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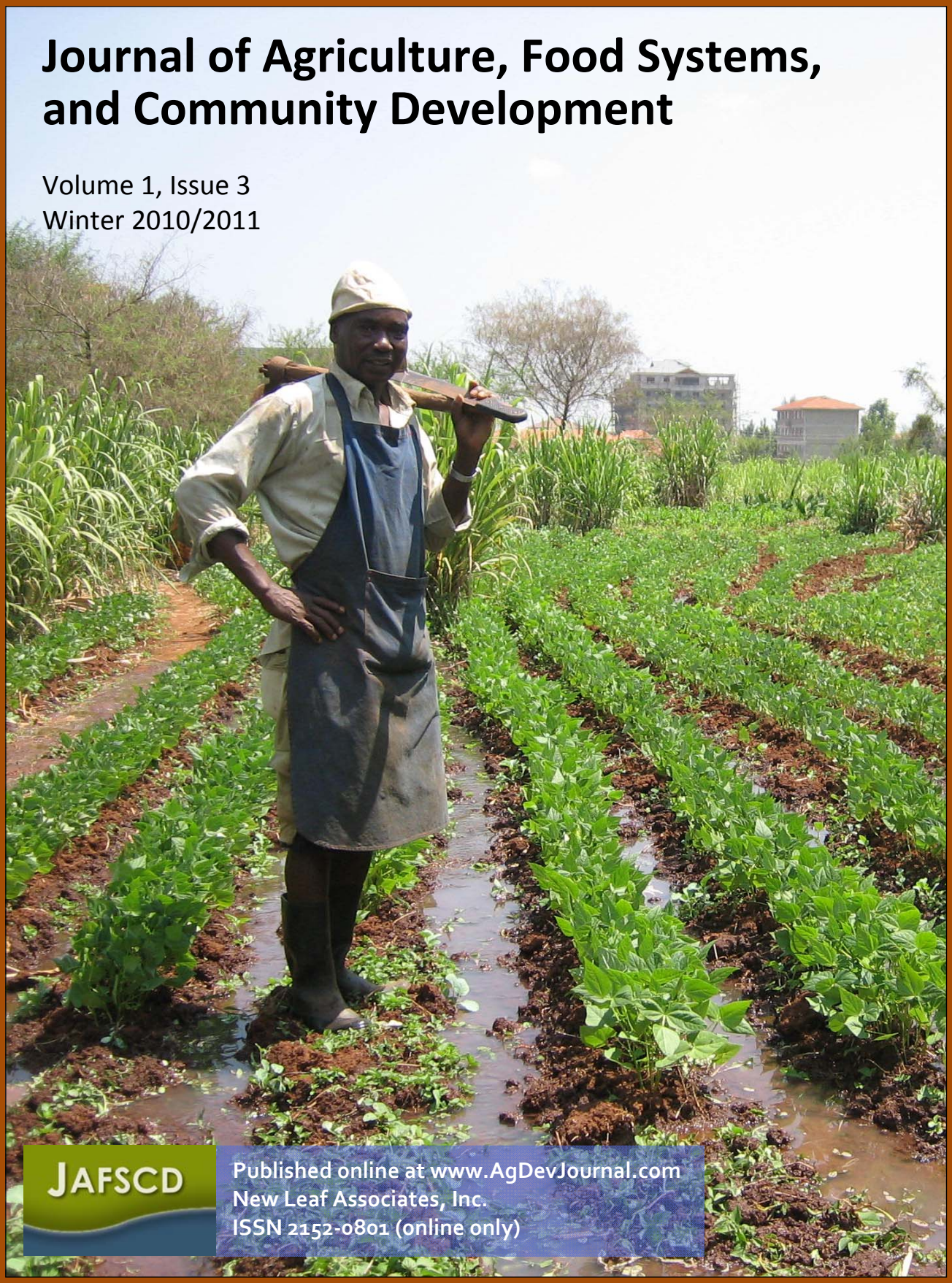

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Cover: A farmer at the Kibera informal settlement of Nairobi grows beans using wastewater, December 2006.

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DUNCAN HILCHEY

Open call papers and urban and peri-urban agriculture — part 2

Published online 30 June 2011

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One of the many benefits of an electronic journal is that it grants us the flexibility to publish additional outstanding papers in response to a special-topic call for papers. Such is the case with volume 1, issue 3. In this issue we offer open-call papers on food and agriculture–based community development, as well as a supplementary collection of papers related to the topic of Urban and Peri-Urban Agriculture that was started in the previous issue. These papers contribute substantially to the breadth of papers found in issue 2 and include the first papers published from Asia, Australia, and Africa.

In honor of National Black Agriculture Awareness Week (July 10–16, 2011), the theme of which is "Recognition, Justice, and Development," we will be providing open access to *"The Next Generation, That's Why We Continue To Do What We Do": African American Farmers Speak About Experiences with Land Ownership and Loss in North Carolina* by the team of Peter Balvanz, Morgan L. Barlow, Lillianne M. Lewis, Kari Samuel, William Owens, Donna L. Parker, Molly De Marco, Robin Crowder, Yarbrough Williams, Dorathy Barker, Alexandra Lightfoot, and Alice Ammerman. Utilizing a community-based participatory research method called Photovoice, the authors gathered deep insights into the experiences of a small group of African American farmers in North Carolina. This study brings to light the racism, courage, ingenuity, and fears for the future felt by current and recent African American farmers, as well as suggestions for action steps and public policy improvements. We believe this paper contributes significantly to the current discourse on the past, present, and future of African American farmers. Though New Leaf maintains the copyright of this paper, permission to copy and share this particular paper at meetings is not required.

Open Call Papers

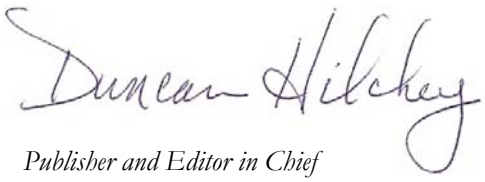
As noted above, **Peter Balvanz and colleagues** study of the challenges of small-scale farming by African Americans in North Carolina in *"The Next Generation, That's Why We Continue To Do What We Do": African American Farmers Speak About Experiences with Land Ownership and Loss in North Carolina.* In *Between Conventionalization and Civic Agriculture: Emerging Trends in the Chilean Agroecological Movement,* **Beatriz Cid-Aguayo** explores the complex structure of the agroecological movement in one region of Chile. **Michelle**

Glowa, Sarah Carvill, and Costanza Rampini analyze two years of food and agriculture policy under the Obama administration in *Planting Seeds for an Improved Agrifood System? Linking the Aims of the Alternative Agrifood Movement to Executive Action in the First Two Years of the Obama Administration.* In *Beliefs, Attitudes, and Propensity To Buy Locally Produced Food,* Canadians **Steven Dukeshire, Renée Garbes, Chloe Kennedy, Ainslie Boudreau, and Theresa Osborne** provide insights into Nova Scotians' interest in local food. **Diego Thompson** explores the essential elements to the success of Latino food producers in *"Somos del Campo": Latino and Latina Gardeners and Farmers in Two Rural Communities of Iowa — A Community Capitals Framework Approach.* **Erin Roche and Jane M. Kolodinsky** explore what's working in Vermont to increase the amount of local produce on school children's trays in *Overcoming Barriers To Providing Local Produce in School Lunches in Vermont.*

Urban and Peri-Urban Agriculture Part 2

Kristin A. Reynolds interviewed 52 urban agriculturalists to inform educational programming and strategies in *Expanding Technical Assistance for Urban Agriculture: Best Practices for Extension Services in California and Beyond.* In *Integrating Agriculture and Food Policy to Achieve Sustainable Peri-urban Fruit and Vegetable Production in Victoria, Australia,* **Rachel Carey, Fanny Krumholz, Kena Duignan, Kathy McConell, Jessica L. Brown, Catherine Burns, and Mark Lawrence** argue for combined land use and food security policy in one of Australia's largest metropolitan areas. **Gopal Datt Bhatta and Werner Doppler** examine the difference between three farming systems and offer public policy recommendations in *Smallholder Peri-Urban Organic Farming in Nepal: A Comparative Analysis of Farming Systems.* In *Community-Based Wastewater Farming and its Contribution to Livelihoods of the Urban Poor: Case of Nairobi, Kenya,* **Mary Njenga, Nancy Karanja, Gordon Prain, Kuria Gathuru, and Diana Lee-Smith** explore the benefits and challenges of wastewater farming. **Sarah Krones and Shari Edelson** describe Baltimore's adaptation of Detroit's successful urban gardening efforts in *Building Gardens, Rebuilding a City: Baltimore's Community Greening Resource Network.* In *Perceptions and Attitudes Regarding Organic Waste: Feasibility of Establishing an Urban Composting Program in Chiapas, Mexico,* **Jorge Camacho Barboza, Helda Morales, Ricardo Alvarado Barrantes, Antonio Saldivar Moreno, and Esperanza Huerta Lwanga** report the results of a feasibility study for community composting based on existing household composting practices. **Tommy Bleasdale, Carolyn Crouch, and Sharon L. Harlan** present the results of a survey of residents' interest in community gardening in *Community Gardening in Disadvantaged Neighborhoods in Phoenix, Arizona: Aligning Programs with Perceptions.*

As always we have an ongoing open call for manuscripts that integrate food, agriculture, and community development. We look forward to hearing from scholars, applied researchers, and food system professionals as both prospective authors and readers. Please email me if you have an comments or questions at duncan@newleafnet.com.



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"Somos del campo": Latino and Latina gardeners and farmers in two rural communities of Iowa — a Community Capitals Framework approach

Diego Thompson[a]

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Abstract

Using the Community Capitals Framework approach, this study describes what makes it possible for Latinos and Latinas to become gardeners and beginning farmers in two rural Iowa communities. Four in-depth interviews were carried out in Denison, Iowa, and four in Marshalltown, Iowa, with Latino and Latina gardeners and beginning farmers participating in community gardening and farming programs. I used participant observation in people's homes and garden plots to understand the meaning of gardening and farming among Latinos. Human, cultural, and social capitals are essential elements in the success of Latino gardeners. The interaction between these three capitals mobilizes other community capitals to improve household well-being. These Latinos bring to their new gardening and farming efforts their previous knowledge of agriculture, fresh food, and how to cook it from their countries of origin and other parts of the U.S. Recommendations center on how to strengthen the most critical community capitals.

Keywords

Latinos, Latinas, immigrants, community gardens, beginning farmers, Community Capitals Framework, Iowa

Latinos and the Community Capitals Framework Approach

Between 1990 and 2000 the Latino population in the U.S. grew 57.9%, and in 2001 Latinos made up 12.5% of the total population (Díaz & Guzmán, 2002; Guzmán, 2001). The Hispanic population is projected to more than double between 2000 and 2050 (U.S. Census Bureau, 2009). The growth has been very rapid in the Midwest (Díaz & Guzmán, 2002), particularly in rural towns with meat-packing plants like Denison and Marshalltown, Iowa.[1]

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This paper is based on the author's master's thesis at Iowa State University presented in spring 2010, *"Somos del campo" Latino/a gardeners and farmers in two rural communities of Iowa A Community Capitals Framework approach.* Available at ProQuest, http://gradworks.umi.com/14/76/1476356.html

[1] Among Iowa counties in 2009, Crawford (where Denison is located) was tied for first in the proportion of its population (22%) that is Hispanic; Marshall County ranks fourth (17%). (State Data Center of Iowa, 2010).

Labor markets and local enterprises in both towns have been affected by the new immigrants. While early employment was in meat packing, other "invisible" employment developed in the informal sector (Tienda & Raijman, 2000).

In the middle of the past decade, Latinos in those two towns began participating in farming and gardening programs organized by Iowa State University Extension, the Leopold Center for Sustainable Agriculture, Iowa Valley Community College in Marshalltown (MCC), the National Center for Appropriate Technology (NCAT), and M and M Resource Conservation and Development Council (RC&D) (serving west-central Iowa) and the Prairie Rivers of Iowa RC&D (serving central Iowa). Community gardens and a farm incubator opened new opportunities for the social, economic, and cultural integration of Latino immigrants into local agriculture and local food systems.

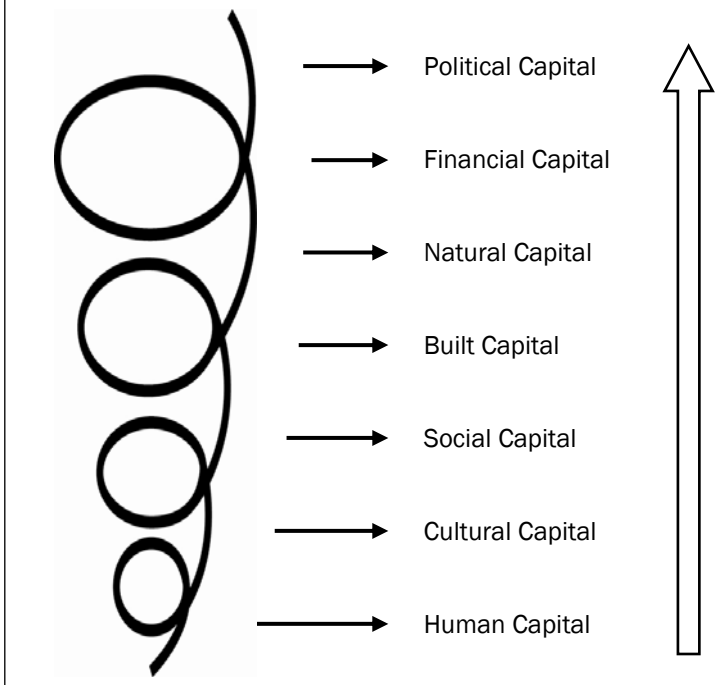
The Community Capitals Framework (CFF) is a methodology that can help identify elements that facilitate Latino and Latina involvement in these enterprises, to describe the challenges, and to assess the implications that these initiatives have within the Latino community and the larger community. The CCF includes seven types of capital: natural, cultural, human, social, political, financial, and built (Flora & Flora, 2008). "These capitals can either enhance or detract from one another, and resources can under certain circumstances be transformed from one form of capital to another" (Flora & Flora, 2008, p. 17). For Latinos participating in these gardening and farming projects, I propose that the different community capitals interact with one another in specific ways (see figure 1).

Description of the capitals involved in Latino and Latina gardening and farming experiences will illuminate how the different capitals are configured in each setting and how they interact, facilitating the process by which Latino immigrants can get access to land, cultivate and consume their own fresh food, and perhaps market some of their products.

Human Capital

In Denison and Marshalltown, Lewis and Tafoya (2008) found that 83% of 111 Latino participants of rural origin grew up on farms that were operated by their parents or grandparents in their countries of origin (Mexico, El Salvador, and Guatemala). They left their family farms at an average age of 19 years (Lewis & Tafoya, 2008). Over half the participants became farmworkers, and 83% had experience with vegetable production as well as with mixed systems of vegetables, grains, and livestock (Lewis & Tafoya, 2008). Experiences that Latinos bring from their background in agriculture in their countries of origin, from farmworker jobs, and from gardening experience in the U.S., give them skills in diverse types of agricultural production. Ninety-four percent of the participants who participated in the Lewis and Tafoya study in Denison and Marshalltown had performed some

Figure 1. Upward Spiral with the Community Capitals



type of fieldwork, including planting, harvesting, weeding, and pruning (Lewis & Tafoya, 2008). Fifty-two percent had experience in selecting and saving seeds, 60% had experience in marketing agricultural products, and 24% had experience in preserving food through drying or canning (Lewis & Tafoya, 2008).

Several examples from the community gardening literature suggest how community gardens offer spaces for knowledge exchange and education (e.g., Lawson, 2005). In community gardens in Latino New York City neighborhoods, educational activities for and among children not only offer ethnic group members the opportunity to learn from one another about gardening and farming; the gardens also provide a venue for knowledge exchange between groups and with the agencies that support the gardens. These educational activities promote civic agriculture (Kransy & Saldivar-Tanaka, 2004; Lyson, 2004). The mobilization of human capital in educational gardening programs can provide spaces for building social capital (Kransy & Saldivar-Tanaka, 2004; Lawson, 2005).

Cultural Capital

Cultural capital consists of values and worldview. It is transmitted through the socialization process (Flora & Flora, 2008). Cultural capital is the way people regard the world surrounding them, which can have both material and nonmaterial implications.

In the Latino community gardens in New York City, gardeners organize many cultural events such as birthdays, Christmas and Halloween celebrations, and weddings, as well as religious activities such as Día de la Cruz, Day of the Dead, and others. According to Kransy and Saldivar-Tanaka (2004), the organization of those events in the open spaces provided by the gardens is more important than the produce derived from that land. As expressed by a staff member of one of those gardens, people want to garden because it gives them a sense of their culture and a sense of strength (Kransy & Saldivar-Tanaka, 2004). Lewis (2007) describes how Mexican farmers in Iowa perceive their agricultural activities as reconstructing their cultural backgrounds. Similarly, cultural capital among Latino and Latina gardeners and beginning farmers in Denison and Marshalltown may have special meaning that need to be explored.

Social Capital

Social capital emerges out of networks of more or less "institutionalized relationships of mutual acquaintance and recognition" that provide each member with "collectivity-owned capital" (Bourdieu, 1986, pp. 248–249). In the U.S., community-garden programs historically have tried to reinforce the importance of the social relationships within those enterprises (Lawson, 2005). As Winne (2008) points out, the most important word in "community garden" is community.

In the Latino community gardens in New York City, social activities connected to the gardens are essential elements in motivating the participants (Kransy & Saldivar-Tanaka, 2004). In addition, Kransy and Saldivar-Tanaka (2004) found that social capital was transformed into political capital such that community development came to be more important than agricultural production.

There are two main types of social capital that are not necessarily mutually exclusive. *Bonding* social capital is made up of the connections among individuals or groups with similar backgrounds, while *bridging* social capital involves connections among diverse groups within the community to each other and to groups outside the community (Flora & Flora, 2008). *Bridging* social capital in the absence of *bonding* social capital can create conflicts between different internal groups through the pressures of external groups seeking power (Bourdieu, 1986; Bourdieu & Passeron, 1977; Flora & Flora, 2008). Glover (2004) points out that social capital can be both a benefit and a cost, depending upon the position that gardeners occupy within the social networks.

Built and Natural Capitals

Built capital consists of physical infrastructure, machinery, and tools. In the case of community gardens and farms, that includes irrigation systems, tillage equipment, gardening tools, and fencing.

Natural capital includes soil quality, water quantity and quality, natural and cultivated biodiversity, and landscapes (Flora & Flora, 2008). Ability to garden and farm requires access to and control of both these capitals.

These two capitals represent challenges for the sustainability of community gardens and farming areas around the country. The quantity and quality of land and water available to local residents for agricultural production are critical issues of access to natural capital. The land available for gardening within urban areas, in towns, and in their immediate hinterlands depends on historical and political contexts, local authorities, and sometimes even national programs (Hou, Johnson, & Lawson, 2009; Lawson, 2005). As a consequence, one of the biggest problems faced by many community gardens, as well as farm incubators, is long-term institutional support and continuity of the provision of public land, which is regularly challenged by developers and other private interests. In response to those threats, some gardeners have used resistance strategies. In New York, Latino gardeners have had an active role in modifying the landscapes and building *casitas* (small houses) for their regular meetings and celebrations. Today, they "contrast sharply with the more uniform and refined aesthetics of institutionalized landscapes, such as the city parks" (Kransy & Saldivar-Tanaka, 2004, p. 409).

Financial Capital

Financial capital includes a variety of financial instruments invested to create additional monetary value. Other community capitals can be used to increase financial capital (Flora & Flora, 2008). In Denison and Marshalltown, a great number of the Latino population and six of the eight gardeners and beginning farmers who participated in this study work in the local meat-packing plants. In recent decades, the meat-packing industry has hired ethnic minorities such as Latinos at lower wages than those of American-born workers who were hired previously (Fink, 1998).

Access to land and capital to purchase inputs represents some of the most important barriers for Latino beginning farmers (Lewis, 2007). Lewis & Tafoya (2008) found that in Marshalltown and Denison, 97% of women and 81% of men considered access to capital to buy land the greatest barrier to starting farming.

Political Capital

Political capital is the power to influence the market, state, civil society, and laws (Flora & Flora, 2008). Political capital is low among new immigrants. They are often invisible (in order to protect themselves or family members from deportation) and lack voice in their workplaces and communities. According to Flora & Flora (2008), political capital is fostered by purposeful organization and development of strategic connections.

Collective gardening and farming experiences can provide opportunities for organizing and gaining more political visibility. In Latino community gardens in New York City, gardens are "participatory landscapes" where people consider activism to be one of the most important elements of their participation in gardening (Kransy & Saldivar-Tanaka, 2004). Community gardens in this country historically have been used to address different social and political agendas (Allen, 2008; Lawson, 2005). For Latino immigrants, political capital gained through working together and with outside groups in gardens and on farms can strengthen sustainable livelihoods. This can help overcome their vulnerability in terms of political representation and power in rural towns.

Research Methods

In this study I explore the human capital that Latino gardeners and beginning farmers bring from their countries and from other parts of the U.S., and how that knowledge is enriched through their experiences in community gardens and a beginning farmer program in Iowa.

I examine the ways in which gardening utilizes and recreates cultural capital in the Latino community. I study both positive and negative ways in which social capital can influence Latinos' gardening and farming experiences in Iowa. Gardening may enhance or detract from social relationships among gardeners and with the rest of the community.

Table 1. Gardeners and beginning farmers interviewed[a]

Names	City and Country of Origin	Gardening and Farming Programs	Length of Participation	Age	Gender
Oscar	Jalisco, Mexico	Start Your Own Diversified Farm—MCC-Marshalltown	1st year	57	Male
Guillermo	Michoacán, Mexico	Start Your Own Diversified Farm—MCC-Marshalltown	1st year	34	Male
Pablo	Guanajuato, Mexico	Community Garden—MCC- Marshalltown	4th year	40	Male
Martín	Guanajuato, Mexico	Community Garden—MCC- Marshalltown	6th year	48	Male
Lucía	Guachapán, El Salvador	Denison Community Gardens	4th year	32	Female
Ricardo	Campeche, Mexico	Denison Community Gardens	4th year	36	Male
Juan	Quesada Municipality, Guatemala	Denison Community Gardens	1st year	49	Male
Raúl	Campeche, Mexico	Denison Community Gardens	1st year	40	Male

[a] I used pseudonyms to assure confidentiality and to protect the identities of the subjects interviewed.

I also analyze how Latinos gain collective access to natural and built capital through their participation in farming and gardening programs and the support of local institutions. I explore how Latinos who participated in the gardens and farm generated the capital necessary to access land and inputs through sources other than sale of production, and I analyze the degree to which financial capital motivates or discourages Latino farmers and gardeners. I examine the degree to which growing high-quality food and participating in local agricultural enterprises give immigrant gardeners and farmers more voice (political capital) in their local community and in the programs designed to serve them.

Participant observation allowed me to participate as intimately as possible in the experience of the subjects studied (Denzin, 1970). As I gathered my data, I attempted to be part of the diverse processes of farming and gardening in the two communities, and, as Denzin proposes, to "be part of the day-to-day experiences" (1989, p. 156).

I used purposive sampling to ensure different backgrounds in gardening and farming, different nationalities (Mexican, Salvadoran, and Guatemalan), different ages (from 32 to 57 years), and male and female gardeners (see table 1).

I interviewed eight of the 28 Latino and Latina immigrant gardeners and beginning farmers who participated in two different community gardens and in small-scale incubator plots in the two towns of Denison and Marshalltown, Iowa. In Marshalltown, two Latino farmers were chosen from the COMIDA[2] program and the beginning farmer course it offers, Start Your Own Diversified Farm,[3] located at Iowa Valley Community College in Marshalltown (hereafter referred to as Marshalltown Community College, or MCC). I was acquainted with these two participants because I was one of the organizers and interpreters for the course. Two gardeners from the community gardens at MCC were also selected to participate. In Denison, four participants were chosen from among the Latino gardeners participating in Denison Community Gardens based on information provided by other organizers of that community garden and what I knew about them as an organizer myself.

Case studies and participant observation provide data for cross-sectional and longitudinal analysis (Neuman, 2003), as data were collected before, during, and after the farming seasons of 2008 and 2009.

[2] County of Marshall Investing in Diversified Agriculture
[3] In Spanish, *Comience su propia granja diversa.*

Table 2. Numbers of times that the participants mentioned indicators of each of the community capitals during the interviews

Gardeners	Human Capital	Cultural Capital	Social Capital	Natural Capital	Built Capital	Financial Capital	Political Capital
Oscar	5	4	3	4	3	2	1
Guillermo	10	2	8	3	1	1	1
Pablo	8	3	9	2	1	1	0
Martín	5	4	4	2	4	3	1
Lucía	10	3	5	0	1	2	0
Ricardo	6	4	11	1	2	1	0
Juan	4	4	7	0	0	2	0
Raúl	10	2	6	3	1	1	0
TOTAL	58	26	53	15	13	13	3

My case studies include six community gardeners (from Denison and Marshalltown) and two beginning vegetable farmers who had been gardeners in the past.[4] This differentiation allows us to compare differences or similarities not only in the scale of farming and gardening, but also differences or similarities that may exist between these Latino and Latina immigrants who garden and farm through the lenses of different experiences, goals, and purposes. I recorded all eight interviews and used the software program NVivo to analyze them. I coded the transcriptions of the eight interviews by the following elements as mentioned by the participants: all the forms of community capital before and during the gardening and farming experience in 2009, the meanings of the gardens, types of crops they used in their countries and in their current gardens, specific agricultural knowledge, food preparation and preservation, demographic data, and barriers to and expectations about their future in farming and gardening in Iowa.

Findings and Discussion

The participants in this study reported indicators of *human, cultural*, and *social* capital most frequently as prominent elements of their farming and gardening enterprises in these two rural Iowa towns (see table 2). Their agricultural knowledge and background, the cultural meanings that gardens hold for them, and the importance of sharing both food and experience were mentioned by all the interviewees as the main motives for their participation in growing vegetables, fruits, legumes, and herbs in their gardens.

Human Capital: Agricultural Knowledge and Skills

Key elements the participants mentioned included transmission of knowledge about gardening and farming to new generations, knowledge exchange with other gardeners and farmers, and the enhancement of financial and natural capital through education. The beginning farmers who participated in the course Start Your Own Diversified Farm mentioned these points more often than the community gardeners. In that course they learned about organic production and its attributes and market possibilities.

All the Latino gardeners and beginning farmers who participated in this study grew up on farms or *ranchos* in Mexico, Guatemala, or El Salvador. Those farms combined production of livestock, grains, and some vegetables. All learned to cultivate diverse crops when they were between 6 and 14. All the male gardeners helped their *jefes* (fathers) or their grandparents with preparing the soil for

[4] Although the interviews were individual, sometimes I included husbands or wives as they were part of the team that participated in the same plot. The information from their partners was registered with field notes and informal conversations with them. In addition, I used pseudonyms for all of the participants to protect their confidentiality.

planting or cultivating. Farming knowledge gained at home and from their rural schools has remained with them, in part. Juan left Guatemala 33 years ago, but he still remembers how he learned to grow vegetables in his school with other students:

> *En la escuela hacíamos grupos de a cuatro estudiantes para ver quien sacaba mayor cosecha al final....Sacábamos tomates, calabazas, y rábanos. Teníamos que ver que tenían los demás grupos pero nosotros teníamos muchos rábanos y con eso hacíamos dinero que era mitad para la escuela y mitad para los cuates.*
>
> In the school we formed groups of four students to see who could harvest the most….We picked tomatoes, squash, and radishes. We were always anxious to see how much the rest of the groups harvested, but we had lots of radishes, which we sold. Half of the money was for the school and half for the kids. —*Juan*

Most participants claimed that they learned about agriculture from their home countries and presumably retain that knowledge. However, they left their family farms many years ago and sometimes when they were very young. Thus, they talk about farming methods they used then that are not used in Iowa (like plowing with oxen in their home countries). Memory fades over time, so important details of farming practices learned in childhood may have been forgotten. In addition, latitude and weather are different in Iowa. What can be grown

Table 3. Vegetables, grains, legumes, herbs, and fruits cultivated by participants in their home countries and in their current gardens in Iowa[a]

Gardeners and origin	Crops grown in home country	Crops grown in their Iowa gardens
Martín, Guanajuato, Mexico	White corn, beans, tomatoes, peppers	Cucumber, beans, onions, different kinds of peppers, beets, green tomatoes, large red tomatoes
Oscar and María, Jalisco, Mexico	Barley, alfalfa, wheat, pears, orange, lime, different kinds of corn, potatoes, yams, beans	"Poblano," jalapeño, Joe's Long Cayenne, and yellow banana peppers, onions, yam bean (lost),[b] four different kinds of squashes, zucchini, five different kinds of tomatoes, white corn (lost), cilantro, lettuces (lost), cabbage (lost)
Lucía and Pedro, Guachapán, El Salvador	Beans, white corn, tomatoes, chilies, rice	Beans, radish, tomatoes, squash
Pablo, Guanajuato, Mexico	Tomatoes, peppers, white corn, peanuts	Beans, peppers, green tomatoes, large red tomatoes, cucumbers, white onions, sweet potatoes
Guillermo and Silvia, Michoacán, Mexico	White corn, wheat, beans, sorghum	Two different kinds of tomatoes, cilantro, chickpea, white corn, beans, watermelon, squashes, belt (for first time), Santa Fe Grande peppers
Ricardo, Campeche, Mexico	White corn, peppers, tomatoes, beans, radish, cilantro	Two kinds of tomatoes, onions, potatoes, cucumbers, watermelons (lost)
Raúl, Jalisco, Mexico	White corn, beans, squash, cucumber, sorghum, chickpeas	Tomatoes, cucumber, Santa Fe Grande and Joe's Long Cayenne pepper, cilantro, radish, squash, onions
Juan, Municipio de Quesada, Guatemala	White corn, beans	Cabbage, cauliflower, onions, two kinds of tomatoes, watermelon, melons

[a] Some of the crops are reported as gardeners named them because it was impossible to corroborate the scientific names.
[b] "Lost" means that that crop did not grow and died during that farming season.

Table 4. Knowledge about different agricultural practices and skills, food processing, and places where gardeners and beginning farmers learned them

Types of practices and/or skills	Martín	Oscar & María	Lucía & Pedro	Pablo	Guillermo & Silvia	Ricardo	Raúl	Juan
Selecting and saving seeds	CA & MEX	MEX & IA	SV	MEX & IA	CA & IA	IA	MEX	GT
Planting and soil preparation	In previous gardens, IA	MEX, CA & IA	SV	Television U.S.	MEX, CA & IA	MEX	Sioux City, IA	GT
Fertilizers, pesticides, fungicides (natural and artificial)	In his garden, IA	MEX (natural) & IA (artificial)	In their garden, IA	MEX & IA (artificial)	In their garden, IA (artificial)	MEX (natural); IA (artificial)	Sioux City, IA	GT (natural) & IA (artificial)
Watering and Irrigation	MEX	MEX	IA	MEX	MEX	MEX	MEX	GT
Equipment and tools for farming	MEX & IA	IA	SV	MEX & IA garden	CA	MEX	MEX	GT
When and how to harvest	In his garden, IA	MEX & IA	SV	MEX & IA	MEX, CA & IA	MEX & IA	MEX	GT
Marketing and/or preserving food	Drying from MEX & other IA gardeners	Drying, freezing, canning, marketing, MEX & IA	Drying & canning from SV	Drying & freezing from IA gardeners	Drying & canning from friends & course in MCC, IA	Drying & freezing from other gardeners in IA	His wife: Drying & canning, MEX & other IA gardeners	Freezing from GT

Abbreviations: California (CA), Iowa (IA), Mexico (MEX), Guatemala (GT), El Salvador (SV).

and when it should be planted may be quite different from their experience in their home country. All eight participants validated their agricultural knowledge by explaining that *somos del campo* ("we are from the countryside"). However, a great part of the knowledge and skills learned about production of vegetables and fruits, particularly those crops selected for their gardens in Iowa, were not actually learned in their home countries at all (tables 3 and 4).

Many of the vegetables, legumes, herbs, and fruits that the participants grow in Iowa were neither grown in their countries nor known to them prior to their coming to the U.S. They learned about the types of crops they now grow through their own experiences or from observing other Latino gardeners in the U.S., particularly in Iowa. They also learned in Iowa about the care those different species and varieties require. Four of the eight participants migrated from their countries directly to California and worked on farms there. Three of the eight participants pointed out that they learned aspects of growing some varieties of vegetables and fruits in California, but that did not mean that they participated in the whole cycle of biological production. That learning experience only included specific agricultural tasks, which often were not directly related to horticulture.

Supplemented by the knowledge they brought from their countries and the experiences they gained from farm work in U.S, the great part of the participants' skills and knowledge about growing vegetables, herbs, and fruits were acquired from their experiences with home gardens (all of them in the towns where they live now and two also in places they lived before).

All the participants were asked where they learned about the different practices and skills required by gardening and farming (see table 4). They learned most tasks from backyard gardening in the U.S., and from other Latino and Latina gardeners.[5] Selecting, planting, and saving seeds are techniques learned in their home countries. However, many of the participants bought their plants from supermarkets or other stores. Some grew varieties from seed they knew from their home countries or from previous experiences. Four of the eight started seeds at home, in basements, in garages, or in the Marshalltown Community College greenhouse during the spring. Two also used improvised greenhouses at home. Germinating the seeds at home was learned in Iowa, since most came from countries and regions with less pronounced seasons in terms of temperature variation. Many of the gardening tasks required that they adapt their knowledge to seasonality and weather conditions in Iowa.

Many of the seeds that gardeners and beginning farmers used were obtained from friends or relatives, especially those that they could not easily get in local stores, such as white corn or particular varieties of pepper, tomato, and squash.

The most critical barriers the participants reported that they face as part of the gardening and farming process are a lack of access to manure or compost, knowledge of the nutrients needed by plants, knowledge about the control of pests, fungus, and insects, and knowledge about organic pesticides in particular. All the gardeners and beginning farmers knew about the application of natural fertilizers in their home countries. This knowledge sometimes came from an indigenous cultural heritage, as in the use of bat manure (guano). In Iowa they had to buy fertilizers and chemical pesticides in local stores and supermarkets. As they do not know much about those products, they asked other gardeners for advice. However, all the participants, especially the two beginning farmers, were aware of the benefits that natural and organic production can have not only for the environment, but also for their diets and health.

As Lawson (2005) points out, community gardens have historically been spaces with great educational possibilities. Knowledge exchange is also reflected in the plant varieties the participants select each year as a result of the advice and comments received from other gardeners and cooks. The exchange of varieties and recipes creates a rich multicultural environment where they try vegetables and recipes from other Latin American countries that were previously unknown to many of them. This knowledge exchange even overcomes the language barriers between Latino and Anglo gardeners.[6] The gardens also allow the children of the gardeners and beginning farmers to learn about nature, agriculture, and related values.

For the two beginning farmers in the study, the Start Your Own Diversified Farm course helped them strengthen their knowledge about organic production, learn Iowa farming techniques from both professional instructors and farmers, acquire tools and practical experiences, experience bilingual instruction (Spanish and English), and interact with members of both Anglo and Latino communities.[7]

Cultural Capital: Meanings of Farming and Gardening

Among participants, cultural capital has an invisible role. It is embodied in their motivations, which are themselves rooted in their "agri-cultural" background. Among these gardeners and beginning farmers, cultural capital includes the meanings embedded in farming culture: sharing, the revalidation of life in the countryside, food identity, and the use of public spaces.

Growing for Latinos in Iowa revalidates life in the countryside and the cultural importance of being

[5] This is with the exception of Juan, who mentioned that all the things he knew about gardening he had learned in Guatemala. His current community garden plot, however, represented his first year of gardening in the U.S. (see table 1).

[6] Notes from field work: conversation at the Denison community gardens with Doug, the only Anglo gardener, and Raúl.

[7] Notes from the field work during the Start Your Own Diversified Farm class, March 2009.

outside and in contact with nature. Gardens and farms are spaces where Latinos who come from rural parts of their countries feel that they are not so far from the lands where they grew up, as they reconstruct natural environments with different varieties of fruits, vegetables, and herbs. Community gardens and the farm at the community college are more than recreational places and even more than the produce they generate; they are *un pedacito del campo,* a little piece of the countryside.

> *Es algo que me gusta mucho, Diego. Es algo que no quisiera perderlo yo. Es como una tradición o como un pasatiempo. Porque nosotros traemos el monte y el campo en la sangre, yo creo, uno no lo puede dejar.*
>
> It is something that I really like, Diego. It is something that I do not want to lose. It is like a tradition or like a hobby. Because we have the forest and the countryside in our blood, I think, I cannot get along without it. —*Ricardo*

Gardeners and farmers reconstruct not only the built and natural capital of their past, but also the meanings of gardening, farming, and being outside in a rural town in Iowa. These towns do not have many public spaces where people can go to relax, to be outside interacting with others, and so gardeners have created their own public spaces in the community gardens. That gardening experience is shared with relatives, friends, and people who enjoy the same things the gardeners enjoy.

When I asked about the importance of growing food for their lives, all eight mentioned that one of their main motivations was to share the produce with friends, relatives, and other people.

> *La papa la regalé toda a mis hermanos, Diego. A mi papá nunca le gustó vender las cosas. Mejor si va un amigo o pasa un amigo mejor. Se las regalas en México, él nunca anduvo vendiendo sandías. La gente que llegaba él les daba las sandías, quien sabe porque esa costumbre que tiene él, y a lo mejor es porque la tenemos nosotros, porque a mí no me gusta tampoco vender. Yo, si veo un amigo, se lo regalo.*
>
> I shared all the potatoes with my brothers, Diego. My dad never liked to sell things; for him it was better to give things as presents to friends. In Mexico, he never went around selling watermelons. When people came to visit, he gave them watermelons. Who knows why he had that habit? And more than likely that is why we share this value — I don't like to sell my produce, either. If I see a friend, I will give it away to him. —*Ricardo*

Sharing is not only based on the participants' cultural backgrounds, but also on the social recognition they gain in the local community as someone who gives to others and works hard. Cultural capital is not only reinforced by the fact of sharing the experience and produce, but sharing also reinforces social and political capital. The cultural image of "I am still a *campesino"* (country person) builds both *bonding* and *bridging* capitals, and one gains social prestige with both the Latino and Anglo communities in these two rural towns. That is reflected in the positive feedback they receive from people who consume their homegrown produce. All eight gardeners and beginning farmers pointed out that recognition and appreciation of what they do generally is only valued by some people inside the Latino community, and not by many in the rest of the society. That contrasts with the comments from the people with whom they share their produce, who usually ask them to grow the same thing next year, or, amazed, ask where or how they grew that chili or tomatillo. Consequently, gardeners and farmers are proud of their work and their produce. That cultural and social recognition serves to motivate them to persist in gardening and farming. In addition, the image of gardening and farming transmits stability, health, and membership to the community.

