gardeners than working on communal gardens (Kurtz, 2001), for example, and fencing and locked gates physically and symbolically exclude outsiders, including nearby residents (Schmelzkopf, 1995).

When community is conceptualized as a spatial or social unit that is not based on association with an AFN, the project's impact on building community refers to the project's relationship with residents of the surrounding area or members of particular racial, ethnic, or income groups. It can also involve the potential of the AFN project to foster social ties within these communities. Some AFN projects explicitly aim to serve a particular community conceptualized in this way (Glover, 2003; Saldivar-Tanaka & Krasny, 2004), while others work with nearby residents as a part of their daily operations (Nettle, 2014). For some AFN participants, their engagement with the AFN motivates them to expand their community involvement beyond AFN activism (Armstrong, 2000; Ohmer et al., 2009). Some urban agricultural projects are established explicitly to address broader social issues, such as racial and ethnic inequalities (Morales, 2011; White, 2010), although these projects remain the exception.

Urban agricultural projects could be employed as part of a social mobilization "repertoire" (Nettle, 2014) that plants the seeds for community organizing toward broader social issues. However, studies of the communities being built through these projects have largely focused on the perceptions and experiences of the committed participants. Less understood is the experience of the peripheral participants, especially those who do not strongly identify with the AFN ideologies despite their social or physical proximity to the project. These individuals may include nearby residents, occasional volunteers, or customers of CSAs, community gardens, or farmers markets. It is not surprising that people who are committed to AFN ideologies develop strong ties with like-minded folks. But to understand how participation in AFNs may contribute to the forging of new social ties and a sense of solidarity, investigating how these activities affect less committed individuals is important.

Finally, researchers who have studied AFNs' community-building capacity tend to evaluate community building by examining whether the participants form a cohesive community centered around an AFN project. However, a project may develop multiple communities among different participants,

depending on their identification with the project or AFN ideologies in general, and their expectations of what AFNs represent. In this study, I pay close attention to which "community" individuals have in mind when they discuss their relationship to an AFN organization or to others involved with the organization.

Study Site and Research Methodologies

This article draws data from a qualitative case study conducted at an alternative food market. The study was designed to combine two qualitative data collection methods, ethnography and interview, to examine the market's daily routines with a particular focus on its engagement with the surrounding community. Hollygrove Market and Farm (HMF)[1] is located in the Hollygrove neighborhood in the northwest corner of New Orleans. A local community development corporation established the market to address the lack of access to fresh produce in the area in 2008, following Hurricane Katrina.

At the time of the data collection, three full-time staff members operated the organization with assistance from volunteers in running the markets and maintaining the facility. Its business model combines elements of a CSA and a farmers market. Unlike at a farmers market, growers do not sell produce to the customers themselves. The market buys produce from local and regional growers throughout the week. The market has on-site gardens, and some items grown there are sold at the market's "growers' table." The market offers a CSA-style produce box for US$25 per week. For example, one week's box included sweet potatoes, shiitake mushrooms, radishes, spinach, Brussels sprouts, tomatoes, green onions, Swiss chard, mixed salad greens, and a half-dozen eggs. However, unlike conventional CSAs, on any market day customers may purchase a box without membership or advance payment. Customers may also purchase individual items, and the market has increased the variety and volume of these items over the years. The market also sells dairy products, bread, pies, and other value-added goods. At the time of the study, on-site market hours were held three times a week: at midday on Saturdays and Sundays and on Tuesday afternoons.

For the ethnographic component of the study, the author and two research assistants worked at HMF as volunteers between June 2010 and December 2011. We worked alongside other volunteers doing jobs that ranged from collapsing cardboard boxes to bagging or bundling produce items into specified portions, setting up and maintaining produce baskets during the market hours, and cleaning up. After each observation, which generally lasted 3 to 6 hours per visit, we wrote field notes to describe in detail what we saw and heard, using the grounded-theory method (Glaser & Strauss, 1999). This method emphasizes fieldwork that is not limited by preconceived frameworks or hypotheses but in which the research topics and foci emerge out of keen, objective empirical observations.

I also conducted 30 in-depth, semistructured interviews during fall 2011 with five current and former full-time staff members, six volunteers, seven customers, and six on-site gardeners of HMF. I interviewed 10 residents of the Hollygrove neighborhood, three of whom were on-site gardeners. Interviewees were recruited through several sources. I approached all full-time staff members, and all of them consented to be interviewed. Among the gardeners, those who tended the gardens most regularly, based on ethnographic observations, were recruited for the interview. In determining which volunteers and customers to interview, I used quota sampling to ensure that people who volunteered or shopped on various days and at various times were included. One Tuesday and one Sunday during the same week, I approached one customer approximately every 30 minutes until I had a sufficient number of customers who consented to being interviewed. Similarly, I recruited volunteers on different days during the same week, some of whom I knew as frequent volunteers and others with whom I had never volunteered before. The interview questions asked the interviewees to describe their experiences of working or shopping at HMF, their motivations for getting involved (or not, in the case of some resi-

[1] This is the actual name of the neighborhood and the organization. Pseudonyms are used for individuals quoted in this article to protect their identities.

dents), and their expectations and suggestions regarding HMF's practices.

Both the field notes and the transcribed interviews were coded using Atlas.ti qualitative data organization and analysis software, which accommodates open coding based on the grounded-theory method. Throughout this paper, quotations in italics denote statements from my field notes, which try to duplicate what people said. Because they may not be verbatim quotations, they are distinguished from the interview quotes. The interview quotes were selected on the basis of their representativeness among the interviews to illustrate the varying views of the "community" that HMF is expected to serve.

In addition to the interviews and the ethnographic data, I will also draw data from the survey that I conducted of 147 HMF customers as a preliminary data-collection process for the study. I surveyed the customers on a Tuesday and Saturday of the same week during spring 2011. The 25 questions on the survey covered topics such as customers' demographic information, their general food consumption behaviors (e.g., where they shop for groceries, how often they cook at home, what matters most when deciding what food to buy from which vendors), their motivations for and experiences of shopping at HMF, and their expectations for HMF. While the primary focus of the survey was not to study the customers' views on "community" in relation to HMF, I refer to the descriptive statistics of the responses to a few of the survey questions that are relevant to this article.

Hollygrove Market and Farm and Its Community-Building Visions

In examining HMF's community-building capacities, it is apt to begin with its mission statement:

> Hollygrove Market and Farm exists to increase accessibility of fresh produce to Hollygrove, surrounding underserved neighborhoods, and all of New Orleans while promoting sustainability through support of local farmers and the local economy as well as acting as a demonstration site for environmentally sustainable practices. (Hollygrove Market and Farm, n.d.)

The statement does not explicitly use the term *community* but refers to three geographical areas in expanding order: the neighborhood where HMF is located, "surrounding underserved neighborhoods," and the entire city. The list does not make clear how high a priority is placed on increasing the access to fresh produce in the Hollygrove neighborhood. It also mentions "local farmers," though how the locality is defined is not specified; it could refer to urban growers as well as farmers outside the city, especially in rural agricultural regions of southeast Louisiana. Its mission mentions raising awareness about environmental sustainability but stops short of establishing HMF as a leader in organizing citizens around this topic. Overall, therefore, HMF's goals seem to be focused on the redistribution of locally grown food and on environmental sustainability, and not on building community, although the former does involve developing transactional links between growers and consumers.

When speaking with the staff members, however, I learned that they have variable visions of the role that HMF plays, or ought to play, in building communities — and more importantly, which communities they had in mind. Nate, a White staff member in his late 20s, told me several times during the interview and in my interactions with him during the fieldwork that he saw HMF as a community organization for the Hollygrove neighborhood. On one occasion during my fieldwork, our conversation led to the discussion of the market's popularity among the "Uptowners" from the wealthier section of the city. Nate told me that he thought it was fine that they dominated the market as customers but that *"my goal is to get people to come to the market, so when they sign up to volunteer, we can get them to also help out in the neighborhood."* He worked closely with some neighborhood organizations, including senior citizens' groups, and helped host their meetings at the market's space during non-business hours while the senior center, which was severely damaged during Hurricane Katrina, was under reconstruction. Thus he viewed HMF as a neighborhood organization whose market operation was just one aspect of how it funneled resources into Hollygrove and provided services to the neighborhood residents.

In contrast, Paula, a White staff member in her 30s, did not mention the Hollygrove neighborhood during our interview, and focused more on the local food growers and consumers in the city and the region. For example, asked if she knew where the neighborhood boundaries were, she responded, "I don't know, but [her partner] does." She also used the word "Hollygrove" during the interview to refer to the market, which many customers and volunteers did, while other staff typically called it "Hollygrove Market" to distinguish it from the neighborhood. Residents, on the other hand, commonly referred to HMF as "the farmers market" without including the neighborhood's name in the reference.

Jess, a White staff member in her 20s, saw HMF as helping local growers, as well as the Hollygrove neighborhood, but with a more specific focus on local food production and consumption. In my conversations with her, during both the interview and the fieldwork, it was never clear to me whether she prioritized one over the other. She spent more time working with the growers in her day-to-day management of the market, but she got very excited every time someone from the neighborhood approached her with produce grown in the neighborhood or value-added goods to sell, such as jars of jelly or pies. But her concerns about the neighborhood tended to be on specific issues of food production and consumption, rather than broader issues in the community. For example, she viewed the abundance of vacant lots in the neighborhood as having a huge potential because "that would be ideal, to really start getting some training to neighborhood members that express interest, and have them take over their own lots, then sell it [the produce being grown in these spaces] to us, so be able to support themselves."

In discussing their relationship with the neighborhood, Jess and most other young, White staff members expressed reservations about deciding what the neighborhood *should* do because none of them lived in the neighborhood and they were acutely aware of the racial and age differences between the residents and themselves. Thus hiring someone from the neighborhood was important to many staff members, who felt that their overwhelming whiteness and lack of credentials as "natives" posed problems in building rapport or representing the neighborhood. Unfortunately, efforts to recruit residents for staff positions often failed. One of the resident community gardeners was recruited to be the lead gardener, but he declined the offer, suggesting that he did not want the responsibility, according to the staff and other gardeners. Vera, a community gardener and part-time staff member in her 60s who identifies as racially mixed, recalled HMF's effort to hire someone who was non-White from the neighborhood. She told me that HMF identified one person who fit the description, but "that person never called back." She then pointed out that "they did make an attempt. That's all I can ask for, if you tried to remedy that."

Overall, HMF staff exhibit varying ideas about which community HMF is meant to engage and whether community building should be a priority. Given this variation, it is not surprising that HMF does not yield a unified community centered around it. Nevertheless, I found that HMF does provide opportunities for several smaller, distinct communities to form through its practices. In the subsequent sections I describe what each of these communities derived from HMF and discuss the extent of these communities' interaction with each other. In doing so, I discuss the operational and structural characteristics of HMF that may have contributed to opportunities and limitations in forging new connections among the individuals who are in social or geographic proximity to HMF.

Community Gardeners, Conspicuous Locavores, Hipsters, and Local Residents

I identified four communities in relation to HMF based on people's motives for engaging (or not engaging) with the organization: community gardeners, conspicuous locavores, hipsters, and local residents. In the following section I describe the social interactions among the members of each community and illustrate, using excerpts from the interviews and field notes, the role that HMF plays or is expected to play, from the perspectives of various individuals, for each community. The description of these communities as typologies is meant to organize the modes of participation and expectation theoretically; they are not intended to

classify any particular individual. Not everyone who is involved with HMF or lives nearby belongs to one of the four communities, and a single individual may exhibit characteristics of multiple communities.

Community Gardeners

The community garden plots at HMF are available to anyone, and Hollygrove residents were tending approximately a third of the 16 plots (each 8 feet by 20 feet, or 2.4 m by 6.1 m) at the time of the data collection. The gardeners from the neighborhood are mostly African American retirees, while other gardeners are almost exclusively White and middle-aged or younger. Some grow food for their own consumption, while others sell the produce and plants to HMF or to other customers in varying quantities. Two Mentor Farmers, who provide guidance to the community gardeners, have larger plots on-site.

When discussing their experience at HMF, many gardeners expressed how much they learned from each other, especially from the more experienced gardeners. The community gardeners I met had been gardening for only a few years. For these novice gardeners, receiving hands-on instruction in urban agriculture was essential. Don, an African American gardener and Hollygrove resident in his 60s, took up gardening at home and at the community garden shortly after HMF opened. He described his experience at HMF as follows:

> You know, I never grew mustard greens or spinach, lettuce….[A mentor farmer], he's an asset. [The other mentor farmer], he's an asset. You know, you can go to these people and ask them questions, real growing questions, and they would have answers for you, or they would lead you down the path where you can go out and get what you need.

But these interactions primarily focused on exchanges of horticultural knowledge, or what Macias (2008) calls "natural human capital," and did not develop into a cohesive identity as a gardener community or an HMF community. Don also described how gardening was therapeutic for him to relieve his anger over his troubles with the contractors rebuilding his flood-damaged house. During the ethnography observation period, I often found Don and other gardeners pleasantly conversing with the market customers strolling through the garden. Nevertheless, during the interview he did not talk about his interaction with the HMF visitors as being of particular importance to him, compared to the emphasis he placed on the personal therapeutic and health benefits of gardening.

Like Don, many gardeners viewed HMF as providing a space for their cultivation activities, as well as a way to make money by selling their produce. Karen, another senior African American gardener from the neighborhood, appreciated having the garden plot because it gave her "something to do" as a "pastime." She responded to the question "Do you see a lot of people out here in the garden when you come?" by stating:

> We used to have a nice time just with the gardeners. Everybody doing their own thing, and we could see them and talk and stuff of that nature. And then they had people come in and look at it, especially on Saturdays [during the market hours] I'm not here too much on Tuesdays [another market day], but even on a Tuesday, you have the children come. Kids come with their instructors and come and look at the garden. They, some of the employees, will show them around and educate them about the garden and stuff of that nature.

As Karen describes it ("everybody doing their own thing"), gardeners keep to their assigned individual plots while enjoying pleasant copresence with other gardeners. The gardeners' descriptions and my observations suggest that the relationships among the gardeners rarely extend beyond the HMF space and are often instrumental in nature, with an exclusive focus on gardening. As previous studies have shown (Kurtz, 2001), this situation may be partially due to the individual plot format of the gardens at HMF. Although the gardeners share knowledge and tools, and occasionally have meetings to discuss rules and expectations about how to maintain

the garden, they work independently and on their own schedule.

The remainder of Karen's response describes her observation of people who come into the garden space, including HMF market customers and schoolchildren on field trips. As she points out, tours of the garden are typically led by HMF staff rather than by gardeners, though I often observed the gardeners showing interested adult or young visitors around the garden and even letting children pick small items from their plots on occasion. In doing so, however, the gardeners did not necessarily represent HMF, as indicated by their reference to HMF as "them," not "us."

Despite her positive description of the interaction with other gardeners or visitors, Karen, like other gardeners, mostly talked about what she was currently growing and how much she enjoys being in the garden. Thus, while the gardeners appreciated friendly interactions among themselves and with the market visitors, they did not describe themselves as a distinct group with a shared identity as community gardeners; rather they mostly saw HMF as a great place to get instruction on gardening that enhanced their own horticultural knowledge and skills.

Conspicuous Locavores

Among the customers and volunteers, the attitudes and practices of the group that I call *conspicuous locavores* take on a characteristic of conspicuous consumption (Veblen, 1899), whereby eating local food becomes an expression of cultural capital rather than a means of subsistence. The survey of the customers indicated that access to locally grown food was most likely to be selected as one of the top two reasons for why they shop at HMF (45.6 percent selected this reason), followed by support for local growers (27.9 percent). Other reasons, such as access to food that tastes good (12.2 percent), organic food (9.5 percent), seasonal food (6.8 percent), support for local businesses (8.2 percent), concerns for the environment (6.8 percent) and health (5.4 percent), were also selected. However, "Being part of the community" received the least number of responses as one of the top two reasons for shopping at HMF a 2.7 percent. While not all customers qualify as conspicuous locavores, the survey data indicate that most customers are not motivated by their desire to be a part of HMF community.

This does not mean, however, that the locavores, many of whom are customers, do not find any value in communities in relation to HMF, as I found in my interview data. The sense of community that the locavores feel at the market is directed toward like-minded people, and within this context they were most eager to interact with other locavores. This sentiment was expressed by Bea, a White customer in her 30s:

> This has created a neat sense of community for me... Someone that has the same concerns as you do, whether it's just brushing shoulders, it's just kind of empowering in that way. Being able to go to that place every week and having just small conversations with people, you just go ah, yeah.

Although she had moved to New Orleans only a few months before being interviewed, Bea had been regularly shopping at HMF since she found it on the Internet when searching for an alternative food market. For her, shopping at HMF was not solely about access to locally grown fresh produce but about interactions with other customers with whom she felt that she shared values. That locavores feel a sense of belonging in the market's space is not surprising given the cultural and ideological homogeneity among many farmers market and CSA customers identified in previous studies (Alkon & McCullen, 2011; Guthman, 2011; Slocum, 2007). However, as Bea's example indicates, this friendly interaction tended to remain superficial and fleeting in nature.

Similarly, some locavores enjoyed talking with the gardeners and admiring their gardens, but did not mention the importance of the on-site gardeners' participation as growers for the market. In contrast to the value that the direct agricultural market places on the symbolic "embeddedness" (Hinrichs, 2000; Winter, 2003) of local food, the locavores at HMF did not express a strong desire to interact directly with the growers. Some considered the gardens' proximity a benefit to the farmers ("They can focus on growing instead of driving for

hours"), and others suggested that the format of the market box was more efficient than a standard farmers market in which customers have to go from table to table before deciding what to buy from whom. They also expected HMF to "do the job" of screening the produce so that they could assume the products meet standards for being "locally grown" or "organic."[2]

Conspicuous locavores are more invested in HMF's role in a broader community of locavores in the city rather than the immediate Hollygrove neighborhood. Almost all nonresident interviewees suggested that they would like to see more Hollygrove residents shopping at HMF. Yet, when asked if HMF should further reduce the price of the produce, in addition to the resident discount, their responses remained ambivalent. Carol, a White female in her 20s who volunteers a few times a month at the market, responded:

> Well, it seems like their goal is just to provide local food to the community — maybe not specific to that neighborhood, but New Orleans. Help New Orleans, like Uptown and Mid-City, and provide support for local famers who are selling the products to them.

According to the survey of customers, approximately one third of the market's customers reside in Uptown and Mid-City, which are middle-class neighborhoods in the city. Like Carol, many locavores tended to positively evaluate HMF in terms of its significance to the locavore community. Nora, a White female customer in her 30s who has volunteered at HMF several times, but not regularly, responded to the same question by stating:

> I think it depends on what their mission is. And I don't actually know what their stated mission is. I mean, personally, I think there's a huge need to get healthier foods in their [neighborhood]. So I would love to see that. But if their mission is just to sell fruits and vegetables from local farmers to whoever will buy them then it's a different type of organization if it's one or the other.