Because farming and eating fresh food is an essential part of the Latino immigrant culture, the fact that they can have this experience in these rural

towns enriches other capitals and consequently the whole society.

Social Capital: Building Social Relationships Through Gardening and Farming

Gardens and farming plots provide spaces for developing social relationships. Participants gather together with their families and friends, reinforcing bonding social capital by sharing the experience of gardening and farming and the products harvested. All eight participants learned of the community gardens and the land available at the incubator farm from relatives, friends, and other Latino and Latina gardeners. Gardening and farming are topics that reveal and reinforce common interests and motivations among Latino immigrants. All eight participants reported exchanging experiences about the previous year's growing season and sharing vegetable and fruit seeds along with recommendations about weather in Iowa, germination time, the care of different plants, and how to cook or preserve different vegetables after harvest.

During the farming season, gardens and the incubator farm became places where all members of the gardeners' families could come to help and/or to socialize and interact with relatives, friends, and other gardeners. In Denison, the community gardens acquire a special social meaning because they are located next to the soccer fields where a great of part of the Latino community goes every weekend during the summer. As Harvey (1973) points out, space plays a distinctive role in both the organization of production and the patterning of social interaction. The location of the community garden in Denison is of great importance, because people attending the soccer games can see and visit the gardens. The space is socially and culturally revitalized by everyday social practices.

In these two towns there is generally little interaction between the Latino and Anglo communities, creating two parallel worlds. However, the experience of the gardeners shows how interaction can be increased through agriculture and noncommercial food networks established between these two communities (*bridging* social capital). All the gardeners and one of the beginning farmers told me how they share vegetables and fruits with workmates, whether Latinos or Anglos.

> *Mira como esos chiles, yo me llevo bolsas para el trabajo y ahí en el trabajo saco mis chiles y si hay gente que me dice ¿me das un chile?, yo les digo, y sí hombre, agarra los que quieras. Si, a diario tengo mi bolsita con chiles, o mira esos tomatillos, vino mucha gente y se llevó…*
>
> See with chilies, I take bags of them to work and there I take out my chilies and if people ask me, "Will you give me one?" I say, "Sure, man, take what you want." Yes, every day I have my bag with my chilies or other produce. Look at those tomatillos! Many people came and took them…
>
> —*Pablo*

The gardeners and beginning farmers not only share their agricultural products with fellow workers, relatives, and friends, but also with institutions that support low-income families or poor people and churches. Lucía makes *papusas* (a traditional dish from El Salvador) in the local Baptist church. Most of the tomatoes and beans that she and her husband Pedro harvest from their small plot are used in the celebrations the church organizes to raise money for a new building. Thus the social networks established are transformed into collective financial capital through food.

However, social capital does not always reinforce financial capital. For example, there were classes about planting, combating pests, and how to sell in the farmers' market. In Denison those classes were bilingual and organized by Iowa State University Extension and the M&M Divide RC&D in Carroll. Although most of the participants had indicated interest in those classes, only a few attended, and none wanted to sell products in the local farmers' market. As Flora & Flora (2008) point out, high bonding social capital combined with low bridging social capital reduces access to information and other resources from the outside. In these situations, groups do not trust each other and are reluctant to cooperate with one another (Flora & Flora, 2008). The evaluation of the project "Scaling

Up to Market: Building Capacity among Immigrant Community Gardens" in Denison Community Gardens found that the lack of trust diminished gardeners' access to education or marketing in the local farmers' market (Emery, Flora, & Thompson, 2009). The combination of high bonding social capital and low bridging social capital also limited the individual aspirations of those gardeners who had previously indicated interest in selling at farmers' markets. However, there are other elements that may have influenced the interest in marketing the gardeners had shown at the beginning of that project: their social and cultural motivations for sharing rather than selling vegetables, the information available, the sizes of the plots, the small quantity of production, and time availability.

Natural and Built Capitals

In 2009 all eight participants rented land at affordable prices. Seven of the eight had gardens in Marshalltown or Denison before 2009. Before 2009, six of the eight had home gardens in which they cultivated vegetables and herbs for everyday use, including cilantro, peppers, and tomatoes, among others. In addition, two of the eight rented small farming plots and cultivated land from other Latinos outside of town previous to 2009.

The two beginning farmers rented and cultivated land at a larger scale for the first time in 2009 at Marshalltown Community College. In previous years they had smaller backyard gardens at homes and/or on rented land.

From their gardening and farming experiences, seven of the eight voiced concern about the applications of chemicals to the soil they cultivated. These seven claimed that they preferred food without chemicals, and in three cases (including the two beginning farmers) highlighted the importance of soil quality and conservation. The two beginning farmers did not use artificial fertilizers, pesticides, or fungicides, because the land they used was being prepared for organic certification. The two community gardeners at the community college used artificial fertilizers, but they would have preferred to use natural products. The four gardeners in Denison used artificial fertilizers and pesticides in their plots. However, all claimed that they knew about (from their experiences in their home countries), and would have preferred to use, natural products like manure that are not easily acquired in small quantities in these towns.

Financial Capital

The two beginning farmers got started in larger-scale vegetable growing with a relatively small cash investment ($500 and $3,000). Those expenses included seeds, tools, and transportation to market. Neither of the farmers achieved a net profit, but each estimated having reduced food expenditures by about $700 annually per household by growing some food for his or her own household.

Economic factors (financial capital) did not represent an important motivation among seven of the eight participants. Profit was important for only one of the beginning farmers, but even for him financial gain did not represent the most important motivation for farming.

> *En nuestra mente no pensamos que nos vamos a hacer ricos de la agricultura pero si pensamos que la gente come más saludable y que es muy lindo trabajar afuera y mirar recoger nuestros productos.*
>
> In our minds we do not think that we are going to become rich from farming, but we think that people eat healthier and that it is very nice to work outside and see our products being harvested. —*Oscar*

Oscar and his wife María sold vegetables in the Des Moines Farmers' Market and made a few sales to stores in Marshalltown and Ames, Iowa. They were aware that they could not earn enough that first year to turn a profit, but they are trying to increase their farm sales and profits based on what they learned in 2009. Even though Oscar knows that he needs to generate profits, that is not his main motivation for participation in the beginning-farming program. His dream is to live and farm in the countryside, share produce, and be self-reliant by producing food for his family, and only later to make some money.

Guillermo and his wife Silvia, the other beginning-farmer household, did not want to sell their products in 2009; they preferred to consume and also to share them. However, because they learned from the Start Your Own Diversified Farm course and from the experience of other Latino beginning farmers that marketing their crops could be a viable option, they are analyzing the possibility of selling some of their produce in the future.

For all the participants, the primary return on investment was the high-quality and healthy food they obtained from their plots. They raised enough vegetables for their families and even for friends and relatives. All felt that their gardens were very important not only for their domestic budgets, but also for the quality of their diets.

Political Capital

Political capital is still low among participants of organized gardening and farming activities in these two towns. However, participation in educational programs may represent opportunities for Latino representation and active participation in issues regarding the whole community.

Summary of Findings

The community capitals reported by participants interact with and strengthen one another. *Human capital* based on *cultural capital* strengthens *social capital,* which is one of the most critical elements among Latino and Latina gardeners and beginning farmers. Social capital not only motivates gardeners and beginning farmers to cultivate, but also to build *bridging* and *bonding social capital* (through sharing the experiences and produce) in these towns, establishing new and stronger relationships within and outside the Latino community. That encourages more egalitarian cross-cultural contact and enhances the exchange of cultural knowledge between Anglos and Latinos.

Among the participants of this study, *cultural capital* is one of the most important motivations for gardening and farming. Cultural capital has a special meaning rooted in cultural tradition; it reinforces identity as a "countryperson" *(campesino).* That identity leads to new social relationships, which are reinforced by sharing the produce and experiences with gardening, food, and outdoor living with family and friends.

Latino and Latina gardeners and beginning farmers enhanced their access to *natural* and *built* capitals by mobilizing *social, cultural,* and *human* capitals.

Financial gain (acquiring *financial capital)* was not the primary motivation for participation in the projects. However, gardeners and beginning farmers save money by not purchasing vegetables, fruits, legumes, and herbs that they grow themselves.

Educational programs designed for both Anglos and Latinos *(human* and *social capitals)* like Start Your Own Diversified Farm facilitate cultural exchange about agricultural techniques and meanings *(cultural capital).* The participants in the course for beginning farmers at Marshalltown Community College expanded their social networks. They mentioned the importance of establishing new relationships with both Latinos and Anglos *(bridging social capital).* The construction of new social networks allowed access to certified organic land *(natural capital),* markets *(financial capital),* infrastructure for farming *(built capital),* education and knowledge about gardening *(human capital),* and more active participation in community institutions *(political capital).* As Emery points out, the outcomes "are not only better food and access to foods for Latino/immigrant populations, but also increased trust and communication across language and cultural divides" (Emery, 2010, p. 29). The Latinos and the Anglos learned they shared values around the importance of fresh food, the meaning of being a gardener or farmer, and eventually the importance of being an agricultural entrepreneur. They also shared particular skills related to cooking and preserving their produce.

The participants have an agricultural background and knowledge *(human capital)* from both their home countries and from other parts of the U.S. that have enriched their gardening and farming experiences. That knowledge of gardening and farming is important in transmitting food and

farming knowledge to others and in the strengthening of other community capitals.

Political capital is a critical capital that needs to be developed so they can secure stable locations for gardening and farming, have more representation in related projects, and reinforce new channels of social and cultural integration through food and agriculture. This represents a challenge for the future of sustainable gardening and farming projects in rural towns or metropolitan areas with immigrant newcomers in the U.S. This may be difficult, however, as long as the immigration system makes it dangerous to call attention to oneself through organizing.

Conclusions

Human, *cultural*, and *social* capitals are the capitals that most benefited this study's participants. All three capitals facilitate access to other capitals. These interviews suggest that although Latino immigrants bring experience in diversified agriculture and an appreciation of local, fresh food to their gardening or farming, they need assistance focused on horticultural and agricultural production practices that are specific to the geographical and geological context of the region in which they currently live. Strengthening of human capital through the use of appropriate educational tools for this population can improve their gardening or farming success considerably, because in this country they find many natural, economic, and cultural challenges that need to be solved with new knowledge and new skills. Bilingual courses for Latino or other immigrant gardeners or beginning farmers clearly offer opportunities not only in terms of knowledge of production and sustainable practices, but also in social networking and financial opportunities. However, those courses and incubator programs need to incorporate creative elements for including Latinos and Latinas, establishing social networks based on trust and reciprocity that link them to the community and local institutions.

Both classrooms and gardens provide venues to share advice and support for healthier agricultural practices, appreciation for fresh and organic products and practices, and channels to access natural capital such as high-quality natural fertilizers or pesticides. Human capital enhanced by education can facilitate access to financial opportunities, such as selling and marketing their produce — for those who desire to do so.

Enterprises need to be based on the cultural meanings that gardening and farming have for the Latino community. The reciprocity that sharing entails enhances knowledge exchange, commitment, trust, and cultural integration. For example, Latino immigrants' focus on giving away rather than selling their produce is in sharp contrast to the focus on selling and profit of those offering the training. The validity of sharing as an end in itself must be recognized if Anglo institutions are organizing the courses. This can happen if Latinos and Latinas are offered the chance to actively participate in designing and implementing the curriculum.

The spiral diagram in figure 2 (next page) illustrates the importance of human capital and how these capitals are connected and can be strengthened for sustainable projects or enterprises that include Latinos and Latinas in agricultural and local food systems efforts.

Future studies should explore critical aspects of political capital and the interactions between the institutions that organize and support Latino and Latina gardeners and beginning farmers and the participants themselves. That will provide more insight about how integration can be achieved in both rural towns and in urban areas of the U.S., through sustainable "agri-cultures" and high quality food.

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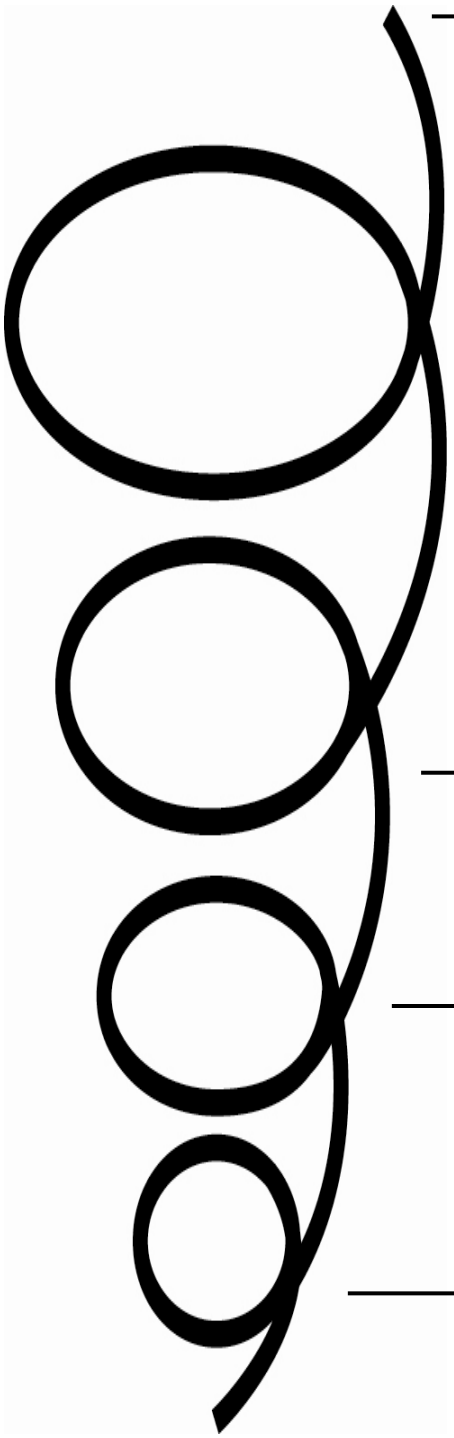
Figure 2. Spiraling-Up: Agricultural knowledge and strengthening of the community capitals
(Modified from Gutierrez-Montes, 2005, and Emery & Flora, 2006; Emery, Flora, & Thompson, 2009)



Political Capital: This is an essential capital for inclusion and social equity. Empowerment through political capital, involvement, active participation, and civic engagement in decision-making by Latino and Latina gardeners and beginning farmers depends on the rest of the community capitals and how well they are positively affected or mobilized by the whole community where they live and cultivate.

Financial Capital: Financial capital was not a major motivator among the participants of this study. Its reinforcement may take time, and if it is mobilized can create new economic opportunities for the Latino and Latina gardeners and farmers and their families. If *cultural, human, natural, built,* and *social capitals* are strengthened, and gardeners, beginning farmers, and stakeholders share similar goals about economic possibilities for farming and selling in the local markets, financial capital can be bolstered over the long term.

Natural and Built Capitals: These capitals will be strengthened through educational, institutional, and long-term community support. This study shows that Latino and Latina gardeners and beginning farmers know about natural fertilizers, but they need improved access to them in Iowa. They also need spaces for social recreation, good quality land, infrastructure, equipment, and other natural agricultural inputs.

Social Capital: Encouraged by farming and gardening experiences and learning, and by cultural meanings of growing and sharing food, social networking facilitates community integration. Sharing produce and gardening and farming experiences can not only overcome cultural barriers and allow access to healthy food and agricultural knowledge exchange, but also lead to social integration and justice.

Cultural Capital: Cultural comprehension is a key element in sustainable agriculture and local food systems efforts focused on the inclusion of Latino communities. It can be mobilized through social relationships and a spirit of commitment and mutual collaboration among the different communities involved. The cultural meanings that Latino and Latina immigrants have around identity as country people, around particular foods, and around the sharing of those foods can enrich the current agriculture and food systems in the U.S.

Human Capital: Latino and Latina gardeners and beginning farmers have important agricultural experiences from both their home countries and from other parts of the U.S. That knowledge needs to be strengthened through external resources and educational instruction about how to practice agriculture in regions like Iowa. Gardening and farming have an important role in transmitting agricultural and food knowledge and in the mobilization of other community capitals as well.

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Beliefs, attitudes, and propensity to buy locally produced food

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Abstract

In this study, conducted in Nova Scotia, Canada, we surveyed people at farmers' markets, agricultural fairs, and other agricultural events to investigate the views of people who would likely be trying to incorporate local food into their everyday shopping habits. Survey respondents (N = 2,316) indicated strong positive beliefs, attitudes, and propensity toward buying local food. At the same time, however, they reported difficulty identifying whether food was local as well as a lack of opportunities to buy local food. The findings build upon the growing body of research surrounding the "buy local" movement in North America by providing insight into why people want to buy local and potential barriers that prevent stronger markets for local food products.

Keywords

agricultural fairs, consumer attitudes, buy local, farmers' markets, local food, Nova Scotia, survey

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Introduction

As food production and distribution become increasingly industrialized and globalized, consumers are becoming more cognizant of the potentially negative consequences posed by the

current food system. Environmental issues (Guthman, 2004), food-safety scares and distrust of the food system (de Jonge, van Trijp, Renes, & Frewer, 2007; de Jonge, van Trijp, van der Lans, Renes, & Frewer, 2008; de Jonge, van Trijp, Goddard, & Frewer, 2008; Eden, Bear, & Walker, 2008), and the ever-increasing opacity of the food production system (Nicolosi, 2006; Pollan, 2006) have left many consumers looking for alternatives to the dominant agro-industrial food paradigm (Roininen, Arvola, & Lähteenmäki, 2006; Selfa & Qazi, 2005). One response to the globalized food system has been a resurgence in "buying local." The buy-local alternative has started to make its way into the mainstream consumer market as people become more conscious of what they eat and, in particular, where their food comes from (Darby, Batte, Ernst, & Roe, 2008; Roininen, *et al.,* 2006). Although research on buying local from the consumer perspective has been relatively sparse, there is evidence to suggest that buy-local initiatives and the buy-local movement in North America and Western Europe have experienced success as shown through growing patronage at farmers' markets (Darby, *et al.,* 2008; Hunt, 2007) and an increase in the availability of local food at supermarkets (Chambers, Lobb, Butler, Harvey, & Traill, 2007).

While there are likely many factors influencing the choice to buy local, such as protection of the environment, perceived health benefits, and better quality and fresher products, the main underlying factor seems to be a desire to support local farmers and the local economy. People believe that buying local food is good for the economy and beneficial for rural areas (Roininen, *et al.,* 2006), and research suggests this positive association is often a primary reason for buying local food. For example, respondents to a survey of 950 consumers from two counties in Washington state ranked helping local farmers as one of the highest and therefore most important considerations when purchasing food (Selfa & Qazi, 2005). Similarly, respondents to a survey conducted in Oregon state indicated that the two most important reasons for buying local were to keep farmers in the area and to support the local economy (Stephenson & Lev, 2004). Participants in a qualitative study of food choices in the United Kingdom also indicated that supporting area farmers was an important consideration when choosing to buy local (Chambers, *et al.,* 2007).

Despite the growing buy-local movement, for most people buying local food still appears to be a secondary consideration in their food purchasing decision. The Washington state survey also asked respondents to rate the importance of 14 factors that could potentially influence their food purchasing decisions. Freshness, taste, and nutritional value were rated the most important, whereas "grown locally" was rated relatively low, at eleventh of the 14 options (Selfa & Qazi, 2005). A study by Schneider and Francis (2005) asked 207 Nebraskans to rate 12 attributes in terms of their importance in the food-purchasing decision. Similar to the previous study, respondents indicated that quality, taste, nutrition, and price were the most important factors in their buying decision. "Locally grown or produced" products were ranked eighth out of the 12 choices. The same study also found that relatively few consumers were willing to pay more for local products, and even when they did say they would pay more, the premium was small (10% or less). These findings are made even more noteworthy when one considers that not only are consumers generally unwilling to pay a premium for local food, but they also both associate local food with higher cost (Roininen, *et al.,* 2006; Stephenson & Lev, 2004), and view this higher cost as a barrier to buying local food (Chambers, *et al.,* 2007).

Unlike many studies that sample cross sections of the general public to gauge levels of interest in buying local food, our study surveyed individuals whose interests and lifestyle increased the likelihood of their buying local food on a more regular basis. Surveying individuals who may be inclined to regularly incorporate local foods into their everyday shopping helps to gain better insight into why people make the effort to buy local and identify the barriers they may face in doing so. With that in mind, the sample for this study was primarily drawn from farmers' markets and agricultural fairs — venues that may be expected to attract indivi-

duals who have an interest in local agriculture and local food — and therefore, perhaps, stronger motivation to incorporate buying local into their lifestyle.

Given the large number of farmers' markets and agricultural fairs in Nova Scotia, they are particularly appropriate venues for data collection in this largely rural province. There are 23 annual agricultural fairs and exhibitions across Nova Scotia, with the largest drawing 40,000 people annually (Exhibition Association of Nova Scotia, 2010). The province's agricultural fairs, like most across North America, typically include the exhibition of farm livestock, such as draft horses, cattle and goats; commercial booths and art and craft exhibits; and vegetable competitions based on the uniformity, smoothness, and freshness of the produce.

Farmers' markets have been providing Nova Scotian producers with marketing venues since 1750, when the first farmers' market was founded in the city of Halifax (Michael, 2008). Today, consistent with industry trends across North America, there are a growing number of farmers' markets across the province. In 2004, sales from Nova Scotia's farmers' markets approximated CAD14 million. Data from 2007 indicate continued upward trends based on growing attendance at Nova Scotia farmers' markets, with over 9,300 customers and 360 vendors on average per week (Michael, 2008).

The types of activities and products present at agricultural fairs and farmers' markets likely draw people interested in supporting local agriculture. Although there is very little empirical published research on the beliefs, attitudes, and values of people attending agricultural fairs, it is frequently asserted among social scientists that farmers' markets and other direct-sale arrangements embody various sets of values and ideologies among food producers and consumers, including sustainability (Kloppenberg, Lezberg, DeMaster, Stevenson, & Hendrickson, 2000), "marketness" and "social embeddedness" (Hinrichs, 2000), and social capital (Smithers, LaMarche, & Joseph, 2008). For instance, Smithers, *et al.* (2008) found that farmers' markets draw a diverse group of consumers and producers who express varying interpretations of "local," social capital, social welfare, and other concepts pertaining to food production and consumption.

With the above in mind, it would be expected that people who attend farmers' markets and agricultural fairs, while holding a wide variety of attitudes and beliefs towards local agriculture, would also have stronger motivations to incorporate buying local food into their lifestyle. Accordingly, for analysts and social scientists, these types of venues are fertile ground in which to gauge motivations and attitudes towards alternative food systems. Therefore, farmers' markets and agricultural fairs were ideal locations to conduct the Buy Local Survey and meet the study objectives to (a) better understand beliefs and attitudes toward buying local food; (b) identify barriers to buying locally produced food; and (c) gauge public perceptions pertaining to labeling and promoting local food.

Methods

The Buy Local Survey was one component of the Buy Local Challenge project. The project was developed by the Women's Institutes of Nova Scotia in 2006 as a way to educate and encourage the public, along with producers, restaurant owners, and food retailers, to think "local" and make buying local a priority when purchasing food products. The Buy Local Survey was distributed throughout Nova Scotia from June to October 2006 by members of the Women's Institute (W.I.). Distribution of surveys through the 64 W.I. chapters across Nova Scotia helped to ensure coverage of the whole province. Surveys were completed primarily at agricultural fair booths, exhibitions, and farmers' markets. Additional surveys were given out at W.I. Buy Local Challenge information sessions and through other rural-based community groups and organizations with which W.I. members were associated. Individuals 18 years and older were handed the Buy Local Survey and asked to complete and return it immediately.

There were 2,432 surveys completed, with over 95% of respondents reporting that they lived in

Nova Scotia. Because the W.I. Buy Local Challenge was carried out solely in Nova Scotia and perceptions about buying local may differ by region (Selfa & Qazi, 2005; Stephenson & Lev, 2004), only the results from Nova Scotia respondents (n = 2,316) were included for analysis. The surveys took respondents approximately 3 to 4 minutes to complete and asked people to indicate their responses to the following:

Factors Influencing Types of Food Purchased
Respondents were asked to rate how much each of six factors (price, ease of preparation, taste, nutritional value, organic, locally grown product) influenced their food purchasing behavior, using five-point scales ranging from 1 (not at all influential) to 5 (very influential).

Sources of Local Foods
Respondents were asked to indicate whether they considered food to be local if it were produced in their community, county, province, and country. Respondents were also asked to rate how good each of seven venues (large grocery store, convenience store, outdoor farmers' market, small fruit and vegetable market, direct from farm, fast-food restaurants, family style restaurants) was as a source for local food, using five-point scales ranging from 1 (extremely poor) to 5 (extremely good).

Propensity, Beliefs, and Ability to Purchase and Attitudes Toward Promoting Locally Produced Food
Respondents were asked to indicate their level of agreement with each of the following items using five-point scales ranging from 1 (strongly disagree) to 5 (strongly agree).

- *Propensity to buy locally produced food*
  Propensity to buy local food was assessed through four items: "I like to buy food that is produced locally," "Whenever possible, I intentionally buy locally produced food," "I make it a priority to buy locally produced food," and "I consider the place of origin when buying food."

- *Perceived ability to buy locally produced food*
  Perceived ability to obtain local food was assessed through four items: "I find it easy to get locally produced foods in the summer," "I find it easy to get locally produced foods in the winter," "It is easy to know whether the food I buy is locally grown," and "I have little choice whether or not the foods I buy are locally grown."

- *Beliefs about locally produced food*
  Beliefs toward local food were assessed through four items: "Buying locally produced food is good for the local economy," "Buying locally produced food helps the environment," "Buying local food means more money goes to the farmer," and "Local food is fresher than food produced farther away."

- *Attitudes toward promoting locally produce food*
  Attitudes toward promotion of local food were assessed through three items: "The government should promote buying locally grown food," "I would buy more locally produced foods in grocery stores if the foods were clearly marked with a logo," and "I would order more locally produced foods in restaurants if the menu items were clearly marked with a logo."

Demographics
Respondents were asked to indicate their sex, age, education level, province and/or state in which they lived, population of the community in which they resided, and annual household income before taxes.

Results

Characteristics of Respondents
Table 1 presents the demographic characteristics of the sample. Overall, the majority of respondents were female (81.4%) and covered a wide age range, although younger adults were somewhat underrepresented. Two thirds of respondents had at least some college or university education. Income was fairly evenly distributed, with one third reporting an income of over CAD60,000. Almost half (49.2%) lived in communities of under 2,000 people.

Table 1. Characteristics of Survey Respondents

Characteristic	Percent
Sex	
Female	81.4
Male	18.6
Age (years)	
18–30	10.7
31–45	20.8
46–60	37.5
61–75	24.0
Over 75	7.1
Education Level	
Less than grade 12	10.2
Completed high school	21.9
Some college or university	24.5
Completed college or university	43.4
Annual Household Income (Canadian dollars)	
Less than $20,000	13.8
$20,000–$39,999	27.7
$40,000–$59,999	25.8
$60,000 or over	32.6
Community Size	
Under 500	27.5
500–1,999	21.7
2,000–4,999	15.3
5,000–9,999	10.7
10,000–49,999	9.4
50,000 or over	15.4

Factors That Influence the Types of Food Purchased

Respondents were asked to indicate how influential they believed each of six factors was on their food purchasing behavior. As shown in table 2, whether the product was locally grown was given the third highest rating (mean = 4.1 out of 5), ahead of price (mean = 3.6) but behind taste (mean = 4.6) and nutritional value (mean = 4.4). Over three quarters of respondents rated whether food was locally grown as either influential or very influential on their food purchasing behavior.

Table 2. Factors That Influence Types of Food Purchesed, by Rating

		Percent				
Factor	**Mean**	**1**	**2**	**3**	**4**	**5**
Taste	4.6	1.3	0.8	4.5	26.4	67.0
Nutritional value	4.4	1.5	2.1	8.3	32.5	55.7
Locally grown product	4.1	3.8	4.3	16.6	29.3	46.0
Price	3.6	3.4	9.9	34.4	26.2	26.0
Ease of preparation	3.2	10.4	15.5	33.3	26.4	14.4
Organic	2.8	21.2	19.0	28.9	17.5	13.4

Responses reported on a five-point scale with 1 = Not at all influential to 5 = Very influential

Table 3. Geographic Area from Which Respondents Would Consider Food To Be Local

Location	Percent "Yes"
My community	99.9
My county	98.8
My province	91.4
My country	37.8

How Far Away Is Local

To get a better idea of what respondents perceived as local foods, they were asked to indicate whether they would consider food produced within a certain geographic area to be local. As shown in table 3, over 90% of respondents felt that food produced in their community (99.9%), in their county (98.8%), or in Nova Scotia (91.4%) constituted local food. Just over a third considered food produced in Canada as local.

Perceptions of Where To Buy Local Foods

As shown in table 4, when asked how good different food venues were for obtaining local foods, respondents gave high ratings to farmers' markets (mean = 4.6 out of 5), direct from farm (mean = 4.6), and small fruit and vegetable markets (mean = 4.4). For all three venues, over 85% of respondents gave a rating of either 4 or 5 on a five-point scale where five signified extremely good. Large grocery stores (mean = 2.8) and family-style restaurants (mean = 2.6) were given middle ratings as sources of locally produced food, and convenience stores (mean

= 1.9) and fast-food restaurants (mean = 1.6) were given relatively low ratings.

Beliefs, Attitudes, and Propensity to Buy Locally Produced Food

Propensity to buy locally produced food

Respondents tended to indicate strong agreement with the three statements associated

Table 4. Respondents' Opinions Regarding Sources of Local Foods, by Rating

		Percent				
Source	Mean	1	2	3	4	5
Outdoor farmers' market	4.6	0.4	1.4	5.6	24.1	68.6
Direct from farm	4.6	2.4	2.8	5.8	12.1	77.0
Small fruit and vegetable market	4.4	0.5	1.6	10.2	32.7	55.0
Large grocery store	2.8	17.1	23.6	34.0	17.2	8.2
Family style restaurants	2.6	17.5	30.9	34.7	12.1	4.8
Convenience store	1.9	42.0	31.5	18.6	5.9	2.1
Fast food restaurants	1.6	59.3	23.9	13.0	2.5	1.3

Responses were on a five-point scale with 1 = Extremely poor to 5 = Extremely good

Table 5. Beliefs, Attitudes, and Propensity Toward Buying Locally Produced Food, by Rating

		Percent				
Statement	Mean	1	2	3	4	5
Propensity to buy locally produced food						
I like to buy food that is produced locally	4.6	0.5	1.1	7.9	22.3	68.2
Whenever possible, I intentionally buy locally produced food	4.4	1.0	2.7	11.7	26.5	58.1
I make it a priority to buy locally produced food	4.0	2.4	6.9	21.7	30.6	38.4
I consider the place of origin when buying food	3.9	3.1	7.3	22.2	30.5	36.9
Beliefs about locally produced food						
Buying locally produced food is good for the local economy	4.7	0.5	0.8	3.5	16.7	78.5
Local food is fresher than food produced farther away	4.4	1.0	2.1	11.2	22.9	62.9
Buying locally produced food helps the environment	4.3	1.3	4.2	15.9	24.1	54.6
Buying local food means more money goes to the farmer	4.2	1.8	4.3	17.0	24.5	52.4
Perceived ability to buy locally produced food						
I find it easy to get locally produced foods in the summer	4.2	1.5	3.9	14.8	31.3	48.5
I have little choice over whether or not the foods I buy are locally grown	2.9	12.2	19.6	39.9	18.9	9.4
It is easy to know whether the food I buy is grown locally	2.8	11.1	26.9	36.3	17.6	8.1
I find it easy to get locally produced foods in the winter	2.3	21.5	37.9	30.7	7.1	2.9
Attitudes toward promoting locally produced food						
The government should promote buying locally grown food	4.6	0.8	1.4	5.0	17.7	75.0
I would buy more locally produced foods in grocery stores if the foods were clearly marked with a logo	4.3	1.4	2.5	12.8	28.3	55.0
I would order more locally produced foods in restaurants if the menu items were clearly marked with a logo	4.2	2.3	3.6	15.6	29.6	48.9

Responses were on a five-point scale with 1 = Strongly disagree to 5 = Strongly agree

Table 6. Propensity to Buy Local Foods By Age

	Age				
Statement	18–30	31–45	46–60	61–75	Over 75
Degree to Which Local Influences Food Choice (/5)	3.7	3.9	4.1	4.3	4.3
Propensity to Buy Local Index (/15)	11.7	12.6	13.2	13.3	13.4

with the propensity to purchase locally produced food (table 5). That is, respondents indicated that they like to buy food that is locally produced (mean = 4.6 out of 5), whenever possible they intentionally buy local food (mean = 4.4), and they make it a priority to buy locally produced food (mean = 4.0). The three items were combined to form a propensity to buy local index (mean = 12.9 out of 15; Cronbach's alpha = 0.87). Supporting the above findings, respondents also indicated that they tend to consider the place of origin when buying food (mean = 3.9).

Beliefs about locally produced food

The four belief items pertaining to local foods were given relatively high ratings by respondents (table 5). Specifically, respondents believed that buying locally produced food is good for the local economy (mean = 4.7), local food is fresher than food produced farther away (mean = 4.4), buying locally produced food helps the environment (mean = 4.3), and buying local food means more money goes to the farmer (mean = 4.2).

Perceived ability to buy locally produced food

Respondents felt they had only moderate control in terms of their ability to obtain locally produced food (table 5). Respondents indicated that they found it easy to get locally produced foods in the summer (mean = 4.2) but not as easy in the winter (mean = 2.3). They also felt only moderate control over having a choice as to whether the foods they buy are locally grown (mean = 2.9) and knowing whether the food they buy is locally grown (mean = 2.8).

Attitudes toward promoting locally produced food

Respondents strongly agreed with the idea that government should promote the buying of locally grown food (mean = 4.6) and also indicated that they would likely buy more locally produced foods if they were clearly marked with a logo in both grocery stores (mean = 4.3) and in restaurants (mean = 4.2) (table 5).

Breakdown of Findings by Demographic Characteristics

In addition to the overall analyses, all items were examined by sex, income, age, education level, and community size. There were not any meaningful differences on items for sex, income, education level and community size (data not presented). However, there was a tendency suggesting that increased age was associated with more favorable beliefs and attitudes toward locally produced food. Most notably, both the degree to which whether a product was local influenced the food purchasing decision and the propensity to buy local index increased with age (table 6).

Relationship Between Beliefs, Ability, and Propensity to Buy Locally Produced Food

Using a multiple linear regression approach, a prediction model was created by regressing the belief and ability items on the propensity to buy local index. To determine whether beliefs or perceived ability to obtain locally produced food were stronger predictors, the four belief items were entered as a block followed by the four ability items. The same process was then reversed, entering the ability items first. As a block, the four beliefs items were a stronger predictor of the propensity to buy locally produced food ($R^2 = .25$) than were the ability items ($R^2 = .13$). Therefore, in the prediction model, the belief items were entered first, followed by the ability items. The four belief items explained 25 percent of the variance in propensity to purchase locally produced food.

Adding the four ability items explained an additional 6 percent, resulting in 31 percent of the propensity to buy locally produced food explained by the eight belief and ability items. Examining the final model (table 7), after adjusting for all other variables, three belief items and one ability item were the strongest predictors of the propensity to buy local. The three belief items were "buying locally produced food is good for the local economy" (*B* = .21), "buying locally produced food helps the environment" (*B* = .20), and "local food is fresher than food produced farther away" (*B* = .15). The ability item was "it is easy to get locally produced foods in the summer" (*B* = .19).

Discussion

This study provided an opportunity to better understand the factors that influence people to buy local food, as well as the barriers they perceive to doing so. The sample of over 2,300 Nova Scotians was drawn primarily from individuals attending events oriented toward local agriculture or opportunities to buy local food. The overall results of the Buy Local Survey confirmed the expectation that patrons of agricultural fairs and farmers' markets hold positive beliefs and attitudes toward locally produced food and have a strong propensity to buy local. It is important to emphasize that the outcome of the survey reflects the beliefs and attitudes of a particular segment of the population and must be interpreted in this light. Specifically, the survey results are based on individuals who were willing and able to visit an agricultural fair or farmers' market. Thus, their reasons for buying local as well as their ability to do so may differ from that of the general public.

There was high agreement among survey respondents that food produced in Nova Scotia is "local." Although Nova Scotia is a relatively small province, using this geopolitical definition means that Nova Scotians could perceive food produced more than 500 kilometers (310 miles) away still as being local. A question that remains unanswered is the degree to which using political boundaries to define local is influenced by the size of the geographic area. It is uncertain whether consumers in other, larger provinces would use their provincial boundaries to define local, or whether they would use smaller boundaries within the province (e.g., counties) or different definitions altogether. Other studies have indicated that the distance food has traveled (Chambers, *et al.,* 2007), geopolitical boundaries (Darby, *et al.,* 2008; Hunt, 2007), and even social relations and product quality (Selfa & Qazi, 2005) are used by different consumers for defining whether or not they consider food to be local.

A geopolitical definition of "local" employing provincial boundaries has positive policy implications, in that the provincial government could effectively equate a "buy Nova Scotia" campaign with a buy

Table 7. Regression of Beliefs and Ability to Buy Locally Produced Food on Propensity to Buy Local Index

	b	Std Error	*B*	t	sig
Constant	2.07	.41		4.98	<.001
Buying locally produced food is good for the local economy	.85	.09	.21	9.67	<.001
Buying locally produced food helps the environment	.50	.06	.20	8.73	<.001
Buying locally produced food means more money goes to the farmer	-.03	.06	-.01	-0.58	ns
Local food is fresher than food produced farther away	.42	.07	.15	6.33	<.001
I find it easy to get locally produced foods in the summer	.49	.05	.19	9.59	<.001
I find it easy to get locally produced foods in the winter	.16	.05	.06	3.13	.002
It is easy to know whether the food I buy is grown locally	.14	.05	.06	3.06	.002
I have little choice over whether or not the foods I buy are locally grown	.04	.04	.02	1.10	ns

local campaign, as they would be similarly perceived by the consumer. Most survey respondents reported that they would buy more local food if it were better labeled in stores and also indicated strong support for government-led buy-local initiatives. And indeed, since this survey was conducted, the provincial government has launched the "Select Nova Scotia" campaign to promote the identification and purchasing of locally grown food. Based on the results of the survey, one can reasonably expect that there would be support among many Nova Scotians for this type of campaign designed to remove one of the main barriers to buying local, that is, the inability to identify locally produced food.

Despite strong favorable beliefs and attitudes toward locally produced food and the propensity to buy local, respondents reported moderate to low levels of ability to obtain locally produced food. This was evidenced by respondents reporting difficulty attaining local food in the winter as well as difficulty identifying whether food is locally grown. Certainly, in Nova Scotia most grocery shopping is conducted in two large supermarket chains, but respondents only gave these chain stores middling ratings as sources of local food. Venues perceived to be high in local food content, that is, farmers' markets, small fruit and vegetable stands, and direct from the farm, tend to be only available in the summer and at limited times, and would not be able to provide the entire food requirements for a typical family. Other studies have pointed out that not only must local food be available, but that given today's busy lifestyles, it must also be convenient (Chambers, *et al.,* 2007; Stephenson & Lev, 2004). It extends beyond the scope of this research to determine whether respondents' perceptions of the sources of local food are indeed accurate, but it is important that people who want to purchase local food know where they can obtain it.

Similar to other studies, respondents to this survey indicated that they strongly believe that local food is fresher than food from farther away and that buying local food benefits both local farmers and the local economy. However, unlike other studies, respondents gave an equally favorable rating to the belief that buying local helps the environment, and this item was one of the strongest predictors of respondents' propensity to buy local. Past studies on buying local either did not include an environmental component (Chambers, *et al.,* 2007; Stephenson & Lev, 2004) or concern for the environment was given relatively low ratings by participants (Schneider & Francis, 2005; Selfa & Qazi, 2005). One can speculate that the heightened awareness of the contribution that food miles potentially make to global warming is entering into food purchasing decisions. Consumers may be moving from considering buying local as solely a pragmatic issue of getting fresher food and supporting local economies, to encompassing larger sociopolitical issues where impacts can be made through responsible consumerism (Jacobsen & Dulsrud, 2007; Vermeir & Verbeke, 2006).

Conclusion

Environmental concerns, food-safety scares, and a general and growing distrust of the food system have contributed to consumers exploring potential alternatives to the agro-industrial model. The resurgence of a "buy local" ethos represents one such alternative. As the buy local movement grows, it becomes increasingly important to identify and understand the motivations of consumers most likely to be on the forefront as the movement becomes more mainstream. With this in mind, the current study focused on consumers from farmers' markets and agricultural fairs in the belief that many of them would likely try to regularly incorporate local foods into their everyday shopping. Using this approach helped provide insight into why people want to buy local food, as well as potential barriers that prevent stronger markets for local food products.

The results of this survey paint a picture of a group of consumers willing and eager to support buying local food, but feeling limited in their ability to do so. Perceptions of the main grocery-shopping venues as being mediocre sources of local food, the inability to discern whether or not food is local, and the perception that locally produced food is primarily available in the summer helps to account

for consumers' overall beliefs that they have limited choice about purchasing local food. It is not surprising, therefore, that respondents also indicated strong support for the promotion of locally produced food, and in particular, labeling food as local. Unlike other studies that seem to indicate buy local campaigns need to convince people to purchase local food, the results of this survey suggest that for individuals who may already be oriented toward buying local food, the largest barriers are related to lack of information and supply. That is, locally grown food needs to be clearly identified and made more available to consumers in places where they would normally shop, increasing its convenience to shoppers. If given the information and opportunity to buy a local food product, it would indeed appear that many Nova Scotians would consciously do so. Further research using a broader sampling frame would be beneficial to determine whether these findings and conclusions are specific to the sample in this study or whether they extend to the general public.

Recent policy initiatives and buy local campaigns seem to suggest an underlying belief that many consumers are indeed prepared to buy local food if presented the opportunity (easily) to do so. For example, recent buy local campaigns in Nova Scotia have been largely oriented to raising awareness of the advantages of buying local and to increasing availability and ease of purchase. The current research was part of the Women's Institutes of Nova Scotia's Buy Local Challenge, a grassroots campaign to educate and encourage Nova Scotians to buy and advocate for local food. This campaign was likely one of the driving forces behind the Nova Scotia Provincial Government launching the Select Nova Scotia Campaign in 2007. The Select Nova Scotia Campaign reflects the survey results in that it focuses primarily on the availability and labeling of local foods and the benefits to both the consumer and producer of buying within the province. A provincial campaign along similar lines in Ontario has been used to help consumers more easily recognize fruits and vegetables produced in Ontario and to encourage consumers to support Ontario farmers by purchasing local produce. It would appear then that both policy-makers and food retailers recognize that there is a growing segment of the population oriented toward buying local food. Our survey results closely match this orientation and suggest that removing barriers to buying local, particularly through increasing availability and the ability to recognize local foods in retail outlets, is a critical component to meeting the demands of this growing segment of the population wanting to buy local.

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Planting seeds for an improved agrifood system? Linking the aims of the alternative agrifood movement to executive action in the first two years of the Obama administration

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Abstract

This paper uses several case studies to look at the dialogic relationship between the Obama administration and the alternative agrifood movement. We evaluate the case studies based on criteria developed from the agroecology literature and literature on food security, agrarianism, and the alternative agrifood movement as a whole. Additionally we compare the policy tools utilized and the funding levels of each of the cases. Our findings suggest that the Obama administration is committed to tackling issues of food security and promoting the well-being of small- and mid-scale farmers and their local agrifood economies. Deconsolidation of large agribusiness, equitable trade, and workers' rights do not appear to be high priorities on Obama's food and agriculture agenda, however. Our analysis further indicates that the administration views agriculture and food policy as embedded into a broader socioeconomic and political system. Both the administration and the alternative agrifood movement support the use of capacity-building, symbolic, and incentive tools that emphasize community and individual responsibility. Overall, there is evidence that the alternative agrifood movement and the Obama administration are co-constructing a more community-based food system that simultaneously reflects neoliberal rationale.

Keywords

agroecology, alternative food systems, executive politics, neoliberal governance, Obama administration, policy tools, social movement

Introduction

Days before his historic election to the presidency, Senator Barack Obama told *Time* magazine political commentator Joe Klein, "Our agriculture sector actually is contributing more greenhouse gases than our transportation sector. And in the mean time,

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it's creating monocultures that are vulnerable to national security threats...sky-high food prices or crashes in food prices, huge swings in commodity prices, and are partly responsible for the explosion in our healthcare costs" (Klein, 2008, "The Full Obama Interview," para. 45). Following a campaign famous for its rhetoric about hope and change, Obama's articulation of the profound reverberations of mainstream American agriculture gave adherents of the nation's diverse alternative agrifood movement reason for optimism. Shortly thereafter, however, Obama appointed two strong proponents of genetically modified crops, Tom Vilsack and Roger Beachy, to key positions at the U.S. Department of Agriculture (USDA). Since opposition to genetically modified organisms has often been a component of movement activism, these initial actions left many alternative food system advocates wondering what type of "change" could be expected of this new administration.

This paper analyzes Obama's agricultural agenda and policy-making by systemically evaluating early initiatives and appointments by the Obama administration, as well as the policy tools and funding associated with them. This evaluation is complemented by a review of the reactions of the alternative agrifood movement to these programs and appointments. We ask how the alternative agrifood movement has defined its priorities, how the administration has responded to the movement in terms of policy initiatives, and how the movement has reacted. Finally, we consider the overall direction of change coproduced by the administration and alternative agrifood movement.

We begin by briefly describing the rise of an alternative agrifood movement in the United States and its important characteristics and tenets. Subsequently, we analyze several key food- and agriculture-related actions from the administration's first two years in office in an effort to understand Obama's commitment to the alternative agrifood movement and his popularity within that movement. To do this, we draw on literature in the social and natural sciences, including agroecological research and social studies of alternative agrifood movements, to develop a set of evaluative criteria that encompass movement goals and priorities. We apply these criteria to three USDA programs, three projects championed by first lady Michelle Obama, and three appointments related to food and agriculture. This criteria-based analysis reveals the extent to which early policy initiatives in the Obama administration align with and diverge from goals of the alternative agrifood movement. Because the programs and appointments we analyze are not equivalent, we also examine the policy tools they deploy and program funding to place the criteria-based analysis in context.

Background

The Alternative Agrifood Movement in the U.S.
In the United States, there exists a diverse group of food- and agriculture-focused activists united by a suite of shared goals. Social scientists have used Scott's (1990) framework to define these actors as a social movement (e.g., Allen, 2004; Hassanein, 2003). As Allen summarizes, a social movement "is a collective actor constituted by individuals who understand themselves to have common interests and identity, and who act collectively in an attempt to change widespread existing political, economic, and cultural conditions" (2004, p. 5).

Today's alternative agrifood movement has its roots in a variety of other social movements, many with long histories in the United States and internationally, including the populist, environmental, antihunger, labor, and civil rights movements (Allen, 2004; Constance, 2009; Hassanein, 2003). The various subgroups within the alternative agrifood movement together have articulated a critique of the dominant agriculture and food system as a corporate-controlled, technology-based, monocultural, export-oriented system that negatively affects public health, food quality and nourishment, traditional livelihoods, indigenous and local cultures, and the environment. They advocate for a transition to more decentralized, democratic, cooperative, and independent organic farming systems, based on the principles of diversity, synergy, and recycling (Allen, 2004; Petrini & Lionette, 2007).

Food and Agriculture in the Obama Campaign

Obama's campaign materials reflect awareness of the connections between agriculture and the environment, and claim that locally oriented systems of agricultural production benefit communities (Obama for America, 2008). The campaign's rural policy statement characterizes consolidation in the agricultural sector as one of two key problems facing rural communities (Organizing for America, 2008). These initiatives directly reflect the alternative agrifood movement's preference for decentralized production and independent local economies (cf. Allen, 2004). However, the policy prescriptions represent relatively conservative reforms, and at times campaign materials conflate "organic" with "sustainable" in recommending policy changes intended to support the latter (Heffernan, Hendrickson, & Gronski, 1999; Obama for America, 2008; Shames, 2009). The campaign's rural policy statement also supports an increased role for biofuels, including corn ethanol, in U.S. agriculture and energy policy; promoting corn as fuel is unlikely to bolster diversified farms. Both the rhetoric and the proposed policies emphasize helping small growers "compete on the open market" rather than challenging agribusiness directly.

Movement Response

In October 2008 the *New York Times* published a "food issue" of its magazine section featuring an extensive letter to the next president by author and movement spokesperson Michael Pollan. Pollan enumerates the failures of today's agrifood system and asserts that the incoming president must recognize the role that it plays in shaping other priority issues, such as health and energy independence (Pollan, 2008). Days before Pollan's article appeared in the *Times,* Jim Goodman, a policy fellow at the Institute for Agriculture and Trade, wrote of the need for candidates Obama and McCain to "talk real farm policy," but credited Obama with going beyond the failed policies of Reagan, Clinton, and Bush (Goodman, 2008, p. 1). He also called on adherents of the alternative agrifood movement to be active in demanding policy action after the inauguration.

Following the election, the Organic Consumers Association "celebrated a hard fought and well-deserved victory," but maintained that the next step was to pressure the Obama administration to take action to improve the national food system within its 100 first days in office (Organic Consumers Association, 2008, p. 1). In December 2008, the U.S. Working Group on the Food Crisis addressed the president-elect in a letter calling for the development of "a democratic and just food policy" and the appointment of persons with similar commitments to positions in several areas of the new administration (U.S. Working Group, 2008, p. 2). Overall, the movement was engaging optimistically with the president-elect, reflecting hope that the arrival of the Obama administration would bring change in the agrifood system.

Methods

In order to systematically analyze the Obama administration's emergent food and agriculture agenda in relation to the alternative agrifood movement, we reviewed social science studies of the movement and the agroecology literature. We used these literatures to develop a set of evaluative criteria reflective of the movement's aims and emphases, and applied these criteria to six agriculture-related policy actions and three appointments of the Obama administration. We then examined the funding levels and policy tools associated with the six selected policy actions.

Case Selection

In selecting cases, we were guided by a set of indicators of presidential performance on environmental policy developed by Vig (2010). His taxonomy identifies the types of actions that are most reflective of the influence of a president, as opposed to Congress or other political actors. Examples include agenda, budget proposals, executive orders, and appointments.

Our cases clustered into three categories: USDA programs, initiatives spearheaded by the first lady, and appointments. Although the first lady is not an elected or appointed official in the administration, political scientists have noted the importance of her political role (O'Connor, Nye, & van

Assendelft, 1996). The functions of the first lady have increased from ceremonial to that of advisor to the president and political agenda-setter. Michelle Obama champions issues surrounding food and diet both in the policy arena and by promoting healthier cultural practices such as urban gardening.

We acknowledge that these nine cases are not equally significant and, consequently, not equally reflective of administration priorities. To account for these differences, we also compare funding and the design of the six policy initiatives. The titles of the appointees indicate their relative power; we consider these differences for our criteria-based analysis in the discussion.

Source Material and Data

Our data are drawn primarily from three types of source materials. To analyze proposed and incipient policy initiatives, we relied on government press releases, official program websites, speeches from program launches, and news coverage in mainstream national publications from the start of the administration to the end of 2010. In order to gain insight into appointees' backgrounds, we analyzed public remarks, interviews, editorials, and speeches, as well as the published materials and curricula vitae of appointees from academia and, for appointees from the government sector, voting records and position statements compiled by nonpartisan government accountability clearinghouses such as WhoRunsGov.com and Project Vote Smart. Finally, we utilized editorial material, press releases, memos, blog posts, reader comments, and other statements culled from blogs and websites identified with the alternative agrifood movement. The accessibility of blogs helps account for the movement's large and vocal web presence, which also includes professional websites of major nonprofit organizations.

Analysis and Evaluation

The design of our study was inspired by Layzer's (2008) assessment of ecosystem-based management (EBM) efforts. Layzer evaluates a series of EBM initiatives to understand whether management plans (outputs) have measurably improved environmental conditions (outcomes). In the case of the Obama administration, it is still too early to analyze outcomes; changes to the agrifood system itself that can be linked directly to administration policy initiatives. Instead, we focus here on outputs, evaluating whether the specified objectives of the administration's new programs and the stated opinions of its appointees are consistent with the critique formulated by the alternative agrifood movement. In order to do this, we rated each case with a "Yes" or "No" for each criterion. A program (or appointee) received a "yes" when we found evidence that it (or she or he) was likely to contribute to the realization of movement goals and values encompassed by the criterion in question. A "no" finding, therefore, does not mean that a program would undermine movement objectives; it means that we did not find evidence indicating that the program or appointee would perform *positively* against the criterion in question.

Given the highly qualitative nature of our data, a quantitative weighting system seemed likely to result in arbitrary values. We therefore evaluated the relative importance of each of the six policy initiatives by comparing its budgets and the policy tools it employs. A program's budget is one indicator of the level of impact it is likely to have; policy tools tell us what policymakers assume is needed to promote desired behaviors in a specific arena (Schneider & Ingram, 1990).

Schneider and Ingram (1990) define policy tools as the instruments used by public policy to induce the changes needed to achieve policy goals. They identify five categories of policy tools according to their underlying motivational strategies.

- **Authority tools** are based on the assumption that directives from government officials will change the behavior of agency employees or the public.
- **Incentive tools** use tangible rewards and punishments to prompt specific behaviors.
- **Capacity-building tools** provide target populations with information and

resources deemed necessary to achieve the target policy goals.

- **Symbolic and hortatory tools** appeal to cultural values and beliefs in order to stimulate policy-related actions.

- **Learning tools** involve the participation of target populations in the decision-making process through hearings, boards and panels.

An understanding of the policy tools mobilized by the administration supplements our analysis by emphasizing how the administration translates commitment into policy action (Schneider & Ingram, 1990).

Limitations

Our analysis reflects the alternative agrifood movement's views as constrained by the rhetorical situations through which we accessed them and the particular individuals and organizations who chose to comment in broadly accessible formats, such as press releases and blog posts. Our discussion of movement responses may therefore reflect a bias toward the subset of the movement that utilizes these spaces.

Our analysis of appointments focused on appointees' professional experiences prior to joining the administration. After they are nominated, appointees communicate with the public as spokespersons for their administrations. This confounds efforts to analyze postappointment public comments by appointees as evidence of appointees' individual views, experiences, and qualities — the very things that form the basis for nominations and make the appointment of a particular individual an "indicator" of an administration's performance in a given policy area. This problem forced us to rely more heavily on pre-appointment data to evaluate appointees. Some appointees' relevant prior work, however, was in the private sector or the rank and file of government agencies, resulting in a paucity of pre-appointment data.

Evaluative Criteria

In order to methodically analyze Obama's policies and nominations, we developed 12 criteria intended to reflect the major goals of the alternative agrifood movement in the United States (table 1). Our criteria, while sometimes overlapping, are grouped into two broad categories: environmental soundness and social critique.

Environmental Soundness

Our criteria for assessing the agroecological basis of Obama's policies and appointments are based on the agroecology literature. Many current definitions of agroecology as a discipline extend its focus beyond individual farms to local and global food systems and emphasize a systems perspective that includes social, ecological, and economic factors, although some agroecologists still focus on natural science (Wezel & Soldat, 2009). We use the systems definitions of agroecology provided by Altieri (2002) and Gliessman (n.d.) to distill generalized criteria for assessing policy that may support the development of agroecology in U.S. farming systems. According to Gliessman (n.d.), "sustainable agroecological systems maintain their natural resource base, rely on minimum artificial inputs from outside the farm system, manage pests and diseases through internal regulating mechanisms, [and] recover from the disturbances caused by cultivation and harvest" (Gliessman, n.d., bullets). Altieri (2002) concurs with Gliessman in identifying key processes that should be promoted in agroecosystems (see also Warner, 2007). Based on these definitions, we developed criteria 1 through 6 for evaluating policies and appointments by the Obama administration.

Social Critique

The social critique of conventional food production advanced by the alternative movement is also broad, encompassing issues as diverse as farm economics, human rights, and food safety. Constance (2009) identifies the movement's agrarian question as the set of emphases that focus on "the relationship between structure of agriculture and quality of life for farmers and rural communities" (p. 5) that began to garner attention in the early 1980s, when plummeting prices led to a

"farm crisis" in the rural U.S. (see also Associated Press, 1985; Hansen, 2003; Kline, 1981). From this "agrarian" critique, we can trace the development of three emphases of the modern alternative agri-food movement: Regaining political and economic control over a conventional food system that is dominated by a small number of corporations with transnational reach; increasing the prices small growers receive for their products on the market, both internationally and domestically; and encouraging the implementation of policies that foster place-based agrifood economies. These emphases are the bases for criteria 7, 8, and 10.

Constance (2009) also describes an "emancipatory" thread linking the agrifood system to human rights concerns. Central to the emancipatory question is the critique of the uneven distribution of poverty, hunger, and food insecurity among different groups of people in the United States (Allen, 2004). Among the issues emphasized under this umbrella are food security, farm workers' rights and conditions, food quality (specifically nutrition), and food safety. These concerns formed the bases of criteria 9 and 11 in our evaluative scheme. We also include the importance of energy independence in the list of concerns associated with "social critique" (criterion 12). As Obama himself has noted, agriculture in the United States is a major source of greenhouse gas emissions due to its use of fossil fuels for various stages of the production and distribution process (Klein, 2008).

Case Studies

USDA Programs and Initiatives

We analyzed three USDA programs: The Healthy Food Financing Initiative (HFFI), Know Your Farmer, Know Your Food (KYF2), and the People's Garden Initiative.

Table 1. Criteria for Evaluating Case Studies

Environmental Soundness
Does the case study or key actor support objectives that are consistent with those prescribed by agroecology?
1. Does it take a systems approach to considering ecological, social, and economic factors within the same piece of policy?
2. Does it address agroecological issues on multiple physical scales?
3. Does it support the improvement of soil health, fertility, and biological activity?
4. Does it promote natural control mechanisms available internal to the agroecosystem?
5. Does it emphasize resource conservation and maintenance of the resources in any given system?
6. Does it encourage the enrichment of biodiversity and "synergisms between components"?
Social Critique
Does the case study or key actor support objectives that are consistent with the social critique raised by the community food security movement?
7. Does it support deconsolidation of food production and processing by supporting small- and mid-scale producers and/or revising policies that confer advantages to large producers and processors?
8. Does it promote higher prices for farm products or support or incentivize the development of value-added enterprises, such as food processing and/or alternative markets for agricultural products? Does it help farmers capture a larger proportion of their products' retail value?
9. Does it promote access to cheap, nutritious, and culturally appropriate food by targeting the distribution, quality and price accessibility of food, the underlying causes of hunger and food insecurity (e.g, poverty, illiteracy and unemployment)?
10. Does it promote the overall vitality of the local agrifood economy?
11. Does it reflect a general concern for the well-being of farm workers, food processing workers, and food service workers?
12. Does it promote energy independence within the agrifood sector by reducing food miles and promoting the use of renewable energy?

HFFI is a joint effort by the USDA, the Department of Health and Human Services (HHS), and the Department of the Treasury intended to provide access to affordable and nutritious food in all areas of the United States. Partner agencies have committed to funding loans, grants, and tax credits for private and nonprofit initiatives that bring supermarkets to communities lacking fresh food. Other projects eligible for HFFI support include farmers' markets and refrigerated produce cases for convenience stores (HHS, 2010). HFFI provides incentive for food retailers to open stores, and increases the capacity of retailers and community groups to act in cases where private capital is reluctant to finance projects. The initiative is based on a well regarded public-private partnership, the Pennsylvania Fresh Food Financing Initiative (Brown, 2010; PolicyLink, 2010a; Reinvestment Fund, 2007). HFFI was announced in February 2010 by the Obama administration as a US$400 million commitment. Legislation to establish and fund HFFI was introduced in the Senate and the House on November 30, 2010, with funding at the US$500 million level (HHS, 2010; U.S. Congress, 2010b; U.S. Congress, 2010c).

Know Your Farmer, Know Your Food (KYF2), chaired by USDA Deputy Secretary Kathleen Merrigan, is a communication mechanism used by the USDA to promote the distribution of money already authorized by Congress (Ferguson, 2010). In a telephone conversation with the authors in January 2011, staff at the office of Deputy Secretary Merrigan revealed that the initiative has no dedicated funds; nevertheless, it has been at the forefront of the USDA and Merrigan's outreach effort for the past two years (Luke Knowles, personal communication, January 13, 2011). KYF2 publicizes loans, grants, technology transfers, and other incentives that support local farmers, strengthen rural communities, promote healthy eating, and protect natural resources (USDA, 2009a). The majority of the opportunities publicized through KYF2 are intended to launch farm-to-school programs and encourage a large-scale conversion of farmers to certified organic farming. KYF2 functions as a symbolic tool: It repackages existing incentive programs to further encourage the participation of small-scale farmers and producers by using language that signals an increased commitment to local and sustainable agriculture. The initiative also serves as a capacity-building tool that connects small producers with resources intended to foster agroecological practices and the vitality of local farming economies. In the last year, a blog was launched on the KYF2 website to provide real-world examples of the activities it is coordinating across the country (USDA, 2010a).

The People's Garden Initiative (PGI) challenges USDA employees to start "people's gardens" at USDA facilities or help communities create gardens. At the USDA's headquarters in Washington, DC, a garden of over 600 square feet has been started, and future plans include on-site composting, rain gardens[1], a pollinator garden, and use of organic and sustainable techniques. The initiative also promotes education through trainings and print resources. The initiative uses incentives, capacity-building, and symbolic tools. The headquarters garden is intended as a model to demonstrate the potential of gardens on both federal and private land. It is also a symbol of the administration's commitment to environmental sustainability and community food security. The program builds capacity by educating communities across the United States in garden development. In a telephone conversation with the authors, a USDA staff member explained that each field office uses funds from existing budgets along with volunteers and donations to run its program (Livia Marques, personal communication, January 14, 2011). In addition to educational opportunities, in 2010 a People's Garden School Pilot Program grant competition was developed, budgeted for US$1 million, to incentivize school garden development. With the exception of the salary of the PGI director, which was paid by the USDA, support for

[1] A rain garden, according to the Rain Garden Network, is "a shallow depression that is planted with deep-rooted native plants and grasses…to capture rainwater runoff and stop the water from reaching the sewer system" (Rain Garden Network, *What is a Rain Garden?* Retrieved from http://www.raingardennetwork.com/).

the headquarters' garden comes from donations and the labor of the maintenance staff and volunteers.

First Lady Michelle Obama's Projects

Three policy actions that we analyzed — Let's Move!, the Food Environment Atlas, and the White House Garden — are projects of first lady Michelle Obama.

Let's Move!, Michelle Obama's most comprehensive policy initiative, is a suite of programs intended to reduce childhood obesity in the United States by addressing its underlying causes (Obama, 2010). One of the aims of the initiative, increasing access to healthy, affordable food, overlaps with the goals of the alternative agrifood movement (Obama, 2010; USDA, 2010c). Under the banner of Let's Move!, executive-branch agencies provide new web tools and labeling programs, increase funding for existing relevant programs, and partner with the private sector to develop healthier products (USDA, 2010c). While the tools in the Let's Move! portfolio are largely capacity-building, the program also includes incentives for schools and the use of government authority (e.g., directing the Food and Drug Administration to develop new labels for food products). The public-sector programs are funded by the US$4.5 billion Healthy, Hunger-Free Kids Act of 2010, signed in December 2010 (U.S. Congress, 2010a). The initiative also uses strategies characteristic of symbolic and hortatory tools: It relies on voluntary action by private-sector groups, and it uses promotional materials to connect the obesity-reduction goal to other major national interests, such as national security and reducing health-care costs (Obama, 2010). Additionally, public-service announcements and even the slogan "Let's Move!" are examples of a "persuasive communication strategy" similar to the "Just Say No" campaign cited by Schneider and Ingram (1990, p. 520).

The Food Environment Atlas is a project especially created for Michelle Obama's Let's Move! campaign by the USDA's Economic Research Service. It aims to "assemble statistics on food environment indicators to stimulate research on the determinants of food choices and diet quality and to provide a spatial overview of a community's ability to access healthy food and its success in doing so" (USDA, 2010b, "Objectives of the atlas," para. 4). The atlas uses 90 indicators within three categories of food environment factors: food choices, health and well-being, and community characteristics. The Food Environment Atlas is a capacity-building tool. The atlas provides information to the public that has been compiled from public, academic, and private institutions. The project aims encourage research and educate the greater public as to the conditions of their communities. It is assumed that individual free agents and "target groups will have sufficient incentive or motivation" to take action to improve their community's food environment (Schneider & Ingram, 1990, p. 518). According to USDA staff there is no allocated budget for this program; staff from ERS are assigned to work on the atlas as needed (Vince Breneman, personal communication, January 14, 2011).

The White House Garden on the South Lawn is the first of its kind since Eleanor Roosevelt's Victory Garden in 1943 (Burros, 2009). The groundbreaking of the White House Garden in fall 2009 cost a total of US$200 (Muir & Wright, 2009; Office of the First Lady, 2009). Overseen by White House chef Sam Kass, the garden hosts weekly educational tours for children in Washington, DC, and provides organically grown food for the White House and a local homeless kitchen (Lee, 2009). The garden combines capacity-building tools (e.g., educational tours) with symbolic tools: the first lady's adoption of urban gardening signals that the administration is committed to values and practices advocated by the alternative agrifood movement. Since spring 2009, an additional 400 sq. ft. have been added to the garden (Kass, 2010). The garden was also featured on the popular Food Network show *Iron Chef* (Associated Press, 2010; Muir & Wright, 2009).

Appointments

We analyzed three Obama administration appointments: Secretary of Agriculture Tom Vilsack, Deputy Secretary Kathleen Merrigan, and National

Institute of Food and Agriculture (NIFA) Director Roger Beachy.[2] Vilsack began his political career in municipal government in Iowa, then moved on to the Iowa state senate and, beginning in 1998, the Iowa governorship. He ran briefly for president in 2008 before giving his support to Hillary Clinton and then Obama (AllGov, 2009). Merrigan held a position as assistant professor and director of the Agriculture, Food and Environment program at Tufts University prior to her appointment, and published articles on farm-to-school nutritional programs, animal health and welfare, and organic farming standards (Lockeretz & Merrigan, 2006; Merrigan, 2005; Merrigan & Bailey, 2008). She is considered one of the authors of the 1990 Organic Foods Production Act, which set federal organic standards (Marlowe, 2010). Beachy has had a long career in academia and research focused on agricultural biotechnology. He is credited with early advances in genetically modified food-crop engineering (Donald Danforth Plant Science Center, 2010; Waltz, 2010).

Results

USDA Programs and Initiatives

The Healthy Food Financing Initiative

The goal of HFFI is to increase access to healthy food by providing communities with fresh food available through retail establishments (criterion 9). HFFI promotes a local agrifood economy (criterion 10) by funding community development corporations and because eligible communities are defined at the neighborhood scale. News releases emphasize the connection between food access and community "revitalization," characterizing HFFI as a "place-based approach" to food security (HHS, 2010; USDA, 2010e). The initiative does not address environmental soundness (criteria 1–6), consolidation in the food systems (criterion 7), equitable trade (criterion 8), workers' rights (criterion 11), or energy independence (criterion 12).

HFFI was developed in cooperation with the Food Trust, an advocacy group that played an integral role in the design and implementation of Pennsylvania's FFFI (PolicyLink, 2010b), and food security activists have responded enthusiastically to the initiative (Community Food Security Coalition, 2010a; DeForest, 2010). The National Sustainable Agriculture Coalition expressed support for the initiative, but also drew attention to HFFI's narrow focus, noting, "We...hope it will be firmly linked with regional food system and rural development objectives in addition to food access" (Witteman, 2010).

Know Your Farmer, Know Your Food

The KYF2 initiative advertises financial and programmatic resources available for small-, mid-scale, and "socially disadvantaged" farmers, as well as nonprofit organizations and businesses in rural areas (criteria 7 and 10). Additionally, a large portion of the program's outreach is dedicated to farm-to-school programs (criterion 9). Although as a communication device KYF2 does not specifically promote sustainable practices, several of the programs publicized through the initiative encourage the conservation and protection of agricultural lands and the conversion to organic farming (criteria 3 and 5). KYF2 does not promote or fund any programs aimed at addressing issues related to food workers' rights and conditions (criterion 11).

The alternative agrifood community has welcomed the initiative as a new commitment to local and regional food systems on the part of the Obama administration (Jenkins, 2009). Some praise KYF2 for helping create a food-literate population that will make better choices when it comes to nutritious and local food (Kohan, 2009a). Critics point out that KYF2 does not make any real attempts to challenge the status quo of the existing agrifood system, and suggest that its support for local agrifood economies will have relatively few impacts in light of the huge federal subsidies promoting con-

[2] As of 20 May 2011, Roger Beachy has resigned as director of NIFA. During his short term with the USDA, Beachy oversaw the transformation of the Cooperative State Research, Education and Extension Service (CSREES) into NIFA. The search for a new director has begun (Stokstad, 2011).

ventional large-scale agribusiness (Estabrook, 2009).

The People's Garden Initiative

This initiative focuses on education, healthy eating, community building, and the promotion of environmental sustainability, showing a truly systematic approach (criterion 1). The program is designed to promote garden creation across the country (criterion 2). The sustainable practices promoted by the garden (e.g., the pollinator garden, rainwater capture and recycling, on-site composting, organic certification, and companion planting) meet criteria 3–6. The vegetables grown in the main garden go to a local food bank (criterion 9). The initiative actively supports a local food economy (criterion 10) by promoting the farmers' market held next to the garden and by buying transplants from a local farmer cooperative. The initiative does not address criteria 7, 8, and 11.

The initial response from bloggers to PGI was to question the legitimacy of the garden and project. It was called "lip service" to the movement — a publicity stunt with "no budget, no staff, and no real plan" (Orton, 2009, "'Secretary of Agrispinculture,'" para. 3). As the project developed, responses have been more positive. The Obama Foodorama blog calls it a "green fever dream [turned] to rapid reality" (Kohan, 2009b, "The People's Garden," headline). Original initiative director Valerie Frances called the project "unbelievably exciting" and other employees in the USDA "are now feeling much freer to speak up, just because of the garden" (Kohan 2009b, "The People's Garden," para. 18).

First Lady Michelle Obama's Projects

Let's Move!

Let's Move! is primarily a public health campaign that overlaps with the alternative agrifood movement on one key concern: increasing access to "healthy, affordable food" (USDA, 2010c) (criterion 9). Commitments to fund the Farm to School program and increase funding to existing farmers' market support programs may enhance local agrifood economies (criterion 10). However, the initiative's emphasis on public-private partnerships and voluntary agreements with major food-industry actors make it unlikely that Let's Move! will challenge corporate concentration in this sector (criterion 7). The initiative does not address the environmental impacts of food production (criteria 1–6), equitable trade (criterion 8), workers' rights (criterion 11), or energy independence (criterion 12).

The movement has taken note of Michelle Obama's interest in childhood obesity. The Community Food Security Coalition characterizes it as an opportunity to further related programs such as Farm to School (Community Food Security Coalition, 2010b). The National Sustainable Agriculture Coalition commented on the strong showing by proponents of small-scale and local agriculture at the Let's Move! launch (National Sustainable Agriculture Coalition, 2010a). However, Let's Move!'s embrace of the private sector has engendered some skepticism among movement commentators. One reader of NSAC's blog complained, "Childhood obesity will not be conquered with 'co-operation from the companies that collectively provide 20% of the nation's school lunch programs', alone" (Stockwell, 2010, "One response to 'Let's Move,'" para. 1).

The Food Environment Atlas

The Food Environment Atlas focuses on economic and social indicators to address health food access and issues of health and nutrition. The visual description is compiled through census and other data sources that are collected at the county, state, and national levels, providing a multiscale perspective (criterion 2). Production is briefly introduced by identifying direct-sale farms, farmers' markets, and grocery stores in the context of examining food security (criteria 9 and 10). Although farm production is addressed, the atlas does not address its environmental sustainability (criteria 1 and 3–6). The project does not speak to other parts of the food system, including those represented by criteria 7, 8, 11, and 12.

Some movement organizations are enthusiastic about the atlas, describing it as "ambitious"

(Kohan, 2010a, "Mapping Food Access," para. 2) and "a great way to begin to look at the various disparities that exist in our country when it comes to what we eat" (Lohan, 2010, "A Food Atlas Like," para. 7). The Farmers Market Coalition (2010) website discusses the multiple ways that movement organizations, farmers, and food retailers can use the atlas to "identify market opportunities, secure community support, leverage financial resources, and more" (Farmers Market Coalition, 2010, "Using the USDA's," para. 3). At the same time, the *San Francisco Bay Guardian*'s food-focused blog points out that the atlas functions to give "a broader comparative perspective of the food-related socioeconomic issues of the U.S." but fails to pick up on smaller physical scale problems, citing the example that, although some parts of Oakland clearly lack healthy accessible food, the map uses county-level data and therefore paints a rosy picture (Johnson, 2010, "Uproot," para. 3).

The White House Garden

The White House Garden stresses the importance of soil health, natural control mechanisms, biodiversity, and synergisms (criteria 3, 4, and 6) through a variety of practices, including the use of 55 varieties of crops, hoop houses, compost, ladybugs, mantises, and pollinators. Additionally, the seedlings for the garden are grown in the White House greenhouses and the food is distributed strictly locally (criterion 12). Finally, the educational component of the White House Garden attempts to link environmental sustainability with questions of access and nutrition (criterion 9). Overall, the White House Garden initiative focuses on the environmental critique of agriculture as formulated by the alternative agrifood movement; it does not address workers' rights and conditions, foster the vitality of the local agrifood economy, nor advocate for the conservation of natural resources beyond the farm (criteria 5, 10, and 11).

Over 110,000 people signed the Kitchen Gardeners International's "Eat the View" campaign petition started in February 2008, asking the Obama family to replant a White House Victory Garden and reserve part of the produce for local food pantries (Doiron, 2010). The groundbreaking for the White House Garden was therefore perceived as a victory for the alternative agrifood movement. Shortly after the garden's establishment, an association representing pesticide and fertilizer companies expressed uneasiness with the alternative practices of the White House Garden in a letter to Michelle Obama (McCarvel & Braun, 2009; Taylor, 2009). Praised by foodies such as Michael Pollan as an important symbolic gesture, the garden sends a strong signal that the administration is engaging with the alternative agrifood movement (Pollan, 2008).

Appointments

Tom Vilsack

Vilsack received a "yes" on Criteria 5 (resource conservation) based on his track record as governor of Iowa. During that time, Iowa "led the nation in enrollment of acreage in the federal Conservation Reserve Program" (Project Vote Smart, 2008, "Title: Energy and Environmental Record," para. 4). Since taking office, Vilsack has vocally supported the promotion of community food security and has taken action to more closely connect food entitlement programs (e.g., WIC and SNAP) to farmers' markets (National Sustainable Agriculture Coalition, 2010b) (criterion 9). Vilsack also supports maintaining farmers on the land and in their communities (criterion 10), calls for achieving energy independence (USDA, 2009b) (criterion 12), and has made addressing civil rights concerns within the USDA a top priority since entering office (Thompson, 2010). His administration is addressing concerns from Black, Hispanic, and women farmers who have been unfairly denied farm loans, thereby addressing agricultural system workers' rights (criterion 11). We found no statements or policy actions evincing support for the agricultural practices represented by criteria 3, 4, and 6, and our research has not found any instances of Vilsack publicly challenging the consolidation of the agrifood system or the inequality in access to the share of profits that farmers receive (criteria 7 and 8).

The movement has responded to Vilsack's appointment with concern over his support for

genetically modified organisms (GMOs), Concentrated Animal Feeding Operations (CAFOs), large agribusiness, and the use of biofuels as a sustainable alternative energy source. The Organic Consumers Association launched a "Stop Vilsack" campaign (Cummins, 2008). Today the tune of the movement has changed a little, however. David Murphy, director of Food Democracy Now!, says the new secretary's reputation as a friend to agribusiness and ethanol producers may have been overstated. Michael Pollan has said, "He's definitely sounding a different note than his predecessors" (Black, 2009a, "Vilsack: USDA Must Serve," para. 5).

Kathleen Merrigan

Merrigan received a positive evaluation for every one of our criteria, although evidence of her support for natural control mechanisms and agrifood workers' rights is only seen in her publications and previous positions. Additionally, while Merrigan positively engages both the environmental and social critique of conventional agriculture as formulated by the alternative agrifood movement, her focus is on organic farming as defined by USDA organic standards, as opposed to other conceptual definitions of organic. Merrigan is a strong advocate for farmers' markets and other mechanisms to boost local food economies (criteria 9 and 10). As the chair of KYF2, she has emphasized the important role of small- and mid-scale farmers in the local and regional food systems (criterion 7). Merrigan also acknowledges the economic and policy barriers that prevent farmers from adopting more sustainable practices, such as organic farming (criterion 1). Finally, she argues for transitioning U.S. agriculture away from its current dependency on fossil fuels (criterion 12). Overall, Merrigan's devotion to sustainable agriculture echoes each one of the main critiques of the alternative agrifood movement, making her a crucial voice at the heart of the USDA.