Such statements indicate that while expressing concerns regarding the social impact of HMF's operations, locavores do not feel strongly about its priority over the immediate service that matters most to them: making local food available. More importantly, their deferral of the decision to HMF, as indicated by the use of "them" in reference to HMF, suggests that they do not view themselves as stakeholders of the organization.

Hipsters

Compared to the conspicuous locavores, whose focus is on local food consumption, hipsters[3] are drawn to HMF as a part of their anticorporation and anti–mass production ideologies that extend beyond food-related concerns. Some would ride bicycles rather than drive to the market, for example, even in the sweltering heat of a New Orleans summer. While their representation at the market was less than that of conspicuous locavores, their presence was more prominent among the volunteers. I did not gather any systematic demographic information on this community, especially because the individuals who exhibited these attitudes did not necessarily always self-identify as part of this group, but through interactions and observations during my fieldwork, I learned that many of these young adults had moved to New Orleans within the three years prior to the data collection period.

Hipsters are as conspicuous about their commitment to buying local food as locavores are, but I found in their narratives an emphasis on their conscious choice to shop local despite their limited budget. Kendra, a White regular volunteer in her

[2] Many customers assumed that all the items sold at HMF were organic, though this was not the case. The items that were organically or naturally grown were labeled as such, although the market does not apply the label "conventional" to other items. Volunteers were often aware of the differences.

[3] I use the popular cultural vernacular for this group with some hesitation, as the individuals I place into this category may not themselves identify with the label (Greif, 2010). The description of this community, therefore, is not meant to describe the hipster subculture at large but focuses explicitly on its intersection with HMF.

20s, described the differences between the conspicuous locavores and hipsters (although she did not use these terms) among the HMF customers:

> It's a really interesting like display of different folks. I feel like a lot of it is pretty white and pretty at least like upper middle class. Then, there's, like, a decent number of, like, young, white people like me who are, like, poor, but still want to make sure that their money is going to good cause.

Their lack of funds to purchase local food partly explains why some hipsters volunteer at HMF. The volunteers at HMF receive a free produce box for 3 hours of work. As Colin, who volunteers once a week, pointed out, "I know I would not be shopping at Hollygrove if I didn't volunteer and get this basket of produce as part of my work." For Colin and others, their work served to validate their efforts to acquire food they otherwise could not afford, and HMF's volunteer opportunity enabled them to exhibit such commitment. In contrast, many of the locavores indicated during the interview that they had not volunteered at HMF, citing lack of time or interest. The survey found only 5.4 percent of the customers had ever volunteered at HMF. When asked if they planned to volunteer at HMF in the future, 17.0 percent marked "Definitely will volunteer," while 53.1 percent marked "Maybe will volunteer." Among the 24.5 percent of the customers who marked "Maybe will not volunteer" (15.0 percent) and "Definitely will not volunteer" (9.5 percent), 34.0 percent cited "I don't have time" as their reasons for not planning to volunteer at HMF, while only 3.4 percent indicated "I'm just not interested." In this regard, HMF's decision not to require membership or volunteering, unlike typical CSAs, in order to lower the bar for participation, seems to have resulted in an expansion of the business to customers who did not feel compelled to get involved with the organization.

When asked why they volunteer, however, many hipsters emphasized the importance of doing "something good," not just obtaining the free box of produce. Mariella, a White regular volunteer in her early 20s, described her motivation:

> I mean, the free food probably does something, but, at least for me, there's a good probability I would be there without the incentives, and I think that's true of other people I have met who are there. It's almost like something you can do that's productive and you can feel like you've done something good.

Interestingly, however, despite their desire to "do something good" and their friendly interactions with one another, the hipster volunteers did not typically express a strong desire to "be part of the HMF community" or to engage with the Hollygrove neighborhood. Compared to the locavore volunteers, many of whom enjoyed conversing with other locavores about their enthusiasm for locally grown food, the hipster customers or volunteers did not interact with others with the same level of enthusiasm. Based on my interactions with them and observation of their in-group conversations, I also found that their interests expanded beyond food to larger social issues of inequality, the environment, and mass consumer culture.

Given their own financial constraints, one would anticipate them to be more empathetic toward the residents who could not afford to shop at HMF. Rather, their efforts to overcome economic challenges reinforced their notion of food access as a choice, while they also viewed the economic disadvantages of the low-income community to be beyond HMF's capacity to address. As Kendra put it,

> I don't think that, like, Hollygrove is doing something like terribly wrong and if they were doing something better that the Black folks would be flocking to the market. I think that there's, like, a bigger problem, a bigger wall in the way that's, like, social and cultural, and economic and lots of big college words.

Coupled with their celebration of individual solutions to their own financial limitation, such sentiments by the hipsters echo the neoliberal ideologies that some scholars have argued perme-

ate the alternative food movement (Alkon & Mares, 2012; Hinrichs & Eshleman, 2014).

Local Residents

The Hollygrove neighborhood, where HMF is located, suffered significant damage from the flooding that followed Hurricane Katrina. The population has not returned to its pre-Katrina level; it is at 63 percent of the pre-Katrina population, with 92 percent of the approximately 4,000 neighborhood residents identifying as Black or African American (The Data Center, 2014). Most Hollygrove residents I interviewed or interacted with during this study were aware of HMF, although they told me that many of their neighbors did not know that the market existed or were unsure about its practices. Even among interviewees who had visited the market, some had visited only once or twice and decided that it did not suit their needs. Louise, a resident interviewee in her 60s, suggested that the CSA-style box sold at the market did not suit her way of shopping:

> One of the things that I think the individuals here in the community complain about [regarding HMF] is that we want to be able to purchase what we want individually and not in a box or a basket, you know? Let us do it that way. That's what I'm used to doing.

Issues that kept Hollygrove residents away from the market, based on the interviewees' assessments, included the price of the produce, which they considered too high, and the rigidity of the produce box system, as Louise pointed out. Interestingly, her comment reveals that she was unaware that options other than the produce box had been available at the market for at least a year at the time of the interview. Another interviewee wondered aloud how many people in the neighborhood knew about the resident discount, and thought HMF should do more advertising in the neighborhood to publicize the program. HMF's limited business hours, combined with senior citizens' limited mobility due to both physical weakness and lack of vehicle ownership, posed additional barriers to access.

Many resident interviewees who had not shopped, gardened, or volunteered at HMF still knew about it because of the community meetings held there. When I attended the meetings, the agendas included issues of concern to the residents, such as reopening of the neighborhood elementary school that had been closed since Katrina, rebuilding a playground, or public safety. One resident interviewee in her 60s, Alice, described her surprise when she first visited the HMF space during the market hours:

> We used to go on, I think it's Wednesday night, Thursday night, to the meetings we have over there. And it would just be us. And then one time we went over there on a Saturday because we trying to raise money for the seniors. And I was amazed at the people coming. And they have their own little bags and they be coming and toting the stuff from that market. I said, oh, they really do come here. I didn't realize that.

As she describes, the attendees were "just us" at the meetings held during off-hours at the market space, meaning that the residents were not sharing the space with the market visitors. This situation resulted in the customers' and volunteers' not being aware of this alternative use of the market's space for the neighborhood and also did not give the residents an opportunity to see the market in action. Alice described the market scene as "nice," but when asked if she has gone back to the market, she said no, because she cannot walk seven blocks to get there and because "I'm on a fixed income."

When asked how HMF could help the neighborhood, the residents seemed much less interested in the market operations or gardening on site. Some of the interviewees recalled the backyard gardening assistance that HMF had provided in collaboration with another local nonprofit organization during the first months of its operation and wanted to see it reinstated. Patricia, a resident interviewee, pointed out,

> Like I said, those of us that live in this area are homeowners. And most of us are elderly, you know? So it's not easy to go to the

> farmers market. But if they can help us to get the ground in a condition where we could grow our own vegetables, yes, I would grow some vegetables.

Other suggestions by the residents in response to the question "What can HMF do for the neighborhood?" included involving young children and providing job training for youth, but the majority of the resident interviewees did not express a strong expectation that the organization should do more for the neighborhood.

By contrast, many customers and volunteers did not know much about the Hollygrove neighborhood, and the only time that they visited the area was to go to HMF. The following responses by one of the couples I interviewed exemplify a typical response to the question "What do you know about Hollygrove neighborhood?":

> Scott: We're going down there, then we go down to Fig Street [where the market is located], take a right, take another right, go back to Carrolton [Avenue].
>
> Carrie: It's like, yeah, we don't tend to spend time there, other than the market.
>
> Author: You pointed out [earlier in the interview] that it doesn't particularly have a good reputation. But it's not something that would stop you from going to…
>
> Carrie: No, it's not like an issue to me. I've biked there. I'm not concerned about it.

As these comments indicate, while these nonresident HMF supporters did not know much about the neighborhood or intend to spend more time there, none of them expressed concerns about being in the neighborhood. This lack of concern is notable, considering that most of these individuals were aware of the area's crime rates or lack of a good reputation. As mentioned earlier, the use of "Hollygrove" to denote HMF among nonresidents may indicate changing impressions about the neighborhood.

Discussion and Conclusions

This study illustrates how ideas about the community that HMF serves, or is expected to serve, vary among individuals who engage directly or indirectly with the organization. I did not detect signs that a cohesive "HMF community" is emerging among the participants and the local residents, but I found evidence of four communities, each with distinct ideas about how HMF could serve their needs. Overall, these communities — community gardeners, conspicuous locavores, hipsters, and local residents — view themselves as separate entities from HMF. For the gardeners and the locavores, HMF provided places to develop natural human capital (Macias, 2008) and social capital, respectively. Their engagements with HMF fits better with Bourdieus' (1984) definition of social capital than Putnam's (2000), since the individuals did not view their interactions with others as civic engagement. The hipsters valued the market and the volunteer opportunity as a way to exhibit their commitment to broader social concerns. Local residents who are not community gardeners may appear to be disconnected from HMF, though they also benefited by being able to use its space for community meetings. Despite sharing the same physical space, these communities had limited interaction.

At the organizational level, HMF lacks consensus on which communities it should serve or work with, in what ways it should do so, and whether these efforts should be a priority. At the same time, the staff collectively expressed a desire for HMF to do more "for the community." This lack of consensus could have contributed to the staff's limited ability to bring together the multiple communities that are already engaging with HMF. Yet some aspects of HMF's operational structure that were meant to increase community involvement may have ironically limited its community-building capacity. For example, customers are not required to have membership or volunteer their time to shop at the market, and its expanded business hours resulted in people not being at the market at the same time every week (this contrasts with when the market used to be open only one day a week for a few hours). Now, more people are utilizing HMF, but they have less structured interaction. The use of the space for community meetings

during nonmarket hours meant that the residents did not come into contact with customers, volunteers, and gardeners.

Recent scholarship has highlighted the failure of the alternative food movement in engaging marginalized populations (Allen et al., 2008; Guthman, 2008; Hoover, 2013), specifically due to the lack of reflexivity in their practices (DuPuis & Goodman, 2005; DuPuis, Harrison, & Goodman, 2011). Considering such critique in the literature, the persistent disengagement across these groups, and especially the lack of interaction between Hollygrove residents and the other three groups, raises some concerns. Despite the concerns the HMF staff expressed about the social disconnects between the organization and the neighborhood in terms of race, class, age, and nativity, they were not able to bridge these communities. On this point I posit that the fact that HMF has not developed a cohesive community around its praxis does not necessarily mean that it lacks community-building capacity. The scholarship on the community-building capacity of the alternative food movement has typically focused on the quality and quantity of the social ties among the committed, core participants of the movement (e.g., Allen et al., 2008; DeLind, 1999; Nettle, 2014) and has evaluated the capacity in terms of whether a unified sense of community emerges from these interactions. This study shows that those who participate on the margins may also gain some social capital, although the connections may be fleeting and confined to intragroup interactions rather than making sustained ties across the communities.

In this regard, this paper illustrates the complexities of defining "community" in relation to the alternative food movement and identifying the expected outcomes of community building. The copresence of regulars and strangers, and the casual encounters and interactions among visitors at HMF, emulate what Oldenburg (1989) describes as the "third place," a neutral place for urbanites to enjoy a communal atmosphere free from the obligations of home and work. The third place's function is not to build community per se, but to expose heterogeneous urban residents to one another in a safe, leisurely, and not overtly political environment and to give them a sense of community and belonging. In the case of HMF, the market brings people with different interests and expectations to one place on a regular basis, and the HMF site symbolically connects growers, marketers, and consumers. It also brings mostly middle-class, predominantly White individuals to areas of the city that they would not have otherwise visited and allows them to have positive experiences and improve their impression of the area.

The changes that occurred as a result of HMF's establishment in the Hollygrove neighborhood are experienced both individually and collectively. The question remains how best to direct the emerging communities of varying interests and expectations toward new, broader social concerns and actions. Here, the solution may require the organization to go "beyond food" (Passidomo, 2013) in defining and engaging communities.

Acknowledgements

I thank Mary Soule for assistance in analyzing the interview data, as well as all the interviewees for their participation in the study. I also thank the Murphy Institute and the Committee on Research at Tulane University for providing funding for the project. I express gratitude to Karin Horler for her thorough copy-editing of the manuscript. Finally, I would like to thank the editor and the reviewers for their critical and constructive comments on an earlier draft of this paper, which helped to improve significantly its theoretical engagement with the current scholarship.

References

Alkon, A. H., & Mares, T. M. (2012). Food sovereignty in US food movements: Radical visions and neoliberal constraints. *Agriculture and Human Values, 29*(3), 347–359. http://dx.doi.org/10.1007/s10460-012-9356-z

Alkon, A. H., & McCullen, C. G. (2011). Whiteness and farmers markets: Performances, perpetuations . . . contestations? *Antipode, 43*(4), 937–959. http://dx.doi.org/10.1111/j.1467-8330.2010.00818.x

Allen, J. O., Alaimo, K., Elam, D., & Perry, E. (2008). Growing vegetables and values: Benefits of neighborhood-based community gardens for youth development and nutrition. *Journal of Hunger & Environmental Nutrition, 3*(4), 418–439. http://dx.doi.org/10.1080/19320240802529169

Andreatta, S., Rhyne, M., & Dery, N. (2008). Lessons learned from advocating CSAs for low-income and food insecure households. *Southern Rural Sociology, 23*(1), 116–148. http://www.ag.auburn.edu/auxiliary/srsa/index.htm

Armstrong, D. (2000). A survey of community gardens in upstate New York: Implications for health promotion and community development. *Health & Place, 6*(4), 319–327. http://dx.doi.org/10.1016/S1353-8292(00)00013-7

Bourdieu, P. (1984). *Distinction: A social critique of the judgement of taste* (R. Nice, Trans.). Cambridge, Massachusetts: Harvard University Press.

Cox, R., Holloway, L., Venn, L., Dowler, L., Hein, J. R., Kneafsey, M., & Tuomainen, H. (2008). Common ground? Motivations for participation in a community-supported agriculture scheme. *Local Environment, 13*(3), 203–218. http://dx.doi.org/10.1080/13549830701669153

Data Center, The. (2014). Neighborhood Statistical Area Data Profiles [online]. Retrieved June 25, 2014, from http://www.datacenterresearch.org/data-resources/neighborhood-data/

DeLind, L. B. (1999). Close encounters with a CSA: The reflections of a bruised and somewhat wiser anthropologist. *Agriculture and Human Values, 16*(1), 3–9. http://dx.doi.org/10.1023/a:1007575521309

DeLind, L. B. (2002). Place, work, and civic agriculture: Common fields for cultivation. *Agriculture and Human Values, 19*(3), 217–224. http://dx.doi.org/10.1023/A:1019994728252

DuPuis, E. M., & Goodman, D. (2005). Should we go "home" to eat? Toward a reflexive politics of localism. *Journal of Rural Studies, 21*(3), 359–371. http://dx.doi.org/10.1016/j.jrurstud.2005.05.011

DuPuis, E. M., Harrison, J. L., & Goodman, D. (2011). Just food? In A. H. Alkon & J. Agyeman (Eds.), *Cultivating food justice: Race, class, and sustainability* (pp. 283–307). Cambridge, Massachusetts: MIT Press.

Glaser, B. G., & Strauss, A. L. (1999). *The discovery of grounded theory: Strategies for qualitative research*. New Brunswick, New Jersey: Transaction.

Glover, T. D. (2003). The story of the Queen Anne Memorial Garden: Resisting a dominant cultural narrative. *Journal of Leisure Research, 35*(2), 190–212. Retrieved from http://js.sagamorepub.com/jlr/article/view/605

Glover, T. D. (2004). Social capital in the lived experiences of community gardeners. *Leisure Sciences, 26*(2), 143–162. http://dx.doi.org/10.1080/01490400490432064

Greif, M. (2010, October 24). What was the hipster? *New York Magazine*. Retrieved from http://nymag.com/news/features/69129/

Guthman, J. (2008). "If they only knew": Color blindness and universalism in California alternative food institutions. *The Professional Geographer, 60*(3), 387–397. http://dx.doi.org/10.1080/00330120802013679

Guthman, J. (2011). "If they only knew": The unbearable whiteness of alternative food. In A. H. Alkon & J. Agyeman (Eds.), *Cultivating food justice: Race, class, and sustainability* (pp. 263–282). Cambridge, Massachusetts: MIT Press.

Hinrichs, C. C. (2000). Embeddedness and local food systems: Notes on two types of direct agricultural market. *Journal of Rural Studies, 16*(3), 295–303. http://dx.doi.org/10.1016/S0743-0167(99)00063-7

Hinrichs, C. C., & Eshleman, J. (2014). Agrifood movements: Diversity, aims, and limits. In C. Bailey, L. Jensen & E. Ransom (Eds.), *Rural America in a globalizing world: Problems and prospects for the 2010s* (pp. 138–155). Morgantown, West Virginia: West Virginia University Press.

Hinrichs, C. C., & Kremer, K. S. (2002). Social inclusion in a Midwest local food system project. *Journal of Poverty, 6*(1), 65–90. http://dx.doi.org/10.1300/J134v06n01_04

Hollygrove Market and Farm. (n.d.). Who we are. Retrieved April 6, 2012, from http://hollygrovemarket.com/content/5670

Hoover, B. (2013). White spaces in Black and Latino places: Urban agriculture and food sovereignty. *Journal of Agriculture, Food Systems, and Community Development, 3*(4), 109–115. http://dx.doi.org/10.5304/jafscd.2013.034.014

Kingsley, J. Y., & Townsend, M. (2006). 'Dig in' to social capital: Community gardens as mechanisms for growing urban social connectedness. *Urban Policy and Research, 24*(4), 525–537. http://dx.doi.org/10.1080/08111140601035200

Kurtz, H. (2001). Differentiating multiple meanings of garden and community. *Urban Geography, 22*(7), 656–670. http://dx.doi.org/10.2747/0272-3638.22.7.656

Lyson, T. A. (2004). *Civic agriculture: Reconnecting farm, food, and community*. Medford, Massachusetts: Tufts University Press.