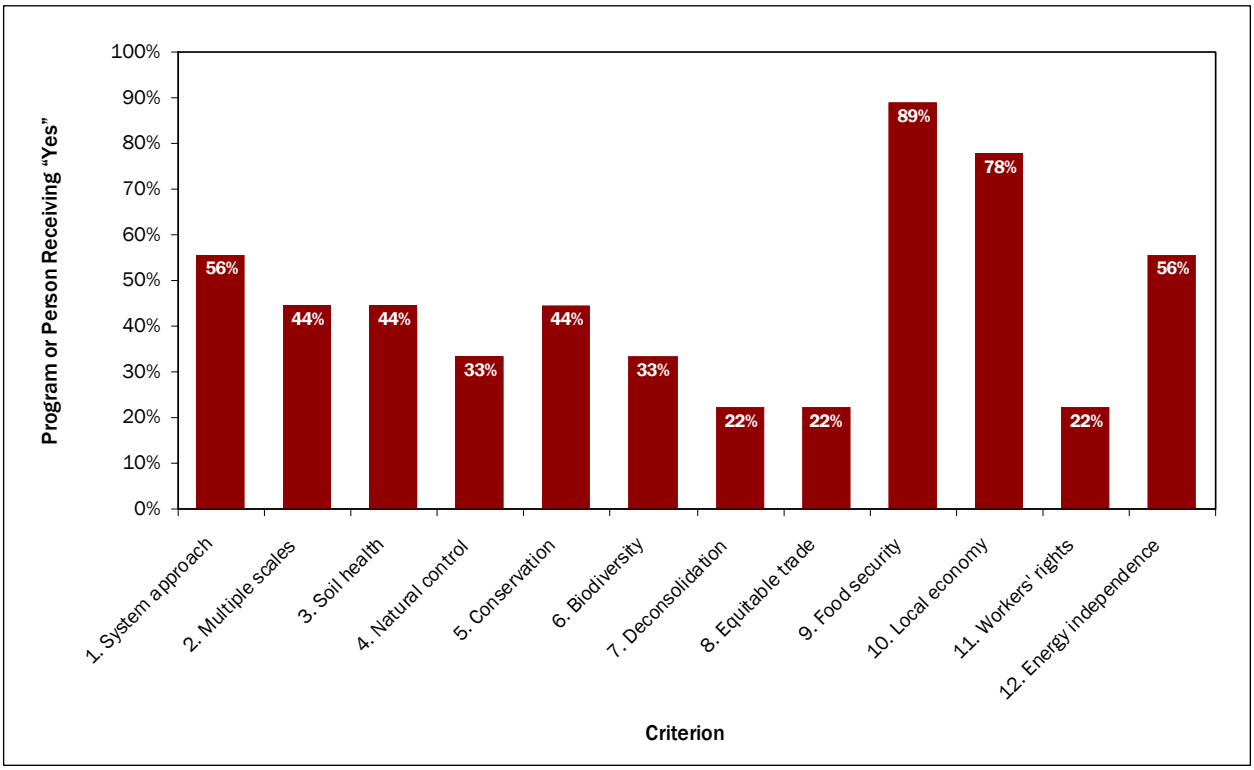
Merrigan's appointment was greeted with enthusiasm on the part of the alternative agrifood movement. In fact, Merrigan's name appeared on the "Sustainable Dozen List" of progressive candidates for her position compiled by the advocacy group Food Democracy Now! and signed by people across the country (Black, 2009b). The National Sustainable Agriculture Coalition expressed its excitement to "have a lifelong supporter of family farmers and sustainable and organic agriculture working with the administration to reform US food and agriculture policy" (National Sustainable Agriculture Coalition, 2009, "Sustainable Farming Group Applauds Choice," para. 1).

Roger Beachy

Public comments by Roger Beachy reflect an awareness of the negative environmental impacts of conventional agricultural production, including the spillover effects of chemical pesticide use and the greenhouse gas emissions associated with synthetic fertilizers (Aldhous, 2009; Beachy, 1999; Waltz, 2010); they also evince a commitment to reducing hunger and poverty domestically and around the world (Waltz, 2010). His comments acknowledge only one approach to addressing environmental and social problems in the food system, however: Expanding the role of agricultural biotechnology (Aldhous, 2009; Beachy, 1999; Waltz, 2010). His curriculum vitae lists over 200 publications on transgenic crop development; his editorial and commentary papers promote transgenic crops as the key technology for mitigating negative impacts of agriculture and addressing global hunger (Beachy, 1999, 2006; Donald Danforth Plant Science Center, 2010). Beachy's focus on technology-intensive off-farm inputs for addressing food insecurity and the environmental impacts of agriculture provide no basis for positive ratings for any of our evaluative criteria.

Alternative agrifood movement response to Beachy's appointment was strongly negative; within weeks of his nomination, a coalition of movement organizations was circulating a petition asking Obama to withdraw Beachy's nomination. A Pesticide Action Network North America (PANNA) news release described Beachy's then-employer, the Danforth Center, as "Monsanto's de facto nonprofit research arm," a characterization repeated widely in movement-linked blogs (Endelman, 2009; PANNA, 2009; Richardson, 2009). The movement's disappointment with the

Figure 1. Obama Administration Performance on Movement Criteria



president's nomination of Beachy was grounded in the claim that Obama was not meeting the expectations he set as a candidate (PANNA, 2009).

Discussion

From our evaluation of these cases we are able to identify areas where the Obama administration has

focused some of its recent efforts and those that have received less attention (figure 1 and table 2). With programs such as HFFI, Let's Move!, and KYF2, which would increase access to cheap and healthy food, support small- and mid-scale farmers, and revive rural economies, the Obama administration is indicating a commitment to improving food security (criterion 9) and fostering local agrifood economies (criterion 10).

The administration's performance falls in the middle range for seven criteria (criteria 1–6 and 12). The number of programs and appointees receiving a "yes" for criteria 1 (systems approach) reflects the extent to which both agricultural production and social concerns linked to the food system are considered within particular administrative actions. The fact that the administration's performance on each of the "environmental soundness" criteria falls into the "moderate" category, despite the more social orientation of Obama's agriculture-related agenda (e.g., health care, childhood obesity, jobs creation), provides further evidence that the administration tends to consider social and environmental issues in connection to one another and is acting on a relatively holistic vision of the agrifood system that is more in line with the movement than those of previous administrations.

Finally, our results suggest that among the movement emphases, three have received less attention from this administration: corporate deconsolidation (criterion 7), equitable trade (criterion 8), and workers' rights (criterion 11). Within our evaluative framework, these criteria represent what are arguably the most transformational objectives of the alternative agrifood

Table 2. Results for All Cases

	Healthy Food Financing...	Know Your Farmer...	People's Garden	Let's Move!	Food Environ-mental Atlas	Kitchen Garden	Tom Vilsack	Roger Beachy	Kathleen Merrigan
Environmental Soundness									
1. System approach	No	Yes	Yes	No	No	Yes	Yes	No	Yes
2. Multiple physical scales	No	No	Yes	No	Yes	No	Yes	No	Yes
3. Improvement of soil health, fertility, biological activity	No	Yes	Yes	No	No	Yes	No	No	Yes
4. Natural control mechanisms	No	No	Yes	No	No	Yes	No	No	Yes
5. Resource conservation and maintenance	No	Yes	Yes	No	No	No	Yes	No	Yes
6. Enhancement of biodiversity and synergisms	No	No	Yes	No	No	Yes	No	No	Yes
Social Critique									
7. Deconsolidation of food production and processing	No	Yes	No	No	No	No	No	No	Yes
8. Equitable trade	No	Yes	No	No	No	No	No	No	Yes
9. Access to cheap, nutritious, and appropriate food	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
10. Local agrifood economy	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes
11. Farm and food system workers' rights	No	No	No	No	No	No	Yes	No	Yes
12. Energy independence	No	Yes	Yes	No	No	Yes	Yes	No	Yes

movement, and policies designed to advance these goals would require challenging politically powerful actors.

Consideration of the funding levels of the six policy actions we analyzed supports this analysis. Following the passage of the Healthy Hunger-Free Kids Act of 2010, Let's Move! is the most well funded of these cases by a substantial margin. If Congress approves funding at the levels proposed in earlier legislation, HFFI will be the only other case representing a multimillion dollar commitment. Both Let's Move! and HFFI address the same two criteria: They include provisions to improve food access and support the development of local agrifood economies.

Policy actions that address the environmental critique of the U.S. food system, as well as those that promote workers' rights, equitable trade, and deconsolidation — and would fundamentally challenge those who benefit from the current distribution of power in the food system — are

small from a budgetary standpoint. Although the USDA's 2011 budget proposal includes US$2 million to support KYF2, the initiative has no budget, office, or staff; according to Merrigan's office, the program is meant to support USDA staff in efforts to coordinate with each other and with stakeholders (USDA 2010a; Luke Knowles, phone interview, January 13, 2011). These policy actions may be symbolically powerful, but they are not being funded at the level of Let's Move! and HFFI, which are narrowly focused on food access and promote voluntary action by communities and the private sector to achieve it.

It is important to bear in mind that, with the exception of Let's Move!, funding for all six policy actions reviewed in this paper is minor compared to that allocated for major, ongoing federal programs in the area of food and agriculture. For example, the USDA's budget proposal for fiscal year 2011 allocates US$9 billion for commodity programs, more than half of which is dedicated to direct payments to commodity producers (USDA, 2010d).

While it is not possible to compare the influence of appointees to the influence of policy actions using funding as a metric, it is important to consider both the relative influence of each of the appointees we reviewed and the ways their inclusion in the analysis impacts the outcomes. The professional record of the highest ranking appointee, USDA Secretary Tom Vilsack, reflects attention to environmental and social issues emphasized by the alternative agrifood movement. Inclusion of his appointment as a case in our analysis strengthens the administration's performance on environmental criteria and three social criteria that are emphasized across the six policy actions (criteria 9, 10, and, to a lesser degree, 12), as well as one social criteria that received little attention in other initiatives: workers' rights. The other two appointees, Kathleen Merrigan and Roger Beachy, rank below Vilsack in the USDA hierarchy. It is therefore possible that their performance on particular criteria will inflate the administration's overall performance on those criteria out of proportion to the actual significance of their appointments. Merrigan's record is in line with movement priorities while Beachy's record is not, suggesting that the two appointments influence the overall results in opposing directions. However, given that NIFA is a department under the jurisdiction of one of seven undersecretaries of the USDA, whereas Merrigan oversees all seven, it is possible that our analysis overstates the significance of Beachy's influence. In this case, the performance of the administration against movement criteria would appear weaker than it would if the significance of the Beachy appointment were factored into our results.

Our analysis of the policy tools used by the six selected programs and initiatives reveals that the Obama administration relies primarily on what

Table 3. Funding, Policy Tools, and Criteria for Programs and Initiatives

Program	Funding	Policy Tools Used	Environmental Criteria Met	Social Criteria Met
Know Your Farmer, Know Your Food	No dedicated budget	Capacity-building, Symbolic	3	5
Healthy Food Financing Initiative	$500 million (approval pending)	Incentive, Capacity-building	0	2
People's Garden Initiative	$1 million plus	Incentive, Capacity-building, Symbolic	6	3
Let's Move!	$4.5 billion	Incentive, Capacity-building, Symbolic	0	2
Food Environment Atlas	No dedicated budget	Capacity-building	1	2
White House Garden	$200	Capacity-building, Symbolic	4	2

Schneider and Ingram (1990) refer to as capacity-building tools and symbolic and hortatory tools (table 3). All the programs and initiatives selected in this study use capacity-building tools to connect stakeholders with resources and information deemed important for them to contribute to changes in the agrifood economy. According to Schneider and Ingram (1990), capacity-building tools assume that the preferred policy alternatives will be chosen if people are informed and they have enough resources and support to carry them out. They also "operate on the assumption that the potential target populations will welcome the information and assistance" (Schneider & Ingram, 1990, p. 519).

Symbolic and hortatory tools appeal to cultural beliefs and values in order to encourage people to take policy-related action (Schneider & Ingram, 1990). Several of the programs and initiatives analyzed in this paper seek to change perceptions about food and agriculture by appealing to intangible values. Let's Move!, for example, links food and agriculture to children's health and the nationwide obesity epidemic. Similarly, the featuring of the White House Kitchen Garden on a popular television reality series and the catchy name of Merrigan's Know Your Farmer, Know Your Food initiative are examples of how the Obama administration is using persuasive communication techniques such as images, symbols, and labels to promote urban gardening and other activities aimed at reviving local agrifood economies. The use of symbolic and hortatory tools is a sign that the administration is attempting to create an image of alternative agrifood practices that fits within people's value schemes (Schneider & Ingram, 1990). At the same time, Schneider and Ingram (1990) warn that symbolic and hortatory tools may "seek to convince people of the importance and priority government is associating with certain activities and goals, even though actual commitment of resources or development of programs may not be underway" (p. 520).

Three out of six of the programs and initiatives we analyzed also mobilize incentive tools to promote some of the practices championed by the alternative agrifood movement. HFFI uses positive tangible pay-offs such as loans, loan guarantees, grants, and tax credits to encourage private and nonprofit initiatives that bring food retail outlets to areas where they are currently scarce. The incentive tools in Let's Move! and the People's Garden Initiative are small components of the overall programs. While the use of incentive tools indicates that the Obama administration is backing its commitment to an alternative agrifood system with resources, the selected case studies also point out that, in terms of incentive tools, the administration is relying primarily on weak positive rewards to influence action.

Our case-studies analysis also reveals that the Obama administration is not mobilizing authority tools and learning tools to supplement its commitment to promote alternative agrifood practices. While the administration is making creative use of new media such as blog spaces to reach out to the general public, it fails to include formal channels through which it can assess public opinions and needs in order to shape selected programs and initiatives.

The Obama administration has advanced regulatory and authority tools through its support and initiation of a few key pieces of legislation. The US$4.5 billion Healthy, Hunger-Free Kids Act of 2010 aims to improve the quality of school meals and "play an integral role in our efforts to combat childhood obesity," according to Mrs. Obama (Kohan, 2010b, "US House Passes Historic," para. 5). This legislation is the central policy component of the first lady's Let's Move! campaign. In December 2010, the president reaffirmed his administration's commitment to addressing institutionalized discrimination in agriculture by signing the Claims Resolution Act of 2010 to disburse funds that had been won by Black farmers and Native Americans through settlements in suits against the federal government (commonly referred to as the *Pigford* case). Obama first introduced legislation for this purpose during his term in the Senate (Kohan, 2010c). President Obama has also been an outspoken advocate for the passage of the FDA Food Safety Modernization Act (Murphy,

2010). This bill received support from the alternative agrifood movement after exemptions to certain safety and reporting requirements were made for small farmers making under US$500,000 a year (Lebens, 2010). All three of these laws mandate action by public institutions and private companies. Administrative advocacy in these legislative initiatives may demonstrate a commitment to using strategies not found within our analysis. These pieces of legislation address equitable trade, food security and safety, and food system worker rights (criteria 8, 9, and 11), which have been foci of alternative agrifood organizing.

Finally, our analysis suggests that the exchange between the Obama administration and the alternative agrifood movement is multidirectional. Kathleen Merrigan's appointment and the White House Kitchen Garden were both specifically requested by the movement and the many online supporters who signed the petitions delivered to the president. The Healthy Food Financing Initiative (HFFI) is modeled after a program developed in Pennsylvania in 2004, the Pennsylvania Fresh Food Financing Initiative (FFFI). On the other hand, the alternative agrifood movement has clearly expressed its disappointment with some of the stances of the new administration on food and agriculture (e.g., the appointments of Tom Vilsack and Roger Beachy). Whether the movement will soften its demands of the administration because of perceived successes remains to be seen, and this possibility should be assessed as Obama's presidency progresses.

Conclusions

Our analysis of six selected initiatives and programs reveals that the Obama administration is using predominantly incentive, capacity-building, and symbolic tools to foster changes in the U.S. agrifood system. This is in line with what Salamon (2002) describes as the massive proliferation of tools of public action that increasingly include third parties. According to Salamon, third-party governance has become increasingly popular since the 1950s specifically because it relies on indirect tools of public action that involve third-party actors such as commercial banks and universities. Indirect tools allow the government to tap into talents and resources that public agencies may not have. At the same time, they give rise to challenges in the management and accountability of these dispersed semiautonomous entities and erode government legitimacy.

The tools used by the administration can also be described as emblematic of regulatory reform in the political processes of "roll-out neoliberalization" as described by Peck and Tickell (2002). In the United States a phase of roll-back neoliberalism led to the dismantling and defunding of programs of the welfare state. More recently, the processes of roll-out neoliberalization have created new modes of governance that both empower the market as authority and assert the power of the state. Tools used in these processes of re-regulation include the devolution of responsibility and resources to local administrations, partnerships with private-sector and third-party organizations in policy development and program delivery, the use of social capital discourses and tools, the mobilization of volunteers to take responsibility for issues once covered by the state, and greater emphasis on personal responsibility (Peck & Tickell, 2002). In food and agriculture scholars have observed both responsibilization (i.e., the delegation of government responsibility to community actors for providing basic food needs, pesticide protection, etc.) and valuation (e.g., the privatization of seed resources and reliance on market strategies such as farmers' markets and entrepreneurial efforts) (Guthman, 2008). The Obama administration's reliance on capacity-building, incentives, and symbolic acts intended to inspire action clearly reflect an emphasis on responsibilization.

The tools that the Obama administration has chosen to carry out programs aimed at transforming the agrifood system influence the set of strategies nongovernmental actors may suggest to bring about systematic change. Our analysis also indicates that the alternative agrifood movement has actively influenced administrative actions. We observed that several of the administration initiatives came directly from calls or suggestions from the alternative agrifood movement. The movement

has focused largely on creating alternatives at the margins of the dominant agrifood system (Allen, 2004). Guthman (2008) observes that these alternatives reflect four central themes: consumer choice and the power of the consumer, localism, entrepreneurialism, and food and farming as a means of self-improvement. These themes echo neoliberal rationales that include the power of the market as a governing structure and the devolution of responsibilities to local communities and the individual (Guthman, 2008).

However, agrifood activists have not relied exclusively on strategies that align with roll-out neoliberalism; they also have lobbied government to strengthen food entitlement programs (such as SNAP and WIC), improve government-funded school meals, address food safety, and address issues of justice in USDA programs. It is important to note that the Obama administration has taken action on several of the above concerns through its support and initiation of the Healthy, Hunger-Free Kids Act, the Claims Resolution Act, and the FDA Food Safety Modernization Act.

The behavioral assumptions of the tools used by the Obama administration reflect not only the political-economic trends of this neoliberal era, but also the demands of alternative agrifood activism. A dialogic relationship between movement and administration coproduces the set of strategies deployed in both policy and activism. Allen (2010) suggests that many actors in alternative agrifood movements choose their strategies not out of ignorance to injustices in political and economic structures, but out of desire to make a difference in the here and now. The strategies and themes chosen by a movement work not only to create change in the present, but also point the direction for future change by shaping the ideas and conceptualizations of possibilities of its participants (Guthman, 2008). Analysis of movement goals and strategy is clearly needed to effectuate the desired change in current conditions while building toward an equally desired future.

Time is needed to observe this relationship and the direction of change in the national food system. At this time we are unable to analyze any of the outcomes of Obama's programs and appointments and compare them to their objectives or the movement's critique of conventional agriculture. A similar analysis repeated at the end of Obama's term would allow for an outcomes-based analysis, which in turn would contribute greatly to our understanding of how the relationship between the alternative agrifood movement and the Obama administration has evolved through time, and whether it has produced any measurable changes.

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Between conventionalization and civic agriculture: Emerging trends in the Chilean agroecological movement

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Abstract

Chile has played a relevant role in neoliberal global food production since the 1980s, using the motto "Chile: An Agro-food Power." Thus, it is relevant to enquire about the exercise of individual and collective citizenship on the part of agricultural producers who attempt to challenge — or at least make a difference — within this dominant economic and productive model. This paper explores the development and current state of the agroecological movement in Chile as an expression of *civic agriculture* representing a Polanyian countermovement developed by diverse actors against the dominant discourse and practices of the "Chilean agro-food power." Performing a discourse analysis of interviews with agroecological producers in the Bío-Bío region of Chile, the paper discusses the limits of the literature with respect to conventionalization and bifurcation processes for the analysis of the Global South in particular. The paper shows the hybrid and intertwined economic, productive, and political practices of agroecological peasants and organic farmers.

Keywords

agroecology, Chile, citizenship, civic agriculture, conventionalization, organic, Polanyi

Introduction

Since the 1980s, Chile has played a relevant role in global food production, particularly in the niche markets of fresh produce (especially off-season Mediterranean fruit for the North American market), premium wine, and Atlantic salmon, through aggressive modernization of the agrarian sector under a neoliberal, competitive-advantages, export-oriented development model. Moreover, during the last decade the Chilean government explicitly promoted the motto "Chile: An Agro-food Power" as a strategic guideline for its agricultural and rural policies. The Chilean strategy has involved a combination of massive international investment by agro-food corporations, monocultures, overuse of agrochemicals, seasonal labor, and an uneasy relationship with peasants and farmers. Thus, it is rele-

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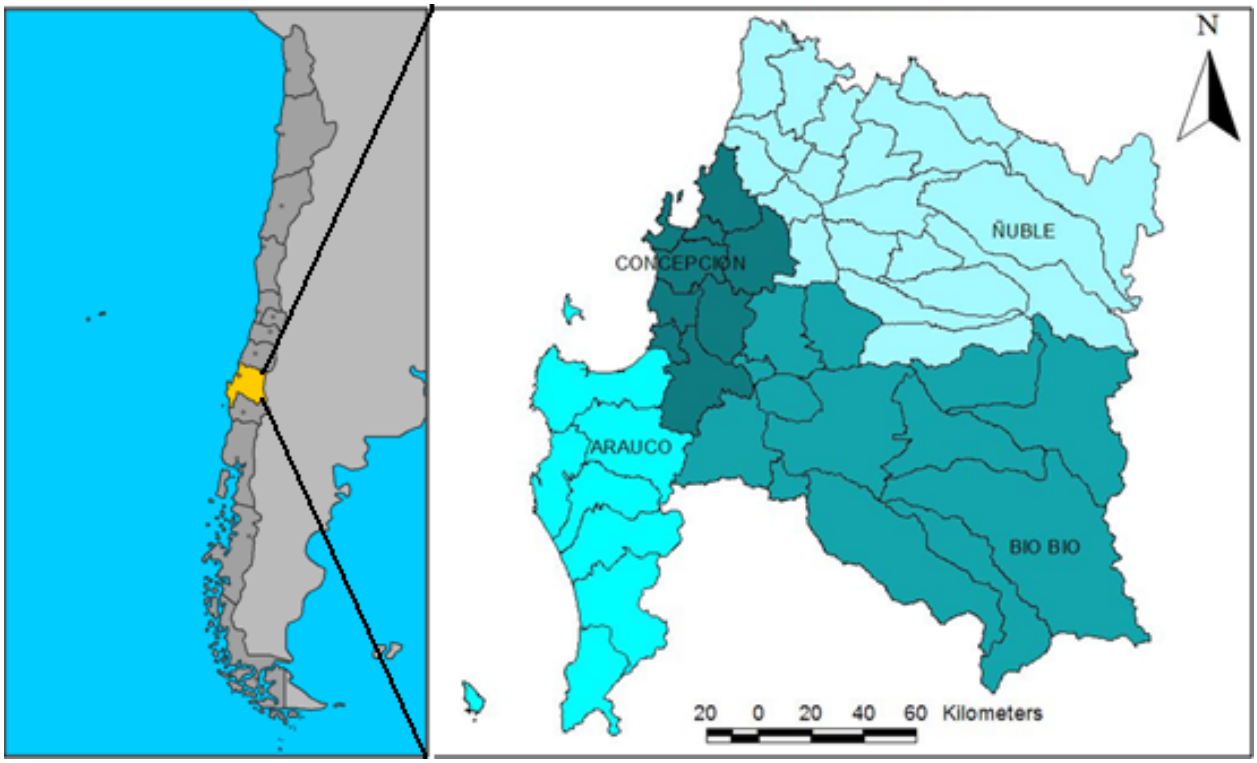
vant to enquire as to the exercise of individual and collective citizenship on the part of agricultural producers who attempt to challenge — or at least make a difference — within this dominant economic and productive model. In more traditional words, this study explores several Polanyian *countermovements* (Polanyi, 2001) by which the active society attempts to re-embed the global self-regulating food market, perceived as dangerous and expanding, within social, environmental, and local controls.

This paper relies on a qualitative study that explores the development and current state of the agroecological movement (or, as we will see, movements) in the Bío-Bío region, in the center-south of Chile (map below). Home to half of all Chilean agroecological production, the Bío-Bío region offers an illustrative case of a countermovement in the context of successful, hegemonic, neoliberal food production in the Global South. Despite evidence of conventionalization trends among bigger farmers, other behaviors can be seen that preserve some essential agroecological practices and constitute exercises of civic agriculture as an expression of several countermovements developed by diverse actors against the dominant discourse and practices of the Chilean agro-food power. This paper addresses the debate over the processes of conventionalization and bifurcation described in the literature as well as the possibility that agroecological production could constitute an exercise in environmental citizenship. Herein, small and medium-sized Chilean agroecological producers are shown to combine strategically the conventionalized and nonconventionalized practices, widely described in the literature, reported to separate these two branches of the agroecological movement. Whereas conventionalized practices are oriented to external and domestic markets and

Map 1. Map of Chile and the Bío-Bío Region



Chilean Map 1985-2007 by Lic. Octavio Rojas. Source: Academia de Ciencias Luventicus — Región del Bío Bío). Retrieved from http://www.luventicus.org/mapas/chile1985-2007/biobio.html

useful for recapitalizing production, nonconventionalized practices are oriented to household consumption and the local market. Thus, to some extent, the exercise of environmental citizenship through the practice of civic agriculture (DeLind, 2002; Lyson, 2004) becomes articulated with more commercial practices oriented toward domestic and external markets.

Agroecology, Conventionalization, and Civic Agriculture

Critics argue that corporate agro-food globalization has been harmful to both the livelihood of food producers and the well-being of consumers (Barndt, 2002; FitzSimmons, 1997; Friedmann, 1994; Kneen, 1999). Such problems are addressed through countertrends that attempt to build economic and political alliances among suppliers, farmers, retailers, workers, and consumers, establishing self-reliant food networks based on elements of trust and cooperation to narrow the metabolic rifts associated with global food production and constrain the power of food corporations (Jarosz & Qazi, 2000). The broad range of alternatives proposed to combat these dominant practices fall within the political categories of *agroecology* and *food sovereignty* (Altieri, 1998; Leahy, 2004). These proposals go beyond reforming the farming system in an attempt to transform the whole society: "A radical transformation of agriculture is needed, one guided by the notion that ecological change cannot be promoted without comparable changes in the social, political, cultural and economic arenas that also constrain agriculture" (Altieri, 1998, p. 4). All these proposals can be analyzed under Polanyi's perspective, who observes the devastating impacts that trends toward self-regulated markets of land, labor, and finance have on the fate of communities and nature; and that those tendencies are always accompanied by civic attempts to *re-embed* social controls on the market. In this sense, the agroecological movement is part of a large attempt by the Polanyian "active society" to establish some control over a socially and environmentally blind, neoliberal, economic logic.

The organic market and the organic certification process are both global-scale initiatives to re-embed (Polanyi, 2001) the global logic of food production into formalized structures of control in order to protect the environment and promote the well-being of farmers and consumers. The organic movement brings together different groups of actors — consumer organizations, environmental and social justice groups, and producer associations — in order to mobilize the consumer's willingness to pay according to environmental and social ends (Bacon, 2005). Organic certification is a self-regulatory, voluntary certification system that sets standards for recycling waste, reducing water pollution, using chemical inputs, and improving soil quality, offering price premiums to producers complying with the established standards (Muradian & Pelupessy, 2005) to create a healthier, more sustainable agro-food system (Raynolds, 2000). Certification systems were initially encouraged by organic farmers and, to some extent, by merchants involved in the organic food market as a way to protect their market from fraud and to be able to guarantee the authenticity of the organic label (González & Nigh, 2005; Raynolds, 2003). Although the international market for organic products has grown impressively in recent years, its scope is still limited. In this sense, Raynolds (2000) argues that the success of the organic market is best judged in terms of its ability to challenge the abstract capitalist relations that fuel exploitation in the global agro-food system as a form of political counterpower.

The economic discussion of organic production has been articulated with the political question of environmental citizenship, mostly in relation to consumption. The consumption of agroecological products has been widely conceptualized as an exercise of environmental citizenship on two grounds: first, responsible citizens display environmental ethics when performing sustainable consumption (Seyfang, 2005, 2006), and second, to eat well is included among the environmental rights (Dowler, 2008; Kojima, 2010). This form of citizenship has the advantage of transcending public/private differentiation, readdressing the feminist idea that personal and family options are deeply political. On the other hand, using consumption as a form of citizenship presents several problems,

particularly the difficulty of distinguishing between narrow self-interest and actual concerns about the political economy of the production process and the desire to protect rural landscape and local economies (DeLind & Bingen, 2008). Moreover, consumers choosing agroecological products in convenience stores displace their political concern onto others, expecting that while they only buy, the actual producers would exercise the political option of performing agroecological production.

The sphere of production has been less addressed in the citizenship debate; thus, whereas responsible consumption is considered to be civic, organic production is seen mostly as a personal option or even a business exercise. In fact, the discussion about the site of production has been largely dominated by certification regimes and the *conventionalization debate,* such that organic production appears to be driven mostly by business logic with minimal ecological criteria rather than by agroecological concerns.

According to the hypotheses of *conventionalization* and *bifurcation* in the literature (Gómez Tovar, Martin, Angel Gómez Cruz, & Mutersbaugh, 2005; Raynolds, 2003), organic farmers entering into market competition under the logic of certification regimes split into two distinct groups. These hypotheses present the formalization of organic certification regimes as having denaturalized the agroecological principles that originally inspired the organic movement. Thus, *conventionalized farmers* are displacing movement-oriented farmers who emphasize distinct farming styles, crop choices, farm size, organizational structures, and personal relations. Such conventionalized producers apply minimal agroecological criteria and support the formalization of organic agriculture and its opening to corporate capital and agribusiness interests. In other words, conventionalized organic farmers are those whose practices no long represent a real departure from conventional agriculture and who are increasingly seen as conventional themselves. This bifurcation is reflected in the definition of certification regimes: despite the historical commitment of the organic movement to domestic and civic values (rooted in personal trust, diversity, and social justice), certification regimes enforce industrial and commercial quality conventions based on efficiency, standardization, bureaucratization, and price competitiveness (Raynolds, 2003).

The conventionalized organic certification regimes have been criticized on several grounds. First, they are accused of being top-down in nature, meaning that current organic standards are organized according to the demands of first-world consumer interests and imposed "from the top down" by certification agencies and intermediaries with little or no farmer participation (Gonzalez & Nigh, 2005). In this sense, the progressive drive of what was originally an alternative trade has been lost because the purchasing practices of self-interested, wealthy consumers have been permitted to guide the movement. This top-down process undermines the original democratic basis of the organic movement and strengthens the subordination of Southern producers to the dictates of Northern consumers (Raynolds, 2000).

A second critique of conventionalization processes is that the logic and structure of certification regimes and the market structure of organic products tend to benefit large, capitalized farmers more than small ones. This is because the farmers have to pay for the certification process and the bureaucratic requirements for said certification have increased, favoring large farmers and agribusiness-style organic cultivation. Extensive farm-level records are burdensome for semi-illiterate farmers in Global South countries, and farm inspections — carried out by foreign agencies — are expensive for isolated farmers. Large producers, on the other hand, have scale economies within the same of certification process; for example, the plots to be certified are more homogenous and more accessible. Thus, the process of organic certification tends to reinforce the advantaged position of large producers, constituting a new form of network governance that serves to reproduce and accentuate existing economic inequalities (Gómez Tovar, et al., 2005; Raynolds, 2003).

A third issue for critics is that of the market structure. Organic certification complicates the distinc-

tion between products developed using minimally certified organic criteria and products from smallholders. Despite having completely different cost structures, the two products must compete for portions of the same market share. A thorough accounting of the political economy is obscured by the process. For example, although organic agribusiness production respects agrochemical and soil management standards, it is a fully capitalist enterprise that probably maintains conventional labor practices, contract farming strategies, and minimal on-farm biodiversity, all of which contrast completely with the productive structure of movement-oriented producers or, more dramatically, with smallholders and peasant producers (Gómez Tovar, et al., 2005; Klonsky, 2000). Moreover, agribusinesses have the power to undermine existing committed producers through price competition (Guthman, 2004a).

Fourth, conventionalism has been criticized because the price premiums associated with organic certification have attracted corporate interests to organic production, leading to minimal practices that rely on a soft rather than a radical definition of organic (Goodman, 2005). This subverts the distinctiveness of organic farming as it permits high levels of intensification, bad labor practices, and few traditional activities such as crop rotation and intercropping. It may also contribute to lower standards due to the huge influence of agrobusinesses on the definition and manipulation of the processes of certification (Guthman, 2004a, 2004b). This issue leads toward conventionalization of the label, blurring its original radical nature. According to Buck, Getz, and Guthman (1997) and Goodman (2005), most conventionalized producers embrace a minimal and also cynical market-oriented definition of organic.

In short, the conventionalization and bifurcation trend described in the literature comes to several fatalistic conclusions that deny the possibility of a market-oriented farmer engaging in meaningful agroecological practices and leave politically minded consumers with the dilemma of choosing between local, super-small-scale agroecological producers (probably not able to satisfy the total local demand of urban centers), or ecologically blind agro-food corporations. Dissatisfied with this fatalistic and dualistic conclusion, and looking for a more conceptually complex approach (Rosin & Campbell, 2008) capable of accounting for the nonlinear trajectories of alternative food chains (Pratt, 2009), I felt it was necessary to readdress agroecological and organic farming as a civic exercise. Using the concept of civic agriculture (DeLind, 2002; Lyson, 2000), this paper attempts to show that, agroecological production — as practiced by several different kinds of farmers — is not only a business option but also a true exercise of ecological citizenship. Moreover, in the Global South, it would be more fruitful to acknowledge those attempts to promote and deepen citizenship rather than to search for option for conventionalization on small and medium-sized farmers that would marginalize them from a deeper agroecological movement.

In civic agriculture, food and agricultural practices are organized according to the needs of farmers, consumers, and the local rural economies. It is an explicitly political attempt to make a difference between civic agriculture and industrially modeled, corporately controlled agriculture, putting the emphasis "on agriculture as a civic, as opposed to a purely economic issue" (DeLind, 2002, p. 217). In other words, "the imperative to earn a profit is filtered through a set of cooperative and mutually supporting social relations" (Lyson, 2004, p. 92). In this sense, civic agriculture corresponds explicitly to a Polanyian countertrend of re-embedding and relocalizing globalized and commoditized agriculture.

At least three kinds of Polanyian embeddednesss can be seen in particular. The first embeddedness is on nature: Civic agriculture rests on an "ecological" paradigm (Lyson, 2004) that attempts to connect with sociobiological processes that are geographically and historically localized. The second embeddedness is on place, which is a specifically effort to "relocalize" the food systems (DeLind, 2002). This place embeddedness has several dimensions: (a) in building a locally organized system of food production characterized by networks

of producers, local resources, local markets and consumers, civic agriculture is seen as an integral part of rural communities, not merely as a producer of commodities; (b) it focuses on varieties and products that are often unique to a particular region or locality; and (c) it relies on indigenous and site-specific knowledge away from standardized production techniques (Lyson, 2004). Finally, civic agriculture is characterized by embeddedness in a food community that attempts to create new kinds of social relations of work and consumption around food. In terms of work, this means more labor- and land-intensive modes of production rather than capital-intensive ones. This raises questions about responsibility, reciprocity, and accountability of the working process. In terms of consumption, this means an attempt to forge direct market links between producers and consumers, rather than indirect links through middlemen (wholesalers, brokers, processors, etc.) (Lyson & Guptill, 2004).

In sum, civic agriculture not only moves away from a strictly mechanistic focus on production and economic efficiency, but also moves toward food and farming systems responsive to particular ecological and socioeconomic contexts. As these practices are important for the relationship between people and the fate of the place in which they live, civic agriculture constitutes an exercise in the promotion of citizenship and environmentalism in rural settings (DeLind, 2002). This then means that farms cannot be considered to be practicing civic agriculture if they produce only for the export market, rely on nonlocal hired labor, engage in bad labor practices and large-scale contract farming, sell only to large food corporations, and are large-scale, absentee-owned or industrial farms.

This paper specifically examines several branches of the agroecological movement in Chile, particularly in the Bío-Bío region, home to half of all Chilean organic production. Despite evidence of conventionalization trends among larger farmers, it is necessary to consider several other behaviors that preserve some essential agroecological practices and constitute exercises of civic agriculture.

Agroecology and Organic Agriculture in the Bío-Bío Region

The Bío-Bío region is in south-central Chile (36°46'22"S) and has a Mediterranean climate. The area is irrigated by several rivers, and it is a traditional area for medium- and smallholders whose land is dedicated mostly to wheat, cattle, and sugar-beet production and small bulk wineries. In fact, the large *haciendas* that characterized the Chilean countryside until the first half of the twentieth century were never consolidated in this area.

Even today, the Agrarian Census shows predominantly small holdings, with 48.6% occupying fewer than 5 hectares (12.4 acres) and 64.9% set on fewer than 10 hectares (24.7 acres). In the last 20 years and in the context of an export-oriented economy, forestry and the paper industry have encroached on the area. During this time, 1,330,163 hectares (3,286,904 acres) of land used largely for wheat and sugar-beet production have been covered by forestry plantations (Censo Agropecuario, 2006–2007). This has meant both a displacement of peasant agriculture and increasing conflicts over the use of water resources and the spread of agrochemicals.

A countermovement to this tendency in the Bío-Bío region has become the center of the Chilean agroecological movement. Three of the main national organizations promoting agroecology (Center of Education in Technology (CET) Yumbel, CET Sur, and Inia Quilamapu) are located in the region, as are most Chilean agroecological producers, including around 1,000 certified organic farms (both individual and cooperative ones), or half of all Chilean certified organic producers. In addition, the main certifying firm that operates in Chile, the German company Bío Control System Eco Guarantee (BCS), is headquartered in the city of Chillán, in the Bío-Bío region. Along with these certified producers, a group of noncertified, small-scale, agroecological producers, in both urban and rural locations, has developed, thanks to the demonstrative effect of the promoter institutions. This concentration seems to be related to the model provided by three large pioneer producers that have been farming organically since the 1970s.

Motivated by my own sympathies with the agroecological movement and intrigued by its development, I developed an explorative qualitative study to find and describe the different actors in the Chilean agroecological production scene. Due to this explorative character, I used a snowball sample technique, starting with a couple of personal contacts. This led me to conduct 23 in-depth interviews and five focus groups. At the end of this stage, I had interviewed all the leaders and directors from formal and informal organizations of agroecological and organic producers, representatives of the certifying companies, local government officials linked to organic regulations, as well as a small sample of producers from each organization. Discourse analysis techniques, with a focus on the critical analysis of the text and context of the recorded interviews, were used. In addition, and as a part of a course assignment, sociology undergraduate students developed several ethnographic research projects within some of these organizations. During this process and due to my own motivations, I became progressively involved in the movement, and the study acquired a more participatory action research character. In fact, I organized an agroecological workshop in 2010, and I was invited to a second workshop in 2011.

Following analysis of the snowball sample interviews, I found that three distinct branches of the agroecological movement are present in the Bío-Bío region. The first branch is organized around the Agrupación de Agricultura Orgánica de Chile (Organic Agricultural Group of Chile, or AAOCH) and Bío-Bío Orgánico (Bío-Bío Organic). These organizations have similar and overlapping constituencies, mainly medium-sized farmers with a certain level of capitalization. Their production, which is mostly certified, is oriented to niche markets for high-end domestic consumption or the export market. The second branch of movement consists of a cluster of peasant federations, urban agriculture organizations, supporting foundations, and nongovernmental organizations (NGOs) that have turned to agroecological practices as a way to lower the cost of household food production, improve diets, and diversify family income through participation in informal local food markets.

Finally, the third agroecological branch is made up of the neo-rural, upper-class permaculture movement organized around the Instituto Chileno de Permacultura (Chilean Permaculture Institute, ICP) and the Granja Agroecológica El Manzano (Apple Tree Agroecological Farm). These groups embrace agroecology as part of their search for a sustainable lifestyle and have almost no connection with markets.

The relationship among these three agroecological lines has been highly conflictive, particularly between capitalized and peasant farmers and between movement-oriented and market-oriented producers. In this paper, I examine the three branches of the agroecological movement, showing that (1) despite their significant differences, all of them, though in rather different ways, constitute exercises of countermovement and civic agriculture, and (2) the distinction between the conventionalized and nonconventionalized approaches is blurred and cannot explain the complexity of the strategic practices of at least two of the branches.

Between Personal Commitment and Market Demands: AAOCH and Bío-Bío Orgánico

AAOCH is a national organization of organic producers whose purposes are to promote agroecological practices, politically represent and lobby for their associated interests, initiate business efforts, promote national and international organic consumption, and safeguard organic standards. Bío-Bío Orgánico represents farmers mostly from the Bío-Bío region as well as from other parts of southern Chile. Many of its members also participate in AAOCH, and the purposes and activities of these two groups overlap, although Bío-Bío Orgánico is distinguished by its largely local nature and has a more political emphasis, taking a public stance and lobbying on issues related to transgenics, seeds, and monoculture practices.

At first glance, the medium-sized, capitalized, market-oriented farmers associated with these organizations seem to constitute a highly conventionalized group that barely represents any form of countermovement against the dominant forms of

production. These producers are highly oriented to the conventional markets; many of these farmers deal with organic packing agro-industries, mostly of berries, oriented to the Northern organic demand and domestic supermarket chains and health stores oriented to national high-income consumers. They thus reflect the conventional political and economic relationships that are widely described in the literature for farmers and food corporations (Grossman, 1998; Warning & Key, 2002). In fact, organic packing industries seem to reproduce the same kind of relationship with farmers as conventional packing industries, especially in terms of the power imbalance and monopsonic position of the firm in relation to multiple farmers. In this sense, the capacity of the farmers to negotiate contracts and prices with the firms has been reduced to that of "price takers." Packing firms can be very selective regarding the produce they will accept and are able to refuse loads for reasons that are not always under the producers' control. In some cases, packing firms also play a highly relevant role in supervising the conditions of production, leaving the farmers with little control over the production processes of their own farms. Finally, because the packing companies' organic criteria are usually limited to avoiding the use of certain products (e.g., pesticides, herbicides, and transgenics) rather that promoting agroecological practices, these companies enforce minimal criteria for organic production among their suppliers.

Interestingly, direct supply to educated, high-income urban dwellers by farmers' markets — as is common in the North — is still very limited, as local *ferias*, or street markets sometimes supplied by farmers, are mostly oriented to lower-income consumers. Therefore, market-oriented organic farmers' production for local markets mostly goes through supermarkets and speciality stores. The relationships of these farmers with supermarket chains are also conflicted. Most individual organic farmers are not able to meet the demands of supermarket chains for a reliable, year-round supply of homogeneous quality. There are, however, some cases in which — by developing an exclusive niche product such as organic herbal teas or organic marmalade — farmers have been able to find shelf space in high-end supermarkets. This niche, of course, offers an important business opportunity, but it is not free of risk; the negotiating capacity of the farmers may be low in relation to giant supermarkets, and the farmers' niche products may experience price competition in the form of premium products from larger, conventional firms that share the same shelf space.

When renegotiating and exercising autonomous forms of power, organic farmers do better than conventional farmers. Given their exclusive produce, some organic farmers can (1) occupy supermarket shelves with their own brands (something that is virtually impossible for conventional farmers), (2) obtain better prices from retailers on the grounds of exclusivity, and (3) develop spaces for direct relationships with consumers through small health and "alternative" stores or by direct supplying. On the international level, organic producers may obtain better prices from packing companies and, more importantly since organic products are still limited in number, it is less likely that buyers will refuse organic produce. In fact, farmers usually say that one of the driving forces behind their shift to organic production is not obtaining price premiums, which they find to be improbable, but ensuring a captive market. Furthermore, although organic packing companies are as intrusive in terms of internal farm management as conventional ones, they also allow and promote several sustainable agricultural practices. For instance, organic packing companies encourage intercropping in between the berries, which allows combining berry production for the international market with more diversified vegetable production for household consumption and domestic sales. These trends require a more careful examination of the fatalist conventionalization thesis.

It is also important to note that most of the interviewed organic farmers indicated a high level of personal commitment to agroecology. Since Chilean organic businesses are still small and do not offer the producers a really important cost benefit, farmers engaging in organic practices do so largely because of a personal commitment and life experience, not because they were encouraged by

price premiums. One of the most important driving forces for "going organic" is the dramatic personal or family experience of pesticide poisoning. The illness or death of a family member due to agrochemicals constitutes an absolute turning point, a sort of "conversion" to organic farming that includes the choice to not only produce organically for the market, but also to supply a full range of agroecological food for the family diet. This involves complex intrafarm production systems and the development of several informal exchanges with other organic producers. Other farmers go organic as a way to combine a former militancy in left-wing political groups with a newer ecological sensitivity or a personal relationship with the countryside and nature, reflected in statements such as, "I want to cultivate as my father did, with respect for nature." One example of this kind of commitment is the case of a farmer who produces milk in a strictly agroecological way despite the impossibility of obtaining a price premium (in Chile, no brands currently offer organic milk). This farmer sells all his milk to a nonorganic cheese factory at the regular price. According to him, the reason for this apparently anti-economic behavior is that it allows him to obtain organic fertilizer in the form of his cows' manure for his other organic crops, for which he has established a complex system of production and nutrient circulation. Even the manager of the certifying company BCS, an actor that the literature would consider among the most conventionalized ones, has a personal historical involvement with anthroposophy, a philosophical approach related to the permacultural movement. Most farmers consider this personal commitment to be a core of resistance against conventionalization practices as well as a civic exercise.

In this group of market-oriented organic farmers, conventionalized and nonconventionalized practices become blurred. Farmers may produce massive amounts of minimally organic (pesticide-free) berries for packing while engaging in several practices in their fields that go well beyond the minimal certification criteria, performing an ecological embeddedness. As described earlier, they may practice intercropping for both household consumption (a vegetable garden) and for selling in the domestic market (as medicinal herbs); they may produce their own compost rather than buying commercial organic fertilizers; or they may even establish certain organic production measures even though they cannot get a premium price. Therefore, despite documented conventionalization trends, these farmers also show countertrends. Although it is not possible to state that these farmers have developed an actual food community, they do work within an ecological paradigm and attempt to re-localize the food production process. Thus, to dismiss them as conventionalized and minimally organic producers is a gross oversimplification. Instead, we must rethink the ways in which authentic environmental concerns are combined with private farming practices.

Agroecological Peasants and Urban Gardeners: On the Margins of Conventionalization Trends

A variety of small rural and urban food producers and their producer associations constitute a second branch linked to agroecological practices. These are small-scale producers with little access to national and global markets, an orientation to self-consumption and local markets, and an instrumental preference for agroecological practices as a way to reduce their production costs. Some of the producer organizations in the region are Cooperativa El Carmen (El Carmen Cooperative), Asociación Comunal de Huertos Orgánicos (Communal Association of Urban Organic Gardens, UCHO), and the local branch of the Asociación Nacional de Mujeres Rurales e Indígenas (National Rural and Indigenous Women's Association, ANAMURI), the main political peasant organization in Chile and one also affiliated with Via Campesina.[1] These organizations are constituted and led by politically informed, highly active *campesinos* and *campesinas* (country people) who do not accept being reduced to the role of mere producers, as evidenced when I

[1] Via Campesina in an international peasant movement that brings together 150 local and national organizations of peasants, small, landless, women, and indigenous farmers, as well as agricultural workers from 70 countries. It defends small-scale sustainable agriculture as a way to promote social justice and dignity, opposing corporate-driven agriculture.

unfortunately introduced the leaders of ANAMURI as the leaders of women agricultural producers during a food sovereignty meeting that I was moderating. The women quickly clarified their position: "First of all, we are *not* producers, our lives are not oriented toward producing for the urban market; we are *campesinas* [country women]; we are the curators of the countryside, its landscape, its environment, its people."

These organizations became involved with agroecological practices through their relationships with three traditional NGOs that have been working in the Bío-Bío region for several decades: CET Yumbel, CET Sur, and Trabajo para un Hermano (Work for a Brother, TPH). The work of these NGOs goes well beyond agriculture and organic production, promoting a wide range of sociably sustainable and environmentally appropriate practices such as solidarity economy, food sovereignty, bioconstruction, low-cost alternative energy, and sustainable forestry, among both rural and urban dwellers. The work of these NGOs is infused with a deep sense of place in terms of caring for local people, economies, landscapes, and nature.

Unlike the highly informed, ideological commitment shown by the leaders of El Carmen and ANAMURI, the peasant constituency of these organizations is very pragmatic, grounded in a concrete concern for their place and livelihood rather than by a more ideological commitment to agroecology. In fact, these peasant groups are oriented mostly to recovering and revaluing traditional intrafarming practices that they know well (e.g., saving seeds, preparing natural fertilizers, and managing pests with natural methods), mainly as a means of substituting expensive and standardized agricultural inputs with site-specific technologies using cheaper supplies prepared on the farm. Therefore, the ecological discourse of these NGOs is articulated by the pragmatic need of the peasants to lower their costs and their identity needs for recognizing traditional know-how.

Urban producers grouped in the UCHO develop intensive gardens in small backyards and abandoned public spaces. They are motivated by the desire to improve their families' diets with high-quality products, revalue the know-how of their peasant family background, and develop a small local trade within the neighborhood to complement their livelihood strategies. To this end, they organize in associations — actually, localized food communities — that allow them to share labor and knowledge as well as seeds and surplus produce.

For the constituency of these rural and urban organizations, agroecological practices clearly respond to more than political and ethical options, instead articulating broader livelihood issues. Thus producers go well beyond minimally organic criteria to engage in a broad range of ecological — and economical — practices, such as saving rainwater for irrigation, using bioconstruction, and exchanging seeds. In this sense, their evaluation of the agroecological knowledge they obtained from the NGOs does not depend on whether it is correct or incorrect from an environmental point of view, but on how it contributes to maintaining the land entrusted to them as *campesinos,* the quality of their production, their cost structure, and the health of their family.

These producers are mostly oriented to household consumption and local and direct markets (*ferias* and neighborhood trade). Therefore, they are located on the margins of formal markets and totally outside the sphere of supermarket chains or export companies. Agroecological production does not offer them a premium price, but generally lowers their costs through the household production of seeds, fertilizers, and pest control. Some of their successful commercialization strategies represent good examples of alternative, locally based, short commodity chains. There are some cases of "peasant markets" located not only in the area's main cities (Chillán and Concepción) but also in smaller towns, oriented to lower-income consumers. There is very limited participation, however, in the main peasant market in the area, *Feria de Collao,* in the city of Concepción, which is supplied mostly by nonagroecological peasants and farmers. More important are the personal distribution networks within urban neighborhoods through which peasants meet all the vegetable needs of nearby towns.

The *trefkintus* (the bartering of seeds, early plants, and produce) are more than mere occasions of exchange; they have become symbolic places of where *sabores y saberes* — tastes and knowledge — meet. In fact, agricultural exchanges are just one part of a broad set of activities ranging from music to communal meals, a sort of coexistence stripped of elitism. After the earthquake of February 2010 in this area, these farmers started a direct supply chain with some of the most affected coastal communities. There has also been an attempt, although it is not yet fully implemented, to connect the El Carmen Cooperative with urban trade unions in the largest nearby cities through direct supplying. All these initiatives constitute experiments with civic economic relationships between producers and consumers.

These forms of commercialization, which do not involve premium prices and are not oriented to high-end markets, do not enter into the logic of certification regimes for several reasons. First, there is no price reward for an organic seal on the local and popular markets in which this produce is commercialized. Second, peasants and urban producers have a hard time complying with the bureaucratic requirements and economic resources needed for a certification process. Finally, in practice, the organic criteria are relatively minimal in relation to the actual practices of the producers. In fact, the NGOs that support those producers and the leaders of their organizations are sharply critical of certification regimes and refuse even to consider the collective options offered by certifiers.

Both the interconnection between livelihood economic strategies and agroecological practices as well as the refusal to participate in certification regimes make these groups less prone to the conventionalization trends described in the literature. On the other hand, because the commitment to agroecological practices among these producers is more strategic than ideological, they may be prone to return to conventional agriculture when faced with a different cost-yield evaluation (e.g., cheaper agrochemicals). Despite that, their commitment to safeguarding traditional practices against the encroachment of dominant relations of production in and of itself constitutes a political-ecological practice in which livelihood interests and civic options become blurred. It is safe to say that these food communities embody the three embeddednesss described for civic agriculture: an endeddedment in nature, as they are highly respectful of the soil, water and seeds they take care off as *campesinos* and *campesinas,* and embeddedness in place, as local resources, market, knowledge, technologies, and products are core to their practices; and finally an embeddedness on the actual building of a food community.

Permaculture Movement

Finally, the agroecological movements in the region also include a smaller branch that ascribes to permaculture principles. This movement is mainly composed of two collective actors: (1) a traditional, elite farm family that decided to withdraw from conventional practices and establish both a demonstration permaculture farm oriented toward self-sufficiency and an eco-school to teach permaculture practices to the general public and neighboring peasants; and (2) the Chilean Permaculture Institute (ICP), formed by a network mostly made up of university students, that practices urban agriculture mainly following the principles of permaculture, and promotes urban ecology and bioconstruction through workshops and other activities. The works of the ICP were especially important after the Concepción earthquake as it promoted bioconstruction to improve the quality of the emergency shelters provided by the government. The scale and economic significance of both groups are rather small, and they are only relevant for their ideological impact and demonstrative effect. They are not business-oriented; in fact, they attempt to reach some sort of self-sufficiency without producing for trade, explicitly constituting an attempt at building a food community in opposition to market relationships. Therefore, neither group is prone to the described conventionalization trends. The same self-sufficiency that prevents them from conventionalization raises questions about their citizenship commitment, as self-sufficiency seems unsocial. On the other hand, their strong ideological background and constant

activities to spread permacultural principles in both rural and urban areas restores to them the social dimension denied by their self-sufficiency.

Conventionalization Trends or Civic Agriculture?

This review of the three branches within the agroecological movement of the Bío-Bío region raises several considerations regarding the conventionalization hypothesis as seen from a Southern country. First, in the context of free-market, globally oriented, agrarian economies, there are real forces that push conventionalization processes among organic producers, including the highly conventional practices developed by organic packing companies (whose production relations do not differ substantially from nonorganic ones) and the dissemination of their minimal organic criteria. In the same vein, the pressure for large-scale production, lower costs, and standardization brought to bear by supermarket chains is also a relevant trend. Finally, certifiers use minimal criteria and unintentionally select large producers capable of meeting the certifiers' bureaucratic requirements.

However, as described, not all agroecological producers are affected by those pressures. In particular, small peasant producers and urban agriculture producers are not oriented to the mainstream food market and thus do not interact with packing firms, supermarkets, or certifiers, and so are not vulnerable to the previously described conventionalization pressures. Moreover, for most such producers, agroecological practices are a matter of ethical principles as well as of highly economic practices that allow them to lower their production costs and diversify their livelihoods. In this sense, these producers perform a political exercise that not only defends an abstract idea of environment, but also addresses place-based and very personal and political issues.

Several countertrends can also be found among market-oriented organic farmers. First, they have a strong ideological commitment to agroecological practices and thus go beyond the demands for certification. At the same time, as in the case of the peasants, these farmers use agroecological practices such as intercropping in order to complement cash crops with household consumption and domestic markets and to lower their production costs. In this sense, small and medium-sized market-oriented producers do not obey the dualistic segmentation described in the literature, but instead follow a mixed trend that includes a variety of practices. Particularly, this trend combines some highly conventionalized production for external markets with agroecological practices for domestic markets, where organic producers also embody political options for civic agriculture.

In this sense, it is important to relate the discussion of citizenship to the sphere of production rather than that of consumption. If citizenship refers to a notion of civic debate and coordinated action, then committed producers — as compared with informed consumers — are closer to citizenship. Whereas producers intertwine their whole livelihood strategies with sustainability options, consumers rarely go beyond shopping responsibility, expecting producers to do the actual "work" for them.

This case also reminds us of the complexity, diversity, and contradictory nature of Polanyian countermovements. According to Polanyi, society attempts to protect itself from the "satanic mill" unleashed by the self-regulated market, but no single unified countermovement exists, nor does one class lead such a movement from an absolute point of view. On the contrary, Polanyi describes how several groups that are affected by self-regulating markets in different ways, raise different protective measures to address their own affected interests and, in doing so, temporarily represent the general interest of society. In his analysis, even landlord classes may take the progressive role of defending land from the consequences of its commoditization. This analysis is appealing since it de-essentializes the question of political action, acknowledging the potential of progressive action by an unlikely actor and allowing for the possibility of diverse political articulations. In this case, small peasants as well as several actors from different backgrounds (from medium-sized, business-oriented farmers to students and urban dwellers)

react against corporate-dominated agriculture and attempt to raise a civic countertrend from their own realm. These citizenship exercises are intertwined with the everyday practice of working, producing food, and caring for the small plots of land and water that they feel have been entrusted to them. 

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"The next generation, that's why we continue to do what we do": African American farmers speak about experiences with land ownership and loss in North Carolina

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Abstract

African Americans face institutional and social discrimination. The deleterious effects of discriminatory practices continue to be barriers to maintaining the family farm. Discriminatory lending is associated with farmland loss, such that the number of African American farmers in the United States has been falling at a much higher rate than that of White farmers. This community-based participatory research (CBPR) study sought to give voice to the experiences and perceptions of a small group of African American farmers in northeastern North Carolina. Researchers used Photovoice, a qualitative CBPR methodology, to identify strengths, concerns, and action steps in regards to farming and farmland loss in the community. This study revealed positive protective factors associated with farming, and long-lasting negative economic and psychological effects of discriminatory lending. Protective factors include increased self-reliance, strong work ethic, and hope for a new generation of African American farmers. Institutional discrimination remains a reported risk factor against maintaining generational family farming activities. Study participants reported a fear of further loss of the African American farming heritage as they perceive youth being deterred from the profession

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due to the combined effects of witnessing discrimination against their parents and the lure of fast, and often risky, money. This preliminary research revealed that African American farmers in the community of this study would benefit from innovative and engaging programs for youth, broadband internet access, and continued modification to current lending systems, including localized representation.

Keywords
Discrimination, community-based participatory research, African American, land ownership, Photovoice, farming

Introduction

African American farmers are historically important contributors to agriculture in the United States. In the era of slavery, White landowners sought the expertise of African slave farmers to improve crop cultivation, production, and animal husbandry (Hinson & Robinson, 2008). After the Civil War the number of African American farmers proliferated, peaking in 1920, when nearly 926,000 individuals worked farms. In that era of small-scale farming there was approximately one African American farmer for every six White farmers in the country (Wood & Gilbert, 2000). After 1920, the number of African American farmers decreased, and at a much faster rate than farmers in other demographic groups (Wood & Gilbert, 2000). The 2007 Census of Agriculture counted 41,024 African American farmers, equivalent to 1 in 80 farmers (U.S. Department of Agriculture [USDA], 2009a). Wood and Gilbert (2000) report that 15 southern states experienced the greatest decline in African American–owned farms, with a 45% reduction between 1982 and 1997. Among these, North Carolina experienced the greatest loss at 66%.

On average, approximately the same percentage of African American farmers and the national average of all farmers combined currently report farming as their primary occupation (44% and 45%, respectively), but African American farmers have less land (an average of 104 vs. 418 acres) and receive less in sales (US$21,340 vs. US$134,807) (USDA, 2009a). African American farmers are older, on average, than farmers of other ethnic and racial groups. A greater proportion of African American farmers are 65 years or older compared to the national average for all farmers (37% and 30%, respectively), and the average age of the African American farmer (60.3 years) is higher than the overall average (57.1 years) (USDA, 2009a).

Specifically in North Carolina, as of the 2007 Census of Agriculture, there were 1,837 African Americans farmers operating 1,595 farms, and 1,447 African American farm owners who owned an average of 60 acres (USDA-NASS, 2011a). Comparatively, there were 72,716 White farmers operating 50,897 farms, and 47,874 White farm owners who owned an average of 100 acres (USDA-NASS, 2011a). From 1992 to 1997, African American farmers experienced a greater decline in the number of farmland owners (–19% vs. –3%) and a decrease in the amount of acreage owned (–9% vs. +4%) as compared to White farmers (USDA, 2009b). This decrease in African American land ownership, whether reflecting outright loss of farms or loss in acreage, interferes with the viability of African American farmers. Land is a form of wealth that can be used for economic development, broader investment, and has been associated with higher educational achievement in children (Gilbert, Sharp, & Felin, 2002).

A number of factors contribute to the rapid and continual decline of farmland owned by African Americans. The initial decrease in African American–operated farms is attributed to increased farm mechanization and the end of the share-cropping system (Wood & Gilbert, 2000). Recent factors associated with the decline in the number of African American farmers are argued to be not the result of economic trends alone, and to include: structural changes by U.S. agriculture favoring large farms, cumbersome tax laws, mortgage foreclosures, intestate death of landowners in the absence of a will and the resulting partition sales, and discrimination (Brown, Christy & Gebremedhin, 1994; Gilbert, Sharp, & Felin, 2002**;** Hinson & Robinson, 2008). Discriminatory lending practices on the part of the U. S. Department of Agriculture

(USDA) included not providing African American farmers with access to credit, granting less credit to African American farmers than White farmers, and distributing loans to African American farmers too late in the farming season for maximized farming production (Gilbert, Sharp, & Felin, 2002; Hinson & Robinson, 2008).

The negative effects of discrimination by race are broad and far-reaching. Racism negatively influences physical health, mental health, and socioeconomic opportunities (Jones, 2000; Paradies, 2006; Brondolo, Brady ver Halen, Pencille, Beatty, & Contrada, 2009). The association of race and socioeconomic factors is rooted in historic events that persist in contemporary institutional structures (Jones, 2000). Institutional racism, defined as the organization and promotion of racial inequity through processes and structures, has a generational impact (Jones, 1997). The historical discrimination practiced by the USDA is an example of institutional racism.

In response to discriminatory practices, African American farmers throughout the country filed grievances against the USDA. An eventual class-action lawsuit led by plaintiff Timothy Pigford of North Carolina reached the U.S. District Court for the District of Columbia with then-U.S. Secretary of Agriculture Dan Glickman as the defendant. The court decided in favor of the farmers and the resulting multibillion dollar settlement from *Pigford v. Glickman* was the largest civil rights settlement in U.S. history (Hinson & Robinson, 2008). A USDA-commissioned investigation into these discriminatory practices also led to the Civil Rights Task Force recommending 92 changes to address racial bias as a part of the USDA Civil Rights Action Plan (Cowan & Feder, 2010). Since the *Pigford v. Glickman* ruling, the USDA has broadened outreach efforts to African American farmers through the establishment of the Office of Minority and Socially Disadvantaged Farmers Assistance, which includes the Minority Farm Register to promote equal access to USDA farm programs (USDA–FSA, 2007) and a grants program (USDA, 2003). The USDA Small Farmers Outreach Training and Technical Assistance program in particular is a highlighted effort resulting in an increase in the number of African American farmers (Gilbert, Sharp, & Felin, 2002). At the state level, the North Carolina Department of Agriculture & Consumer Services (NCDA&CS, 2011) instituted the Small Farms Ag Policy to provide outreach and education to minority and traditionally underserved farmers.

In the wake of the *Pigford* settlement, plaintiffs seeking restitution found the procedures overly burdensome, including the requirement to obtain records from a similarly situated White farmer to provide evidence of preferential treatment (Hinson & Robinson, 2008). Many also found the time period allotted for claims submissions too short to produce the "evidence of discrimination" required. The 2008 Farm Bill opened an opportunity for farmers filing late to receive federal determination of their claims. Numerous cases representing over 25,000 farmers were consolidated into a new lawsuit, *In re Black Farmers Discrimination Litigation* (Pigford II), which awarded African American farmers an additional $1.15 billion in appropriations through the Senate-passed Claims Resolution Act of 2010 (H.R. 4783) approved by the House of Representatives and signed by President Obama on December 8, 2010 (Cowan & Feder, 2010).

Despite USDA discrimination on African American farmers cited in the literature above, and the resulting reparations and programs, a more recent study in Georgia found no evidence of discrimination on nonwhite borrowers based on the probability of a Farm Service Agency (FSA) loan application's approval (Escalante, Brooks, Epperson, & Stegelin, 2006). Lending criteria has included subjective "risk stereotypes," however, and the FSA loan review board comprises locally elected farmers who are generally White, with a few exceptions (Havard, 2001). This present preliminary study sought to give voice to the individual and community experiences of African American farmers in rural North Carolina, to shed light on their experiences and perceptions of discrimination, as well as their hopes for the future of African American farming in the region.

Methods

Principles of community-based participatory research (CBPR) were used in this study (Israel, Schulz, Parker, & Becker, 1998). One aspect of CBPR includes blurring the distinction between researcher and participant by creating a co-researcher relationship among all members, thereby minimizing power dynamics common in research and maximizing mutual engagement. For clarity, this report uses the word "researcher" to refer to graduate students and university mentors, and "participant" to refer to farmer collaborators.

Recruitment

Participants were recruited with a convenience sampling method. Efforts to secure a broader sample were stifled by the relatively small number of regional African American farmers, distance between farms, and declined participation in a couple instances. Participants were sought through personal, academic, and African American farmers' social networks. Researchers approached African American farmers at home, local farmers' markets, and farming meetings to seek participation. Two farmers who eventually agreed to participate were introduced to us at a land loss summit in North Carolina by an African American farmer activist attending the meeting. Additional participants were secured through the network of farmers attending that meeting.

In the three northeastern North Carolina counties that encapsulate this study's area, at the time of the 2007 Census of Agriculture there were 122 African American farmers with 104 farms and, comparatively, 1,473 White farmers with 1,027 farms (USDA-NASS, 2011b). Overall, approximately 90% of all farmers are White, 7% are African American, and 3% report a different race or multiple races. County-level statistics from the 2007 Census reflect single-race categories; individuals reporting multiple races are featured in a separate category, multiracial. National and state statistics cited in this paper for African American and White categories reflect responses of either single race alone or in combination with other races.

Data for age, acreage, and income of farmers was not available for all three counties represented above. Statistics from two neighboring counties, and inclusive of one county in the sample, however, indicated that African American farmers in this region are older than their white counterparts (64 years vs. 60 years), and have smaller land holdings (70 acres vs. 240 acres) (USDA-NASS, 2011b). At the national and state levels, all farms on average were profitable in 2007 regardless of White or African American classifications. In contrast, at the county level in this study, whereas White-owned farms continued to be profitable overall, African American farms had a negative income. Net cash income for African American-owned farms was negative, at –US$186,000, averaging –US$2,038.50 per farm and, for White farmers, was US$6,555,000, averaging US$10,398.50 per farm (USDA-NASS, 2011b).

A site located conveniently within an approximately 20 miles radius of all participant farms, was selected as a central meeting place. Historically, this community has benefited from manufacturing industries such as textiles, tobacco, and cotton for economic growth.[1] Recently the prevailing industries have changed to include retail, and educational, health, and social services. Agriculture makes up less than 1% of industry, and less than 1% of the population serves in farming, fishing, or forestry as a vocation.

Participants

The five individuals who agreed to participate in this study (four males and one female) had varied educational and professional experience. All five attended college. Among them, two had had careers as high school teachers in eastern North Carolina, one worked in city government in New Jersey, and another was a computer operator for large corporations. Two participants worked at a nonprofit organization dedicated to protecting minority-owned farmland, two were predominately hog farmers, and one was a vegetable farmer. All but one farmer supplemented her or his farm

[1] Reference excluded to maintain confidentiality.

income with other forms of employment. All of the participants were exposed to farming as children, left their homes to seek alternative opportunities, and ultimately returned home to northeastern North Carolina for farm-related employment. For further participant demographics, see table 1.

Procedures

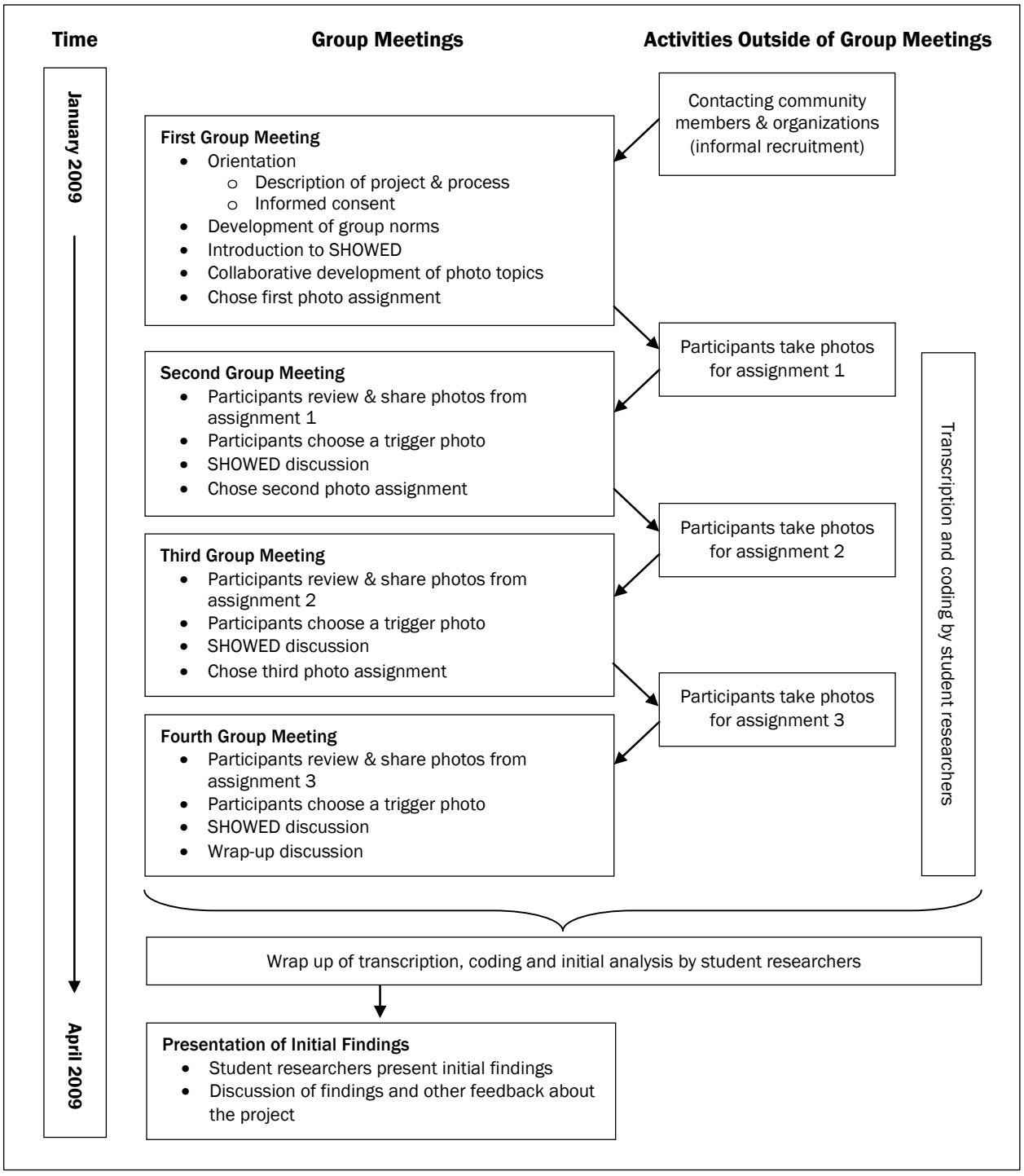
Photovoice, a CBPR method that uses participant photography to trigger discussion, was used to gather qualitative data. Photography is a tool used in recent history as a form of ethnography, to convey information and to document social change (Harper, 2003). The use of photographs both to investigate and to create dialogue on competing and complementary meanings is well documented (Harper, 2003). Photovoice combines and transforms the traditional purposes of photography and critical dialogue into participant and researcher dialectic. In this reference, dialectic is the process and discovery of understanding truth through mutually engaged conversation. Since its inception, Photovoice has been used in a growing number of projects to investigate a range of health and social issues, and has been effective in engaging hard-to-reach populations, including those mistrustful or resistant to research (Catalani & Minkler, 2009). The small sample sizes and nonrandomization often associated with Photovoice projects open the method to bias. The scope of the method,

Table 1. Participant Demographics Related to Farming

	Farmer A	Farmer B	Farmer C	Farmer D	Farmer E
Age (years)	62	60	71	45	60
Sex	Male	Female	Male	Male	Male
Education	M.A., history; some law school	Some college	B.S., business	B.A., accounting	B.A., industrial arts
Farming since*	1979	1971	1958	*No longer farming*	1982
Farming employment	Full-time	Part-time	Full-time	*No longer farming*	Part-time
Production	Tobacco, produce, flowers	Tobacco, livestock, dairy	Livestock, produce	*No longer farming*	Livestock, produce
Farming methods	Traditional (organic practices, *not* certified)	Organic (working toward certification)	Organic, confined & free range (working toward certification)	*No longer farming*	Confined
Acreage	50 (actively farms 3 acres)	20 (originally 300; decrease was due to foreclosure)	50	*No longer farming*	145
Experienced foreclosure?	No	Yes	Yes	No	Yes
Generation in farming (including sharecropping)	Second	Third	Fourth	Third	Fourth
% income from farming	30%	50%	10%	0%	10%
Current employment	Farmer	Farmer; nonprofit organizer	***Deceased***	***Retired***	Farmer; small business owner
Former employment	City planner; manual laborer; factory worker; pipe layer	Farming entrepreneur; life insurance salesperson	Teacher; salesperson	Computer programmer	Teacher; mason

* Reflects the year the farmer began her or his most recent operation.

Figure 1. Depiction of Study Activities and Procedure using Photovoice



however, aims to reflect and act upon community concerns and strengths rather than make broad generalizations. According to a seminal article by Wang and Burris (1997), Photovoice has three stated goals:

> (1) to enable people to record and reflect their community's strengths and concerns, (2) to

> promote critical dialogue and knowledge about important issues through large and small group discussion of photographs, and (3) to reach policymakers. (p. 560)

Photovoice and qualitative data analysis are appropriate methodologies for an inductive discovery of lived experiences (Catalani & Minkler, 2009) and effects associated with land loss. Photovoice methods acknowledge that African American farmers are the experts of their individual and collective experience. Accordingly, an inductive discovery of their experience, the cumulative effects of land loss, and ways to address concerns in their words were sought rather than a deductive understanding of isolated concepts or indicators. Following the Photovoice process, participants were first asked to collectively develop a photography assignment relating to issues of farmland loss. Next, participants were asked to take photographs related to the topic through the week. At a follow-up meeting the group collectively selected one or two photographs they believed best represented the photo assignment. The selected photos served as triggers to generate discussions and probe for deeper meaning (Wang & Redwood-Jones, 2001). This procedure was iterated through three distinct photography and discussion sessions. See figure 1 for a depiction of the procedure and timing of study activities.

Figure 2. Overview of SHOWED Discussion Process

S	What do you **see** in the photo?	Observational Questions
H	What is **happening** in the photo?	
O	How does this relate to **our** lives?	Interpretation
W	**Why** does this issue exist?	
E	How can we become **empowered** with our new social understanding?	Potential Action Steps
D	What can we **do** to address these issues?	

Discussion sessions were facilitated using the SHOWED method, an empowerment education-based facilitation technique, to: (1) engage participants in comparing and contrasting their individual and collective experiences, and (2) identify their strengths and concerns as farmers confronting the issue of land loss (Wang & Redwood-Jones, 2001). Using photographs as triggers, SHOWED progressively leads participants from observational questions, through interpretation, to potential action steps for addressing concerns (figure 2). Through the dialectic, individual commentary was challenged by other participants and researchers alike to cross-check legitimacy of experiences in relation to the group, and to foster a new collective understanding. With the consent of the participants and Institutional Review Board approval from the University of North Carolina–Chapel Hill, all sessions were audio recorded.

Step-by-step qualitative analysis was conducted throughout the study including reading, coding, displaying, reducing, and interpreting data (Ulin, Robinson, & Tolley, 2005). Between sessions, researchers transcribed audio recordings, reviewed content for preliminary themes, and identified gaps in understanding to be addressed at ensuing meetings. At the conclusion of the last Photovoice sessions, a final codebook with 15 codes was developed by researchers from preliminary codes and themes, including definitions and coding rules. A code is a label that is attached to a piece of text to better enable researchers to group and compare similarly labeled sections of information. For example, sections of text were coded "protective factors" when participants mentioned or referred to the benefits of farming as it relates to protecting individuals from poor health and social problems. The 15 codes were the result of iterative review of

transcripts and researcher discussions to identify the most prevalent and rich preliminary themes.