Macias, T. (2008). Working toward a just, equitable, and local food system: The social impact of community-based agriculture. *Social Science Quarterly, 89*(5), 1086–1101. http://dx.doi.org/10.1111/j.1540-6237.2008.00566.x

Morales, A. (2011). Growing food *and* justice: Dismantling racism through sustainable food systems. In A. H. Alkon & J. Agyeman (Eds.), *Cultivating food justice: Race, class, and sustainability* (pp. 149–176). Cambridge, Massachusetts: MIT Press.

Nettle, C. (2014). *Community gardening as social action*. Farnham, UK: Ashgate.

Ohmer, M. L., Meadowcroft, P., Freed, K., & Lewis, E. (2009). Community gardening and community development: Individual, social and community benefits of a community conservation program. *Journal of Community Practice, 17*(4), 377–399. http://dx.doi.org/10.1080/10705420903299961

Oldenburg, R. (1989). *The great good place: Cafés, coffee shops, community centers, beauty parlors, general stores, bars, hangouts and how they get you through the day*. New York: Paragon House.

Ostrom, M. R. (2007). Community supported agriculture as an agent of change: Is it working? In T. A. Lyson & C. C. Hinrichs (Eds.), *Remaking the North American food system: Strategies for sustainability* (pp. 99–120). Lincoln: University of Nebraska Press.

Passidomo, C. (2013). Going "beyond food": Confronting structures of injustice in food systems research and praxis. *Journal of Agriculture, Food Systems, and Community Development, 3*(4), 89–93. http://dx.doi.org/10.5304/jafscd.2013.034.009

Putnam, R. D. (2000). *Bowling alone: The collapse and revival of American community*. New York: Simon and Schuster.

Saldivar-Tanaka, L., & Krasny, M. E. (2004). Culturing community development, neighborhood open space, and civic agriculture: The case of Latino community gardens in New York City. *Agriculture and Human Values, 21*(4), 399–412. http://dx.doi.org/10.1007/s10460-003-1248-9

Schmelzkopf, K. (1995). Urban community gardens as contested space. *Geographical Review, 85*(3), 364–381. http://dx.doi.org/10.2307/215279

Slocum, R. (2007). Whiteness, space and alternative food practice. *Geoforum, 38*(3), 520–533. http://dx.doi.org/10.1016/j.geoforum.2006.10.006

Veblen, T. (1899). *The theory of the leisure class: An economic study of institutions*. New York: Macmillan.

White, M. M. (2010). Shouldering responsibility for the delivery of human rights: A case study of the D-Town farmers of Detroit. *Race/Ethnicity: Multidisciplinary Global Contexts, 3*(2), 189–211. http://www.jstor.org/stable/10.2979/RAC.2010.3.2.189

Winter, M. (2003). Embeddedness, the new food economy and defensive localism. *Journal of Rural Studies, 19*(1), 23–32. http://dx.doi.org/10.1016/S0743-0167(02)00053-0

Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
www.AgDevJournal.com

Conceptualizing community buy-in and its application to urban farming

Melissa N. Poulsen,[a] * Marie L. Spiker,[b] and Peter J. Winch [a]
Johns Hopkins Bloomberg School of Public Health

Submitted August 11, 2014 / Revised October 8, 2014 / Accepted November 21, 2014 / Published online December 16, 2014

Citation: Poulsen, M. N., Spker, M. L., & Winch, P. J. (2014). Conceptualizing community buy-in and its application to urban farming. *Journal of Agriculture, Food Systems, and Community Development, 5*(1), 161–178. http://dx.doi.org/10.5304/jafscd.2014.051.014

Abstract

Supporters of urban farming — a type of urban agriculture that emphasizes income generation — view it as a productive use of vacant land, increasing access to fresh produce and contributing to local economies. Yet its viability depends on gaining "community buy-in" (i.e., the acceptance and active support of local residents). While recognized as important to the success of socially oriented programs, information is lacking regarding effective processes for gaining community buy-in. Through participant observation at urban farms and interviews with urban farmers, neighborhood leaders, city residents, and key stakeholders in Baltimore, Maryland, we explored the perceived importance of community buy-in for urban farming, as well as the barriers, facilitators, and strategies for gaining such buy-in. Findings reveal consensus regarding the importance of buy-in, justified by farms' vulnerability to vandalism and the need to align farm services with local residents' desires. Barriers to buy-in include unfamiliarity of residents with urban farming, concerns about negative impacts on the neighborhood, and perceptions of urban farms as "outsider projects." Buy-in is facilitated by perceived benefits such as access to fresh produce, improvement of degraded lots, employment and educational opportunities, the creation of community centers, and community revitalization. Strategies urban farmers use to gain community support followed three main phases: (1) gaining entry into a neighborhood; (2) introducing the idea for an urban farm; and (3) engaging the neighborhood in the urban farm. We make recommendations based on these three phases to assist urban farmers in gaining community buy-in and discuss themes that can be applied to community buy-in processes more broadly.

[a] Social and Behavioral Interventions Program, Department of International Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA

[b] Human Nutrition Program, Department of International Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA

* *Corresponding author:* Melissa N. Poulsen, 615 North Wolfe Street, Baltimore, Maryland 21205 USA; mpoulsen@jhu.edu

Author note

The research funding for this study was provided through a doctoral fellowship from the Johns Hopkins Environment, Energy, Sustainability, and Health Institute.

Keywords
community acceptance, community buy-in, community participation, local food systems, qualitative methods, urban agriculture, urban farming

Introduction

Urban farming is a type of urban agriculture that emphasizes income-generating agricultural activity. Urban farms are generally categorized as either *community* farms (which are driven by social goals) or *commercial* farms (which are production-focused), and so can be run as nonprofits or for-profits. However, unlike the more familiar community gardens, in which the growers consume their own produce, urban farms grow food for commercial distribution, selling produce through venues such as neighborhood farm stands, farmers markets, and restaurants.

Urban planners, public health practitioners, and local food advocates have promoted urban farming in many U.S. cities, including Baltimore, Maryland, the site of this study. In Baltimore, this enthusiasm stems from concerns about an over-abundance of vacant properties, a lack of access to healthy foods in many low-income neighborhoods, and high unemployment rates, three interrelated problems that urban farms are seen as addressing. Over a dozen urban farms have started in Baltimore since 2010, and while most reflect the efforts of individuals and community groups, the municipal government also supports urban farming, including through an innovative initiative that leases vacant city-owned land to experienced farmers (Baltimore Office of Sustainability, n.d.).

While excitement for urban farming abounds among experts, it is important also to consider the perspectives of city residents whose neighborhoods host urban farms, particularly given critiques of urban agriculture as a white-dominated practice that occurs primarily in black and Latino neighborhoods, with little participation from within those communities (Hoover, 2013). Questioning the inclusivity of urban agriculture, Hoover (2013) recently called for an expanded research agenda that includes the perspectives of more ethnically and racially diverse populations on urban agriculture. Heeding this call and operating under the assumption that urban farming is most viable if it has the support of local communities, the aim of our study was to determine effective processes for gaining the "buy-in" of city residents for urban farming. Drawing upon findings from interviews with urban farmers, neighborhood leaders, residents, and key stakeholders, participant observation of urban farms, and incorporating feedback from a stakeholder dissemination meeting, we explored the perceived importance of community buy-in for urban farming, as well as the barriers, facilitators, and strategies for gaining such buy-in. Based on these findings, we propose a series of recommendations to assist urban farmers in gaining community buy-in for future farming projects that are embraced by local residents.

Conceptualizing Community Buy-in

Though the term "buy-in" originates in the financial sector, it has been adopted by implementers of projects ranging from the promotion of physical activity (Kahn et al., 2002) to tourism development (van der Stoep, 2000) to describe stakeholders', participants', and local community members' acceptance of and willingness to actively support projects. Despite recognition of the importance of community buy-in to a project's success and survival, there appears to be a major gap in the literature regarding effective processes for gaining community buy-in.

Two related concepts have been researched more widely: community participation and community acceptance. *Community participation* refers to "the social process of taking part (voluntarily) in either formal or informal activities, programs and/or discussions to bring about a planned change or improvement in community life, services, and/or resources" (Bracht & Tsouros, 1990, p. 201). This broad definition is appropriate given the many ways that community participation is conceptualized. While a variety of classifications of community participation have been proposed, Morgan (2001) captures the main conceptual dichotomy. The *utilitarian* perspective sees participation as a collaborative effort in which community members agree to collaborate with an externally determined project, often contributing resources in return for some expected benefit. The *empowerment* perspec-

tive sees participation as local community members taking responsibility for identifying and working to solve their own problems.

The risk in labeling what we refer to as "community buy-in" as community participation is that despite categorizations of community participation that include weaker participatory forms, the term often connotes the empowerment perspective. From this perspective, community ownership is seen as a critical outcome of participation, with community members defining their own health or social agenda and committing to long-term community involvement in the project (Bracht & Tsouros, 1990). In contrast, projects seeking community buy-in may desire community input and involvement in project activities, but ownership and control of these (often preconceived) projects ultimately lie with the outside organization.

Community acceptance has not been as widely researched, but research on social acceptance of the placement of renewable energy production sites (e.g., wind farms) may be applicable to our research on urban farming since both relate to community reactions to a physical change in landscape. In a special issue of *Energy Policy* on this topic, community acceptance is defined as acceptance "by local stakeholders, particularly residents and local authorities" (Wüstenhagen, Wolsink, & Bürer, 2007, p. 2685) for decisions and projects. Unlike the empowerment model of community participation, community acceptance is sought for predetermined projects; community involvement is generally limited to the planning phase; and ownership of the project clearly lies with the sponsor. Though there is significant overlap between community acceptance and community buy-in, these concepts are not synonymous in that "acceptance" implies a more passive compliance whereas "buy-in" insinuates active support.

Thus community buy-in is not equivalent to community participation or acceptance, but instead provides a unique end goal that has utility for the introduction of new projects. That said, there are limitations to using the term "buy-in" that should be addressed up front. First, considering its origin in the corporate world, buy-in can carry a financial connotation that may be inappropriate for socially oriented programs. In the case of urban farming, this connotation is not entirely irrelevant, considering that urban farming emphasizes income-generating agricultural activity and commercial urban farms are run as small businesses. Second, community buy-in may be construed as jargon that is not accessible to a lay audience. For these reasons, organizations might choose to use terms such as "community support" when describing their programmatic goals, particularly when communicating with participants. In this paper, we use the term "community buy-in" despite these limitations because (a) we believe it aptly describes the space that lies on the continuum between community participation and acceptance; and (b) the term is frequently used, but poorly described, in the context of health and social justice programming. As such, processes for achieving buy-in within the context of health and social justice programming need to be defined. Through this case study of urban farming in Baltimore, we seek to contribute to the task of determining effective processes for gaining community buy-in.

Methods

We used a qualitative, collective case study methodology to explore the relationship between urban farms located in residential neighborhoods and the residents living in proximity to them. This methodology involves studying an issue through multiple bounded systems (in our case, urban farms) using several sources of information (Creswell, 2007). We deemed this methodology appropriate considering its usefulness in gaining an in-depth understanding of each case, and we employed a *collective* case study approach in order to explore the farm-community relationship among urban farms in different stages of development. Cases comprised three types: (1) "active farms" included neighborhoods where there was an urban farm that had been operational for more than one year (2 sites); (2) "new farms" included neighborhoods where there was a vacant lot where a new urban farm was planned to be established (2 sites); and (3) "rejected farms" included neighborhoods where a proposal to start an urban farm on a vacant lot was withdrawn based on objections from residents (1 site).

Selection of Urban Farming Sites for Case Studies

The farms selected for inclusion were located in residential areas in Baltimore, Maryland, and within direct view of multiple households, thus increasing the relevance and salience of the topic for interviewees. The cases included both community farms and commercial farms. Among the two new farm sites, one had just broken ground at the time data collection began and was in production by the time data collection was complete, while no farming-related activity occurred at the second site during the study period.

The neighborhoods surrounding each farm site were mostly low-income, with a greater proportion of residents living below the poverty line (between 21% and 37%) as compared to Baltimore as a whole (18%). The exception was the rejected farm site, which bordered two neighborhoods, one of which had a lower rate of poverty (12%) than Baltimore as a whole. The majority of residents living in our study sites were black (ranging from 79% to 97% of the neighborhood's population, compared to 64% of all Baltimore residents) (Baltimore Neighborhood Indicators Alliance, n.d.).[1]

Data Collection Procedures

Data were collected from October 2012 to October 2013 by the first two study authors and a trained research assistant. In order to understand the ways in which urban farming projects attempt to gain community support and how residents respond to these efforts, we conducted in-depth interviews with 49 individuals, including key stakeholders with expertise related to urban farming (n=8), urban farmers associated with each site (n=8), and neighborhood leaders (n=12) and adult residents from the study neighborhoods (n=21). Farmers, neighborhood leaders (which included members of neighborhood associations), and key stakeholders were purposively selected for participation. Residents were selected through snowball sampling. All interviewees except key stakeholders received US$20 as an incentive to participate. Interviews were semistructured following prompts from an open-ended discussion guide that was refined over the course of the study to follow up on emergent themes. Interviews lasted approximately one hour and took place at a location of the participants' choosing, frequently a public space such as a library or the relevant urban farm.

In order to gain a contextual understanding of our research sites and the issues discussed during interviews, we also conducted 16 unstructured participant observations (totaling 25 hours) throughout the study period at farm sites in which there was ongoing activity, including volunteering during farm volunteer hours, shopping at neighborhood farm stands, and attending community events held at the farms. Observations focused on who was present during farm activities (including passersby), interactions between individuals, and the attitudes expressed about the urban farm and its relationship to the neighborhood. We wrote detailed notes immediately following each observation. At one new farm site and the rejected site where no activity occurred, we viewed the vacant lot where the proposed farms were to be located.

Data Analysis

Interviews were audio-recorded and transcribed verbatim, and transcripts were pooled by interviewee type (key stakeholders, urban farmers, neighborhood leaders, and residents) for data analysis. Data analysis followed a thematic approach, performed primarily by two of the researchers. We first developed a codebook by identifying themes relevant to our study aim from a subset of interviews. After coding each group of transcripts, we wrote comprehensive summaries for each code illustrated by direct quotations — a process of interpretive review that formed the findings from each interviewee type. We then integrated the summary for each code across interviewee types, looking for points of convergence and divergence. Following this process, we read the participant observation notes, looking for observations relevant to the thematic codes and adding this data to the summaries. Based on these findings, we developed draft recommendations for gaining community buy-in for urban farms. We then held a dissemination meeting during which study participants and other stakeholders provided feedback on the draft recommendations through discussion and

[1] Income data is from 2011; race and ethnicity data is from 2010.

written feedback. This feedback was incorporated into our final set of recommendations.

Data Quality

The credibility of our research was enhanced in several ways. First, the in-depth study of multiple cases led to a richer conceptual interpretation of farm-community relationships. Triangulation of the data through the use of multiple methods of data collection (interviews and participant observation) and interviewee types also improved the study's ability to credibly capture a comprehensive understanding of the community buy-in process. Additionally, conducting numerous interviews among different interviewee types over the course of a year strengthened our confidence in having obtained adequate data saturation. Finally, the dissemination meeting provided an opportunity for member validation of our findings and to refine our recommendations to best reflect the lived experience of our research participants.

Ethical Considerations

The Johns Hopkins Bloomberg School of Public Health Institutional Review Board approved this study. Interview participants provided verbal informed consent prior to participating in the study.

Results

We first discuss our findings related to the importance of community buy-in for urban farming projects. We then describe the barriers and facilitators to achieving buy-in, as well as the strategies farmers and others[2] use to gain community buy-in for urban farming. The final section of our results describes the outcome of our stakeholder dissemination meeting and provides our final set of recommendations.

Importance of Community Buy-in for Urban Farms

We found consensus regarding the importance of community buy-in for urban farms located in residential areas. While neighborhood leaders were most ardent in their views, with several emphasizing the importance of community buy-in to the viability of *any* new project or business that enters a neighborhood, other interviewees saw a specific need for urban farms to become "a part of the neighborhood" since farms are not traditionally located in cities.

Opinions varied as to the degree of community buy-in that is necessary. For example, one farmer stated that a few outspoken naysayers should not "keep you from serving all these other people that live in the neighborhood." In contrast, one key stakeholder noted the difficulty that arises when even a "small minority of people" is opposed to an urban farm:

> It's very hard to say to your neighbor, "I don't care how upset you are. This is going in front of our houses..." Nobody wants to ruin other people's experiences of their safe space, their home space.…It can't really be like a purely democratic process. Like 51% is not enough. (Key stakeholder)

The most common justification for community buy-in provided across interviewees was to build understanding and solidarity so community members will help protect the farm. In the spirit of creating a welcoming atmosphere (and in some cases, to save money), many urban farms are not fenced, so there is little to deter people from entering. Therefore, as one stakeholder stated, if people are opposed to a farm, they "can come in the middle of the night and slash all the plastic up on your hoop house…and stomp on your plants." Many neighborhood leader and resident interviewees confirmed this concern about vandalism, with one resident stating, "If you don't have the neighborhood backing you, then you're pretty much gone.…It's not going to last long. It'll be done in six months."

According to interviewees, engaging neighborhood residents alleviates this concern by creating respect for and a sense of ownership of the farm, which can result in residents keeping an eye out for it. Every urban farmer we interviewed described

[2] We use "urban farmer" to refer to the individuals, organizations, or companies that start and manage an urban farm. For simplicity, we discuss strategies that urban farmers use to gain community buy-in, but in some instances, municipal government offices are also actively involved in this process.

community support as the best form of security for an urban farm, an opinion backed by the fact that our study sites had experienced minimal vandalism.

The second reason given for needing community buy-in relates to the potential of urban farms to serve the surrounding neighborhood. According to some interviewees, urban farmers must engage residents to ensure their projects provide benefits that resonate with local residents, rather than making assumptions about what the neighborhood desires. One stakeholder emphasized the need for a purposeful process to gaining community buy-in if an urban farming project aims to "help" the neighborhood.

> [Otherwise] you're there for this self-righteous idea you have for yourself, but you're not trying to allow the community to grow with your idea…you'll always have that tension there.…I can have the greatest idea, but if people…don't feel the benefits of it because they haven't bought into the idea, then it's really just a great idea that won't go nowhere. (Key stakeholder)

Barriers and Facilitators to Community Buy-in

We identified several common barriers that can negatively affect city residents' views of urban farming, as well as a wide range of perceived benefits associated with urban farming that positively influence residents' reactions. These are summarized with exemplary quotations in Tables 1 and 2.