Transcripts were double coded to ensure internal reliability using Atlas.ti software, Version 6.1.8. All sections of labeled text within each code domain were then extracted using the software, and compared to reveal patterns of meanings, or themes. For example, a theme identified under the code "protective factors" is:

> Participant farmers believe farming will create a strong work ethic in youth and prevent them from becoming involved in illegal or otherwise dangerous activities.

For some codes, the patterns of meaning were not strong enough to compose a theme. For themes identified in this study, representative quotes were extracted and are presented in the findings section. Final themes were further arranged in three overarching categories. Post analysis, findings were presented to participants to check for accuracy.

Findings

Each Photovoice session provided rich qualitative data that included photo assignment selection, photography, and photo discussions. Through successive sessions, participants developed the following assignments to guide their photography and discussions:

- Why we continue to farm despite the odds
- Communities of justice and injustice
- Politics and economics

Analysis revealed several overarching categories, including historical and current discrimination, positive perceptions of farming, and farming and the next generation. For each category, associated themes, representative quotes, and photos are presented. A summary of themes within the overarching categories can be found in table 2. Collectively developed recommendations for

Table 2. Summary of Overarching Categories and Themes

Category	Themes
Historical and Current Discrimination	• Past discrimination resulted in participant African American farmers not trusting governmental organizations and some report continued discrimination on the farm. • The group believed lack of access to loans has led to an increase in the financial problems of African American farmers and has been a factor in the dwindling size of the African American–owned farm. • Discrimination increased the psychological stress of participant farmers, influencing sense of self-worth. • Participant farmers believe that lack of representation in governmental agencies hampers advancement of African American farmers.
Positive Perceptions of Farming	• Despite the perception of continued discrimination, participants believe instrumental changes by government agencies to be more inclusive of African American farmers has contributed to greater success on the farm. • Participants believe lack of funding and opportunities have had the effect of making African American farmers innovative and entrepreneurial to sustain their farms.
Farming and the Next Generation	• Participants believe that farming helps them to be more self-reliant and live a healthier lifestyle. • Participants perceive that African American farmers continue to cultivate the land, despite advancing age, with hopes to pass on the land for the next generation to farm. • Participant farmers believe farming will create a strong work ethic in youth and prevent them from becoming involved in illegal or otherwise dangerous activities. • Participant farmers believe that African American youth avoid farming because of the financial and emotional struggles they witnessed while growing up, and are lured by activities that generate more money at a faster pace.

preserving African American–owned farmland were also discussed and recorded at each session. These recommendations are presented at the conclusion of the findings section.

Historical and Current Discrimination

Race-related discriminatory lending practices on the part of the USDA remained a present and pressing concern for participants. Themes identified as related to discriminatory practices were both historical and current (see table 2). Reported experiences of historic discrimination or witnessing this on other African American farmers permeated every session. Many of the participants reported actively fighting systemic race-related discrimination for decades, both within North Carolina and in Washington, DC. One participant, who has farmed in North Carolina since 1958, recalled the history this way:

> What Black farmers have encountered over the years is basic, hard racism — Black lawsuit [*Pigford v. Glickman*], out of Washington DC, because of misjustice. People weren't treated right.

All participants agreed that disparities in lending during the previous decades strongly deterred African American farmers in their community from applying for needed loans from the USDA. Instead, farmers sought out local creditors for small loans, or managed with what they had, until they depleted personal savings. One participant who continues to farm the same tract of family land he helped with 50 years ago recalled the experience within his community:

> In fact they [African American farmers] wouldn't deal with loan officers because they know it wouldn't come out in their favor. Instead, it's better just to do what you can, because once you start dealing with the loan officers, they're gonna make it difficult for you….And they'll use everything they can to prevent you from getting the loan, and then they'll get you in a situation where you've gone so far and then they start now giving you problems with taking your property.

The absence of access to adequate credit resulted in minimal reinvestment into the farm. Participants acknowledged that regardless of the race of the owner, small farms are at an economic disadvantage primarily due to economies of scale: small farms' owners receive smaller subsidies; often have less access to major markets because of smaller yields; and have limited buying power due to smaller revenue streams. The added effect of discrimination through compromised loan access was viewed as further restricting development into larger operations. One participant expanded, providing a current example on how having a smaller farm put her family at a competitive disadvantage:

> Well, one thing was that fuel got so high [expensive], and you had to keep your farm fuel, you know… If you're a small farmer and you can't afford but a hundred gallons at a time, ah, in the past, maybe you'd buy a hundred gallons, used it up, paid, and buy another hundred gallons. But then all of a sudden, even for small farmers you'd have [to purchase] a minimum of two hundred gallons [at a time].

Beyond restricting economic advancement, discriminatory lending had the effect of making some of the participants feel as if they were incompetent farmers and, as a result, increased their experiences of stress. In addition to receiving less money from loans, one participant recalled waiting with other African American farmers in lending offices entire days while White farmers came and went. The psychological effect of this was often significant, as exemplified by the farmer who once believed the disparities in lending were a reflection of his abilities, despite later traveling widely to share his farming expertise. He explains the effect of discrimination this way:

> It takes you to these places, places you don't even want to go [feelings of depression and lack of self-worth], when they treat you like this…And, ah, you know, it's these types of things that we've experienced all our lives. I thought that I was the bad part: well, you know, I'm just no good. But when the lawsuit [*Pigford v. Glickman*] came to be,

> and I saw these hundreds and hundreds of people come in, I said, "Well, I'm not gonna be by myself, and we all can't be bad farmers." So then it was the establishment that put us where we are.

Throughout the discussion, participants agreed that discrimination endured by African Americans in their community deteriorated self-confidence, which prevented them from seeking new opportunities for economic advancement since they expected further rejection. According to the participants, many farming colleagues began to despair about their opportunities within agriculture. This is illustrated by the following quote:

> And if I tell you "no" long enough, you're going to believe "no." And that's what has happened to a lot of the older folk in the neighborhood, you know, they've been told no, no, no, so much that they just accept a negative attitude.

Among African American farmers in the region that remain in the profession, many were noted to have withdrawn from participating both in educational and financial meetings, and the wider community of farmers. Participants attributed this absence to both historic discrimination causing distrust of government institutions, and competing time demands to earn a living. One participant offered his opinion:

> Black farmers are very shy. We are in bad shape and we don't want anyone to know it—not anyone.

For another participant the distrust pointed to a need for yet further reform to deal with what he perceived to be the persisting underlying problem. He commented:

> The nation needs to know that we haven't eradicated racism. It's been going on, and it needs to be eliminated.

A couple participants lamented the lack of African American representation in government positions to influence reform, and reported continued experiences with discrimination today. Among African Americans employed in farm-related government positions, many were believed to be occupying token posts. A participant who is active in community outreach and continues to regularly attend USDA-sponsored meetings explained:

> We…don't have the people that are in places in NC [North Carolina] that would help the majority of the small Black communities to pull themselves up by their bootstraps. Some people may disagree…, but I know people who are really trying. And it seems like every time they try, there's somebody out there to put their foot on their head, to pop up this way, they gonna push 'em down in another place. And, it's NC [North Carolina] politics.

Another participant noted disparities in land use conservation enforcement on his farm compared to his White neighbor. For the photo assignment "Politics and economics" this participant took a photograph of a fenced-in stream on his neighbor's land where cows were allowed to roam (photo 1). While another participant referred to environmental regulations restricting farm animals from wading into interconnecting bodies of water, the photographer reported his experience as inconsistent with what is required of the White neighbor:

> It's a branch [stream], right down through the middle of it [land]. Now my thing, how come he [White farmer] can allow his cows to run in the branch, and they made me fence mine out. So my animals, my hogs, couldn't get in it [stream].

Experienced and perceived discrimination has resulted in a continued distrust of some agriculture-related governmental agencies, as noted in the above quote. The initiation of the Tobacco Transition Payment Program in 2005 (commonly referred to as the "tobacco buy-out") was viewed by some participants as a means to eliminate small-scale African American farms. Most participants recalled that, even before the start of the program, the amounts of tobacco they were contracted to sell, as well as selling prices, became progressively lower compared to that of White farmers. One

Photo 1. Fenced-In Stream Running Through a Cow Pasture on a White-Owned Farm

Photo credit: Photovoice participant.

participant viewed the transition program this way:

> The tobacco buyout to me, was, one of those strategies that would eliminate the one-acre, the two-acre, the five-acre smaller Black farmers, and to get his acreage so that they [larger farms] could become bigger. And so they came up and made a rule that we gonna have a tobacco buyout. …You [government agencies and large farmers] have stolen for so many years—grandma, this lady's poundage [tobacco quota], that poundage….But to get them [eliminate small farms] complete.

In addition to distrust, the low incomes generated from small-scale farms force owners to continue maintaining supplemental employment, thus reducing the time farmers have available to attend USDA-sponsored and other farm-related meetings. Due to these competing demands African American farmers are underrepresented at those meetings, and, consequently, their concerns are not heard or addressed. In light of these significant barriers faced by African American farmers in their communities, an outreach advocate within the group explained:

> They'll [government agents] say "oh they're [African American farmers] not here." Well, what you talking, why they not here, because they cannot make every place that they need to be.…If you don't have enough gas to carry you to work every day, how can you afford to leave from [town], go to work, come back, or go to work and leave from work, go to Raleigh to attend meetings, so?

Positive Perceptions of Farming

Despite years of reported discrimination, study participants remain involved in farming. They were excited to highlight success stories conveying what they and other African American farmers have at-

tained through ingenuity, persistence, and collective organization. Themes identified through analysis of participants' discussions on their positive perceptions of farming can be reviewed in table 2.

All participants reported disparities in Farm Service Agency (FSA) loan amounts and timely disbursement between White and African American farmers, but reacted differently. With compromised access to larger FSA loans, most farmers relied on local creditors and merchants in their community for support. While one participant recalled his family's approach to be conservative and borrow as little as possible to get by, two others would seek to maximize investment in their land. Another participant successfully used available resources to supplement funds by starting a small organic fertilizer business, as she commented:

> I was told that I was full of it, never [fit] to be a seller. I sold more manure — cow, pig, more money….We had to, we didn't know about biodiesel then. We had to have money for gasoline and diesel fuel for the fields.

Participants recalled how they were compelled to be entrepreneurial to remain as farmers. Almost all farmers either held another form of employment or started small businesses to survive financially. While all participants recognized this struggle to be a common plight for small farm owners regardless of race, discrimination was viewed as an added barrier to successful farming. The group discussed how disparities in lending forced them to be innovative in maintaining equipment while their White counterparts purchased new technologies. As recalled by one participant:

> One of the FSA loan officers told us in the past "Use it up, fix it up, do anything, don't buy anything new." We couldn't go out and get this piece of equipment new.

The ingenuity participants mentioned as imperative for their survival as farmers in the past is seen to have an additive effect when eventually given more equal access to funds and opportunities. Farmers selected photo 2, a biodiesel machine, as a trigger to represent this innovation of African American farmers. One participant commented on the African American farmer in his community that built the machine after successfully competing for funds through the FSA:

> He can take nothing and make something out of it.

Photo 2. Machine Used To Make Biodiesel on an African American-Owned Farm

Photo credit: Photovoice participant.

> [He] took it, and he's talking about right now incorporating it with some bigger tanks to make more fuel. And he wants to get to the point where he can commercially sell it, you know. Right now he doesn't make that much, he just does enough for his farm and enough for demonstrations.

As evidenced by the biodiesel machine, the participants strive to be current with emerging agricultural innovations and the changing demands of the market. All participants have taken steps to become certified as organic, discussed at length sustainable practices, and one had recently started preparing free-range lots for livestock in lieu of confinement operations. During discussion on the same topic, participants also noted the success another African American farmer in the state has had in raising turkeys (photo 3), along with other animals and crops, for a decent profit. The creativity with which the farmer approached raising and marketing these turkeys demonstrates the entrepreneurial spirit that garnered a state award for farming excellence. The participant who took this picture interpreted the photo in the frame of justice:

> And this one I picked from when we went on a farm tour, and I picked that as justice — you know, showing where we [African American farmers] were able to do some things with some help from some grants and some other justice. To me, that's instrumental changes.

All participants agreed that the positive opportunities provided by farming outweighed the difficulties faced. Farming increased their self-reliance and their ability to produce food and provide for their families, a heightened concern in light of the country's insecure economy at the time this study took place. Participants also felt that by farming one could maintain health through the physical activity of working in the fields and by eating the healthy food produced. A participant who raises livestock and vegetables reported on the security farming can provide:

> We can feed ourselves, and no matter how bad the economy gets, regardless of what anybody else does. All farmers know how to provide enough food to feed their family. That's a necessity.

The farmers also shared the common excitement of watching growth—whether it be livestock, produce (shown in photo 4), or the burgeoning future of African American farmers in their community. All participants spoke positively about how farming fostered creativity, allowed them to work in the fresh air, and offered different challenges and opportunities with each new day. Such sentiments inspired one participant to invest in the community by developing a town market

Photo 3. Farmers Walking Past Turkeys Being Raised on an African American-Owned Farm

Photo credit: Photovoice participant.

wherein he sells produce from local farms and crafts alongside the meat from his hog farm. He commented:

> All farmers enjoy seeing things develop and grow. I mean that's really what we get excited about.

Farming and the Next Generation

Every farmer participating in this study underscored the importance of involving African American youth in farming. Engaging the next generation in farming was a prominent discussion under the topic "Why we continue to farm despite the odds." See table 2 for themes identified through analysis related to Farming and the Next Generation.

Photo 4. Field of Spring Greens Growing on an African American-Owned Farm

Photo credit: Photovoice participant.

Photo 5. Grandchild of a Study Participant Walking Off the Back of a Truck To Help on the Farm

Photo credit: Photovoice participant.

Many participants reported that they farmed primarily to ensure that they could pass on their land and profession to their children or grandchildren. A couple of the farmers discussed with regret how they had missed the opportunity to recruit their children to eventually take over the farm while they worked in other professions, or before they came to own the family farm outright. As a result, they see the need to mentor their grandchildren and other youth so as not to miss another generation. A participant who

was successful in cultivating a desire to farm in his four-year old grandson explained the strong emphasis he puts on passing along the value of farming (photo 5):

> I'm doing it basically for my grandchildren because I want them to continue being able to live the goodness. And I'm teaching him [grandson].

Another participant who successfully involved both her grandchildren and other African American youth in farm work elaborated:

> If he has the choice he is out there on that farm with this grandfather. [He] doesn't have to worry about anyone messing with him, not contained, as long as he is outside. Living in the city he couldn't go outside and play peacefully. Farm life is better for him. If we can hold them to the land maybe one day they can make a profit. The next generation, that's why we continue to do what we do.

All participants vocalized their concern about the loss of family land outright and the need to provide youth with healthy lifestyle options as reasons to continue farming. Getting youth involved in farming was viewed as a way to build a strong work ethic, to promote physical and mental development, and, as a protective factor, to keep children away from damaging activities like the use and sale of drugs. Concern that the next generation is being attracted to selling drugs and other crimes to make money prompted one participant to start a youth gardening program to cultivate interest in farming. In commenting on the photo of the young boy in photo 5, this participant relayed hopes and fears for the younger generation in relation to farming:

> I see a little boy on a truck. That's what I want to see — more people off the streets and on the farm doing something constructive. That's what I hope to see — more kids off the street and it's hard.

Continuing the legacy of farming family land was important to the participants and is currently a pressing concern because of the aging African American farmer population as a whole. A majority of participants are retired from their other jobs and are able to devote much of their time to farm-related activities. An older participant who cultivates vegetables with his brother repeatedly commented on the need and benefit of involving young people in farming:

> As I said, the young people are out there, and they got the great minds.…I'm an old man, and they got the minds.

This participant recalled that a couple of decades ago it was commonplace for young African Americans in their community to seek work on the land. During that time, the children sought farm work to earn money to buy materials and new clothes for the first day of school. Farmers did not have to seek help from the youth; youth sought out the farmers. The trend of African American youth involvement on farms in the region has been decreasing, however, as he explained:

> Well my brother he was here for two generations; he was hiring young youth, but within the last [20 years] things were slowing. He hired a lot of youth. If we were to have a thriving produce business we could have brought some of the younger kids into this kind of operation. So for 20 years in this community we have had very little impact on a generation of youth. And previously we had a lot of impact.

Participants discussed how economic influences deter youth from going into farming as a profession. They highlighted two deterrents: (1) the effect of watching parents struggle financially with farming, and (2) the lure of fast money from selling drugs as an alternative to a lifetime of struggle on the farm. This is described in the following statements:

> I think young people my age and a little younger saw their parents work a lifetime, and then got to check-up at the end of the year [with the owner of the farm, usually White], "you're almost paid up this time, John." Gotta work a whole year for that farmer [as a sharecropper], and when that White man paid [you] at the end of the year, you almost made out [paid off your expenses]. Means you got

> to work another year, you know, go buy shoes for your children, you have to go to that man to borrow money, because he [the African American farmer] don't got any of his own.
>
> Well like I said, they [children] see there's not any success in his father's farm, so why would he want to go down and be a farmer, and do the same thing his dad did and be a slave the whole time.
>
> And I can understand why I see children now — or boys on the corner selling drugs. Because they see the guy driving down the street, and that looks nice, all that gold around his neck, and got a roll full of money. He doesn't understand the consequences, but for work on that farm, ten dollars — no, five dollars an hour, you can't but make 50 dollars. Five days a week that's 250 dollars, and that boy can stand on the street corner, and in an hour have a wad big enough to choke a horse. And that's what they want, they want some of the finer things, and you aren't gonna get it from a farm.

One of the participants warned that the memory of discrimination believed to deter African American children from farming will have further negative ramifications for the nation as a whole:

> I think the nation, when the nation fails, I would hope that they would have enough foresight to realize the importance of the Black farmer before they fail miserable. Because they [the United States] are inevitably on a road of failure, because as I said, they have excluded — maybe not openly, but by not opening the doors of opportunity to young people they have cut off some of the most talented and great minds that could really shape agriculture and deal with the challenges there.

Although the participants reflected that youth in the community are more inclined to pursue other jobs than work on a family farm, they also mentioned that African American farmers held onto their land, regardless, in the hopes of maintaining their heritage. Many had doubts as to whether the individual(s) who ultimately inherit the land will continue with the profession. One participant reported on the continuing trend of children not farming inherited land:

> When you deal with people holding on to their land.…They pay taxes on this land and a lot of them will not sell it because they say they want to keep it in the family. And that's where I think this is going to. People are keeping land in the family because they have so many memories of it. But as to people getting out [in the fields] and growing stuff, it's a new day [not happening].

Participant Recommendations to Address Land Loss

As noted above, the methods employed in this study include a process for participant-developed action steps to support African American farming in their communities. Collectively developed participant recommendations for addressing issues around farm or acreage loss are summarized in table 3.

The participants had already taken steps to retain their land and that of other minority farmers through individual initiative and participation in outreach through nongovernmental organizations. Farmers noted that the general public, however, is largely unaware of the history and issues surrounding the disproportionately high rate of farmland loss by African American farmers. One participant

Table 3. Participant-Recommended Actions to Preserve African American–Owned Farmland

Action Steps to Address Land Loss
• Continue to raise awareness in public and among government officials about injustices that affect African American farmers.
• Promote collective organization and cultivate leadership by engaging the community, including farmers and nonfarmers, through outreach activities.
• Facilitate ongoing agricultural education in farming communities.
• Pursue funds to develop infrastructure and enable greater benefit from farming education.
• Enlist youth involvement in farming activities.
• Provide greater access to Internet services to enhance communication efforts and accessibility to information resources.

recommended that the public and government officials be better informed:

> We have to continue to bring about awareness about the injustice that goes on. We have talked to people all the way to Washington, DC. Even having no minority loan officers! Come on. People that are in authority that can do something about these injustices. But nobody applies, no one is qualified. The agencies treat them [African American employees] so bad and they won't go back. We have to make the people in authority aware.

Several participants regularly engaged in outreach efforts to inform current African American farmers about financial and educational opportunities, and to educate nonfarmers about the potential in farming. Some participants recommended that African American churches serve as venues for these discussions because these churches are the primary social outlet for the African American community. Others, however, lamented the limited amount of time available for such a discussion during services and noted the importance of expanding outreach efforts and venues. One participant had already mobilized a group to meet regularly and discuss relevant issues within the community, at which he invited professionals from across the state to speak on specific agricultural topics. He recommended further education:

> I am back to education. People have become complacent. They are used to nothing, want nothing. Let the White man feed you. You can't live on Social Security. Instead of watching "As the World Turns," watch them flowers grow. Give them an opportunity.

Most of the participants have mobilized groups of children or adults to promote farming, either currently or in the past. All recognized that the progress they have made as farmers was bolstered by organization and teamwork. They recommended the implementation of collective initiatives to get other community members involved, as this quote illustrates:

> One person being able to achieve is nothing. We have to organize and put our resources together. The loan thing [reparations] isn't about fixing things. I think opportunities, we have to grab opportunities. We need organization, leadership.

Participants also believed that widespread access to the Internet would facilitate better communication and access to resources. At present, Internet connectivity in the participants' communities is limited and is particularly poor for African American farmers. One farmer commented on the limited Internet service in the region:

> Where I live, about a mile from me, another member, she has broadband. But when I try to get [it] they tell me we don't have a substation in your area, so we can't offer you broadband. So I have to pay like $69 a month for wireless, you know, and I really want [Internet access] to follow me wherever I go. So, they put a lot of money in the stimulus package for new technology in areas, but, ah, and that's politics. We don't know because we're cut off. And they say, oh you all don't have cable? Yeah, the one we pulled across the yard.

Farmers agree that with affordable Internet access they could remain up to date on the latest agricultural regulations and funding opportunities, organize more people with less effort, and develop new markets for their products.

Discussion

Significant changes have been made to reduce disparities in access to government support for African American farmers (Cowan & Feder, 2010; NCDA&CS, 2011; USDA, 2003; USDA–FSA, 2007). As a result, farmers in this study note specific benefits that have aided in the viability of African American–owned farms in their region. According to participants this has included increased access to funding, knowledge of new opportunities, and availability of education. 2007 Agriculture Census data indicates that, from 1997 to 2007, there was a concurrent and comparable increase in the number of African American and White farm owners (10% vs. 11%) in North Carolina (USDA, 2009b). Gilbert, Sharp & Felin

(2002) claim, however, that this increase is misleading as the census changed hands from the Department of Commerce's Bureau of the Census to the USDA. These authors suggest that the new census was more accurate and inclusive of all farmer numbers, and that if the same census had been employed in the previous cycle, a continued drop in the number of African American farmers would likely have been observed. Despite advancements in federal and state programs to be more inclusive of African American farmers, participants in this study still report discriminatory practices.

The negative impacts of institutional racism, including discriminatory lending, are evident in this study and the literature (Brondolo, et al., 2009; Jones, 2000; Paradies, 2006). These findings support prior studies showing that African American farmers who continue farming also continue to endure the negative economic repercussions of years without adequate loans to invest in their farms and the resulting accumulation of stress (Hinson & Robinson, 2008). The cyclical effect of discriminatory lending in the past affects current investment capacity, and thus wealth of these farmers, and remains a threat for the viability of African American–owned farms today.

Despite the obstacles, the participants reported continued commitment to the profession, noting that the health benefits of outdoor physical labor, producing nutritious food, and the pure enjoyment of facilitating growth enhance their quality of life. Their experiences have had the positive effect of fostering creativity and innovation on the farm as evidenced by the expansion into alternative fuel sources, the raising of free-range turkeys and other livestock, and the cultivation of new cash crops. Such innovations are seen as necessary for the survival of the African American–owned agribusiness and can contribute to the wealth and broader investment of the farmers (Gilbert, Sharp, & Felin, 2002; Grim, 1995). Further, small-scale farm owners, like the participants in this study, contribute positively to agribusiness, and promote community vitality through the consumer industries created (Brown, Christy, & Gebremedhin, 1994).

The participants in this study yearn to pass on their farmland and what they view as the "good life" to the next generation. To these farmers, the land represents their families' heritage and future opportunities, even with the complex challenges they have experienced as farmers. In addition to the personal pride and quality of life noted by participants, land ownership is associated with the positive educational achievement of children (Gilbert, Sharp, & Felin, 2002), which is a primary goal for participants. It is critically important to participants that the next generation remain involved with the land to ensure survival of their heritage and to influence their well being. However, participants expressed deep concern that younger family members would choose to step away from farming and the family land because they have become disillusioned by watching their parents' financial struggles with farming and their experiences of discrimination. Participants fear that instead of farming, the African American youth who represent the next generation will succumb to the lure of risky or illegal ways to earn money that have a more immediate payout. These concerns suggest a need for innovative agricultural programs to engage African American youth.

Numerous studies on the topic of African American farmers confronting land loss make recommendations to maintain the land (Gilbert, Sharp, & Felin, 2002; Grim, 1995; Wood & Gilbert, 2000). Using CBPR methodology, we sought current participant perceptions on action steps believed to help curb land loss and promote farming among African Americans in their community. Primary recommendations included raising awareness of injustices affecting African American farmers, collective organization and leadership, greater access to agricultural education, funds for infrastructure development, greater Internet access, and youth involvement. Participants believed such actions will bolster success among African American farmers in North Carolina and beyond.

Based on participant recommendations, we emphasize three immediate action steps to support African American landownership in the region:

improved access to the Internet, increased local representation, and innovative youth farming programs. Expanding Internet connectivity to the farmers' communities would enable access to current information on the latest education and opportunities. Nationwide only 34% of African American–operated farms have Internet access, compared with 57% of all farms (USDA, 2009a). Results of this study also suggest the need for increased training of African American agricultural educators and lending agents with deployment to localized communities. These services could reach a broader population if delivered at varied and nontraditional times to the schedules of farmers who also work off the farm. Finally, innovative programs involving youth in farming programs could influence future interest in the profession. Programs exist in a limited scope within participants' communities, but are starting to expand. Entrepreneurial programs that offer income through individual, community supported agriculture (CSA), or farmers' market sales may encourage youth involvement.

Lessons Learned

The procedure used to conduct this study led to numerous opportunities for lessons learned, particularly around recruitment and use of the Photovoice process. Recruiting farmers to participate in this study proved difficult. Having little experience initially with the African American farming community, we had no credentials to lend legitimacy to the project. At the outset, we enlisted the help of individuals and organizations who had connections with African American farmer networks in nearby communities and farmers' markets. Through discussions with farmers it became clear that experiences with discrimination, long distance between individual farms, overexposure to researchers, and the small numbers of African American farmers in the area would make recruitment challenging.

During recruitment, we became aware of how our race and class, current and past race relations, and the history of studies done on African American communities worked against us—a team of one African American female, three White females, and one White male. We were graduate students, younger than the age of potential participants, and represented a large research-intensive institution. As public health researchers, we were aware of the long-standing history of African American involvement in research, particularly the Tuskegee Public Health Service syphilis study. Recognizing this harmful history and the potential for distrust in the community necessitated the use of sensitivity on our part when approaching African American farmers and introducing the idea for this project. Access to participants was eventually gained through personal validation by a member of the African American farming community who was involved in efforts to maintain African American-owned farms in the United States. Securing a foothold in the community through this gatekeeper proved essential for recruitment.

In addition to difficulties with recruitment, the demands of farming hampered the study's flow and required constant flexibility on the part of the research team. Participants were preoccupied with work and family responsibilities, preventing some from attending every meeting. Working around farm schedules proved especially difficult during the spring planting season. Following the SHOWED method directly also proved difficult: rather than following the sequential procedure leading from observation, to interpretation, relevance to the lives of the participants, and action steps, the conversations moved back and forth across these categories. Participants often combined observations and interpretations. Periodically the conversation would be brought back to the prescribed question, but, on some occasions, we thought it best not to adhere to the linear questioning in favor of allowing rich conversations to unfold.

Limitations and Strengths

The approach used in this study, including the Photovoice technique, has its weaknesses. The small sample sizes of qualitative analysis and convenience sampling do not support broad generalizations across the population. The aim of this project was to capture the strengths and concerns of African American farmers in a North

Carolina community in light of historic discrimination and its effect on land ownership. While prior research reveals that discrimination and issues of farmland loss are widespread in the region and it is expected that other African American farmers in the American South may have similar experiences, the specific events and histories related here are unique to these participants.

Photovoice also has strengths. This method allowed us to gain input directly from individuals affected by discriminatory lending. Further, Photovoice taps into the rich traditions, history, and strengths of community members regardless of their educational background. Additionally, the use of Photovoice engaged all participants in finding connections between the lived experiences of each group member, and brought a strong sense of context and place to each discussion. The use of photographs as triggers aided participants' efforts to convey these experiences not only in their own words but also from their own perspectives.

Finally, the iterative research process of Photovoice, with its series of meetings and opportunities for exchange and co-learning, allowed participants and researchers to build rapport and probe difficult issues. Participants were not shy about sharing personal trials, but as the collective level of comfort grew, the discussions and the topics explored deepened. Later conversations allowed all group members, participants and researchers alike, to gain deeper understanding of the challenges faced by African American farmers in this region. Moreover, the Photovoice method created the opportunity for the farmers to explore their experiences in a new light, share those experiences with influential advocates, and generate next steps to address their concerns.

Conclusion

This study illustrates the lived experiences of five African American farmers in North Carolina, their experiences with discrimination, and their farming successes despite that discrimination, in their own words. As the participants noted, this study sheds light not only on the hardships they face, but also draws attention to ongoing strategies and new directions for African American farmers to maintain their farm land. One participant commented that through this study he had gained specific insights into the hardships of people he had known for years. Another participant reflected with others that his problems obtaining loans were not a reflection of his abilities as a farmer, but a systematic history of discriminatory practices. All participants agreed that sharing their stories is one way to address this history of discrimination and to curtail potential future practices. In addition, these farmers, with others across the state and nation, are working together on ventures that will ensure their economic viability for the long term. Innovations include ways to capitalize on the upsurge of interest in local, sustainable farming.

African American farming continues to be threatened by the lack of interested family members to whom the land can be passed. Participants have begun intentional outreach to recruit younger African Americans into farming. The experiences and perspectives of young, rural African Americans in regard to farming, however, are largely unknown. Participants and researchers alike recommend focusing future research in this area, and view engaging younger African Americans in farming as imperative in reducing further loss of farms or acreage.

The Photovoice methodology used for this study proved effective in eliciting rich experiences and perceptions of a group of African American farmers, as well as collectively developed action steps to maintain land ownership in their community. While the small sample size prohibits generalizability, the results can provide methodological and content direction for future studies on this topic. Along with the other action steps developed in this project and described above, this suggests future directions for community research, practice, and policy.

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Overcoming barriers to providing local produce in school lunches in Vermont

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Abstract
Vermont is a leader in connecting its agricultural sector to its education system in order to provide schoolchildren with fresh, local produce. Adopting farm to school programs is not easier in Vermont; in fact, school administrators and food service directors cite the same barriers as can be found throughout the country. However, some communities in Vermont have worked hard to address these barriers and are succeeding in getting fresh local foods into their schools' meals. This article reviews common barriers and challenges to successful farm to school programs and describes some of the creative ways that schools in Vermont have addressed them.

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Keywords
barrier, farm to school, local agriculture, National School Lunch Program, nutrition, school lunch

Literature Review
In 2008, 17% of children in the United States aged 2 to 19 were at or above the 95th percentile for body mass index and 31% were at or above the 85th percentile or considered overweight or obese (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010). Vermont's rate of 26% considered overweight or obese is slightly lower (NSCH, 2008; Eaton, Kann, & Kinchen, 2008) than the national average. This problem has gained national attention. While the cause of obesity is typically an energy imbalance, solving the problem has proven to be complex, as evidenced by the number of solutions put forward with no improvement in the obesity trend. The National School Lunch Program (NSLP), which has been administered by the USDA since 1946, provides an opportunity to ensure that children get at least one healthy meal five days per week. But the quality of these school lunches in terms of both nutrition and calorie availability has been questioned in the popular media as well as by

scientific research (for example, Crepinsek, Gordon, McKinney, Condon, & Wilson, 2009).

The American Dietetic Association believes that schools should provide meals high in nutrition to all students (Pilant, 2006). Unfortunately, this is often not the case with school lunches. The NSLP requires that not more than 30% of lunch calories come from fat, and not more than 10% of calories from saturated fat. Lunches are required to provide one-third of the Dietary Reference Intake for calories, protein, vitamin A, vitamin C, iron, and calcium (for more information about Dietary Reference Intakes, see Penland, 2006). Each meal must include an entrée, milk, and at least one other item. However, according to the School Nutrition Dietary Assessment Study III (SNDA-III) survey in 2004–2005, an average of 34% of calories in school lunches came from fat, and only 20% of the schools met the guideline for fat and only 30% met the guideline for saturated fat (USDA, 2007).

While most school meals do meet dietary requirements for protein and a variety of essential vitamins and minerals, two-thirds of schools serve lunches that are too high in fat (Crepinsek et al., 2009). Students who participate in the NSLP generally have an increased intake of fat (Gleason & Suitor, 2003), and this has been an ongoing problem (Dwyer, 1995). Further, school lunches are generally high in sodium and low in fiber (Crepinsek et al., 2009).

Given that school lunches may account for 25% (or more) of a participating schoolchild's nutrition (USDA, 2010), they are an appropriate place to address childhood obesity. But participation in school lunches varies greatly, especially by household income (Dunifon & Kowaleski-Jones, 2003; Gleason, 1995). While NSLP lunches may provide more fat than required, one recent study concluded that homemade lunches have more fruit, more energy from sugar, and fewer vegetables (Rees, Richards & Gregory, 2008).

Policymakers and researchers alike seek solutions to combat childhood obesity and ensure good nutrition. Nationwide, communities are beginning to establish a link between local agriculture and schools as one way to teach children about good nutrition and ensure availability and consumption of more fruits and vegetables. Often referred to as farm to school (FTS) programs, these efforts can include one or more of the following: establishing school gardens; serving fresh, local products in school meals; making food and agriculture–related field trips; having farmers visit schools; teaching curricular units on food and nutrition; and providing professional development for food-service staff. Increasing children's fruit and vegetable intake alone may not be sufficient to address the childhood obesity challenge (Lin & Morrison, 2002), but it's unlikely that energy balance can be achieved without eating more fruits and vegetables. The United States Department of Agriculture (USDA) has specifically included fruit and vegetable intake as a measure for lowering obesity in children (USDA NIFA, 2011).

Research has shown that FTS programs increase students' intake of fresh fruits and vegetables and can improve their nutrition and knowledge of the food system (Croom, 2005; Graham, Feenstra, Evans, & Zidenberg-Cherr, 2004; Joshi, Azuma, & Feenstra, 2008; Joshi & Beery, 2007; Ohmart & Feenstra, 2004). Despite the positive effects associated with FTS programs, fewer than 10% of public schools nationwide have implemented a farm to school program (Farm to School, 2010; NCE, 2008). Narrowly focused school-based interventions generally result in slight impact on childhood obesity and children's food behavior (Sharma, 2006). FTS programs may succeed because when fully implemented they focus not just on a single area of intervention, but also include classroom education and utilize cafeteria, garden, and farm venues (VT FEED, 2010).

According to one estimate, at least one-third of all Vermont public schools have engaged in one or more of the activities described above (VT FEED, 2010). In a recent survey of Vermont schools, 71% (King, Kolodinsky, Roche, Berlin, Nelson & Norris, 2009) reported purchasing some local foods for their school lunches. State and local policies play a role in encouraging FTS efforts as

well. The Vermont Department of Education requires school districts to have a wellness committee (VDE, 2010), and many schools' FTS efforts have arisen from these committees. The Vermont Agency of Agriculture, Food and Markets administers the Rozo McLaughlin FTS grant program (VAAFM, 2009), which has provided grants to more than 40 elementary and secondary schools since 2007 (VAAFM, 2009; VAAFM, 2010). In addition, several mission-based organizations offer technical assistance to school food service in the form of recipe development and distribution, workshops, and professional development.

Why don't more schools adopt these programs? Many barriers obstruct schools' efforts to adopt FTS programs. These barriers may lead one to conclude that while desirable, FTS programs are neither feasible nor sustainable. These barriers have been documented in other research (Berkenkamp, 2006; Izumi, Rostant, Moss, & Hamm, 2006) and include the higher cost of local produce, lack of training, lack of equipment, logistical challenges, and limited availability of local food. However, some communities in Vermont have sought to overcome these barriers in order to procure fresh, locally produced foods for school meals as well as to contribute to the continued vitality of their mostly rural communities. How are these schools and communities able to overcome these barriers? And can other communities benefit from these solutions?

Applied Research Methods

This research utilized in-depth qualitative interviews at each school with the person who was most knowledgeable about that school's FTS efforts and programs. In some cases, the school food service director was interviewed, while in others an FTS coordinator was interviewed. Qualitative methods are ideal for this exploratory research to determine not only what barriers exist to getting local foods in the cafeteria, but also to understand how each school addresses these barriers. An interview guide, summarized below, was developed to provide structure and consistency to each interview.

- Current and past states of the FTS program
    - Describe school activities that help promote healthy eating.
    - Describe the process of implementing each activity.
    - Describe challenges to activity implementation.
    - Describe any failures of activity implementation.
- Future of FTS program
    - Describe how these activities will or will not continue.
    - Describe any planned new activities.
    - Describe the requirements to sustain these activities.

Schools having some type of FTS activities during the past 10 years were identified and asked to participate by the research team. Efforts were made to interview schools with different FTS activities and program longevity, as well as to represent a broad geographic distribution. In total, 20 interviews were conducted at schools throughout the state. See table 1 for the characteristics of the participating schools. All schools in this study were Vermont public schools and participated in the NSLP.

Interviews were conducted by telephone during March and April 2009, and February and March 2010, by a team of researchers led by the University of Vermont. Each school representative was interviewed only once during the course of the research. The researchers were trained in qualitative interview techniques and used a discussion guide for the semistructured interviews (Trochim, 2006). Content analysis was used to analyze the interview notes. For the purposes of this research, FTS "success" is defined as an ongoing or sustained FTS program.

Results and Discussion

Participants were asked to describe any challenges the program faced. Challenges that could be barriers to FTS programs are summarized in table 2. All school staff members interviewed cited at least one of the barriers summarized below. When asked to describe best practices and other ways the school has made its program successful, responses were far more diverse, but can be categorized as addressing one or more of the barriers identified. Quotations regarding best practices and barriers used below are all from interviewees.

As reported in other studies and as shown in table 2, a common barrier to successful FTS programs is the relatively high cost of local foods as compared to commodity alternatives. One school staff member related that "demand for local produce is greater than supply, resulting in higher prices. Large food service doesn't get much of a price break for ordering large quantities from small farmers" when demand is high.

As stated by numerous interviewees, school lunch budgets in Vermont are separate from the rest of the school budget, and the lunch program must cover its own costs for food as well as labor and equipment. Revenue for school lunches comes from three different sources:

(1) Schools are federally reimbursed for the lunches they serve at rates of US$2.68 for students qualified for free lunch, US$2.28 for students qualified for reduced-price lunch, and US$0.25 for all other students' lunches. In addition, schools that serve a student population that is 60% or more eligible for free or reduced lunches receive a slightly higher reimbursement (USDA, 2010);

(2) The full price of an elementary school lunch in Vermont ranges from US$1.50 to US$2.50 (as determined from the school lunch menus and interviews); and

(3) Some schools make "à la carte" items such as extra milk, snacks and sandwiches available for purchase in addition to the hot lunch.

Table 1. Summary of Schools (*N*=20)

	# of schools
Rural, urban	
Rural	19
Urban	1
Grades	
Elementary	17
Middle/secondary	6[a]
Farm to school program experience	
Less than 1 year	6
1–2 years	8
2–3 years	4
More than 3 years	2
Percent of students eligible for free or reduced lunch[b]	
Less than 50%	13
50% or more	7
Number enrolled (2009–2010)[c]	
<100 students	4
100–300 students	8
301–500 students	4
501+ students	4

[a] Some schools included both elementary and secondary levels.
[b] Vermont Department of Education. (2011). Food and Nutrition Management Eligibility Report for Fiscal Year 2011. Retrieved from http://education.vermont.gov/new/html/data/enrollment.html
[c] Vermont Department of Education (2010). Fiscal Year 2010 Public School Enrollment Report, Table 4. Retrieved from http://www.education.vermont.gov/new/pdfdoc/pgm_nutrition/school_nutrition/pubs_resources/educ_sch_nutrition_fr_report.pdf

Table 2. Summary of Barriers to Providing Fresh, Local Foods in School Lunches (*N*=20)

	# of mentions[a]
Cost of labor and/or increased time	10
Higher cost of local food	8
Storage and/or equipment	4
Availability and/or transportation of local food	2
Training and skills for food-service staff	1
Other	4
Total responses	**29**

[a] More than one mention per participant was permitted.

These three revenue streams may be sufficient to cover the costs of a hot lunch prepared from canned goods and commodity foods. However, this revenue does not result in the budgetary flexibility that would allow purchase of higher cost items such as fresh, local produce or meat.

Schools with sustained FTS programs, however, have found creative means to provide local foods in their lunches. Table 3 provides a summary of these approaches. Involvement from the broader community was a common approach to procuring local foods. Several schools have planted gardens and use produce from the garden to "supplement meals with tossed salad offered three times a week." One school reported "planting 12 blueberry bushes" in order to add this popular fruit to lunch menus. School gardens, especially in a northern climate, require assistance from the community during the summer months. One school "had a spring vegetable garden the spring before for the meal program" but had not addressed summer garden maintenance and thus could not sustain this program. At the other extreme, one school took its school garden to a new level by having a "[maple] sugar house with an attached greenhouse" at the school.

Many schools reported holding community fundraisers to raise money to purchase from local farms. These fundraisers take many forms. The "farm fest" is a fundraiser for FTS programs that invites the whole community to participate. Another school uses athletic event concession sales to its advantage by using "basketball snack proceeds to put into money for the meal program." In several schools where the parental community is especially supportive, the Parent Teacher Organization hosts fundraisers or uses fundraiser proceeds to purchase local foods for school lunches. Another approach is for schools to sell what they produce, with one school making and selling salsa while another uses "maple syrup produced by eighth graders [which] is sold to the school as a commodity."

Lastly, schools take advantage of the most affordable local produce. From "using apple drops to make applesauce" and gleaning produce at local farms to "forming buying cooperatives" and nonprofit "food distribution networks," these schools are obtaining fresh, local produce for school lunches. The drawback is that raw, unprocessed food typically requires more time on the part of food service employees. Many food service staff require additional training or skills to learn how to use unprocessed ingredients. It may take longer for a food service manager to identify a source for an ingredient than just calling a distributor. Preparing and processing the ingredients takes

Table 3. Summary of Solutions[a]

Barrier type	Solutions
Cost of labor and/or increased time	• Community fundraisers • Purchase of processing equipment • Parent Teacher Organization (PTO) fundraisers • Sale of food service products • Parent and school board support • FTS coordinator position
Higher cost of local food	• School garden with community support • Community fundraiser • Proceeds from concession sales • PTO fundraisers • Sale of food service products • Purchase of "seconds" • Form buying cooperatives and networks
Storage and/or equipment	• State grant program • PTO fundraisers • Community fundraisers • Purchase of freezers
Availability and transportation of local food	• Form local distribution networks • Build farmer relationships • Community participation • Technical assistance provided by nonprofit • FTS coordinator position
Training and skills for food service staff	• State grant program • Technical assistance provided by nonprofit

[a] Examples of each solution are explained within the results section.

time as well. A food service director candidly explained, "They had to get me a helper, because I just couldn't [get] it all done. I told them if you want me to do this, I need help. And [now] she's busy preparing fresh food for me." Since many food service workers are paid an hourly wage, the cost of this additional time affects the lunch budget; as one food service director stated, "You just can't be a one-[wo]man band and process fresh fruits and vegetables." Some food service directors take this responsibility to heart because, "The processing is definitely time-consuming. I spend weekends and nights when it's processing [time]. I don't get paid for it. I volunteer because there's just not enough time during the day."

As one school food service director commented, "If you know how to do it [cook], it's cheaper to make your own." But for most schools, food service staff needed new skills before they could effectively incorporate fresh produce. "We were doing brown-and-serve lunch [before] and that was what the staff was comfortable with. We had to start from the ground up. We had cutting boards and knives, needed food processing equipment, and ServSafe® [food safety] training, and health and safety training."

To overcome this barrier, one school staff member states that training received from a nonprofit "was key because they needed outside professionals to get advice from. They are not fancy cooks and are not used to cooking for large numbers with fresh ingredients." Another school staff member reiterated, "Staff training is important for making the program sustainable." In addition to cooking skills, food service staff members need training to source local ingredients. One nonprofit that acts as a regional FTS program coordinator recalls, "We had to train the cooks on how to order from the farmers. It's not one-stop shopping like they're used to. We had to develop an ordering protocol. We had the cooks, farmers and supervisor all meet together to develop this."

In fact, many schools interviewed that had ongoing FTS programs created an FTS coordinator position, either on staff or on a contractor basis. This coordinator may provide training, logistical coordination, and support, as well as organize fundraisers and write grants. Overall, schools have used a variety of approaches to address logistical concerns. One school crafted an agreement for a local store to serve as "drop-off or collection point for farm product for schools" until food service staff could pick it up, essentially creating its own local food hub. Another school summed up a common sentiment with, "We've worked hard to make purchasing more efficient [by knowing what to make ourselves and what to buy premade]."

Especially in a northern climate, even if a school can address challenges of cost and logistics, timing and availability continue to be a barrier to using local produce in school lunches. One school addressed this by "using grant money to buy a freezer for freezing vegetables." Several schools have taken advantage of having committed community members and relied on "families to sign up through the summer" to maintain and harvest the garden. This "gets families from each grade to make a commitment to weed, water, and harvest from the school garden throughout the summer." However, this is not feasible for all schools; one school staff member believes that "Gardens are too labor-intensive in the summer months."

These exploratory findings may provide some insight for practitioners seeking to address the many barriers to getting more fresh produce into school meals, which is admittedly just one aspect of FTS. While, as this research shows, there is no standard approach that every school can use, the diversity of solutions described may offer some guidance. School budgets are carefully scrutinized, and many of the barriers to FTS are directly or indirectly related to costs. Addressing these barriers without increasing the school's budget may be necessary to support efforts at procuring fresh, local produce.

Conclusions

Getting fresh, local produce into school lunches is one strategy that some communities have adopted to improve student nutrition and reduce obesity.

But the barriers to getting fresh, local foods into school meals often seem daunting. Some schools, however, have been able to succeed despite the many barriers. While there is no one "recipe" for success with an FTS program, these schools have provided a list of "ingredients" that may be used by others. All the solutions described in the results have required hard work and dedication throughout the school community, and while these schools have been able to address barriers, they will need to keep working hard to yield continued success. Anecdotally, it seems that the one common element among these schools is the presence of an FTS champion, in some cases a teacher, parent, administrator, or food service worker, who is determined to make a change.

This applied research has several limitations and also makes clear several areas for future research. This research focused on the nutritional outcomes of FTS programs; it made no effort to consider barriers or solutions to educational or community outcomes. While subjects talked generally about the higher cost of local food, it was beyond the scope of this research project to quantify the cost difference or to determine how much of the costs are direct food costs compared with labor and equipment expenses. Research is needed to examine whether the improved quality of FTS meals translates to changes in food quality outside of school (e.g., meals at home). Further, do school gardens, because of their reliance on parental support for summer garden maintenance, result in more increased school lunch participation or broad nutrition changes in meals at home?

Childhood obesity rates continue to climb (CDC, 2009; Eaton, Kann, & Kinchen, 2008; Ogden, Carroll, & Flegal, 2008), and getting kids to eat their vegetables has long been a challenge (Lorson, Melgar-Quiñonez & Taylor, 2009; Muñoz, Krebs-Smith, Ballard-Barbash, & Cleveland, 1997; USDA, 2005). Communities struggle, but the results of our research suggest that they can make progress using creative solutions to address barriers inherent in providing healthy, calorie-appropriate, nutrient-dense meals to students.

Fresh produce alone may not address the number of calories kids consume, but like an ingredient in a recipe, when combined with increased cooking skills and less reliance on processed foods, the result may be greater than the sum of the parts and over time may help shape better nutritional preferences among children and improve their health outcomes.

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Community gardening in disadvantaged neighborhoods in Phoenix, Arizona: Aligning programs with perceptions

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Abstract

This study examined a struggling community gardening program in a low-income minority community in Phoenix, Arizona. The gardening program exists within a larger local food initiative organized by a nonprofit community development organization. The nonprofit's goals for the community gardening program are to provide residents with opportunities for education, extra income and socializing. In partnership with the nonprofit and local residents, we undertook a study to determine the potential for increasing the recruitment and retention of local gardeners in order to sustain a successful community gardening program. We used interviews and participant observation to create an exploratory survey that measured residents' perceptions of benefits and burdens associated with gardening. Results revealed that while respondents had a level of gardening interest and experience in the community, they also lacked awareness about the gardening program. Perceptions of the benefits and burdens of gardening varied among current gardeners, ex-gardeners, and people who had never gardened. The benefits of gardening suggested by many residents differed from the local food initiative goals. If community gardens and local food initiatives are to succeed, organizers should align their programs with the desires of neighborhood residents and educate them about a wide range of potential benefits of gardening to both individuals and neighborhoods.

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Keywords
community garden, community food initiative, quality of life plan, urban agriculture, food justice, community partnership, food desert

Introduction

It is well established that there are disparities in access to supermarkets between lower- and higher-income communities in the United States (Alwitt & Donley, 1997; Baker, Schootman, & Barnidge, 2006; Block & Kouba, 2006; Morland, Wing, & Diez Roux, 2002). Many low-income minority residents who live in areas commonly known as food deserts struggle to reach a grocery store, spending significantly more time (19.5 minutes) traveling to a grocery store than the national 15 minutes average (USDA, 2009). The burdens of travel distance, time spent in transit, and the high price of food weigh heavily on vulnerable populations. According to the United States Department of Agriculture, "low-income households must allocate a higher share of both their income and time budgets to food if they wish to consume palatable, nutritious meals" (Golan, Stewart, Kuchler, & Dong, 2008).

An unjust disparity in access to and affordability of quality foods highlights the greater social and environmental health burdens experienced in low-income areas of the United States (Algert, Agrawal, & Lewis, 2006). Easy access to convenience stores and fast food outlets increases residents' exposure to unhealthy food, and the potentially negative effects of such a diet may disproportionately affect the health and well being of low-income communities and minority populations (Larson, Story, & Nelson, 2009; Pearce, Blakely, Witten, & Bartie, 2007).

Community food initiatives endeavor to alleviate some of these burdens. Community gardens in particular provide a way to connect the urban poor with inexpensive fruits and vegetables (Gottlieb & Fisher, 1996). Placed in the context of poor minority neighborhoods, community gardens are enmeshed in a network of justice issues. Food justice is a framework with theoretical links to both environmental and social justice (Wekerle, 2004). "Food justice places the need for food security — access to healthy, affordable, culturally appropriate food — in the contexts of institutional racism, racial formation, and racialized geographies" (Alkon & Norgaard, 2009, p. 289). In blighted urban neighborhoods, community gardens provide environmental benefits in the form of green space (Gottlieb & Fisher, 1996) and a social gathering place where vulnerable populations can empower themselves through democratic organization (Armstrong, 2000; Levkoe, 2006). Community gardens are places where both social and environmental justice can be framed and practiced (Irazábal & Punja, 2009).

In this article we focus on the potential of a locally organized food initiative to revitalize a community gardening program in Phoenix, Arizona. We interviewed community organizers and collected social survey data in low-income, inner-city neighborhoods. Current gardeners, ex-gardeners, and non-gardeners were surveyed. To our knowledge, these groups have not been analyzed separately in other studies. We asked how perceptions of gardening differ between these groups and garden organizers, and what factors influence residents' participation in community gardens. We inquired if and how residents connect gardening with a larger vision for their neighborhood. Finally, we explored how food justice is experienced within the context of a poor, minority community.

Benefits and Burdens of Community Gardens

Benefits

Community gardens can play a major role in newly evolving urban agriculture systems that are designed to enhance community food security (Allen, 1999; McCullum, Desjardins, Kraak, & Ladipo, 2005). Participants in urban community gardens are three and a half times more likely than nonparticipants to consume fruits and vegetables five times a day (Alaimo, Packnett, Miles & Kruger, 2008). Benefits of gardening to individual participants have been documented in previous surveys. For example, Armstrong (2000) found that among the important reasons people gave for participating

in a community garden were access to fresh foods, enjoyment of nature, and health benefits. Lee (2001) found that immigrant populations with previous agricultural experience used community gardens to connect with their homeland, and that they value beautification and growing traditional vegetables as aspects of community gardening.

Clayton (2007) found that gardens are commonly used to appreciate nature and to improve the environment. Community gardens increase public awareness of environmental stewardship and local control over the food system (Peters, Bills, Wilkins, & Fick, 2008). They have been credited with reducing ambient air temperature in summer and aiding with rainfall runoff, noise control, food provisioning, attracting birds and pollinators, and providing points of recycling organic matter into the soil (Schmelzkopf, 1995). The Millennium Ecosystem Assessment defined these impacts as ecosystem services that benefit the environment (2005).

In the last three decades, academics and community organizers have come to see the social benefits of community gardens. They bring neighborhood residents together to form wider social networks and cultivate greater community involvement (Glover, Shinew, & Parry, 2005). This increased involvement strengthens neighborhoods' ability to address issues of social justice and ways to increase cultural enrichment (Armstrong, 2000; Schmelzkopf, 1995). Local community food movements can forge networks among residents, nongovernmental organizations, and state agencies, and can begin severing dependency on industrialized global food (Wekerle, 2004). Although past surveys have shown how communities as a whole perceive gardening, differences in perception among gardeners, ex-gardeners and nongardeners within a community have not been studied. This is potentially important in investigating the reasons why community gardens fail.

Burdens

In a longitudinal national survey of more than 6,000 community gardens in the U.S., the total number of community gardens increased, but about 9% (n=542) of existing community gardens were lost over the duration of the four-year study (American Community Gardening Association, 1998). Some gardens are endangered due to external pressures, such as repurposing of the land by government and/or private industry (Irazábal & Punja, 2009; Schmelzkopf, 2002). More often, gardens struggle with low levels of community participation or interest in the gardening initiative. Community gardens confront "gardener drop-out," when people sign up for a plot, decide the work is too difficult or the summers too hot, and then abandon the land (Surls, 2008). The primary reason for garden failure cited in the national survey of community gardens was abandonment (49.4%), followed by loss of a garden to a public agency (19.7%) (American Community Gardening Association, 1998). Ferris, Norman, and Sempik (2001) argued that successful community gardens must be designed around the social context of the neighborhood if the garden is to be accepted by the community. Gardens fail when foisted upon neighborhoods through top-down decisions (Schmelzkopf, 1995). Neighborhood resistance can hinder or eliminate the multiple benefits that a community garden might otherwise provide.

The gardens we discuss in this article are located in an area that has a history of unsuccessful community gardens, and garden organizers had informed us of declining participation in the remaining community gardens. When these gardens were initiated eight years ago, membership was between 10 and 15 residents per garden, but since then some gardens had dropped to one member and others were totally abandoned.

Research and Action Partnership

In September 2009 we began a partnership with residents and a nonprofit community development organization, the Phoenix Revitalization Corporation (PRC), in a roughly two-square-mile area in Phoenix, Arizona. This area comprised eight neighborhoods and was chosen for its low level of income, location in the Phoenix urban core, and the community organizer's stated intention of expanding the struggling community gardening program. The bounds of our study site were

suggested by our partner nonprofit organization as it is the core area of that organization's engagement. The nonprofit describes its core area of engagement:

> Sixty-six percent (66%) of the public housing in the City of Phoenix is in [the eight neighborhoods]. There is nineteen percent (19%) unemployment rate and fifty-two percent (52%) of the population lives below the poverty level. (PRC, 2010, p. 7)

The most recent neighborhood-level census data available from 2000 shows the community had a population of over 10,000 people living in 3,200 dwellings. Seven percent of the housing stock was vacant, 66% renter-occupied, and 26% owner-occupied. The average median annual income across the eight neighborhoods was $14,500, and the highest median income among the neighborhoods was $23,500. The racial and ethnic composition was 76.2% Hispanic, 16.9% African-American, 4.2% White (non-Hispanic) and 1% Asian (U.S. Bureau of the Census, 2000). Sometime after the year 2000, an influx of retired Chinese immigrants moved into public housing in two of these neighborhoods, noticeably increasing the Asian population.

Indicators of food desertification within the study area are emerging through other research. The Reinvestment Fund (2010) identified three of the eight neighborhoods as Low Access Areas in a nationwide study of supermarket access. A study of the area based on the Nutritional Environment Measure Survey found that this entire community lacks fresh produce in neighborhood stores and has significantly less availability of healthy food options compared to unhealthy food options (Crouch, 2011; Crouch, Phoenix Revitalization Corporation, & Harlan, 2011). At one time the study area had a farmers' market, but in 2005, a more profitable location opened downtown and the farmers moved.

History of the Gardens

Our nonprofit partner sponsors a community gardening program in the neighborhoods and provides funding and technical support. A new garden is initiated when a group of residents approaches the nonprofit with a request for garden space and supplies. The nonprofit then locates a suitable area and makes arrangements with the owner for use of the property. The nonprofit works with the city to cover hook-up to the water supply and monthly costs. The residents then form a gardening club with their own charter and organizational rules. The club is responsible for maintaining the garden, growing the produce, and deciding how the produce is distributed. The nonprofit organization describes the garden clubs as independent and autonomous units, with the exception of the funding and technical support the organization provides.

Until January 2010 a gardening coordinator met with each independent gardening club once a month. He provided seeds, equipment, and technical instruction. He also wrote a column for the nonprofit's quarterly newsletter, which was distributed to some 1,500 homes. The gardening coordinator is bilingual, speaking both English and Spanish. He has become fatigued, but he may return to coordinating the gardens in a couple years.

There are currently six small community gardens sponsored by our nonprofit partner. Of the six community gardens, only one continually uses all available plots. Two others comprise mostly unclaimed plots. Periodic visits to these gardens during one year showed only sporadic plantings within a few of the available plots. The fourth garden is located within a day school.

Two other gardens are totally abandoned and are now sometimes used by children at play. Organizers and community gardeners told us that repeated vandalism discourages use of the land. At the time of this writing, a fence has been proposed for the abandoned plots. A seventh garden is under construction, and recruitment for its gardening club membership is underway.

In cities hosting more established community gardening programs, the gardens in these Phoenix

neighborhoods would probably be classified as "pocket gardens" (Ferris et al., 2001). The gardens are all less than 1,000 square feet and are composed of unedged, tilled soil. Compost, when it is available, is added to the soil. Some composting is done on site; most of the gardens rely on purchased soil amendments. All the gardens are watered from hoses connecting to locked spigots. Garden club members have keys in order to access the spigots. None of the community gardens has a sign alerting residents to the garden's existence or availability, although one of the gardens has a no-trespassing sign on the fence.

Throughout our year of ethnographic observations we recorded which gardens were most actively used (table 1). The largest and most active community gardening club is composed of 12 people, most of whom speak only Mandarin Chinese. Their garden has slightly terraced raised beds so that water flows from the highest plots to the lowest. Tall plants, such as corn, are planted around the perimeter. The interior plots are devoted to tomatoes, peppers, and leafy greens. Due to lack of translators, communication between this garden club and the garden coordinator was limited to pointing at pictures and hand gestures. The second most active garden is maintained by a local Girl Scout troop. This garden has straight furrows, and the produce is given to a retirement community. The third garden is also associated with a retirement community and consists of five raised beds constructed with plywood and a ground-level tilled bed. The raised bed frames are crumbling, and over the last year we have not observed any new plantings. One community gardener sporadically works the tilled area. The remaining gardens were unused, but gardening club recruitment will begin after fencing is installed.

Hypotheses

Our nonprofit partner enlisted our help to explore whether there was potential to increase the recruitment and retention of local gardeners in order to sustain a more successful community gardening program. The small size of the community gardens and their lack of visible signage led us to hypothesize that the majority of neighborhood residents were not aware of the local community gardening program. We also hypothesized, based on the research findings of others, that residents of these neighborhoods would associate or anticipate some substantial benefits from community gardening, but that they would also associate and anticipate burdens with gardening, which could decrease their participation if left unaddressed. These perceptions may differ among people with different levels of gardening experience, and they may or may not align with the premises of the community gardening initiative promoted by the nonprofit.

Research Methods

Academic partnerships with community-based stakeholders can offer insights into complex social processes operating in the practice of urban agriculture (Austin, 2004; Feenstra, 2002). Guided by the interests of our community partners, we collected qualitative and quantitative data to study their gardening initiative. The ethnographic data (interviews with key informants and field obser-

Table 1: Community Gardens Within Neighborhoods, Listed in Descending Order of Use

Garden	Members	Type	Population Served	Fencing
1	12 members	Tilled soil	Retirement community	Fenced community
2	Girl Scouts	Tilled soil	Retirement community	Fenced
3	1 member	Raised beds	Retirement community	Fenced
4	Not available	N/A	Day school	Fenced
5	Unused	Tilled soil	All ages	Waiting for fencing
6	Unused	Tilled soil	All ages	Waiting for fencing

vations) and survey responses of a much larger sample of residents offer a compelling new understanding of why community garden initiatives may struggle to find participants.

Ethnographic Methods

To familiarize ourselves with the community and its gardening program, we conducted interviews with seven community organizers. We attended monthly community meetings hosted by our nonprofit partners and the city of Phoenix to talk with residents. In October 2009 at a community fair we handed out seeds and talked with residents about their gardening experiences. During the summer months the first author helped construct a small community garden for an after-school program.

Survey Methods

After gathering knowledge about the local community gardens, we created a survey to explore neighborhood sentiment about the benefits and burdens associated with community gardening. We compiled lists from this existing literature (Armstrong, 2000; Clayton, 2007; Ferris, et al., 2001; Lee, 2001; Saldivar-Tanaka & Krasny, 2004; Schmelzkopf, 1995; Voicu & Been, 2008). Interviews with organizers and residents revealed other benefits and burdens that were not addressed in this literature. For example, some residents and community organizers expressed dismay at the difficulty of maintaining a garden during Phoenix summers. The average daily high temperature in summer is roughly 105^0 F (WRCC, n.d.), and Arizona leads the U.S. in heat-related deaths (CDC, 2005). Yet we knew many gardens in Phoenix are cultivated during the summer. We suspected that comparing groups with more and less gardening experience could add to our understanding of how to get people into gardening and keep them interested.

Twelve possible benefits of gardening and 13 possible burdens of community gardening were listed on the survey, as well as an option for respondents to write in other answers. Respondents were asked to choose three benefits and three burdens of gardening that were most important to them because this would help us to identify themes for building a community garden that residents would find most attractive. Respondents had to fill in at least one benefit (or burden) to be included in the analysis. Responses to other questions about gardens on the two-page survey are discussed in the Results section.

With assistance from the community nonprofit, we administered the survey in March 2010 from a booth at a communitywide fair in order to reach the widest audience. The survey was available in English, Spanish and Mandarin Chinese. Spanish and Mandarin Chinese translators were on hand to facilitate the completion of surveys by non-English speakers or readers. Free bags of fresh fruits and vegetables supplied by a local community supported agriculture (CSA) group, were given to residents who completed the survey. Our respondents were not a truly random sample of the population, and so our statistical results may be subject to sampling error.[1] In situations such as ours, one can only capture as large a sample as possible, document the possible sources of bias, and use the nonrandom sample (Bernard, 2006, p. 187). To the extent possible, we triangulated our statistical findings with qualitative data.

Results

Results from Interviews and Observations

Despite many setbacks, most community organizers in both informal and semistructured interviews voiced their commitment to continuing the existing gardens and cultivating a neighborhood-wide community gardening initiative. Community organizers often conceptualized gardening as an activity for retired residents or children, and our observations confirmed that. Three of the existing gardens are associated with low-income retirement commu-

[1] Random sampling of the population via telephone or mailing would have increased the costs of the survey beyond our means. Community organizers suggested that linguistic barriers and neighborhood resistance to unsolicited calls or mail would result in low response rates. An Internet-based survey limits the population sample to those who have Internet access, which would likely result in a very small sample skewed toward a more educated population. Citing safety concerns, community organizers requested no door-to-door canvassing.

nities, one is maintained by Girl Scouts, and other children-oriented community gardens are in the planning phase. Of all the gardens listed, only two (which are temporarily unused until fencing is installed) are available to nonretired adults. Yet in these types of neighborhoods, economically disadvantaged working-age adults may struggle to meet their nutritional needs, and women in particular are vulnerable to food insecurity (Townsend, Peerson, Love, Achterberg, & Murphy, 2001). The active gardening clubs revealed that female community gardeners outnumbered male community gardeners four to one which may, in part, reflect a gendered struggle with food insecurity among neighborhood residents.

Regardless of all the problems and very low participation rates evident in the current community gardens, there were indications that residents wanted community gardens in their neighborhoods. We learned from interviews that in 2009 community organizers had engaged in round-table talks with neighborhood stakeholders — service providers, nonprofits, local government officials, and academics — and participating residents to create a Quality of Life Plan (QLP), a vision for the future of the community. The QLP is a:

> …document to be used collectively by residents and stakeholders to work towards creating neighborhoods that are healthy, safe, economically vibrant, and happy places for families and individuals to live, work and play. (PRC, 2010, p. 6)

Stakeholders and the residents who participated in the QLP discussions identified community garden expansion as vital to providing opportunities for social interactions and education on healthy eating (PRC, 2010, p. 21). They would like a new farmers' market to partner with the community gardens, linking local food production with distribution and economic development (PRC, 2010, p. 35). To the extent that stakeholders and participating residents represented the broader community's sentiment toward the gardening program and new farmers' market, there appears to be some measure of "buy-in" to the local food initiative. One organizer expressed her desire to expand the gardening program, saying, "I would like to see a farmers' market over here. And a big garden, like a really big garden."

Community organizers offered multiple opportunities for residents' input to the QLP, but they faced many challenges to gathering opinions of a representative sample. To the extent possible, meetings were arranged around resident's schedules, but community organizers spoke of time and travel burdens for neighborhood residents who would otherwise attend community meetings. Uncertainty regarding what exactly the QLP is, and what it is intended to do, also may pose a hurdle to embracing it as a plan of action. One tentative resident said: "At first I was scared to participate in the [QLP] plan because I did not understand. Then I realized that my opinion was heard and I felt more comfortable" (PRC, 2010, p. 10). The difficulties in getting residents to engage in the process of drafting of the QLP challenges the otherwise inclusive nature of the document and the interpretation of how much resident support exists for community gardening.

Results from Survey of Residents

Our survey was completed by 149 community residents ages 18 and older. To better understand how well our sample represents the demographics of the neighborhoods, we compared the gender, ethnic and age profiles of our respondents with the demographic breakdown by census block group in the 2000 U.S. Census (table 2).[2] Women were more likely than men to complete our survey, as were respondents over 40 years of age. We had the only booth with written materials and translators for Mandarin speakers, so the Chinese population was also more likely to complete our survey.

[2] Preliminary 2010 census data pertaining to population ethnic composition in the neighborhoods has recently become available: 74.4% Hispanic; 13.8% Black or African American; 7.1% White (non-Hispanic); 1.8% Asian; 1.6% American Indian; 0.1% Other (U.S. Census Bureau, 2010). All calculations in table 2, however, are made using 2000 census data to avoid using data from multiple census years.

The first question asked respondents "Are you interested in gardening?" Using a five-point response scale of interest in gardening with 5 = *very interested* and 1 = *not interested,* the mean level of interest was 4.4 for 94 respondents who answered that question, and 83% replied that they were very or somewhat interested (table 3). This response indicates a high level of residents' interest in gardening.

Table 2: Gender, Ethnicity and Age Profile of Survey Participants (N=149) **Compared With the 2000 U.S. Census of Blocks**

	Demographic Characteristics	U.S. Census 2000 (% of block residents)	Survey 2010 (% of survey respondents)
Gender	Male	49.3%	29.8%
	Female	50.7	70.2
Ethnicity	American Indian	1.4	0.7
	Asian	1.0	27.0
	Black or African American	16.5	24.8
	Hispanic	76.8	38.3
	White/Caucasian	4.2	6.4
	Other	0.1	2.8
Age	18–29	31.9	15.8
	30–39	21.9	15.0
	40–49	15.6	14.3
	50–64	15.3	22.6
	65 or older	15.1	32.3

Of the 131 respondents who stated their current status with respect to gardening, 26% (n=34) identified themselves as current gardeners, 35% (n=46) as ex-gardeners and 39% (n=51) as non-gardeners. Home gardeners, community gardeners, and nonagricultural gardeners were represented in the category of current gardener. Overall, one of four survey respondents in this sample was currently engaged in some type of gardening, and three of five respondents had gardening experience.

A working definition of a community garden was included in the survey: "A community garden is a single piece of land gardened by a group of people." Respondents were asked, "If you are interested in gardening, where would you prefer to garden?" Twenty-one percent (n=31) selected community gardens, 41% percent (n=61) selected gardening at home, and 1% (n=2) selected school gardens.

Table 4 shows the percentages of men and women, ethnicities, and ages interested in community gardening. In parenthesis we show the number of respondents interested in gardening divided by the total number of respondents in that gender, ethnic, or age category (e.g., 15.3% or six of 39 males who responded to the survey were interested in gardening). Although some of the percentages are based on small numbers of respondents, table 4 suggests which groups expressed the most interest in community gardening and which groups may need further encouragement. A greater proportion of women reported interest in community gardening than men. In this sample, African Americans and Whites seemed the most likely to be interested in community gardening. Hispanics and Asians

Table 3: Level of Interest in Gardening (N=94)

Response	Gardening Interest
Very interested	59.6% (56)
Somewhat interested	23.4 (22)
Neutral	13.8 (13)
Little interest	2.1 (2)
Not interested	1.0 (1)
Total	**100.0% (94)**
Mean level of interest	**4.4**

Table 4: Percentage of Each Group That Indicated Interest in Community Gardening

	Demographic	(# of respondents interested) / (total # of respondents in group)	
Gender	Male	15.3%	(6/39) [a]
	Female	27.1	(25/92)
Total		**23.7**	**(31/131)** [b]
Ethnicity	American Indian	0.0%	(0/1)
	Asian	18.4	(7/38)
	Black or African American	34.2	(12/35)
	Hispanic	14.8	(8/54)
	White/Caucasian	33.3	(3/9)
	Other	25.0	(1/4)
Total		**22.0**	**(31/141)** [b]
Age	Younger then 25	40.0%	(4/10)
	25–34	26.3	(5/19)
	35–44	13.6	(3/22)
	45–54	20.0	(3/15)
	55–64	29.1	(7/24)
	65 or older	20.4	(9/44)
Total		**23.1**	**(31/134)** [b]

[a] Number of respondents interested in gardening divided by the total number of respondents in the same gender, ethnic, or age category.

[b] Differences in total n's are accounted for by missing data on the gender, ethnicity, and age variables.

seemed to have lower levels of interest. Younger people seemed to be more interested than older people. Nevertheless, some people of all ages were interested in gardening. In sum, there was a substantial amount of interest in gardening, including community gardening, in this community.

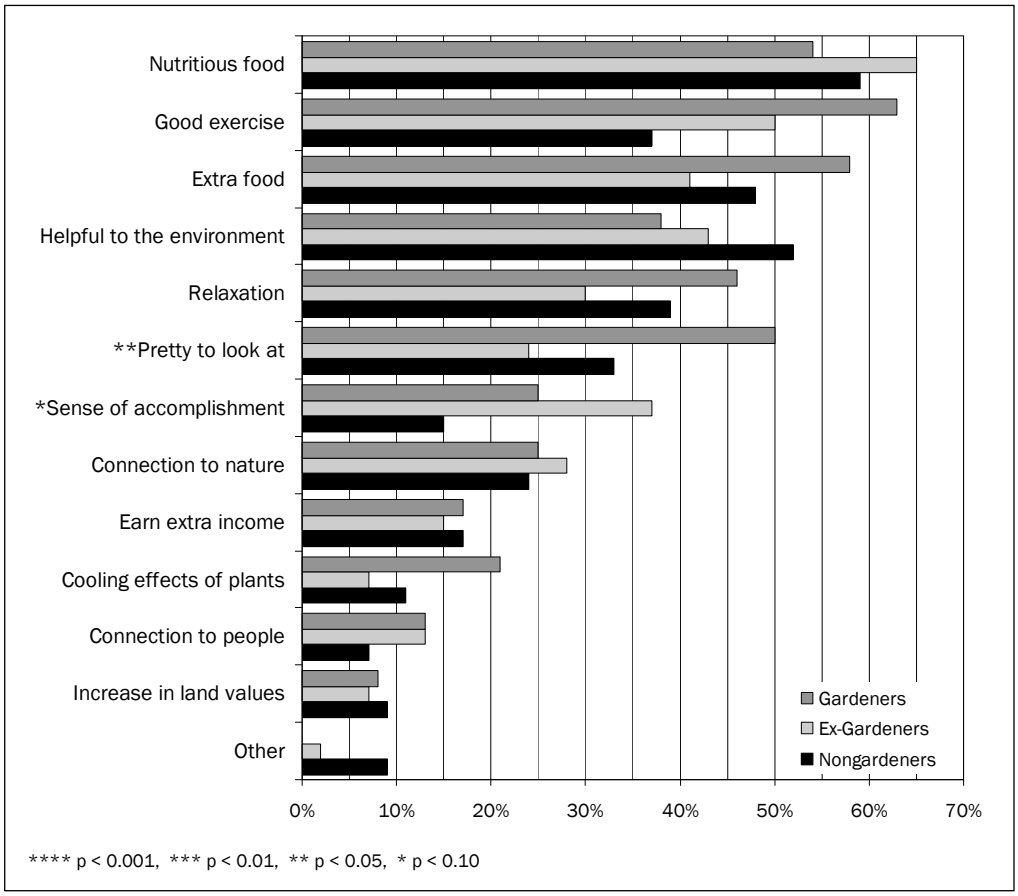
A large majority of community residents did not know about the community gardens in their neighborhoods, and 72% (n=107) of the respondents did not know of the existing community gardens program. Of the respondents who indicated interest in working in a community garden, 67% (n=22) did not know of a community garden near their home. The data support our first hypothesis that more residents are interested in community gardening then are aware of the program. Furthermore, 82% (n=112) of total respondents had not heard of the local food initiative outlined in QLP, and 77% (n=24) of respondents interested in community gardening had not heard of the local food initiative.

Benefits and Burdens of Gardening

The perceived benefits of gardening for the categories of gardeners, ex-gardeners and nongardeners are shown in figure 1, reported in descending order of the percentage of respondents who indicated the item as a benefit. Analysis of variance was used to test for significant differences in perceptions among the three categories. Overall, residents' perceptions of the benefits of gardening revolved strongly around nutritious food (61%), exercise (49%), and extra food (49%). Other gardening benefits important to many were helping the environment (45%) and relaxation (37%). Gardeners, significantly more than others, admired the beauty of gardens (pretty to look at, $F = 3.071$, $p = 0.05$). Gardeners were also more likely to appreciate the cooling effects of plants, although the difference was not statistically significant. Ex-gardeners were significantly more likely to perceive that they had given up an important sense of accomplishment ($F= 2.874$, $p = 0.06$). Earning extra income (from selling produce) (16%), socializing with people (11%), and increasing land values (10%) were not rated highly important by any group.

The perceived burdens of gardening are reported in descending order of the percentage of respondents who indicated the item as a burden, as shown

Figure 1. Percent of Respondents by Gardening Status Who Identified the Item as an Important Benefit of Gardening (N=131)



in figure 2 (next page). Overall, lack of space (48%) and excessive heat (39%) were the two largest barriers to gardening for both gardeners and ex-gardeners. The ex-gardeners were significantly more likely to say that being too hot was a burden (too hot, $F = 5.187$, $p = 0.01$). Gardeners were significantly more likely to mention crop loss as a burden (crop loss, $F = 3.706$, $p = 0.03$), which is potentially related to hot weather. Two burdens that were significantly more important for nongardeners were not knowing how to garden (do not know how, $F = 7.837$, $p = 0.001$) and the belief that gardening would take too much time (takes too much time, $F = 2.5$, $p = 0.09$). Interestingly, nongardeners did not mention as often as the other groups that excessive heat would be a barrier to gardening. Although some respondents acknowledged that gardening was harder than grocery shopping (14%), very few listed hard work (10%), messy gardens (7%), getting dirty (6%), or feeling unsafe (5%) as barriers to participation in gardening. No respondents indicated that they thought gardening is not enjoyable.