Table 1. Barriers to Gaining Community Buy-in for Urban Farming Identified in Qualitative Interviews in Baltimore City

Barrier	Exemplary Quotation
Lack of familiarity with urban farming	*People don't have a mental image. They hear "farm" and maybe they picture cows or fields of wheat, or tractors, and they just don't see how that could possibly fit into an urban environment.* (Key stakeholder)
Concern about the appearance of urban farms	*You're not up a dirt road where just your two immediate neighbors are seeing you. You really have a responsibility…to keep it looking sharp, to keep it beautiful.…Where you could have some equipment lying around, or where you could leave a pile of woodchips sitting at the corner of your plot for a while in the country, you just can't do that in the city.* (Key stakeholder)
Fear that an urban farm will attract rats to the neighborhood	*I was thinking about thousands…of rodents just running — all migrating to this one area, you know, and it'll be really a mess.* (Resident, new farm)
Worry that urban farms will fall victim to vandalism	*So far, nobody's done anything to [the farm].…And I'm really kind of surprised.… [Interviewer: …Why's that?] Because it's Baltimore City! You got dysfunctional children, you have drug addicts…and all kinds of people who just constantly coming through this neighborhood.* (Resident, new farm)
Concern about the safety or cleanliness of food grown on urban farms	*There was a lot of concern in the neighborhood. A farm there? [Residents] really didn't think it was a good idea.…'Cause that area was so filthy. There was so much trash. So much rats. A lot of folks threw out mattresses. It was like a dumping ground. It was really bad, I mean not some place you wanna eat from.* (Neighborhood leader, active farm)
Concern that urban farms may replace other potential development	*It's city-owned land that we're talking about, so really, it belongs to the community.…We're choosing land that is not being used for any positive purposes…But still, there is the potential that it could be used for anything. And so to give it — even for a period of just five years — to private individuals for a for-profit purpose, that maybe feels like something is being taken away from you, even if it's just the potential opportunity of something else that could serve people more broadly.* (Key stakeholder)
Distrust of urban farming projects that are run by "outsiders"	*So I think that initially starts with a disbelief in thinking that somebody is coming in — again, white spoiled kids — are coming in to take advantage of their neighborhood. Even though obviously nobody was claiming that land before.* (Resident, active farm)
Concern about the sustainability of urban farms	*You know that we're coming in from the outside, and we have the idea about what's best for your neighborhood, and it's not something that you came up with…It's us just coming in and plopping it down. And then maybe we just walk away, and let it fall to pieces and become an eyesore.…People have experience of that. Sometimes experience that's decades old, but that's still very resonant.* (Key stakeholder)

Table 2. Services Urban Farms Are Perceived to Provide Neighborhoods in Baltimore City

Service	Exemplary Quotation
Increased access to fresh produce	*It's going to bring more people around because like I said, some people like fresh vegetables… people… will come around and want some vegetables, so it's going to be nice for the neighborhood.* (Resident, new farm)
Use of degraded vacant lots for productive uses	*I think it was very exuberant feeling and exciting to see something like [the farm] happening in the area, because before it was just an empty plot of land and when that happens and there's always an accumulation of garbage, bottles, and things of that sort. So just to see a group of people really energized to change it and to also not only do it for themselves, but to give back to the community*. (Resident, active farm)
Employment opportunities for local residents	*We need to create jobs. And this is why I'm more interested in for-profit farming because I think that the value that urban farms can bring to the city is not just the food that it harvests, but I think that there are a thousand jobs that we could create if we were serious about local food production. From composting to growing food, processing food, washing it, packaging it, distributing it, selling it.* (Urban farmer, rejected farm)
Educational opportunities about the provenance of food, agricultural processes, and nutrition, particularly for youth	*People don't understand where your food comes from, how to grow it, why it costs so much. So that's the nice point about urban farming, it shows people what it takes, you know to actually put something on the plate.* (Urban farmer, new farm)
Provision of a central space that brings the community together	*It may sound cliché, but it helps the community grow itself because you have more people that are involved and taking care and you have a sense of, you know, this is mine, this is where I live. You have a sense of pride.* (Resident, active farm)
Revitalization of the broader community	*I think that these urban farms have the potential for urban revitalization. I think they have the potential to take an area that is in a downward spiral, begin positive momentum.* (Urban farmer, new farm)

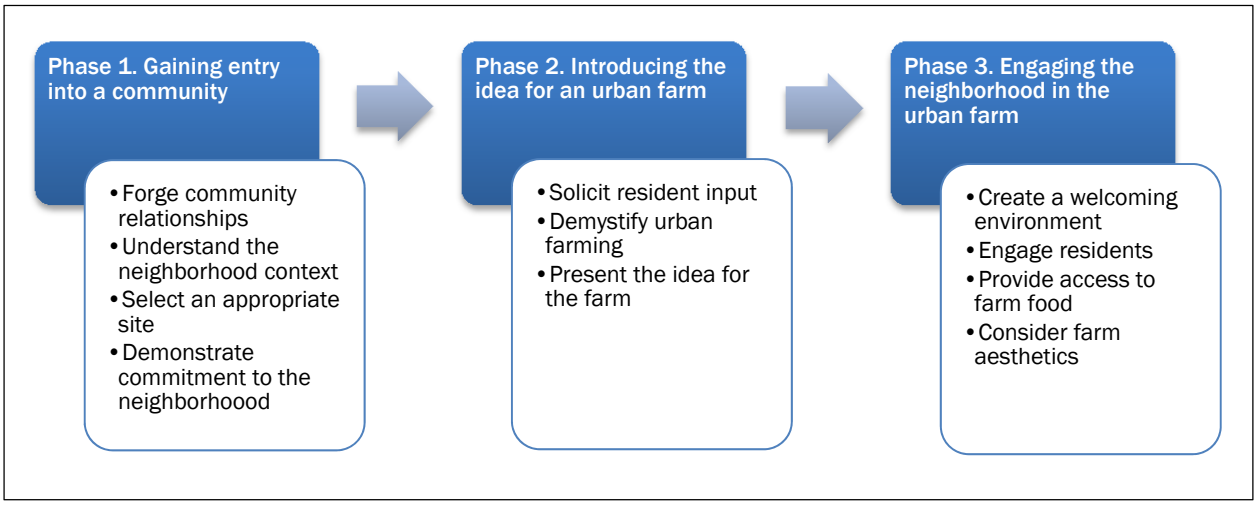
Strategies Used to Gain Community Buy-in

Figure 1 outlines the strategies for gaining community buy-in that emerged from our findings. These strategies fell into three main phases: (1) gaining entry into a neighborhood; (2) introducing the idea for an urban farm to a neighborhood; and (3) engaging the neighborhood in the urban farm.

Phase 1. Gaining entry into a community

The first phase refers to the early strategies urban farmers use to develop ties within a neighborhood. While these were generally discussed as useful for farmers who are not from the neighborhood in which they plan to farm, we found that even those who farmed in their own neighborhood drew upon these strategies to help garner broader support.

Figure 1. Strategies Used by Urban Farmers in Baltimore City to Gain Community Buy-in



Forging community relationships. Interviewees recommended building relationships with individuals and community groups as a way of gaining entry in a neighborhood and as a precursor to all other steps in the process. Interviewees discussed two key strategies to build community relationships: (1) identifying community leaders who can act as champions for the farm, such as civically engaged residents, community association representatives, leaders of community-based organizations, and city council members; and (2) collaborating with community groups with an established presence in the neighborhood.

Most urban farmers we interviewed relied on community associations to facilitate entry into a neighborhood, as these associations can play critical roles in garnering broader community buy-in. These groups were in full support of all the active and new farms in our study before the farmers ever broke ground. A drawback to relying on community associations is that because they are viewed as official entities that can grant "permission" for the development of urban farms, they can obscure the voices of residents outside of the community associations. Several interviewees raised concerns about the lack of representativeness of community associations, particularly at the rejected farm site, where a potentially supportive neighborhood was unable to override opposition to the proposal for a new urban farm from a community association that was viewed as unrepresentative of the neighborhood.

In addition to community associations, some urban farmers we interviewed had established formal partnerships with community-based organizations in the neighborhood. This had facilitated the process of gaining the trust of local residents for the urban farm, alleviating skepticism about the farm being managed by individuals from outside the neighborhood.

Understanding the neighborhood context. To gain entry into a neighborhood, it is important for urban farmers to understand the current and historical context of the neighborhood. One interviewee framed this approach as:

> …recognizing that you're part of an evolving organism of your neighborhood that has been around for a long time. And figuring out how to work with people who are there, and have been there, and have been working on these issues for a long time. And not being really presumptive about what your role might be before building those connections. (Key stakeholder)

Gaining this understanding allows urban farmers to ensure a farm is a reasonable fit for the neighborhood, build on existing resources, and identify ways the urban farm can provide services to the neighborhood that are valued by residents, rather than — as one stakeholder put it — assuming "you know more about what this community needs than what the community knows." One neighborhood leader complimented an urban farmer for such efforts:

> It was clear that they did their research about [the neighborhood]. They looked at something that would be appealing to us and they tailored their message TO us…I feel like it would have shut people off before they even were presented all the great things that, was like, "Y'all don't know this area." But it was clear that they did their research. (Neighborhood leader, rejected farm)

Selecting an appropriate site. A farmer looking for land to start an urban farm must not only consider parameters such as its slope, exposure to sunlight, and soil quality, but also the role it plays in the neighborhood's social environment. For example, trash-filled vacant lots act to degrade neighborhoods, so their transformation to a productive farm is often a welcome change. In contrast, urban farmers in our study avoided vacant lots that were actively used by residents, even when used for informal purposes such as parking for cars. As one farmer explained, "You have to look at the utility of the land…the way that residents look at it."

Demonstrating commitment to the neighborhood. A final strategy in this phase relates to the perception that urban farmers are "outsiders" potentially exploiting the neighborhood's resources.

Based on our findings, this view is more common when farmers are not residents of the neighborhood in which they farm or are of a different race from the majority of residents, and stems from a history of strained racial relations in Baltimore. We found that urban farmers overcome this perception by demonstrating their dedication to the larger neighborhood. Toward this end, some interviewees felt it is important for farmers to move to the neighborhood in which they are farming.

> I do think the ownership has to be local.…Because if not it's just like somebody's just found a good place to plop their factory, and then they go home at night. But you learn so much by being IN the community. (Resident, rejected farm)

Other farmers found acceptance by taking an active role in the community, for example, by attending community association meetings, or by having a visible presence at the farm and engaging passersby.

> In honesty…first I thought the majority of the people that were up there were white people. And I thought it was gonna benefit them. And then, [the farmers] came out in the community strong. And my whole thought just turned around.…They got involved with the community association, they would bring stuff to the meetings, they knocked on every door darn near around here. And they gave samples out.…It wasn't, "Cause we white, we gonna do this and… take it over here..." They gave back right to the community. (Resident, active farm)

Phase 2. Introducing the idea for an urban farm to a neighborhood

The second phase addresses the way in which a farm is introduced to the neighborhood.

Resident input. One of the strongest themes that emerged on gaining community buy-in was the need to allow residents to have a voice in the planning process. Neighborhood leaders warned that not soliciting local input would breed resistance to the farm, regardless of the merits of the project, framing such inclusiveness as a matter of fairness.

> That directly affects our home, not theirs, so for anybody to have more say in it than us, that would not be fair…We're the ones that's going to feel the impact of everything the most. (Neighborhood leader, new farm)

Underscoring these sentiments is the idea that residents should be involved early on, before any farming activity starts. Otherwise, interviewees warned that efforts to involve the community may be seen as self-serving, for example to meet the requirements of a grant. One neighborhood leader applauded the urban farmers in his neighborhood for their early and open approach:

> This is someone who says, "We have an idea. We wanna know what the community thinks about it!…We wanna ENGAGE with you." And that's so different than a lot of people who come into the neighborhood. They have their plans all made up, and they come to the association, and say, "We've got this plans, we've got this money, this is what we're gonna do, we want a letter of support." (Neighborhood leader, active farm)

Demystifying urban farming. Considering that a common barrier to community buy-in for urban farming is city residents' lack of familiarity with the activity, an important component of this phase is to "demystify" urban farming. Many resident interviewees had no exposure to an urban farm until one appeared in their own neighborhood. Most of these interviewees expressed initial skepticism, but across the board, their doubts were alleviated once they saw the farm up and running. To avoid the initial skepticism and give residents an idea of what to expect from an urban farm, interviewees suggested sharing examples of existing farms, for example by using diagrams of potential farm layouts and "before and after" photos of existing urban farms, as well as inviting neighborhood leaders to visit an existing urban farm.

Presenting the idea for an urban farm. Our findings revealed two common approaches to introducing the farm proposal to a neighborhood: presenting at community meetings and going door-to-door to speak with residents living around the potential farm site. Neighborhood leaders expressed appreciation for the high level of detail that urban farmers provided in their presentations, which included potential benefits of the farm, mock-ups of the space, and an explanation of the farm's management.

> Because of that, the simplicity of their presentation, it didn't seem like they were putting on smoke and mirrors. You know, very straightforward, this is it, we're laying it out all before you, there's no behind-the-scenes things that we're trying to keep from your eyes. (Neighborhood leader, rejected farm)

Interviewees also thought it critical to emphasize how an urban farm can benefit a neighborhood and attributed the positive reception some farmers have received to their effective articulation of how a farm would alleviate problems in the neighborhood, such as improving access to fresh vegetables or mitigating illegal dumping on a vacant lot.

Interviewees noted the importance of communicating with residents about their concerns regarding urban farming. Several interviewees specifically recommended proactively addressing widespread concern about farms attracting rats to a neighborhood. This concern was reported to be the main cause of resistance for developing an urban farm at the rejected farm site and escalated so quickly that the farmers never had an opportunity to address the issue.

Phase 3. Engaging the neighborhood in the urban farm

The third phase involves an ongoing process to encourage local residents to engage with the farm. Such efforts appear to positively affect community buy-in by further demystifying urban farming and facilitating respect for the farm.

Creating a welcoming environment. One prerequisite to neighborhood engagement is creating a welcoming and inclusive environment at urban farms, which includes the physical space as well as the manner in which urban farmers interact with the neighborhood. One farmer discussed the importance of having a regular presence in the neighborhood, stating, "I think engaging with people and showing them around makes them feel like they are able to come in and get used to the project." We observed many instances of positive informal engagement with residents. For example, while volunteering at one active farm site, a woman walking by with her children stopped to question the farmer about a plant with which she was unfamiliar. In response, the farmer let each child try harvesting some of the Swiss chard and gave the woman a bunch to try, explaining how to cook it.

Interviewees also shared that a diversity of people involved with a farm creates a more inclusive environment:

> For a lot of people, and certainly I'd say older African American residents, if you haven't been invited onto someone's space and you see them working, that's not your space to enter…So the more people we can get physically on the site itself, shows it's an open space.…And if you don't see…somebody that looks like yourself, you might be less likely to join them. (Neighborhood leader, active farm)

Resident engagement. We found that urban farmers use a variety of strategies to engage residents on the farm, depending on their business model and the preferences of neighborhood residents. Some activities engage the broader neighborhood, such as hosting celebratory events at the farm, offering gardening workshops, creating neighborhood recipe books, and making farm produce available to residents. Other efforts engage a smaller number of residents in ongoing activities, creating strong allies for the farm. For example, at one active farm site, the urban farmers created a community garden on the lot across from the farm, giving residents ownership of part of the farm space. Of note, while volunteerism can create important relationships between volunteers and urban farms, it may not be an option for all city

residents. Some resident interviewees were skeptical that local residents would have the time or desire to volunteer and even worried that an urban farm would not be viable if it relied upon residents' active involvement.

Youth participation was viewed as beneficial to community buy-in, as it provides a gateway for demystifying the farm for their families while also creating constructive activities for youth that are sorely lacking. Youth had become involved at the active farm sites through collaboration between the farms and local elementary schools, family-focused community events, and farm internships. Involvement was often informal; for example, at one active farm we observed that local youth were almost always present when the farmers were working, with one six-year-old girl calling the farm her "backyard."

Access to farm food. A key strategy for connecting local residents to an urban farm is providing access to the farm's produce. Nearly all the neighborhood leaders and residents we interviewed assumed that at least some portion of the food grown at their local urban farm would be made available to residents. This assumption was even made at sites where there were no opportunities for residents to purchase food.

Stakeholders generally suggested being generous with farm produce, giving away samples or selling produce in the immediate neighborhood at a lower price than would be sold at a farmers market in a more affluent neighborhood. However, some interviewees thought giving farm produce away for free would devalue it. As one stakeholder explained, residents are "more likely to eat it if they pay for it…I think that if they just put the food out in a bag and said 'it's for free,' it would just sit there." That said, many neighborhood leaders and resident interviewees assumed that food from an urban farm would be more affordable than supermarket produce since it "cuts out the middle man." Beyond cost, stakeholders discussed the importance of letting local residents have a say in what is grown and explained that many urban farms grow produce that local residents want to eat, even when that means growing certain crops that have a low return on investment.

> Heirloom tomatoes are great, but we gotta get ones that look like the tomatoes in the stores a little bit. We need some orange carrots, we need beets that look standard. (Urban farmer, new farm)

Communication about the farm. The urban community farms we studied communicated with residents in order to keep them apprised of the farm's activities, promote events held at the farm, solicit volunteers, and market the farm's produce. Interviewees reported that the most effective communication strategies were face-to-face strategies such as signage on the farm, flyers given to passers-by, knocking on doors of nearby residents, and providing samples of foods grown on the farm. Some farmers emphasized the importance of simply walking around the neighborhood and having spontaneous social interactions with residents. Others attended community association meetings on an ongoing basis as a part of their communication strategy. The two active farm sites also have an online presence, but urban farmers reported using online methods primarily to communicate with an audience beyond the neighborhood, since many residents do not use these forms of communication.

Farm aesthetics. While urban farms often inherently improve the appearance of a neighborhood by cleaning up the trash that has accumulated in a vacant lot, simply removing trash does not appear to be sufficient for gaining community buy-in. Urban farms face higher aesthetic standards than do rural farms. An added challenge noted by stakeholders is that a farm's first season is a critical time to cultivate community buy-in, but a farm is likely to look messy when farmers are setting up the farm. At one site where the farmers were significantly constrained in the amount of time they could devote to the farm, tension had arisen in the neighborhood regarding the farm's appearance. As a result, we observed many instances in which the farmers integrated considerations of appearance into their decisions about how they used their own and volunteers' time and the crops they planted, hoping to regain the community's goodwill.

Table 3. Summary of Recommendations for Gaining Community Buy-in for Urban Farming

Phase 1. Gaining entry into a neighborhood	
A.	In choosing a farm site, ensure that local residents do not use the space for other purposes (e.g., family gatherings, parking, playfields) and that it provides an opportunity to improve blighted land.
B.	Take steps to gain an understanding of the neighborhood context through such approaches as reaching out to neighborhood leaders, going door-to-door to speak with residents, and attending community meetings.
C.	Avoid assumptions about what local residents desire and take steps to identify ways the urban farm can provide services that they value by speaking with a variety of community leaders and residents.
D.	Forge relationships with community leaders or groups that can champion the idea for the farm and assist urban farmers in understanding the neighborhood context and how to incorporate goals into their project that are meaningful for residents.
E.	Avoid perceptions that an urban farm is an "outsider project" by demonstrating dedication to the neighborhood through active community involvement, such as by attending community association meetings, hosting community events, partnering with local institutions, or informally engaging with residents.
Phase 2. Introducing the idea for an urban farm	
F.	Include local residents in the planning process for a new urban farm through such forums as community meetings or individual conversations with residents living in proximity to the potential farm site.
G.	Demystify urban farming by sharing examples of other urban farms via photographs and tours.
H.	Proactively address common concerns about urban farming, including rats, vandalism, soil contamination, and food safety and sanitation, and explain potential benefits for the local neighborhood.
I.	Use multiple forums to present the idea for the urban farm, including community meetings and engaging residents who live in direct proximity to the potential farm site.
Phase 3. Engaging the neighborhood in the urban farm	
J.	Create a welcoming environment at the urban farm site by engaging passersby, holding events at the farm, creating spaces where local residents can enjoy the green space, and considering ways to involve a diversity of people.
K.	Create a variety of opportunities for residents to be involved, such as an associated community garden, community events, and opportunities for youth.
L.	Provide opportunities for local residents to access farm produce. Consult residents to determine the types of food they prefer and convenient times and locations for distribution, and to ensure food is affordable.
M.	Communicate with residents to encourage their engagement with the farm by distributing flyers, going door-to-door to speak with residents in close proximity to the farm, making announcements at community meetings, or using signage at the farm site.
N.	Maintain and beautify the urban farm to meet residents' expectations for their neighborhood's appearance, including creating a sense of permanence in the space in the off-season (e.g., building structures like sheds and pergolas, planting trees).

Recommendations and Feedback from Dissemination Meeting

Drawing upon these findings, we designed draft recommendations to assist urban farmers in their community buy-in efforts. The Appendix lists these draft recommendations and displays the ratings and comments received through the feedback process. There was little variation in ratings, with most recommendations viewed as moderately feasible for farmers to put into practice and quite beneficial to residents.

We drew upon this feedback to develop a final set of recommendations, which are presented in Table 3. While our findings suggest that community buy-in is essential for all urban farms located in residential areas, the degree to which urban farmers engage local communities will differ based on the goals they have for their farm. Therefore, these recommendations are not intended to be a checklist that is applied to every urban farming project, but rather a full spectrum of strategies for urban farmers to draw from when designing a process for community buy-in. Additional details on each recommendation are provided elsewhere (see Poulsen & Spiker, 2014).

Discussion

In his call for urban agriculture research that is

attentive to race and power dynamics, Hoover asks, "Is [urban agriculture] just another form of urban renewal, displacing underprivileged communities in the process, or is it an inclusive practice that works with marginalized people in the remediation of 'their' land?" (Hoover, 2013, p. 112). Our study demonstrates a trend toward the latter. Urban farmers, and particularly urban community farmers, in Baltimore view community support for their projects as crucial and employ numerous strategies to ensure that surrounding communities buy in to the farm.

Using a collective case study methodology facilitated a more comprehensive understanding of the farm-community relationship and the strategies that were successful in building positive relationships. In addition, the inclusion of the "rejected farm" case revealed what can go wrong during the community buy-in process. In this particular case, the urban farmers did not build relationships with influential community leaders, thus undermining their entry into the community; a few vocal community members' concerns about an urban farm attracting rats to their neighborhood fueled antagonism to the idea; and a community association that is viewed as unrepresentative of the neighborhood was given warrant to disapprove of the idea for an urban farm.

Based on our findings, we have proposed a set of recommendations to facilitate the process of gaining community buy-in for urban farming projects to ensure these projects are accepted and embraced by communities. While the specific recommendations pertain to urban farming, there are several themes that can be gleaned from these recommendations that are applicable to broader community buy-in processes. We discuss these themes below, also highlighting their relevance to similar processes of community participation and community acceptance.

Fairness in the distribution of benefits and drawbacks. Several of our recommendations point to a need for fairness in the distribution of benefits and drawbacks resulting from the development of an urban farm. New projects are unlikely to achieve community buy-in if they are perceived to deal advantages to some community members and disadvantages to others, defined as "outcome favorability" by Gross (2007). For example, when selecting a site for an urban farm (Table 3, recommendation A), if a vacant lot is chosen that is used by some residents — perhaps as a place for family cookouts — they may feel unfairly disadvantaged, negatively affecting their acceptance of the farm.

Fairness is a critical element of community acceptance, as demonstrated by research by Gross (2007) on the siting of a wind farm. She found that outcome favorability influences individuals who have a personal loss or gain at stake, while "outcome fairness" — an assessment of whether the outcome is fair for the community at large — influences those without strong opinions on an issue. Based on our research, we conclude outcome fairness can influence community buy-in if the project implementer is perceived to be the only beneficiary. This highlights the importance of addressing concerns about urban farms and communicating the benefits an urban farm will bring to a neighborhood (recommendation H). It also relates to recommendations to provide opportunities for local residents to access farm produce (recommendation L) and to meet residents' expectations for the farm's appearance (recommendation N) so as to avoid perceptions that the farmer is benefitting from the project at the expense of the neighborhood.

Understanding the community context. The need to gain familiarity with the community context of a neighborhood was a common theme throughout our interviews (Table 3, recommendations B and C). There were many justifications for this need: to address existing challenges or meet residents' desires through the farm's services, to build on existing resources in the neighborhood, and to demonstrate the farmers' interest in creating something of value for the neighborhood. To gain understanding of the local context, the urban farmers in our study forged relationships with community leaders or groups (recommendation D), along with attending community meetings on an ongoing basis and speaking informally with local residents.

Familiarity with the local community is also considered a necessity in community participation.

In their seminal work on effective community participation, Bracht and Tsouros (1990, p. 203) suggest that one factor for successful community participation is "early and extensive knowledge of community history, organizational resources, influence structures and inter-organizational networks" and cite the value of community participation as a way of incorporating local values into programs.

Establishing trust in "outsiders." A recurring theme throughout our interviews was the view of urban farmers as "outsiders" who enter a neighborhood to change things, a perception that potentially breeds resistance to an urban farm. This was thought to stem in part from the fact that many urban farmers in Baltimore are white, farming in majority black neighborhoods. In their study of urban agriculture in Philadelphia, Meenar and Hoover (2012) similarly found that due to systemic and historical racism, non-whites are often suspicious of privileged whites coming in to start gardens. They also noted that Philadelphia is defined by class-conscious boundaries, where "any outsider coming into the neighborhood may be perceived as "other" (Meenar & Hoover, 2012, p. 152). This may also be at play in Baltimore, where residents are similarly conscious of neighborhood boundaries.

Urban farmers were able to overcome this perception and gain the community's trust by demonstrating their dedication to the neighborhood, developing relationships with residents, and creating a welcoming environment (Table 3, recommendations E and J). In their study of urban farming in Baltimore, Hu and colleagues (2011) similarly noted residents' distrust of "outsiders," concluding that to achieve buy-in farms should advertise their community-focused mission and demonstrate longevity.

This phenomenon has also been discussed in the community acceptance literature. In their introduction to the concept, Wüstenhagen and colleagues highlight the distrust that can arise when projects are instigated by community outsiders, warning, "trust in their aims, attitude and competence becomes an issue" (2007, p. 2687). And similar to our own findings, in research regarding community acceptance of planned pig production sites, Mann and Kögl (2003) found that the social integration of the farmer is a key factor for public acceptance, particularly if he or she comes from outside the community.

Local involvement in decision-making. One of the strongest themes to emerge from our interviews was the importance of involving residents in decision-making (Table 3, recommendation F). One aspect of such involvement is responding to concerns that arise (recommendation H). Some urban farmers in our study went to great lengths to create opportunities for residents to be involved in decision-making by holding community meetings and consulting residents living in proximity to a potential farm site before ever breaking ground.

Involving communities in decision-making and planning is one of the main approaches to community participation, and the willingness by those in power to involve the community in decision-making is essential to its success (Bracht & Tsouros, 1990; Buchan, 2003). However, scholars also caution against "tokenism" in community participation processes whereby communities are given opportunities to express their opinions, perhaps making the project look more credible in the process, while the "expert" ultimately makes the decisions about project design and management (Buchan, 2003; Butterfoss, 2006). While we found similar concerns, the urban farmers in our study who were committed to community involvement reported creating specific and transparent opportunities for residents to influence decision-making. In this way, flexibility and open-mindedness on the part of the project implementer can build trust in projects, particularly those started by community outsiders (Wüstenhagen et al., 2007).

Transparency. Transparency emerged as a key component in the community buy-in process for urban farming, exemplified by the fact that the entire second phase of this process relates to open communication. Two dimensions of transparency are relevant: (1) knowing what is meant by "urban farming" (demystifying urban farming, Table 3, recommendation G); and (2) knowing what is being proposed for a specific site (recommendations I and M).

The importance of transparency throughout the process of planning a project is discussed in both the community participation literature and the community acceptance literature. For example, in her study of a wind farm siting, Gross (2007) found that perceived secrecy in the planning of the project was one of the main reasons community members viewed the process as unfair. This points to the importance of transparency in both the consultation process and the plans for a project. Through our research, we found an emphasis on the latter, but not on open communication about the consultation process itself; this may be something that should be considered in community buy-in processes.

Community engagement. A final theme that emerged from our recommendations involves active engagement of the community in the urban farm's activities, as exemplified by the third phase of the community buy-in strategies (Table 3, recommendations J, K, L, M, and N). The buy-in efforts that are needed evolve over time, transitioning from activities that introduce the idea for the farm to ongoing activities that build and maintain relationships between community members and the urban farming project. Our findings suggest that this relationship is facilitated through community engagement. For example, numerous interviewees formed a positive impression of their neighborhood's urban farm after early involvement in the project, such as attending a farm event or volunteering.

Community engagement is a mainstay of community participation. However, the goal of such engagement is to achieve local action to solve specific problems (Bracht & Tsouros, 1990) as opposed to involvement in project activities for the sake of building a relationship between the project and the community. In the literature on community acceptance, we have not seen discussion of community engagement with a project after the project is established. Thus community engagement in terms of ongoing interaction between local residents and a new project may be a unique aspect of community buy-in.

In discussing these themes, it is clear that there is significant overlap between processes of community buy-in, community participation, and community acceptance. Is there, then, utility in conceptualizing community buy-in as distinct? We believe there is, and that the difference lies not in the processes that are used, but in the end goals. From an empowerment perspective, the end goal of community participation is that local communities take responsibility for identifying and solving their own problems, while the end goal of community acceptance is agreement, or compliance, with a decision. We see community buy-in as a middle ground in the continuum lying between these two concepts, with the end goal being acceptance and active support by a community for a project or plan. Such support can encompass a broad range of actions, with the minimal level of buy-in equating to community acceptance, all the way to stronger participatory forms such as involvement and collaboration by communities. In addition, we identify community engagement, in terms of ongoing interaction and relationship-building between local residents and a new project, as a potentially unique aspect of community buy-in.

Study Strengths and Limitations

Through this research, we aimed to understand the relationship between geographic communities and urban farms and ultimately to determine effective processes for community buy-in. However, a limitation of this endeavor lies in the very use of the term "community," which is notoriously problematic in its implication of cohesiveness. Head (2007, p. 441) best sums this up, stating that the term "glosses over the social, economic and cultural differentiation of localities" implying "a (false and misleading) sense of identity, harmony, cooperation and inclusiveness." The views of our interviewees represent their specific social, economic, and cultural perspectives, inherently excluding others. Given the diversity of views present in any group, gaining the support of all members of a neighborhood for an urban farming project is an ideal rather than a reality.

One group whose input we were not able to incorporate is residents who are antagonistic toward the establishment of urban farms. Future research that elucidates the reasons for opposition

to urban farming would strengthen our understanding of the community buy-in process. However, we were only able to identify one individual who was reportedly opposed to urban farming, and this individual was not interested in participating in this research; this may reflect a general lack of opposition to urban farming. The residents we interviewed frequently had an interest in urban agriculture or had established a relationship with the urban farm in their neighborhood and so were interested in the research topic, leading to rich and insightful interviews.

As with all qualitative research, it is important to consider contextual factors when transferring the findings of this study to settings beyond Baltimore. Baltimore is characterized by an overabundance of vacant land and widespread inaccessibility to fresh produce in poor neighborhoods, both of which drive grassroots enthusiasm and political will to support urban farming. However, based on the strength of our study methodology — including the inclusion of multiple cases, the triangulation of data and sources, and the integration of feedback received during the dissemination meeting — we are confident that the proposed recommendations provide a springboard for developing community buy-in processes that are tailored to meet the needs of a variety of urban farming models.

Future research on this topic should consider drawing from the experience of other types of small businesses in gaining community buy-in. Literature on the success of small businesses recognizes community buy-in as a criterion for success (Kilkenny, Nalbarte, & Besser, 1999), and businesses themselves appreciate the importance of contributing to the public good above and beyond the goods and services they sell (Besser, 1999). Though community urban farms more aptly parallel community-based nonprofit organizations, commercial farms may have more in common with other small businesses.

Conclusion

As urban farming continues to expand across the U.S., it is increasingly important to help farmers engage local communities so as to develop projects that thrive in the complex social landscape that defines urban farming. This includes supporting urban farmers as they work to balance the need to build strong relationships within the neighborhoods that host their projects while meeting the demands of production-level farming. Toward this end, the recommendations we propose provide a variety of strategies urban farmers can draw from when designing a process for community buy-in. In addition, we contribute a starting point for defining effective processes for gaining community buy-in within the context of health and social justice programming more broadly.

Acknowledgements

We would like to thank Nestor Mojica for his invaluable contributions to this study as a research assistant. We are also indebted to the many study participants who made this research possible by generously sharing their time and thoughts with us. We would also like to thank Dr. Larissa Jennings for reviewing drafts of this manuscript, and acknowledge the valuable feedback provided by the anonymous reviewers. This research was made possible by the Johns Hopkins Center for a Livable Future–Lerner Fellowship and a fellowship from the Johns Hopkins Environment, Energy, Sustainability, and Health Institute.

Appendix

Results from Feedback on Draft Recommendations from the Dissemination Meeting

Feasibility and benefit ratings based on a scale from 1 to 5, with 5 being the highest or best

Draft recommendation	Feasibility for farmers	Benefit to residents	Selected qualitative feedback
Identify ways the farm can support the neighborhood's own goals	3.19	4	• Recognize diversity within geographic communities and that cohesive "neighborhood goals" do not exist • Farmers should also build on resources and social capital already in place • Acknowledge the challenge farmers face in balancing demands of production farming with community engagement
Build relationships with community leaders or groups who can be a champion for the farm	3.44	3.94	• Depth and quality of community relationships outweigh the services provided by urban farms in terms of community buy-in • Important to build multiple relationships within neighborhoods, not just with leaders of a single group
Include community members in the process of planning the farm	3.31	4.31	• The onus of gaining community input lies with the farmer rather than placing demands on time and energy of residents and leaders • Farmers should approach the local community with a "blank slate," rather than a predetermined idea for an urban farm • Recognize informal forms of community input (e.g., casual conversation) • Important to acknowledge the agricultural knowledge that exists among neighborhood residents
Talk to local residents to ensure an appropriate site is selected for the urban farm	3.63	4.38	• Enlist trusted organizations and/or individuals to facilitate this process
Demystify urban farming for residents in terms of what an urban farm is like, including addressing common concerns and explaining potential benefits	3.31	4.31	• Understanding the neighborhood context can help frame the idea for an urban farm for a particular neighborhood • Sharing examples of other urban farms through tours or before and after photos can be an effective method • Ongoing and transparent communication about the purpose of the farm is critical
Show dedication to the neighborhood through active involvement in the community	3.25	4.44	• Finding opportunities for involvement is simple, but limited by farmers' time and energy
Create opportunities for residents to be involved with the urban farm	3.38	4.53	• Let residents define the ways they want to be involved • Volunteerism is a limited mechanism for involvement considering the demands it places on farmers and the lack of feasibility for many residents
Provide opportunities for local residents to access farm produce	3.38	4.75	• Challenges in making produce accessible include timing and location of purchasing opportunities, effective advertising, and ensuring food is desirable to residents • Difficult to balance a farm's economic sustainability with affordability of food
Ensure the urban farm meets expectations for the neighborhood's appearance	3.31	4.44	• Important to meet residents' expectations for farm appearance, particularly in the off season

References

Baltimore Neighborhood Indicators Alliance. (n.d.). Community profiles. Retrieved July 24, 2014, from http://bniajfi.org/vital_signs/cprofiles/

Baltimore Office of Sustainability. (n.d.). Homegrown Baltimore: Grow Local. Retrieved June 12, 2014, from http://www.baltimoresustainability.org/homegrown-baltimore-grow-local

Besser, T. L. (1999). Community involvement and the perception of success among small business operators in small towns. *Journal of Small Business Management, 37*(4), 16–29.

Bracht, N., & Tsouros, A. (1990). Principles and strategies of effective community participation. *Health Promotion International, 5*(3), 199–208. http://dx.doi.org/10.1093/heapro/5.3.199

Buchan, D. (2003). Buy-in and social capital: By-products of social impact assessment. *Impact Assessment and Project Appraisal, 21*(3), 168–172. http://dx.doi.org/10.3152/147154603781766266

Butterfoss, F. D. (2006). Process evaluation for community participation. *Annual Review of Public Health, 27,* 323–340. http://dx.doi.org/10.1146/annurev.publhealth.27.021405.102207

Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches* (2nd ed.). Thousand Oaks, California: Sage.

Gross, C. (2007). Community perspectives of wind energy in Australia: The application of a justice and community fairness framework to increase social acceptance. *Energy Policy, 35*(5), 2727–2736. http://dx.doi.org/10.1016/j.enpol.2006.12.013

Head, B. W. (2007). Community engagement: Participation on whose terms? *Australian Journal of Political Science, 42*(3), 441–454. http://dx.doi.org/10.1080/10361140701513570

Hoover, B. M. (2013). White spaces in black and Latino places: Urban agriculture and food sovereignty. *Journal of Agriculture, Food Systems, and Community Development, 3*(4), 109–115. http://dx.doi.org/10.5304/jafscd.2013.034.014

Hu, A., Acosta, A., McDaniel, A., & Gittelsohn, J. (2011). Community perspectives on barriers and strategies for promoting locally grown produce from an urban agriculture farm. *Health Promotion Practice, 14*(1), 69–74. http://dx.doi.org/10.1177/1524839911405849

Kahn, E. B., Ramsey, L. T., Brownson, R. C., Heath, G. W., Howze, E. H., Powell, K. E., . . . Corso, P. (2002). The effectiveness of interventions to increase physical activity: A systematic review. *American Journal of Preventive Medicine, 22*(4, Supp. 1), 73–107. http://dx.doi.org/10.1016/S0749-3797(02)00434-8

Kilkenny, M., Nalbarte, L., & Besser, T. (1999). Reciprocated community support and small town-small business success. *Entrepreneurship and Regional Development, 11*(3), 231–246. http://dx.doi.org/10.1080/089856299283182

Mann, S., & Kögl, H. (2003). On the acceptance of animal production in rural communities. *Land Use Policy, 20*(3), 243–252. http://dx.doi.org/10.1016/S0264-8377(03)00025-5

Meenar, M. R., & Hoover, B. M. (2012). Community food security via urban agriculture: Understanding people, place, economy, and accessibility from a food justice perspective. *Journal of Agriculture, Food Systems, and Community Development, 3*(1), 143–160. http://dx.doi.org/10.5304/jafscd.2012.031.013

Morgan, L. M. (2001). Community participation in health: Perpetual allure, persistent challenge. *Health Policy and Planning, 16*(3), 221–230. http://dx.doi.org/10.1093/heapol/16.3.221

Poulsen, M. N., & Spiker, M. L. (2014). Integrating urban farms into the social landscape of cities: Recommendations for strengthening the relationship between urban farms and local communities. Baltimore, Maryland: Johns Hopkins Bloomberg School of Public Health. Retrieved from http://www.livablefutureblog.com/wp-content/uploads/2014/08/CommunityBuy-inUrbanFarms_July2014.pdf

Van der Stoep, G. A. (2000). Community tourism development. In W. C. Gartner & D. W. Lime (Eds.), *Trends in outdoor recreation, leisure and tourism* (pp. 309–321). Wallingford, UK: CABI. http://dx.doi.org/10.1079/9780851994031.0309

Wüstenhagen, R., Wolsink, M., & Bürer, M. J. (2007). Social acceptance of renewable energy innovation: An introduction to the concept. *Energy Policy, 35*(5), 2683–2691. http://dx.doi.org/10.1016/j.enpol.2006.12.001

Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
www.AgDevJournal.com

Illinois farmers markets using EBT: Impacts on SNAP redemption and market sales

Afroza Hasin [a]* and Sylvia Smith [a]
Southern Illinois University Carbondale

Pat Stieren [b]
Illinois Farmers Market Association

Submitted August 11, 2014 / Revised November 3 and November 18, 2014 / Accepted November 18, 2014 / Published online December 19, 2014

Citation: Hasin, A., Smith, S., & Stieren, P. (2014). Illinois farmers markets using EBT: Impacts on SNAP redemption and market sales. *Journal of Agriculture, Food Systems, and Community Development, 5*(1), 179–188. http://dx.doi.org/10.5304/jafscd.2014.051.015

Abstract

The number of people in the Supplemental Nutrition Assistance Program (SNAP), formerly known as food stamps, is currently at an all-time high. The switch from food stamp coupons to the Electronic Benefit Transfer (EBT) system was completed nationwide in 2004, yet almost 75% of the nation's farmers markets are not equipped to accept EBT. The state of Illinois has the sixth largest number of farmers markets in the U.S. and only 24% of its farmers markets accept EBT. The objective of this study is to identify variables important to facilitate successful EBT transactions at Illinois farmers markets. A survey was administered electronically to all Illinois farmers market managers who reported using EBT in 2011 in this cross-sectional study. Twenty-four markets participated and completed the survey. The main outcome measure was EBT sales at farmers markets in 2011. We used linear regression analysis to examine effects of selected market characteristics and management variables on EBT sales. We also performed a paired sample t-test to compare the sales of 2010 and 2011 and did correlation analysis to explore relationships between EBT and total credit and debit sales. SNAP redemptions increased significantly in

[a] Department of Animal Science, Food and Nutrition, Southern Illinois University Carbondale, Carbondale, Illinois.

[b] Executive Director, Illinois Farmers Market Association, Springfield, Illinois.

* *Corresponding author:* Afroza Hasin, MS, Instructor, Department of Animal Science, Food and Nutrition, Southern Illinois University, Carbondale; 875 South Normal Avenue, Mail Code 4317; Carbondale, Illinois 62901 USA; +1-618-453-5193; afroza@siu.edu

Disclosures

At the time of this study's data collection and manuscript writing, Pat Stieren and Dr. Sylvia Smith were volunteer board members of the Illinois Farmers Market Association (IFMA). Ms. Stieren is currently the executive director of IFMA.

Illinois farmers markets using EBT. Use of incentives, receipts or direct swipes, and volunteers handling EBT transactions had significant positive effects on EBT sales. Total credit and debit sales and the number of EBT transactions were found to be positively correlated. We conclude that having EBT service increases SNAP redemption at farmers markets, and that obtaining funds for incentive programs and using "receipts" method over tokens or scripts in processing EBT transactions should be areas to prioritize in adopting EBT at farmers markets.

Keywords
access to healthy food, Electronic Benefit Transfer, EBT, farmers market, SNAP

Introduction

The Supplemental Nutrition Assistance Program (SNAP), formerly known as the "food stamp" program, is the nation's largest federal entitlement nutritional assistance program. It is administered by the United States Department of Agriculture's (USDA) office of Food and Nutrition Service (FNS). Families and individuals who are elderly, unemployed, receiving welfare or other public assistance payments, and are low income and/or have a disability receive this assistance in order to reduce the amount of money they spend on food (USDA FNS, 2014). Federal spending on SNAP in 2012 was a record high of US$80.4 billion, up from US$68 billion in 2010, due in part to the economic recession and a high unemployment rate (Tiehen, Jolliffe, & Gundersen, 2012). Electronic Benefit Transfer (EBT), the system that allows individuals and families to access their SNAP benefits electronically using a card similar to a credit or debit card, was introduced in 1994 to reduce processing costs, misuse, and fraud (Federal Electronic Benefits Transfer Task Force, 1994; Humphrey, 1996). The switch from food stamp coupons to EBT was completed nationwide in 2004.

In 2013 an estimated 49.1 million people in the U.S., including 15.8 million children, lived in households that experienced food insecurity, resulting from lack of affordability as well as accessibility to adequate food (Feeding America, 2014). Food insecurity can be defined in many different ways. Since 2006, the USDA has referred to "reduced quality, variety, or desirability of diet" as "low food security," and "multiple indications of disrupted eating patterns and reduced food intake" as "very low food security," previously known as "food insecurity without hunger" and "food security with hunger," respectively (USDA ERS, 2014a). Lack of access to healthful foods is another reason why many people, including children, are not eating the recommended amount of fruits and vegetables. Studies have shown direct correlations between the incidences of poor diet and related chronic diseases such as type 2 diabetes and obesity, which are more prevalent among the poor, people of color, and those living in food deserts (Feldeisen & Tucker, 2007; Ver Ploeg et al., 2009; Wiig & Smith, 2009). The USDA defines food deserts as "urban neighborhoods and rural towns without ready access to fresh, healthy, and affordable food" (USDA Agricultural Marketing Service [AMS], n.d., para. 1). Farmers markets have the potential to be useful in alleviating healthy food disparities in food deserts by lowering the cost of, and improving access to, fresh produce (Larsen & Gilliland, 2009, McGuirt, Jilcott, Liu, & Ammerman, 2011). People worldwide are rediscovering the benefits of buying local foods at farmers markets; not only are the foods perceived to be fresher and often more nutritious than those found at supermarkets, but buying directly from family farmers helps the farmers stay in business and the whole community benefits from the boost to their local economy (Favell, 1998; Govindasamy, Italia, & Adelaja, 2002; Serafini, Bugianesi, Salucci, Azzini, Raguzzini, & Maiani, 2002; Vallejo, Tomás-Barberán, & Garciá-Viguera, 2003; Wolf, Spittler, & Ahern, 2005).

Redeeming SNAP Benefits at Farmers Markets

The number of SNAP-authorized farmers markets in the U.S. (including direct marketing farmers) increased by a massive 343%, from 936 (18% of all farmers markets) in 2009 to 3,214 (41% of all farmers markets) in 2012 (USDA, n.d.; USDA AMS, 2014a). Yet SNAP benefits are not always easy to redeem at farmers markets. Authorized farmers markets need to have access to wireless devices to scan the EBT cards, otherwise they must

process the transactions manually. The free "EBT only" machines provided by the USDA can only accept EBT cards, not credit or debit cards, and they require a phone line and electricity (Briggs, Fisher, Lott, Miller, & Tessman, 2010). These machines may appear ineffective since the farmers markets usually operate in a field or parking lots with no electricity or telephone connections, and only operate once or twice a week for a small number of hours. Although only 0.012% of the US$68 billion of SNAP benefits was redeemed at farmers markets in 2010, the total value of this redemption was US$7,547,028 (Love, 2011). There is limited literature available on the successful use of EBT at farmers markets, as well as on identifying challenges and investigating practices to overcome these challenges. Several pilot studies have suggested effective strategies to attract SNAP customers to farmers markets, such as offering incentives, partnering with organizations (public or private sector) to acquire funding for incentives, having a central POS terminal, hiring adequate staff support, etc. (Briggs et al., 2010). The purpose of this study was to identify variables related to market management that are playing roles in the successful EBT implementations at Illinois farmers markets.

With the evolution of wireless technology, many individual farmers and market organizations are using wireless point-of-sale (POS) devices which allow them to swipe EBT as well as credit and debit cards. Farmers can buy or rent this device from third-party processors. The farmers markets using the device set up a central terminal where SNAP customers swipe their EBT card at the POS device location, the staff enters the requested amount into the device, and when the transaction is approved, tokens (wooden nickels) or paper scripts are given to the SNAP customers to be used as cash to purchase SNAP-eligible items at the market. In the receipt system, vendors itemize the products a customer wants to buy and writes down the amounts to be paid on a piece of paper. At the central terminal, that particular amount is then charged on the customer's EBT card, and the customer is given the payment receipt, which the customer exchanges for the product (Owens & Verel, 2010). An intervention program conducted in Arizona found four out of five markets that received a POS device experienced a significant increase in SNAP redemption as well as in overall sales (Bertmann, Ohri-Vachaspati, Buman, & Wharton, 2012). Another study conducted in West Philadelphia reported a 38% increase in SNAP redemption when each vendor was given a POS device to operate (Buttenheim, Havassy, Fang, Glyn, & Karpyn, 2012).

Partnerships with organizations like food banks, food pantries, and community-based groups can be valuable for farmers markets since they have direct contact with people in the community, including SNAP recipients. State agencies like departments of human services are responsible for promoting and processing SNAP applications, but they can also play an important role by channeling funds for a market to obtain wireless EBT devices. Philanthropic organizations like Wholesome Wave are funding price-matching programs known as "Double Value Coupon" (DVC) programs in 26 states and over 200 farmers markets (Wholesome Wave, 2011; Young, Aquilante, Solomon, Colby, Kawinzi, Uy, & Mallya, 2013). Markets offering a US$2–US$5 DVC incentive for every EBT swipe have been successful at attracting more SNAP recipients to redeem their benefits at farmers markets for several years (Briggs et al., 2010).

Although low-income communities can benefit from having well-run farmers markets, there are often economic, social, and sometimes cultural barriers impeding success (Appalachian Sustainable Agriculture Project, 2012; Leone et al., 2012). Studies showed that low-income consumers perceive "convenience" as one of the major barriers to shopping at farmers markets. Convenience has been identified as 24-hour access, access to public transportation, one-stop shopping, and availability of products (Briggs et al., 2010; Colasanti, Connor, & Smalley, 2010; Grace, Grace, Becker, & Lyden, 2007). Researchers have also cited insufficient revenue, lack of balance between the number of vendors and the number of customers, product mix, and unpaid markets managers as reasons for market failure (Stephenson, Lev, & Brewer, 2006).

The state of Illinois has 28 million acres (11 million hectares) of fertile farmlands (Illinois Department of Agriculture, 2001, para. 2) and has

the sixth largest number of farmers markets in the nation, yet at the time of this study, only 55 of the 292 USDA registered farmers markets accepted EBT (USDA AMS, 2014b). About 75% (6,183 out of 8,161 markets) of U.S. farmers markets are still not equipped to accept EBT (USDA AMS, 2014b).

SNAP sales dropped to their lowest level at farmers markets in 2007 because farmers markets vendors were not given a universal, feasible method to accept SNAP benefits, and SNAP recipients were not well informed about the services at farmers markets (Briggs et al., 2010). Successful EBT implementations at farmers markets can provide SNAP customers with better access to healthful, fresh fruits and vegetables, and have a positive impact on the overall health of our nation, in addition to improving the economic viability of small to medium-size produce farmers.

The objectives of our study were to find out the following: (1) whether SNAP redemption (in dollar amounts) increases when farmers markets offer the EBT service, (2) whether credit and debit transactions are positively related to EBT sales at farmers markets, and (3) whether markets offering incentive programs have higher EBT sales. We also wanted to explore the effects of operational variables such as the location of the market (located in or near food deserts) and the method of EBT transactions (through tokens or receipts, and the handling of transactions by paid employees or volunteers) on EBT sales. Farmers market managers, policy makers, community nutritionists, and public health officials can utilize findings from this study as they attempt to facilitate successful EBT programs at farmers markets across the U.S.

Methods

Study Design

This quantitative study was carried out using a cross-sectional survey of farmers markets in Illinois that were using EBT during the 2011 market season. All Illinois farmers markets that were accepting EBT in the years 2010 and 2011 were considered as the sampling frame for this study (a total of 40 farmers markets). The study was approved by the Institutional Review Board for human subject research. The survey questionnaire was distributed electronically with LimeSurvey (an open-source Web-based questionnaire tool) during the months of December 2011 through February 2012. Farmers market managers were contacted four times, as recommended by Dillman (2007): first with a pre-notice email, second with the actual electronic survey, followed by two reminders via email.

Instrument and Data Collection

The EBT questionnaire was developed, checked for face validity, and pretested by a panel of four experts (who were market managers administering EBT and farmers market consultants). A number of questions were reworded and added after pretesting the survey. The 37-item survey included questions regarding (1) market size and location, (2) EBT transactions, (3) credit and debit transactions, (4) vendor participation, (5) staff support, (6) partnership with organizations, (7) methods of processing EBT, and (8) associated costs. The following detailed questions were asked in order to identify operational variables affecting EBT sales at farmers markets in Illinois: "Who is responsible for the EBT/Credit/Debit program?" (The categories were government, nongovernmental organization (NGO), business, and other); "How did you handle EBT/credit/debit transactions with your vendors?" (tokens/scripts, receipts, other); "How did you process transactions?" (manual voucher, free EBT machine, owned/leased EBT-only machine, owned/leased POS machine, other); "Who handled the EBT transactions at your market?" (volunteer, employee, intern, other); "Did you offer any incentive programs for those customers using EBT?" (yes or no); "Did you accept credit/debit cards?" (yes or no); "Did you require all vendors to participate in your EBT/credit/debit programs?" (yes or no). Information on whether the market was located in or near a food desert was collected using the online Food Desert Locator tool developed by the USDA's Economic Research Service.

Statistical Analysis

The data was analyzed using Statistical Package for Social Sciences (SPSS) version 20; descriptive statistics were used to describe the characteristics of the markets. The average EBT sales in 2010 and 2011 were compared using a paired t-test. In order

to identify market management variables influencing the 2011 EBT sales (dependent variable), linear regression analysis was performed with a significance level of 0.05. The data were checked for the assumptions of normality, multicollinearity, and homoscedasticity, and the assumptions were met before running the regression. Dummy variables were constructed for the independent variables that were categorical. Market size was included in the analysis as a control variable. However, dummy variables for two large markets with very high EBT sales relative to their number of vendors (Daley market in Chicago and the Urbana market) were included in the regression analysis to deal with outlier effects. The linear regression model we used to predict market management variables influencing EBT sales was specified as:

$$EBTsales2011 = \beta_0 + \beta_1 X1 + \beta_2 X2 + \beta_3 X3 + \beta_4 X4 + \beta_5 X5 + \beta_6 X6 + \beta_7 X7 + \beta_8 X8 + \beta_9 X9 + \varepsilon_i$$

Where X1=number of vendors selling SNAP-approved items; X2=NGO-administered EBT, credit, and debit program; X3=Handling EBT, credit, and debit transactions with receipts or direct swipe; X4=Use of owned or leased EBT-only machine; X5=Employee handling of EBT, credit, and debit transactions; X6=Use of incentives for EBT; X7=Acceptance of credit and debit cards; X8=All vendors are required to accept EBT, credit, and debit transactions; and X9=Farmers market located in or near a food desert. Correlation analysis was used to examine the relationship between EBT sales and the amount of credit and debit transactions.

Results

Twenty-four market managers responded out of 40 Illinois farmers markets that were using EBT in 2011 (60% response rate). Twelve of these markets were among the 25 markets that were using EBT in 2010 as well. A statistically significant 104.7% increase in EBT sales was observed between 2010 and 2011 (from US$3,760 to US$5,922). The sizes of the markets varied from a single vendor to 66 vendors, with the average being 22 vendors. In 66.7% of the markets, the farmers markets required all vendors to participate in the EBT program. The one-time start-up cost for the electronic transaction service per market ranged from US$0 to US$2,500 with an average of US$390 to purchase tokens, supplies, or equipment. Forty-five percent of the markets financed the start-up cost through local government or public agencies, 20% through the private sector or NGOs, and the rest

Table 1. Characteristics of Illinois Farmers Markets Using EBT in 2011 (*N*=24)

Variables	Number (percentage)
Markets administered by	
Government entity	13 (54.2%)
Nongovernmental organization	10 (41.7%)
Other	1 (4.2%)
Responsible for EBT, credit, and debit program	
Government entity	4 (16.7%)
Nongovernmental organization	18 (75.0%)
Business entity	2 (8.3%)
Have partnership with organizations or SNAP outreach programs	
Yes	11 (45.8%)
No	13 (54.2%)
Credit and debit card acceptance	
Yes	7 (29.2%)
No	17 (70.8%)
Offer incentives	
Yes	18 (75.0%)
No	6 (25%)
Transaction of EBT, credit, and debit cards	
Free EBT machine	4 (16.7%)
Own or lease EBT-only machine	4 (16.7%)
Own or lease POS device	16 (66.7%)
Process of transaction	
Token or script	9 (37.5%)
Receipt	13 (54.2%)
Other	2 (8.4%)
Who handles transactions	
Volunteer	4 (16.7%)
Employee	20 (83.3%)
Location of market	
In or near food desert	9 (37.5%)
Not in or near food desert	15 (62.5%)
Urban or rural setting	
Urban	22 (91.7%)
Rural	2 (8.3%)

by federal, state, or county grants. About 70% of the markets did not accept credit or debit cards. Descriptive statistics of the participating markets are shown in Table 1. The total credit and debit sales of the markets (n=7) ranged from US$200 to US$67,966, with an average of US$30,517 per season. A significant positive correlation was found between credit and debit sales and the number of EBT transactions in the market (r=0.755; p=0.050).

Results of the regression analysis (adjusted R^2=0.866) showed that the use of incentives (p=0.007), paid employees versus volunteers (p=0.034), and the handling of transactions by receipts and direct swipe (p=0.025) were significant predictors of EBT sales at markets. Results are shown in Table 2. These results indicate that markets that offered incentives for EBT use had on average US$3,716.67 (95% CI: US$1199.12, US$6234.23) more in EBT sales compared to EBT sales of the markets that did not offer any incentives. Results also indicate that markets that used receipts or direct swipes on individual POS devices rather than using tokens in EBT transaction had on average US$3,001.83 (95% CI: US$439.03, US$5564.63) more in EBT sales. On the other hand, markets where a paid employee handled the EBT transactions rather than a volunteer had an average US$2936.11 (95% CI: US$5609.717, US$262.511) less in EBT sales.

Discussion

When comparing sales data (2010 to 2011), we found that EBT sales (dollar amount) in Illinois farmers markets significantly increased when the EBT technology was used. We also found a significant positive correlation between the number of EBT transactions and the amount of credit and debit sales at farmers markets. These findings suggest that having the wireless POS device that can be used to accept EBT, credit, and debit cards can not only increased SNAP redemption, but also generated revenue through credit and debit transactions at these farmers markets. These results support the findings of other studies in which the researchers reported significant increases in SNAP redemption as well as increased total revenue for

Table 2. Regression Results Showing Determinants of EBT Sales in Illinois Farmers Markets in 2011

Independent Variable	Coefficient (95% CI)	*p*-value
Constant	261.066 (–5296.244, 5818.377)	0.920
Number of vendors sold SNAP-approved items	87.873 (8.979, 166.767)	0.032
NGO administers EBT, credit, and debit program	–545.515 (–4222.032, 3131.002)	0.752
Method of handling EBT, credit, and debit transactions	3001.826 (439.025, 5564.626)	0.025
Use of owned or leased EBT only machine	223.318 (–2448.906, 2895.543)	0.859
Employee handling EBT, credit, and debit transactions	–2936.114 (–5609.717, –262.511)	0.034
Use of incentives for EBT use	3716.674 (1199.120, 6234.229)	0.007
Acceptance of credit and debit cards	1531.275 (–360.978, 3423.529)	0.103
All vendors required to accept EBT	–822.700 (–2986.242, 1340.842)	0.424
Farmers market located in or near food desert	–1290.534 (–2962.805, 1340.842)	0.118

Dependent variable: EBT sales in 2011
Adjusted R^2=0.866
F-Statistic=14.568 (*p*-value=0.000)

the markets when operating EBT services (Institute for Agriculture and Trade Policy [IATP], 2011; Krokowski, 2014). Our third objective was to find out whether the amount of SNAP redemption is influenced by the presence of customer incentive programs. We found that offering incentives for EBT use was a significant predictor of SNAP redemption at these farmers markets. These incentives are typically double value coupons; in essence, SNAP customers receive double the amount of fresh produce for every dollar spent. This finding is supported by those of other studies (Obadia, 2011; Wholesome Wave, 2011). No significant effect on sales was found for EBT sales at farmers market located in or near food deserts. However, additional research is warranted with a larger sample size to investigate any effect of farmers markets being located in food deserts on EBT sales. It will also be beneficial to conduct qualitative research on the perceptions of SNAP recipients living in food deserts in regard to redeeming their benefits at farmers markets.

The use of receipts or direct swipe was found to have a significant positive effect on EBT sales over the token or script transaction methods. This finding suggests that customers found receipts, or getting the commodity directly from vendors by swiping the EBT cards, more convenient than handing and counting tokens or scripts. Results of another study showed that disbursing tokens to reimburse farmers was one of the major challenges reported by the market managers (Krokowski, 2014). Three of the Illinois markets had single vendors, and therefore the customers were able to use the EBT card like a credit or debit card without going through the central terminal.

Often farmers markets are run by volunteers, but may run better with paid employees (Ragland & Tropp, 2009). However, the handling of the EBT, credit, and debit transactions by paid employees as opposed to volunteers was found to have a significant negative effect on EBT sales. This came out as an additional finding of this study suggesting that EBT sales were higher when markets were run by volunteers. A plausible explanation for this finding could be the fact that almost 60% of the nation's farmers markets are run by volunteer market manager (Ragland & Tropp, 2009). Historically, market managers have been volunteers as they were also producers or vendors at the market as well. They volunteered their services in order to organize the operation of the market, ultimately to be more successful in selling their own products. However, we acknowledge that volunteerism does not necessarily indicate experience and since we did not know the years of experience of any paid employee or volunteer in the current study, we suggest caution in interpreting this result. Further investigation is needed to understand the role of volunteer staffing on EBT sales.

Among the limitations of this study, information regarding the experience of market managers and cash sales by vendors was not collected. Vendors usually were reluctant to report total cash sales; the lack of information on cash transactions by vendors has also been reported by others (Obadia, 2011). One of major limitations of this study is the small sample size and not having data from the markets that did not participate. We acknowledge that there is potential respondent bias in our study as the markets that participated could be completely different from the markets that did not participate. However, we are not aware of any differences and have no reason to believe that any differences exist. Additionally, due to the very small number (n=7) of markets in our sample that accept credit and debit transactions, inferential statistical analysis was not performed to identify the variables influencing credit and debit sales. More research is warranted in other geographic locations and one should be cautious before generalizing the findings of this study. In spite of these caveats, the findings provide insight into various practices involving EBT transactions at farmers markets, which can be valuable for the markets that are in the process of obtaining EBT service.

Conclusions

Further research is needed to investigate what motivates farmers and other vendors to participate in the EBT program and, likewise, what motivates SNAP customers to redeem their benefits at farmers markets. We recommend conducting a mixed-method study, in a cross-sectional manner, where the quantitative results can be verified by the

qualitative findings from a focus group consisting of managers at a combination of markets that accept EBT and do not. Vendors at farmers markets should be educated about the financial and public-relations benefits of offering EBT, and SNAP customers should be informed about the availability of EBT services at their local farmers markets. Market associations should select the most user-friendly options of an EBT operation, for example using receipts or swipe methods instead of tokens or scripts, when deciding to implement EBT at a market. Obtaining data on years of market managers' experience (whether volunteer or employed) will be useful to better understand how it affects sales at a market. Although it is unclear what long-term impact incentives might have on SNAP customer behavior (that is, if they will keep coming back to farmers markets even when the incentives are not offered), obtaining funds for an incentive program could be a possible policy instrument to attract more SNAP customers to farmers markets. It is important that the new farm bill address issues related to effective implementation of EBT technology at farmers markets, which can not only promote healthy eating in low-income communities, but also support local farmers by increasing SNAP redemption at farmers markets.

Acknowledgements

The authors thank Dr. Stephen Brown and Dr. Subhash Sharma of SIUC for their valuable input in preparing this manuscript.

References

Appalachian Sustainable Agriculture Project. (2012). *Farmers markets for all: Exploring barriers and opportunities for increasing fresh food access by connecting low-income communities with farmers markets.* Ashville, North Carolina: Appalachian Sustainable Agriculture Project Local Food Research Center. Retrieved from http://asapconnections.org/downloads/asap-farmers-markets-for-all-full-report.pdf

Bertmann, F. M. W., Ohri-Vachaspati, P., Buman, M. P., & Wharton, C. M. (2012). Implementation of wireless terminals at farmers' markets: Impact on SNAP redemption and overall sales. *American Journal of Public Health, 102*(7), e53–e55. http://dx.doi.org/10.2105/AJPH.2012.300727

Briggs, S., Fisher, A., Lott, M., Miller, S., & Tessman, N. (2010). *Real food, real choice: Connecting SNAP recipients with farmers' markets.* Community Food Security Coalition and Farmers Market Coalition. Retrieved from http://oregonhunger.org/real-food-real-choice-connecting-snap-recipients-farmers-markets

Buttenheim, A. M., Havassy, J, Fang, M., Glyn, J., & Karpyn, A. E. (2012). Increasing Supplemental Nutrition Assistance Program/Electronic Benefit Transfer sales at farmers' markets with vendor-operated wireless point-of-sale terminals. *Journal of the Academy of Nutrition and Dietetics, 112*(5), 636–641. http://dx.doi.org/10.1016/j.jand.2011.12.021

Colasanti, K. J. A, Connor, D. S., & Smalley, S. B. (2010). Understanding barriers to farmers' market patronage in Michigan: Perspectives from marginalized populations. *Journal of Hunger and Environmental Nutrition, 5*(3), 316–338. http://dx.doi.org/10.1080/19320248.2010.504097

Dillman, D. (2007). *Mail and internet surveys: The tailored design method* (2nd ed.). Hoboken, New Jersey: John Wiley & Sons.

Favell, D. J. (1998). A comparison of the vitamin C content of fresh and frozen vegetables. *Food Chemistry, 62*(1), 59–64. Retrieved from http://ucanr.edu/datastoreFiles/608-97.pdf

Federal Electronic Benefits Transfer Task Force. (1994). *From paper to electronic: Creating a benefit delivery system that works better & costs less — An implementation plan for nationwide EBT.* Washington, D.C.: Government Accountability Office.

Feeding America. (2014). *Hunger and poverty fact sheet.* Retrieved from http://www.feedingamerica.org/hunger-in-america/impact-of-hunger/hunger-and-poverty/hunger-and-poverty-fact-sheet.html

Feldeisen, S. E., & Tucker, K. L. (2007). Nutritional strategies in the prevention and treatments of metabolic syndrome. *Applied Physiology, Nutrition, and Metabolism, 32*(1), 46–60. http://dx.doi.org/10.1139/h06-101

Govindasamy, R., Italia, J., & Adelaja, A. (2002). Farmers' markets: Consumer trends, preferences, and characteristics. *Journal of Extension, 40*(1), 1RIB6. Retrieved from http://www.joe.org/joe/2002february/rb6.php

Grace, C., Grace, T., Becker, N., & Lyden, J. (2007). Barriers to using urban farmers' markets: An investigation of food stamp clients' perceptions. *Journal of Hunger and Environmental Nutrition, 2*(1), 55–75. http://dx.doi.org/10.1080/19320240802080916

Humphrey, D. B. (1996). The economics of electronic benefit transfer payments. *Federal Reserve Bank of Richmond Economic Quarterly, 82*(2), 77–94. Retrieved from https://www.richmondfed.org/publications/research/economic_quarterly/1996/spring/humphrey.cfm

Illinois Department of Agriculture. (2001). *Facts about Illinois agriculture.* Retrieved December 10, 2014, from http://www.agr.state.il.us/about/agfacts.html

Institute for Agriculture and Trade Policy [IATP]. (2011). *Electronic benefits at three farmers markets in Minneapolis: An analysis of the 2010 pilot program.* Minneapolis, Minnesota: Author. Retrieved from http://www.iatp.org/documents/electronic-benefits-at-three-farmers-markets-in-minneapolis-an-analysis-of-the-2010-pilot-

Krokowski, K. (2014). Evaluating the economic and nutrition benefits of EBT programs at farmers' markets. *Journal of Agriculture, Food Systems, and Community Development, 4*(2), 37–44. http://dx.doi.org/10.5304/jafscd.2014.042.011

Larsen, K., & Gilliland, J. (2009). A farmers' market in a food desert: Evaluating impacts on the price and availability of healthy food. *Health & Place, 15*(4), 1158–1162. http://dx.doi.org/10.1016/j.healthplace.2009.06.007

Leone, L. A., Beth, D., Ickes, S. B., MacGuire, K., Nelson, E., Smith, R. A.,…Ammerman, A. S. (2012). Attitudes toward fruit and vegetable consumption and farmers' market usage among low-income North Carolinians. *Journal of Hunger and Environmental Nutrition, 7*(1), 64–76. http://dx.doi.org/10.1080/19320248.2012.651386

Love, D. (2011). *Farmers market SNAP sales soar in 2010.* Farmers Market Coalition. Retrieved from http://www.farmersmarketcoalition.org/snap-sales-soar-2010

McGuirt, J. T., Jilcott, S. B., Liu, H., & Ammerman, A. S. (2011). Produce price savings for consumers at farmers' markets compared to supermarkets in North Carolina. *Journal of Hunger and Environmental Nutrition, 6*(1), 86–98. http://dx.doi.org/10.1080/19320248.2010.551031

Obadia, J. (2011). *Why some markets succeed when others fail: Final report, October 2010–August 2011.* Medford, Massachusetts: The Friedman School of Nutrition Science and Policy, Tuft University. Retrieved from http://www.ams.usda.gov/AMSv1.0/getfile?dDocName=STELPRDC5093846

Owens, N., & Verel, K. (2010). *SNAP/EBT at your farmers market: Seven steps to success.* Project for Public Spaces, Inc., & Wholesome Wave. Retrieved from the Project for Public Spaces website: http://www.pps.org/pdf/SNAP_EBT_Book.pdf

Ragland, E., & Tropp, D. (2009). *USDA national farmers market manager survey, 2006.* Washington, D.C.: USDA, Agricultural Marketing Service. http://dx.doi.org/10.9752/MS037.05-2009

Serafini, M., Bugianesi, R., Salucci, M., Azzini, E., Raguzzini, A., & Maiani, G. (2002). Effect of acute ingestion of fresh and stored lettuce (*Latuca sativa*) on plasma total antioxidant capacity and antioxidant levels in human subjects. *British Journal of Nutrition, 88*(6), 615–623. http://dx.doi.org/10.1079/BJN2002722

Stephenson, G., Lev, L., & Brewer, L. (2006). *When things don't work: Some insights into why farmers' markets close* (Special Report No. 1073). Corvallis, Oregon: Oregon State University Extension Service. Retrieved from http://smallfarms.oregonstate.edu/sites/default/files/small-farms-tech-report/eesc_1073.pdf

Tiehen, L., Jolliffe, D., & Gundersen, C. (2012). *Alleviating poverty in the United States: The critical role of SNAP benefits* (Economic Research Report No. ERR-132). Retrieved from the USDA Economic Research Service website: http://www.ers.usda.gov/publications/err-economic-research-report/err132.aspx

U.S. Department of Agriculture [USDA]. (2012). *USDA directory records more than 7,800 farmers markets* [Press release]. Retrieved December 7, 2014, from http://www.usda.gov/wps/portal/usda/usdahome?contentid=2012/08/0262.xml

USDA Agricultural Marketing Service [AMS]. (n.d.). *Food deserts.* Retrieved December 14, 2014, from http://apps.ams.usda.gov/fooddeserts/fooddeserts.aspx

USDA AMS. (2014a). National count of farmers market directory listing graph: 1994–2014 [Chart]. Retrieved from http://www.ams.usda.gov/AMSv1.0/ams.fetchTemplateData.do?template=TemplateS&leftNav=WholesaleandFarmersMarkets&page=WFMFarmersMarketGrowth&description=Farmers%2520Market%2520Growth

USDA AMS. (2014b). *Farmers markets directory search.* Retrieved on July 7, 2014, from http://search.ams.usda.gov/farmersmarkets/

USDA Economic Research Service (2014a). *Definitions of food security.* Retrieved on October 26, 2014, from http://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/definitions-of-food-security.aspx#.VA9KYkvDA00

USDA Food and Nutrition Service [FNS]. (n.d.). *USDA Supplemental Nutrition Assistance Program (SNAP): Putting healthy food within reach. Retailer Policy and Management Division, 2012 annual report.* Retrieved from http://www.fns.usda.gov/sites/default/files/2012-annual-report.pdf

USDA FNS. (2014). *Supplemental Nutrition Assistance Program (SNAP): Facts about SNAP.* Retrieved from http://www.fns.usda.gov/snap/facts-about-snap

Vallejo, F., Tomás-Barberán, F., & Garciá-Viguera, C. (2003). Health-promoting compounds in broccoli as influenced by refrigerated transport and retail sale period. *Journal of Agricultural and Food Chemistry, 51*(10), 3029–3034. http://dx.doi.org/10.1021/jf021065j

Ver Ploeg, M., Breneman, V., Farrigan, T., Hamrick, K., Hopkins, D., Kaufman, P.,…Tuckermanty, E. (2009). *Access to affordable and nutritious food — Measuring and understanding food deserts and their consequences: Report to Congress* (AP-036). USDA Economic Research Service. Retrieved from http://www.ers.usda.gov/publications/ap-administrative-publication/ap-036.aspx

Wholesome Wave. (2011). *Double Value Coupon program: A 2010 snapshot.* Bridgeport, Connecticut: Author.

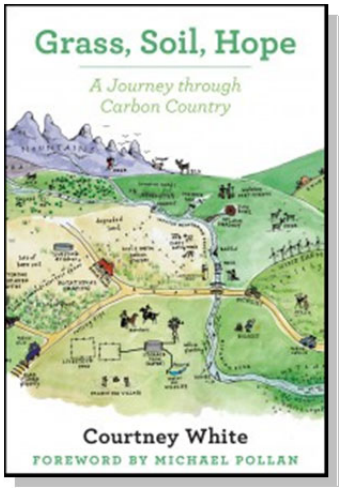
Wiig, K., & Smith, C. (2009). The art of grocery shopping on a food stamp budget: Factors influencing the food choices of low-income women as they try to make ends meet. *Public Health Nutrition, 12*(10), 1726–1734. http://dx.doi.org/10.1017/S1368980008004102

Wolf, M. M., Spittler, A., & Ahern, J. (2005). A profile of farmers' market consumers and the perceived advantages of produce sold at farmers' markets. *Journal of Food Distribution Research, 36*(1), 192–201. Retrieved from http://purl.umn.edu/26768

Young, C. R., Aquilante, J. L., Solomon, S., Colby, L., Kawinzi, M. A., Uy, N., & Mallya, G. (2013). Improving fruit and vegetable consumption among low-income customers at farmers markets: Philly Food Bucks, Philadelphia, Pennsylvania, 2011. *Preventing Chronic Disease, 10,* E166. http://dx.doi.org/10.5888/pcd10.120356

Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
www.AgDevJournal.com

Native to place: *Grass, Soil, Hope* by Courtney White



Book review by Philip A. Loring *
University of Saskatchewan

Grass, Soil, Hope: A Journey Through Carbon Country, by Courtney White

White, C. (2014). *Grass, soil, hope: A journey through Carbon Country*. White River Junction, Vermont: Chelsea Green Publishing. Available as paperback; 272 pages. Publisher's website: http://media.chelseagreen.com/grass-soil-hope/

Published online October 17, 2014

Citation: Loring, P. A. (2014). Native to place: *Grass, Soil, Hope* by Courtney White [Book review]. *Journal of Agriculture, Food Systems, and Community Development, 5*(1), 189–191. http://dx.doi.org/10.5304/jafscd.2014.051.002

In *Grass, Soil, Hope* (2014, Chelsea Green), archaeologist-turned-activist-turned-cattle rancher (and now writer) Courtney White recounts a personal journey to discover "on-the-ground-solutions to the rising challenges of the 21st century" (Introduction, p. XX). Throughout the book he circles two common themes — the role of carbon in both creating and solving environmental problems, and paradigm change — and uses these themes to stitch together stories of ranching, organic farming, wetlands restoration, and beaver conservation, among others. Individually the stories are interesting forays into creativity and innovation at the local scale. Taken together, however, they suggest a compelling and hopeful thesis: that sustainability is not merely about learning to *minimize* human impacts, but about learning to reorganize our actions such that they become *important* to the rest of the natural community, fostering biodiversity and promoting healthy ecosystem structure and function.

Carbon, according to White, is a common thread that cuts across many, if not all, contemporary environmental problems. Focusing on how people in a variety of ecological systems are experimenting with managing carbon, White builds the case that sustainability requires a mosaic of interlocking, place-based solutions. But whereas many authors implicate and even vilify carbon with respect to environmental challenges (think emissions and global warming), White is more pragmatic; he argues for consideration of carbon as a tool that can "be used for good or evil depending on one's goals" (p. 13).

This conciliatory attitude toward carbon

* Philip A. Loring is an assistant professor in the School of Environment and Sustainability at the University of Saskatchewan. He is a human ecologist with training in anthropology and ecology, and research interests in food systems and security, fisheries, and environmental justice. He can be contacted at phil.loring@usask.ca and followed on Twitter: @paloring.

underlies what is arguably the most important theme in the book: paradigm change. White urges the reader to abandon what he describes as the fatalistic and antagonistic philosophy of human nature that many environmentalists seem to embrace: that we are fundamentally destroyers of the natural world and that meeting our own needs will necessarily come at its expense. White contends that this perspective limits our options, locking us into what he calls "scarcity thinking," a mindset that he argues will always steer us toward thinking about sustainability as a matter of trade-offs and enforcement of limits to human consumption. The point he seems to be making is that the metaphor of limits, while a fundamental tenet of sustainability, make for a poor vision to guide our common future.

With this line of thought, White bucks a mountain of 20th century environmental philosophy (everything from Garrett Hardin's "Tragedy of the Commons" to Paul and Anne Erlich's I=PAT equation). Yet he is not alone in this argument; other writers such as Wes Jackson, Daniel Quinn, Elinor Ostrom, Nathan Sayre, and Paul Rosenzweig all in various ways encourage a more optimistic (and empirically justifiable) philosophy on human nature. White joins these writers in asking readers to reexamine their assumptions about the roles that people can play in ecosystems, and encourages them to look instead to matters of technology, culture, and social inequities for explanations of ecological degradation.

Surveys of sustainability case studies such as this have become common fare in environmental reading, following works by Michael Pollan (who writes the foreword), Dan Daggett, and many others. Some have critiqued this approach as "cherry picking," in that they put too much emphasis on unique systems at the local level while ignoring whether these solutions are "scalable." While common, this criticism is inherently fallacious — it's guilty of "moving the goal post" in that it evaluates locally scaled solutions based on their ability to do something they do not purport to do: solve regional and global problems. Yet White surprises here by taking on the scaling question anyway, suggesting that carbon management is the common feature necessary in all local systems for making such a mosaic approach work.

With this book White also takes on the currently divisive question of resilience, exploring what it does and doesn't offer as a design principle for sustainability. He aptly chooses the case of New Orleans and Hurricane Katrina to couch his discussion, which is an exemplar of both the good and bad sides of resilience. He describes the city as a place that "bounced back…but just barely and only with a great deal of expense and suffering" (p. 105). These words are as succinct a summary of resilience in the context of social systems as I have ever encountered, and they are illustrative of the problem with resilience: it is important, necessary even, but focuses too much on endurance and recovery to provide a vision for a better future (Loring 2013; Yanarella & Levine 2014). Resilience is advertised by many as a source of science-based best practices for sustainability, and in some cases as a preferable replacement for sustainability altogether (Benson & Craig 2014); yet, in White's words, we need to think about life as "more than resilience, more than [mere] survival and bouncing back" (p. 129).

White's book is not without its shortcomings, of course. His attempt to keep the tone entirely conversational and his overuse of rhetorical questions to drive the narrative will surely frustrate some readers. He also makes some strange segues that, while interesting, may distract readers from the thesis he is developing throughout the chapters. Even Homer Simpson makes an appearance in White's narrative. This is particularly unfortunate (the segues, not Homer Simpson), because White is introducing a lot of important ideas here — ideas that cumulatively provide a scaffolding for a new way of thinking about sustainability challenges. Indeed, with his comments on life force and life as art and embracing change, White is flirting with a moral environmental philosophy that is reminiscent of the Tao, though he covers too much ground in too few words for this contribution to shine through.

Whether you are a newcomer to literature on small-scale sustainability or a scholar working in the areas of human or landscape ecology or ecosystem services, this book deserves a read. It is not revolutionary, but it does add a valuable and

unique new voice to the discussion. It also leaves the reader with some lingering ideas about reconciling ourselves in the natural world, and hope that it is indeed possible to, as Wes Jackson called it, "become native to place."

References

Benson, M. H., & Crain, R. K. (2014). The end of sustainability. *Society & Natural Resources, 27*(7), 777–782. http://dx.doi.org/10.1080/08941920.2014.901467

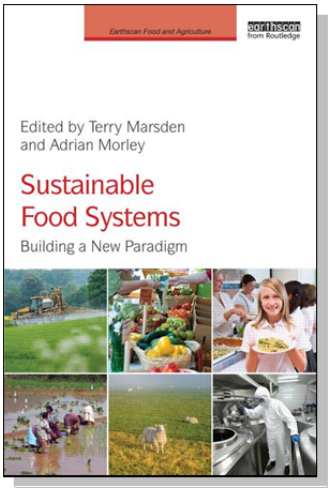
Loring, P. A. (2013). Are we acquiescing to climate change? Social and environmental justice considerations for a changing Arctic. In F. J. Mueter, D. M. S. Dickson, H. P. Huntington, J. R. Irvine, E. A. Logerwell, S. A. MacLean, L. T. Quakenbush, & C. Rosa (Eds.), *Responses of Arctic marine ecosystems to climate change* (pp. 1–11). Fairbanks, Alaska: Alaska Sea Grant, University of Alaska Fairbanks. https://seagrant.uaf.edu/bookstore/pubs/AK-SG-13-03.html

Yanarella, E. J., & Levine, R. S. (2014). From sustainability to resilience: Advance or retreat? *Sustainability: The Journal of Record, 7*(4), 197–208. http://dx.doi.org/10.1089/SUS.2014.9782

Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
www.AgDevJournal.com

Building blocks for sustainable food systems

Book review by Molly D. Anderson *
College of the Atlantic



Review of *Sustainable Food Systems: Building a New Paradigm,* edited by Terry Marsden and Adrian Morley

Marsden, T., & Morley, A. (Eds.). (2014). *Sustainable Food Systems: Building a New Paradigm.* Abingdon, UK, and New York: Routledge. Available as hardcover and Kindle eBook; 256 pages. Publisher's website: http://www.routledge.com/books/details/9780415639545/

Published online December 1, 2014

Citation: Anderson, M. D. (2014). Building blocks for sustainable food systems [Book review]. *Journal of Agriculture, Food Systems, and Community Development, 5*(1), 193–195. http://dx.doi.org/10.5304/jafscd.2014.051.009

This is an ambitious book; it is not a light undertaking to build a "new paradigm" for sustainable food systems. The authors and editors succeed in notable ways, although there are questions about the applicability of the framework and analysis they present outside Western Europe, where most of the contributors are based, and beyond the concerns and activities of relatively privileged people in that region.

In the final chapter, Marsden describes this "new paradigm" as one of "social and economic creativity and care...that shines a strong light upon the existing unsustainable conditions... It needs to be a paradigm that starts as much with the critical social and public priorities as with the economic; and it needs to be able to shape the latter through imagining and designing more effective...state-based interventions and actions" (p. 206). Chapters in the book are conceived as "key building blocks" of this paradigm, such as regulation and governance mechanisms, public procurement, the design of urban food systems, sustainable supply chains, the rural-urban nexus, biosecurity risks, and animal welfare. Chapters describe work conducted over the past 10 years through Cardiff University's Centre for Business Relationships, Accountability, Sustainability & Society, which Marsden directs.

The first chapter lays out some of the major developments and debates in the conjoined fields of food security and sustainability, attempting to explain why these have not been explicitly considered together. This discussion takes the reader through imperial food regimes, productivism, intensification and neoproductivism, as they played out against an unfolding environmental crisis. Marsden and Morley ask what comes next, and in

* Molly D. Anderson holds the Partridge Chair in Food & Sustainable Agriculture Systems at College of the Atlantic, where she teaches on food security, food policy, and sustainability. She can be contacted at College of the Atlantic, 105 Eden Street, Bar Harbor, Maine 04609 USA; manderson@coa.edu

response examine agri-food scholarship dealing with alternative food systems, localization and place-based alternatives to "food from anywhere," and the moral economy. They suggest key parameters of a sustainable food system, going beyond environmental sustainability into equity within the present generation and with future generations, new governance systems, and new economic structures. They introduce neoliberalism and "corporate-interest food governance" as key barriers to sustainable food systems, a theme that many of the subsequent chapters and the conclusion pick up. In some ways this book is the food-security counterpoint to Naomi Klein's *This Changes Everything: Capitalism vs. the Climate;* whereas Klein focuses on climate change as the driver for a new and more sustainable socioeconomic system, Marsden and Morley focus on food security as the driver. Climate change and food security are closely linked, of course.

The second chapter is also a scoping chapter and addresses assessments and reports of food futures, oddly omitting the 2008 IAASTD; the 2009 Agrimonde study; and United Nations studies of the food-environment intersection, such as FAO's multiple studies of organic agriculture and UNEP's 2009 *Environmental Food Crisis*. This chapter would have benefited from an "assessment of the assessments," or critical analysis and comparison of recommendations from different reports, what has been learned, and the knowledge gaps that remain. Following chapters address more specific topics: European food governance, public procurement, sustainable food supply chains, animal disease regulation, farm animal welfare regulations and market differentiation based on welfare standards, rural-urban linkages, and urban food strategies.

Most chapters are UK-centric, although some examples are included from other places and the chapters on animal disease and animal welfare are explicit comparisons across countries. Despite the focus on British practices, many of the conclusions apply across industrialized countries. The final chapter notes that entry into "post-productivist" agri-food policy has been uneven. This has not happened at the federal level in the United States, so much of the book is not (yet) applicable to U.S. policy, even though alternatives are emerging at state and municipal levels. The chapters do not delve into exactly who is using and benefiting from the alternative mechanisms in the UK or other countries, although the chapter on urban food strategies claims that many of these are focused on the right of every citizen to have access to healthy, nutritious food. While I am aware of "good food" or healthy food for all as a common denominator across urban food strategies, this is not the same as being focused on rights and justice. The question remains whether the many alternative ways of achieving food security more sustainably described in this book are resulting in greater equity and political engagement for disenfranchised or marginalized people, which are among the attributes of sustainable food systems described by the authors. And their applicability in impoverished countries where food insecurity is highest was not a real concern of most chapters. Exploring global feasibility and applications of this "new paradigm" was not a stated intention of the authors, yet they did not limit its scope to Western Europe and industrialized countries.

The book has a few factual errors and out-of-date figures; for example, chapters 1 and 2 used the FAO's 2009 and 2010 "malnourishment" figures, despite including many later references and even though these figures have been subject to revisions and indicate extreme chronic hunger rather than malnourishment. Another example: Toronto was not the first city to establish a food policy council (p. 189). Yet overall the writing is clean, if somewhat dense for a reader who is not steeped in sociological and political science terminology.

This book would be an interesting supplement to a graduate course in Food Studies that deals with food system governance and agri-food alternatives. Among its strengths are the rich bibliographies, especially of sociological and political science literature in Europe, that accompany each chapter. These offer an intriguing window into British and European scholarship on new possibilities for sustainable food systems.

(continued)

References

Klein, N. (2014). *This changes everything: Capitalism vs. the climate*. New York: Simon & Schuster.

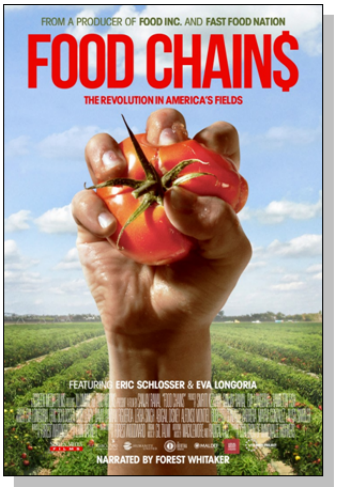
McIntyre, B. D., Herren, H. R., Wakhungu, J., & Watson, R. T. (Eds.). (2009). *Agriculture at a crossroads: Synthesis report*. Washington, D.C.: Island Press.

Nellemann, C., MacDevette, M., Manders, T., Eickhout, B., Svihus, B., Prins, A. G. & Kaltenborn, B. P. (Eds.). (2009). *The environmental food crisis — The environment's role in averting future food crises*. Arendal, Norway: GRID-Arendal. Retrieved from http://www.grida.no/publications/rr/food-crisis

Paillard, S., Treyer, S., & Dorin, B. (Eds.). (2010). *Agrimonde — Scenarios and challenges for feeding the world in 2050*. Versailles: Editions Quae.

Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
www.AgDevJournal.com

More than one meaning of "chain" in *Food Chains,* a documentary film



Film review by Jane Kolodinsky*
University of Vermont

Review of *Food Chains,* directed by Sanjay Rawal; executive producers Eva Longoria and Eric Schlosser (*Fast Food Nation* and *Food Inc.*). Limited release; also available at iTunes. Film's website: http://www.foodchainsfilm.com

Published online December 10, 2014

Citation: Kolodinsky, J. (2014). There is more than one meaning of "chain" in *Food Chains,* a documentary film [Film review]. *Journal of Agriculture, Food Systems, and Community Development, 5*(1), 197–198. http://dx.doi.org/10.5304/jafscd.2014.051.011

On November 18, 2014, I had the opportunity to see an advance screening of *Food Chains,* a documentary from the producers of *Fast Food Nation* and *Food, Inc.* (It was released in the U.S. on November 21.) The film is about the long and arduous journey of the Coalition of Immokalee Workers (CIW) to win rights — *basic* rights — as farmworkers. The film was shown at the American Public Health Association (APHA) meetings in New Orleans, sponsored by the Food and Environment Working Group at APHA and hosted by Healthy Food Action. Worker rights have a lot to do with public health. But the film serves a much bigger audience. It can be used as a transdisciplinary starting point for discussion by scholars and practitioners in the food system who are interested in health, worker safety, food justice, labor laws, unlikely partners, and economic power and concentration in the food industry.

When I received the invitation to review the film, I immediately thought of the book *Nobodies: Modern American Slave Labor and the Dark Side of the New Global Economy* (Bowe, 2008) which I read a few years ago and still recommend. I distinctly remembered the first chapter about slave labor in the tomato fields of Florida. Indeed, *Food Chains* is about the Immokalee workers of Florida, their struggles and successes, and the film included a segment on the slave-labor case that surfaced in 1997. Yes, 1997. That's 17 years before this film was released and just four years after the Immokalee workers began to organize. Particularly disturbing to me is the fact that after more than a decade since that slave-labor case surfaced, farmworkers are still fighting for basic worker rights… even basic human rights. These are the same workers, in the same tomato fields, suffering some of the same indignities. And while the CIW has some victories under its belt, we as a nation have a long way to go.

* Jane Kolodinsky is professor and chair of the University of Vermont Department of Community Development and Applied Economics, and is director of the UVM Center for Rural Studies; Jane.Kolodinsky@uvm.edu

Just as with *Fast Food Nation,* someone could write down a passage from *The Jungle* (Sinclair, 1906) and *Food Chains* and have about a 50-50 chance of a reader assigning the passage to the wrong source. *Food Chains* is a documentary; *The Jungle* is a novel. How can it be that more than a century after muckrakers exposed the deplorable conditions of workers in the food system, that harassment of workers, rapes in the fields, squalid living conditions, pesticide showers, hazardous working conditions, and slave wages continue be the norm? As the documentary highlights, the food industry goes out of its way to hide where our food comes from. After all, shopping wouldn't be such a pleasure if shoppers really knew about farmworker conditions.

A major initiative of the CIW is "a penny per pound." Workers have lobbied to have large purchasers of tomatoes pay just one penny more per pound. This would result, they say, in nearly doubling farmworkers' yearly incomes. Some major players have signed on, including Taco Bell and Trader Joe's. Publix, the largest supermarket chain in Florida and the store with the slogan "Where shopping is a pleasure," is a hold-out. A large portion of the film is dedicated to showing the hunger strike by workers and advocates in front of Publix's headquarters. The image of the strike, along with footage of field workers, makes the situation of farmworkers real to movie viewers. The goal of the strikers is the signing of the Fair Food agreement. To understand the significance of the Fair Food movement, we need to understand who the CIW is, and what signing a Fair Food agreement entails:

The Coalition of Immokalee Workers' (CIW) Fair Food Program is a unique partnership among farmers, farmworkers, and retail food companies that ensures humane wages and working conditions for the workers who pick fruits and vegetables on participating farms. It harnesses the power of consumer demand to give farmworkers a voice in the decisions that affect their lives, and to eliminate the long-standing abuses that have plagued agriculture for generations (Fair Food Program, n.d.). There is a twist to this film. Publix does *not* sign the Fair Food agreement — but another giant food purveyor does. For some of us, that causes cognitive dissonance. In the arena of labor, and as the film points out, food giants are typically low-wage payers that compete on low prices that fuel the poor treatment of farmworkers. But in this film, one of the largest players is one of the heroes. The giant corporation buys into Fair Food. The film does not dwell on their signing of the agreement, nor does it place a lot of significance on it. After all, the documentary is about persuading Publix to sign on to fair food. Perhaps the film-makers suffered the same cognitive dissonance I did and did not know exactly how to portray the "bad guy gone good." It does make one think about strange bedfellows. We have to give some credit to the corporation that sells *a lot* of tomatoes to the consuming public because it means many more pennies per pound that increase farmworkers' incomes. You have to see the film to find out which food giant signed the Fair Food agreement. Personally, I never would have guessed.

The documentary is real, compelling, and a must-see. I know I will encourage student groups to screen it for our campus. Some people will cringe, some will make excuses, and some may look away. Regardless of the reaction, *Food Chains* will be a conversation starter. And, while my research into the film's claims confirmed the idea that it is the large supermarket and other chains that really have the power over farmworkers through their buying policies, there is no doubt that the word "chain" has a double meaning. Our abundant and cheap food policies in the U.S. have kept real chains on farmworkers.

References

Bowe, J. (2008). *Nobodies: Modern American slave labor and the dark side of the new global economy*. New York: Random House.

Fair Food Program. (n.d.). *The Fair Food Program.* Retrieved November 26, 2014, from http://www.fairfoodprogram.org/

Sinclair, U. (1906).*The Jungle.* New York: Doubleday, Page.