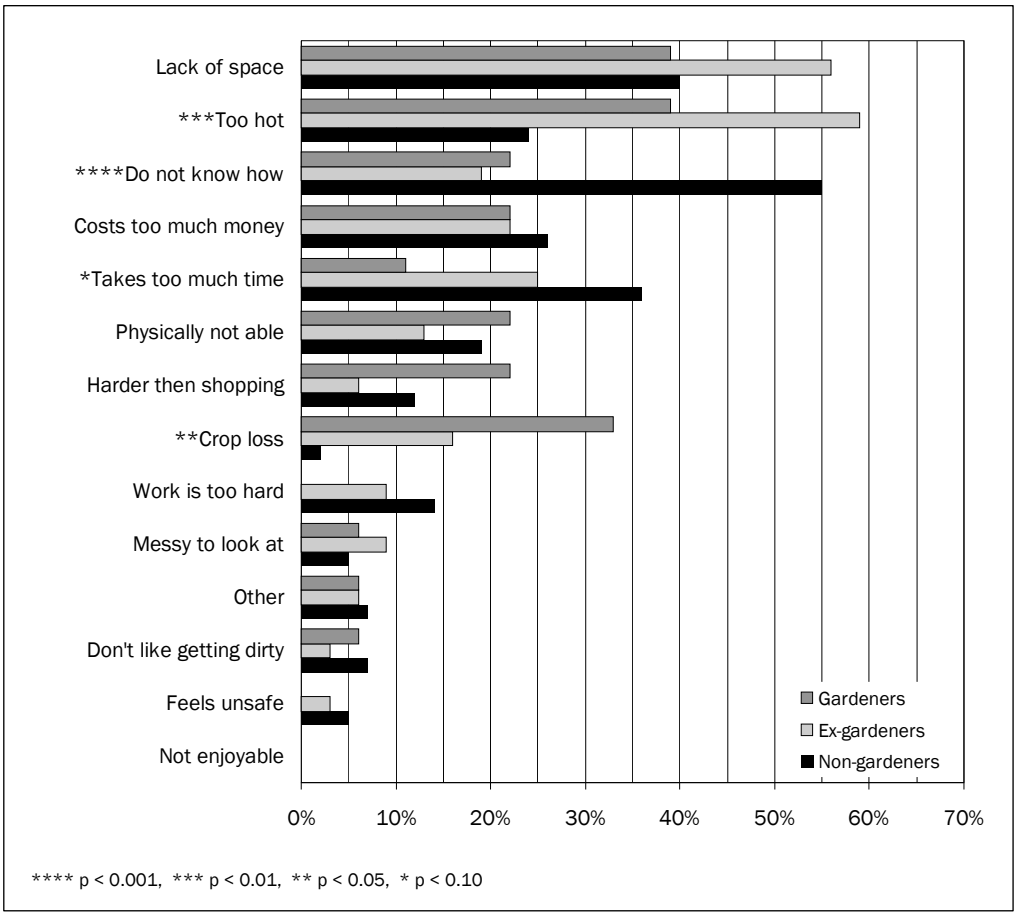
For each benefit and burden item, we calculated the differences in percentages between respondents who said they were interested in gardening at home and those who said they were interested in community gardening. None of the t-tests showed a statistically significant difference between how these groups perceived gardening.

In sum, our second hypothesis was supported: residents sampled in this low-income community perceived some important benefits to gardening, which mainly entail access to good food. They also perceived barriers that make gardening difficult, notably lack of space to garden and excessive heat. Those without gardening experience felt hampered by a lack of knowledge.

Discussion

This study is the product of an active and ongoing partnership among academics, community organizers, community stakeholders, and the residents of eight low-income and minority neighborhoods. The data we collected are being utilized to further engage the neighborhoods and

Figure 2. Percent of Respondents by Gardening Status Who Identified the Item as an Important Burden of Gardening (N=108)



help strengthen their community gardening program and local food initiative, as called for in the Quality of Life Plan. The QLP is very much a living document. We are working with community organizers to provide substantive contributions to later drafts of the QLP based on our findings.

Our survey showed that only 28% of the respondents knew of the existing community-garden program and 21% of respondents indicated an interest in community gardening. The number of respondents who indicated they were interested in community gardening exceeded the existing number of community gardeners. Simply cultivating awareness of the garden program may substantially increase current garden membership. However, barriers still exist and a substantial portion of the population did not indicate interest in community gardening. This section discusses strategies that may increase resident interest in joining the community gardening and local food initiatives.

To increase understanding of complex on-the-ground issues facing this local food initiative, we must examine the multiplicity of perspectives surrounding the project. We compared the gardening objectives stated in the QLP with our ethnographic and social survey findings. We found several statistically significant differences in perception among groups with and without gardening experience, indicating that residents cannot be treated as a homogenous group when designing a community garden or local food initiative. Multiple perceptions of community gardening exist in the same neighborhoods between residents as well as between residents and the staff and volunteers with the local food initiative. This is not a simple case of "if you build it, they will come." Meeting the needs and desires of so many disparate groups will require careful planning and action.

The objectives of the QLP community gardening initiative are to generate supplemental income and provide greater opportunities for residents to socialize. Less than 20% of residents, however,

currently associate gardening with either of those objectives. This discrepancy may have contributed to the difficulty community organizers and stakeholders had with sustained resident participation in drafting the community gardening section of the QLP. The survey allowed us to take a larger sample of neighborhood gardening sentiment than was easily available to stakeholders and community organizers.

The QLP calls for community gardens to supplement income. Successful market gardens and community supported agriculture programs can be found in Phoenix, but in the community we studied residents did not strongly associate gardening with an extra source of income. Armstrong (2000) had similar findings in upstate New York: Community gardeners were more interested in health benefits associated with gardening than in using the garden as a way to supplement their income. The recent loss of their farmers' market may have further impacted the neighborhoods' negative perceptions of supplementing income through gardening.

The QLP states that community gardens should be used as a place for residents to socialize. Yet we found no statistically significant differences in perceptions of burdens and benefits between residents interested in gardening at *home* and those interested in *community* gardening. Therefore, we believe residents placed home gardening and community gardening under the same umbrella. So it may come as little surprise that respondents who indicated an interest in community gardening did not associate the garden with a place to socialize. Educating potential community gardeners about sharing seeds, produce, and gardening tips may demonstrate some advantages of gardening in company. Placing a bulletin board in the community garden could serve to increase awareness of the social aspects of community gardening. Large colorful signs advertising the existence of the garden and how to gain access to it could increase both the social awareness of the garden and the likelihood that it will be viewed as a place of social interaction. To meet QLP goals, further promotion of opportunities for market gardening and socializing in the gardens will be necessary. Scheduling fun gardening activities such as garden parties, harvest parties for children, and opening the gardens for social events may increase awareness, interest, and participation.

Neighborhood residents envisioned a community garden that provides plentiful and nutritious food, exercise, beautification, and a sense of accomplishment. The perceived burdens for residents included lack of garden space, little knowledge of gardening, substantial time commitments, and hot summers. Since the residents represent the pool of potential community gardeners, understanding their perceptions will be critical in creating a garden that welcomes their participation rather than a garden that goes unnoticed and underappreciated. An inclusive garden design must acknowledge neighborhood food desertification, reflect critical thinking about justice issues, and construct an environment in which residents would like to relax, socialize and garden.

Crouch et al.'s ongoing food-resource mapping project shows that this community fits the definition of a food desert: having low access to quality food (2011). It is not surprising then that residents' interest in gardening revolved most strongly around having extra food and nutritious food. The survey findings may reflect residents' difficulty in obtaining and affording fresh fruit and vegetables. Female-headed minority households are more likely to suffer food insecurity then male-headed minority households (Martin & Ferris, 2007). In our study, 27% of women indicated an interest in working in a community garden compared with 15% of men.

The proportion of female participants in community gardens seems to vary by the design of the community garden. Schmelzkopf (1995) found more men participated in New York City community gardens that featured a clubhouse, but more women participated in family-oriented community gardens. Providing family-oriented community gardens with playground equipment could encourage mothers to come to the gardens with their children. If expectant mothers or children will be spending time in and/or eating

food from a community garden, it should be tested for levels of lead in the soil and that may be taken up by the plants.

For many residents, a community garden may offer a chance to inexpensively attain high quality produce. In this context, a community garden can offer the physical space residents need to practice food justice. Low homeownership rates, apartment complexes, and public housing in the community we studied could be among the reasons for the greatest perceived burden: lack of space to garden. Inclusion of as many diverse groups as possible in a community garden program may help particularly vulnerable populations. Utilizing raised beds opens up the gardens to handicapped individuals. Locating translators to facilitate communication with non-English speakers invites an otherwise alienated group into the garden. High-yield, intensive gardening methods could be particularly attractive for residents struggling with food security.

The community garden can become a social space where agricultural and environmental knowledge is transferred from garden coordinators to residents and from one resident to another. A substantial burden for residents in our study area was "crop loss," which may reflect a lack of knowledge about gardening. Participation in a community garden could generate a reservoir of local agricultural knowledge and strategies to create a more just and equitable distribution of nutritious foods along with environmental benefits.

Respondents who were actively gardening were no more likely than nongardeners or ex-gardeners to select "helpful to the environment" or "connection to nature" as benefits. This supports Clayton (2007), who found that gardens were not generally perceived as part of a larger ecosystem, but instead were appreciated for specific nature-related benefits provided to the gardener. In our survey, nongardeners most strongly associated gardening with general environmental benefits, but it seems that association was not sufficient to encourage them to garden.

Gardeners, more then other populations, noted specific environmental benefits that impacted them directly, such as beautification and the cooling effects of plants. Instead of concentrating on broad environmental concerns, local food initiatives in poor and minority communities may gain more support if they construct a specific environment in which residents want to live, work and play. Alkon (2008) stated that, "by defining the environment as places where low-income people and people of color *are,* rather then where they *are not,* ecological issues are clearly connected to issues of inequity" [emphasis in original]. Designing a community garden that incorporates a heat-mitigation strategy might entice ex-gardeners back into neighborhood gardens. In the neighborhoods we studied, the most successful community garden is also the only garden with a shade sail.[3]

Increasing local knowledge about community garden programs and the environmental benefits of gardens will be paramount to creating a sustainable local food initiative. Community fairs may provide an excellent place to reach out to local residents. Staffed with seven assistants, our survey booth was very busy for the duration of the three-hour fair. Many of our survey respondents wished to engage in conversations about gardening and find out more about the existing community gardening program and any plans for expansion. This may offer a hint as to how to promote community gardening programs and local food initiatives. Participation in local events such as a community fair increases communication between garden coordinators and potential community gardeners, which appears to be a major hurdle for struggling community garden programs.

Limitations of the Study

As a "research frame," community fairs attract a segment of the population that has both the time and interest to participate. The retired Asian community (composing the majority of currently active community gardeners) lives close to the location of

[3] A shade sail is an awning made from fabric or plastic that reduces the intensity of sunlight reaching the people or plants below.

the community fair where we conducted our survey. Their retirement communities also provided transportation to the fair. These respondents were particularly interested in the gift bag of fresh fruit and vegetables and in talking about gardening. Removing or limiting retired Asian respondents from the survey sample would yield a sample demographic that more closely corresponds to neighborhood census data, specifically with regard to ethnicity and age of respondents. However, a sample that more closely represented the neighborhoods demographics would not have been representative of the Asians' active engagement in the existing neighborhood community gardens. Women were also oversampled. However, they are generally the first to suffer the effects of food insecurity and also make up the majority of active community gardeners in our study area. Although the sample of survey respondents was not random, we learned that there are considerably more gardeners and ex-gardeners in the community than we expected.

Conclusion

Our findings provide valuable insight for community garden organizers in the southwestern U.S. and perhaps in other hot and arid regions. In a low-income Phoenix community we found that access to nutritious food, extra food, and exercise were the top benefits that gardening provided to residents. Nongardeners connected gardening with helping the wider environment, but it was not sufficient inducement for them to start gardening. Gardeners were more likely to value personal environmental benefits, such as beauty and cooling. On the other hand, ex-gardeners left gardening because of a lack of space and intense summer heat. Lack of knowledge about gardening and time for gardening were major burdens for nongardeners.

The objectives of the gardening initiative were to generate supplemental income and provide greater opportunities for residents to socialize. Less than 20% of residents, however, currently connect gardening with either of those objectives. Multiple perceptions about community gardening exist in the same neighborhood. Programs need to align themselves with residents' perceptions. Education about community gardens may also align residents' perceptions with the local food initiative.

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Perceptions and attitudes regarding organic waste: Feasibility of establishing an urban composting program in Chiapas, Mexico

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Abstract

The poor management of household and municipal waste is a threat to the sustainability of urban communities throughout the world, and also constitutes a missed opportunity for community and economic development. Additionally, many innovations in household solid waste management are never adopted because they do not take into account existing local knowledge, preferences, behaviors, and management practices. In order to contribute to solving solid waste problems in small multicultural cities in Latin America, we conducted an interdisciplinary study that (1) documents current practices for managing organic waste and identifies citizens' willingness to compost household refuse; (2) analyzes whether composting municipal organic waste results in compost of adequate quality; and (3) identifies farmers' willingness to use this compost. We also identify innovative urban practices for organic waste management. Compost obtained during the study fulfilled minimum requirements for nutrients in compost according to international standards, despite the fact that no consistent composting

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methods were followed. The results indicate that household or neighborhood composting could contribute to solving urban organic waste problems as well as the lack of organic fertilizer available for agriculture in urban and peri-urban areas. While distributing compost could be a challenge, it also provides an opportunity to strengthen links between farmers and consumers.

Keywords
compost, domestic waste, environmental education, local knowledge, urban agriculture, vermiculture, Mexico

Solid Waste Problems and Opportunities

Poor management and disposal of domestic solid waste is one of the most common problems in cities worldwide (Del Carpio, Escamirosa, & Castañeda, 2000; Xudong, Yong, & Tsuyoshi, 2010). In most Latin American cities, solid waste is disposed in open-air dump sites, without consideration for environmental and public health risks (Del Carpio, *et al.,* 2000; Escamiroza, Del Carpio, Castañeda, & Quintal, 2001; Zarate, Slotnick, & Ramos, 2008).

Governments of many cities see incinerators and municipal composting plants as possible solutions to garbage problems, and in some cases these have been implemented. Incinerators contribute to diminishing the volume of solid waste, and may be built with technologies to significantly reduce emissions. However, most existing incinerators generate toxic fumes, and the necessary equipment to eliminate the discharge is usually unaffordable for small cities in poorer nations (NOM-098-SEMARNAT, 2002; Öberg, Öhrstrom, & Bergström, 2007). Furthermore, during the incineration process, potentially valuable organic matter is lost.

Some cities have successfully implemented municipal or private composting. For example, in Catalonia, Spain, 75% of the city's organic waste is processed in 25 composting plants (Barrios, Fernandez, Vasquez, & Font, 2004), providing compost for urban and rural agriculture. However, since municipal composting processes garbage from a wide variety of unknown sources, further research is required regarding aspects of hygiene and toxicity in large-scale composting (Murillo, Cabrera, Lopez, & Martin-Olmedo, 1995; Déportes, Benoit-Guyod, Zmirou, & Bouvier, 1995; Farrell & Jones, 2009).

The city of Loja, Ecuador (lat. 3°59'35" S, long. 79°12'15" W), has also successfully implemented municipal composting. Loja has established a solid-waste treatment plant that includes recycling and worm composting using locally developed technology. Loja has a population of 150,000 and produces an average of 90 tons of solid waste daily (J. Ramirez, personal communication, 20 June 2006). The composting plant processes 95% of this waste, 60% of which is organic. Most of the composted organic waste is used to fertilize public parks or is sold to local farmers (J. Ramirez, personal communication, 20 June 2006). In contrast, other communities that have initiated municipal composting have had difficulties such as residents not cooperating by separating their household waste. We believe, however, that some municipalities have significant potential given the right approach. In this paper we focus on one such case, San Cristobal de Las Casas (herein referred to as "San Cristobal"), in the southeastern Mexican state of Chiapas (lat. 16°45'0" N, long. 92°38'0" W; see figure 1, next page). The aim of this study was to explore the feasibility of establishing a municipal composting program in San Cristobal, taking into account the current organic waste management practices of its residents.

San Cristobal, with a population of 180,000, is similar in size to Loja. Approximately 170 tons of solid waste is produced daily in San Cristobal (Vasquez-Sanchez, Ramos, Mendez, Diaz, & Valencia, 2004). The great majority of this waste is deposited in an open-air dumpsite, without consideration for the environment or the health of the local population. In 2005, the city tried to initiate a waste-separation program in some neighborhoods. The program failed due to a lack of containers for separating materials, as well as logistical problems when the same vehicle collected both organic and nonorganic waste (A. Garcia, personal communication, 3 October 2005). The

Figure 1. Map of Mexico Indicating Location of San Cristobal de Las Casas

only study available regarding San Cristobal waste estimated that 62% of the city's solid waste was organic (Aguado, 1998). Based on our observations, this percentage has not changed significantly over the past decade. San Cristobal has great potential for producing compost for both domestic and municipal use. Some local government officials believe that municipal composting plants could be established. However, they report that at least in the short term they cannot afford to establish an integrated waste-management program. Such a program would include a composting facility as well as programs to motivate and teach citizens to separate their garbage (Vasquez-Sanchez, *et al.,* 2004).

In the past, when municipal authorities have sought alternative waste-management solutions, they have not sought the opinions of local residents. Past alternatives involved techniques exclusively from other locations that were not only rejected, but also threatened to displace existing local techniques. These efforts disregarded the possibility that local techniques could be more efficient and sustainable, as they are adapted to local conditions. According to the logic of constructivist theory for solving community problems (Coll, 2002), one means of minimizing solid-waste problems is to identify existing local techniques and initiatives among citizens and promote them broadly across the population. Successful implementation of an integrated waste-management program requires marrying traditional organic waste-management practices and other aspects of daily community life with the public interests and motivations regarding new ideas and technology. That is, people are more likely to adopt new practices if they do not involve drastic changes in their lives. The premise of our study was that documenting local knowledge and practices is an important early step toward a successful waste-management plan that includes composting.

Mayan farmers throughout the Mesoamerican highlands near San Cristobal still cultivate the land using traditional farming practices and are generally aware of the benefits of compost, such as higher yields and reduced pest damage. However, since the cold climate does not facilitate rapid production of biomass, farmers lack resources to produce a sufficient amount of organic compost for their crops (Morales, Perfecto, & Ferguson, 2001). Making composted urban waste available to them could help solve this problem. However, in order to ensure that farmers adopt the use of compost produced with organic municipal waste, their opinions and concerns — for example, with respect to quality, availability, price, cost of transport, and health risks — must also be taken into account. Addressing these concerns regarding the use of compost could help develop strategies to safely use and even market this product.

In urban and peri-urban areas, solid-waste disposal problems could be greatly resolved by composting organic waste, which would also provide local farmers with organic fertilizer. This interdisciplinary project involving the biological and social sciences had the following objectives: first, to document San Cristobal residents' current organic waste-management practices, and to measure their willingness to separate organic waste and compost at home, and second, to study whether waste in San Cristobal is suitable for vermiculture (worm composting), as well as for conventional pile composting. Thus, we sought to determine the most efficient method in terms of cost, time, and management that would produce a high-quality product and be adapted to San Cristobal lifestyles. The final objective was to identify current fertilization practices of San Cristobal farmers as well as their level of willingness to use compost made from organic municipal waste. Although our study documents the case of San Cristobal, this approach could be implemented in similar projects in other cities around the world.

Methods

The current study explored three areas of research: (1) documenting current practices for managing organic waste and identifying citizens' willingness to compost household refuse; (2) determining whether municipal organic waste is adequate for composting; and (3) identifying farmers' willingness to use this compost. The methods we used are outlined below.

Willingness of San Cristobal Residents To Separate Organic Waste, and Current Organic Waste-Management Practices

Six citizen focus groups were organized in San Cristobal neighborhoods and schools, with an average of 10 participants in each group. The objective was to discuss the issue of solid-waste management, verify the vocabulary to be used for the broader survey, and motivate local citizens to participate in trials of neighborhood composting.

We used a random sampling technique to distribute the survey to 369 households located in 40 of the 115 city sectors. Households were selected according to a two-stage conglomerate sample (Scheaffer, Mendenhall, & Ott, 1987). We aimed to ensure that confidence intervals for percentages obtained had an estimation error no greater than 10%.

Survey questions were categorized according to topic. Each question had several categories of response. For each category, the number of people per city block who responded affirmatively to each category was counted, as well as the proportion of affirmative responses in each category. Estimation error was calculated using the formulas suggested for sampling by conglomerates (Scheaffer, *et al.,* 1987).

Suitability of San Cristobal Waste for Vermiculture and Conventional Pile Composting

Trial composting systems were developed in order to determine the suitability of San Cristobal waste for composting. Four community composting sites were established among the focus groups' participants and another in a local research center. These groups included people of different socioeconomic and educational levels. In each site, a workshop was held to explain how to separate waste and compost and to establish participants' responsibilities. This project was carried out over a six-month period. Two composting methods were

tested at each of the five sites: worm composting (vermiculture), using *Eisenia andrei* and *E. foetida;* and conventional, or "pile," composting, in which wastes are piled one meter high and turned and watered once or twice per week until the organic matter decomposes. Food waste and yard debris collected at each site were divided between the two compost piles in order to guarantee that each pile had a similar composition of waste. Neighbors cooperated to collect organic waste daily and take it to a central compost pile (see appendix for details on type of waste used, temperature, pH, and duration of the compost piles).

The two types of finished compost were compared for quality using a paired samples design. Nutritional content, pathogen levels, and heavy metal content of both types of compost were also analyzed. The Student's t-test for paired samples was used to determine whether the composting method significantly affected outcome. Confidence intervals were calculated for the average of each response variable in order to evaluate whether results obtained were within established limits. This analysis was carried out using the statistical package SPSS, version 12.0 (SPSS Inc. 2003). The two compost methods were also evaluated in terms of cost, space required, aeration, size of particles in each substratum, and participants' preferences.

Farmers' Fertilization Practices and Willingness To Use Compost Made From Organic Municipal Waste
Finally, field interviews of a sample of farmers were conducted to determine their current fertilization methods, their willingness to use and buy compost made from organic municipal waste, under what conditions they would be willing to use it, and any reasons they might not be willing to do so. The survey included 43 farmers in three agricultural neighborhoods in the area surrounding San Cristobal whom we found working in their plots and who agreed to speak with us. Each question had several response categories. The number of farmers who responded affirmatively to each category was counted and the proportion of affirmative responses in each category was calculated. This survey identified farmers' general point of view regarding composting. While this limited sample does not allow us to generalize about all farmers in the San Cristobal region, survey results do offer some insight into their potential interest in using community organic waste.

Results

Current Waste Management Practices and Residents' Willingness To Compost

Household separation and management of organic waste
We found that 41.1% of respondent households already separate and compost organic waste in order to deal with their solid waste. This may be an overestimate, as some respondents who say they separate and compost may not do so consistently. This could be verified through future observation.

Local organic waste-management practices include composting, feeding food scraps to pets and farm animals, saving waste for neighbors' animals, burying waste, and using organic waste in their gardens (figure 2). Food scraps fed to one's own or neighbors' animals are referred to in San Cristobal as *hachihual*. With respect to burying organic waste, some respondents reported using a single pit, while others dig several small pits and fill them over time. Some inhabitants who use organic waste in the garden put their non-composted organic waste in a blender and use the resulting liquid to water their plants.

Compost methods currently used by San Cristobal residents are pile (2.5%), pit (1.7%), combination pit and layered (1.2%), layered (0.5%), worm composting (0.3%), and other (1.7%). In pit composting, organic waste is placed in a hole in the ground. When it is full, it is covered with earth, turned, and watered as necessary. Layered compost is made by layering organic waste, sawdust, limestone, and soil. These layers are covered and left to decompose for two to three months. The compost is then turned and used. Several other composting methods were identified in the category of "other actions": (1) kitchen and garden waste is placed along with charcoal in a large plastic bag, and the contents are stirred once a month; (2) small areas in the garden are filled with organic waste, cow manure, ash, and

leaf litter, and turned and watered when necessary; and (3) organic waste mixed with soil is deposited in a receptacle, which is then closed, allowing the contents to decompose.

Of those who separate their waste, 21.6% take it to the curbside for city garbage pick-up. The most common reason for separation is to minimize unpleasant odors and diseases at home. However, many people appear unmotivated to separate waste, as they see it collected and mixed together in the garbage truck. Thirty-seven percent of respondents say they do not separate organic and inorganic waste (figure 2).

Initially, 65% of those interviewed (n=369) stated that they understood the concept of organic waste. However, when asked to distinguish organic from nonorganic waste products, only half responded correctly, 7% of responses were incorrect, and another 3.2% had confused the concept, believing organic to be nonorganic and vice versa.

Those who responded correctly (n=209) were then asked to provide a definition of organic waste, and responses were grouped into several general categories. The majority of respondents generally defined organic waste as vegetable and fruit peels and leaves, while others defined it as materials that putrefy or decompose, materials that can be used to make compost, natural materials, or kitchen waste (figure 3).

Residents' willingness to separate organic waste and compost at home

Ninety percent of respondents who

Figure 2. Current Organic Waste Management Practices of San Cristobal Inhabitants (n=369)

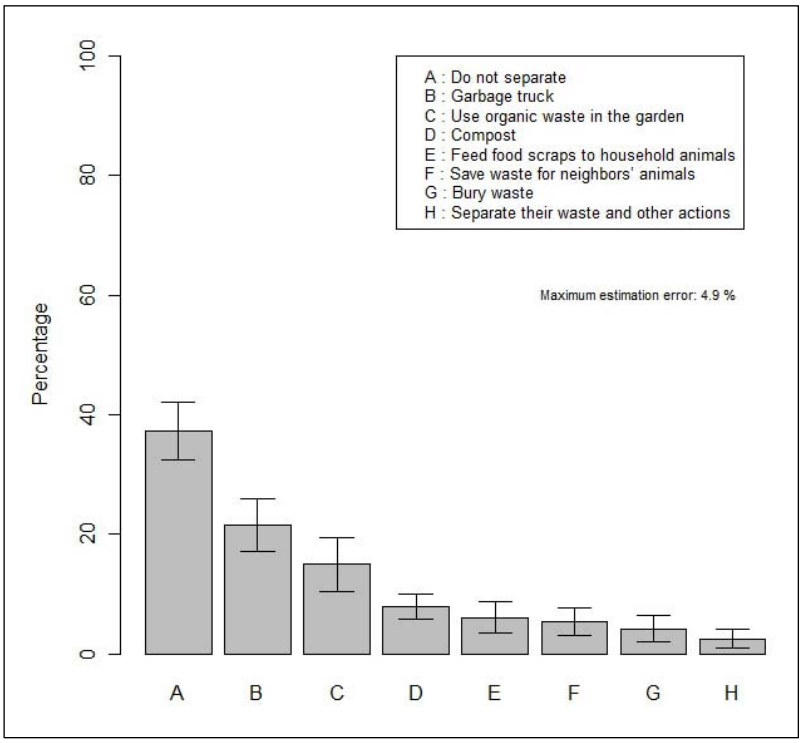


Figure 3. San Cristobal Respondents' Definitions of Organic Waste (n=209)

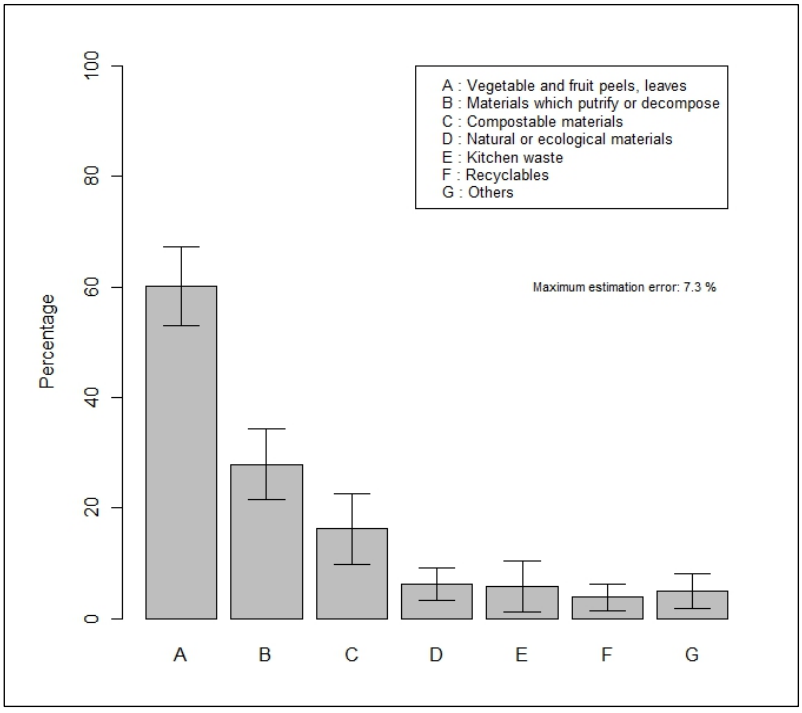


Figure 4. Reasons Why Respondents Willing To Separate Do Not Currently Do So (n=137)

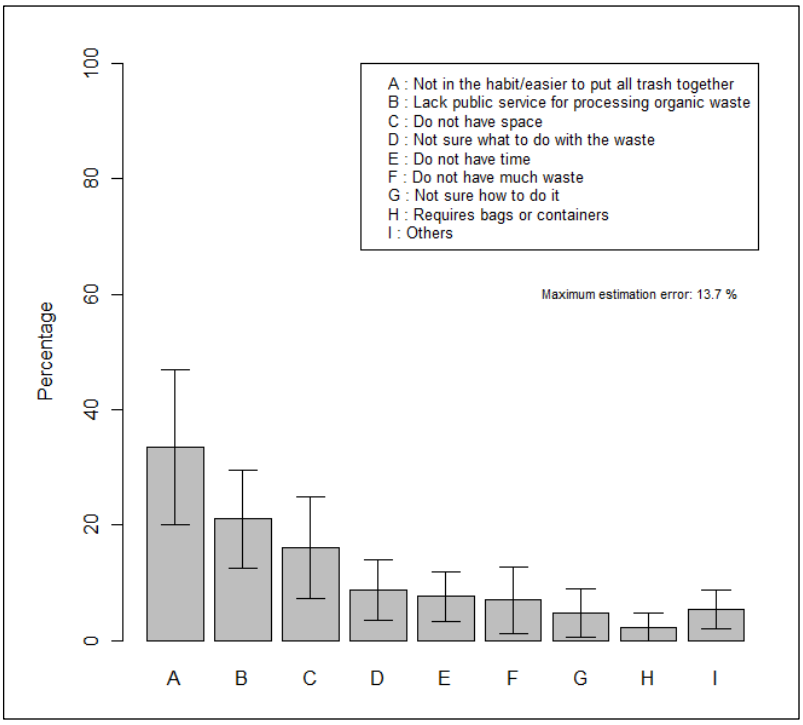
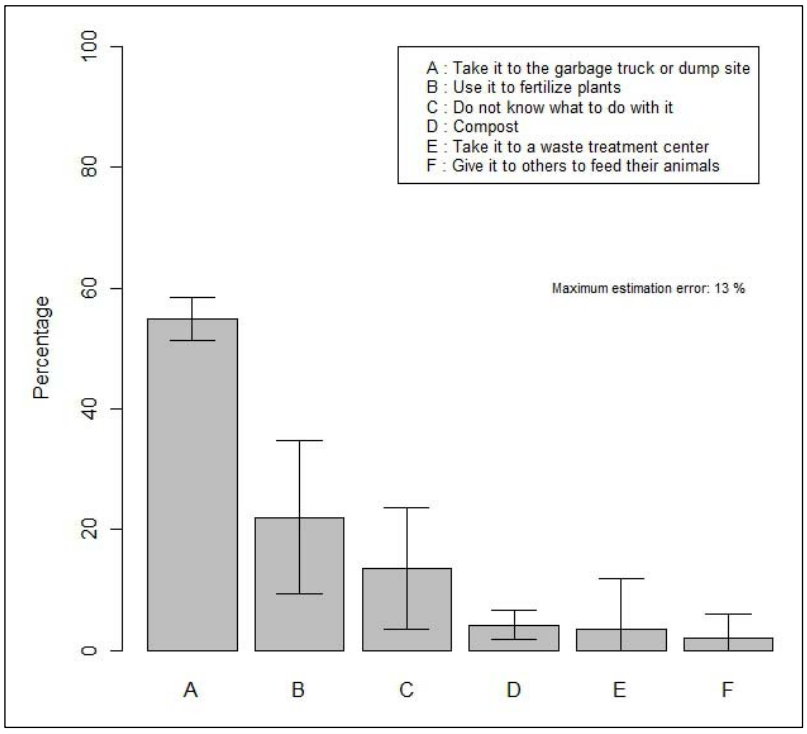


Figure 5. Actions To Be Taken with Separated Organic Waste Among Respondents Willing To Separate (n=127)



do not currently separate (n=137) said they would be willing to do so. This high level of willingness may suggest that people recognize the severity of the waste-management problem. Of those interviewed, 31.9% mentioned "garbage in the streets, on corners, and vacant lots" as one of the city's major problems.

Respondents who expressed a willingness to separate but who currently do not do so were asked why they do not separate. Responses included: "Not in the habit/easier to put all trash together," "There is no processing or management available," "Do not have space," "Not sure what to do with the waste," "Do not have time," "Not sure how to do it," and "Requires bags or containers" (figure 4).

Respondents who said they would separate (n=127) were asked what they would do with separated organic waste. The majority answered, "I would take it to the garbage truck or dump site," while others said "I would take it to a treatment center" or "I do not know what to do with it." Some respondents who do not separate their organic waste indicated that they knew they could benefit by doing so. Twenty-two percent of those said, "I could use it to fertilize my plants," referring to the technique of simply burying fresh waste beneath their plants. Fewer said they could compost (4.2%), and some said, "I could give it to others to feed their animals" (2.0%) (figure 5).

Nearly 40% of all respondents (n=369) reported a willingness to compost their own organic mate-

rials, although they do not currently do so. Respondents providing a reason (n=115) gave the following reasons for not composting: "I have no idea that it is possible to compost organic waste," "I do not know how to do it," "I do not have space," and "I do not have time" (figure 6).

Those expressing unwillingness to compost their own organic waste (n=201) were asked to identify their reasons. Some reasons relate to insecurities and fears. These include, "I have concerns about bad odors, flies, worms, and rats," "I feel it would be too much work," and "I do not see the point" (figure 7). More insecurities and fears were included in the category of "other": (1) "Composting is done only in rural areas and it harbors contaminants," (2) "Dogs destroy it," and (3) "Children might upset it."

Finally, the survey asked if they would be willing to participate in community composting. Forty-seven percent of respondents said yes, 39.6% said no, and 13.0% did not know or did not respond.

Comparison of Composting Methods Among Different Groups in San Cristobal

Costs and operability

In San Cristobal, as perhaps in most communities, worm composting requires much greater initial investment than conventional pile composting. The cost of worm composting in our study was 960 Mexican pesos (approximately USD85) for 500 worms, wood, and labor to build the worm

Figure 6. Reasons Why Respondents Willing To Compost Do Not Currently Do So (n=115)

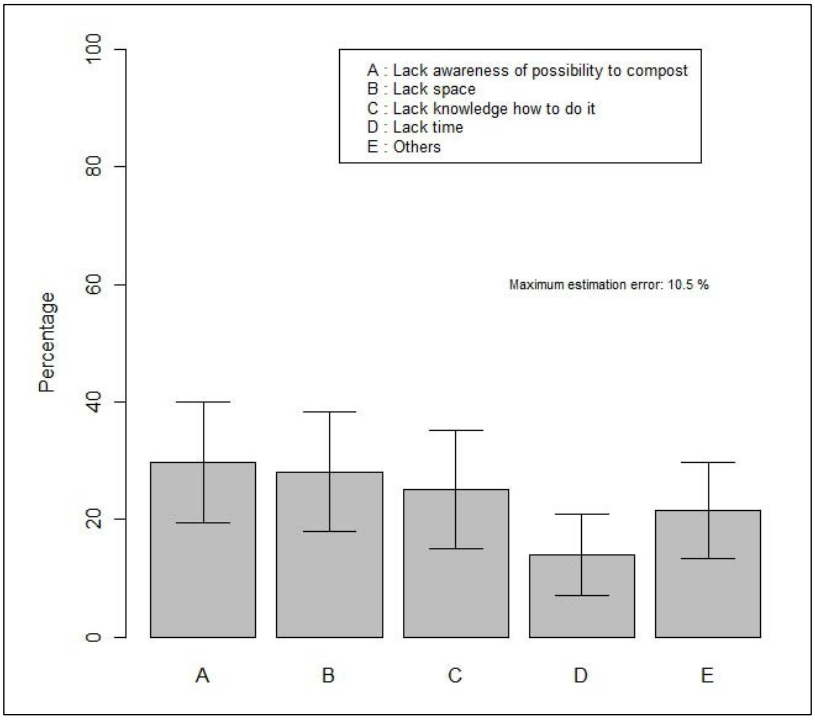
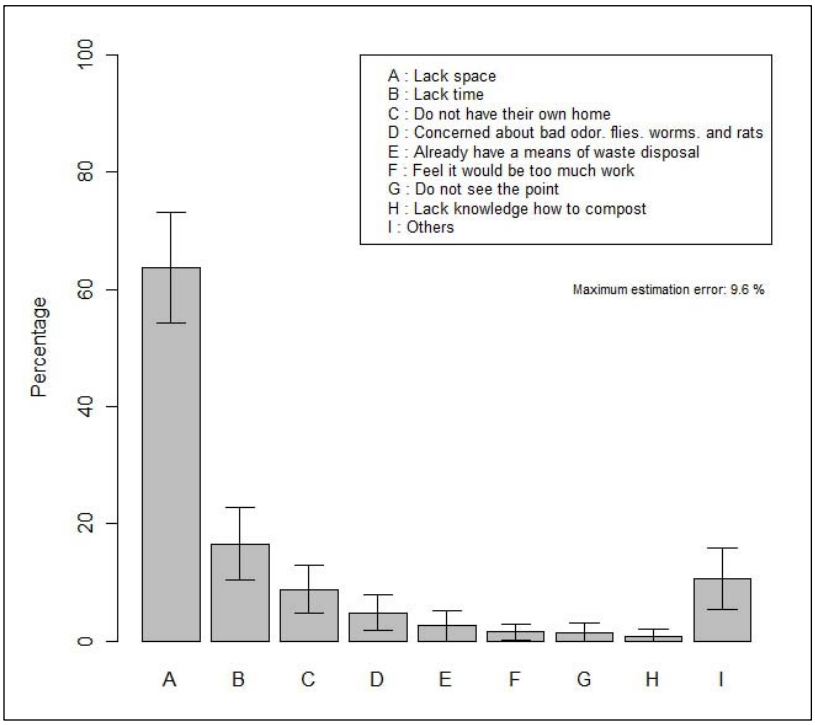


Figure 7. Reasons Some Respondents Are Not Willing To Compost (n=201)



boxes. On the other hand, conventional compost piles require no special materials. It should be noted that worm compost requires special care; it cannot be exposed to direct sunlight, should be watered regularly, and must be protected from predators such as birds and ants.

Conventional composting, however, requires more work than worm composting. After a wormless "precomposting" stage of one month, worms are added but the compost is not turned, as this would stress the worms (Díaz, Savage, Eggerth, & Golueke, 1993). A conventional compost pile must be turned once or twice per week (Romero, 2000) to ensure aeration, which facilitates waste degradation and prevents bad odors, elevates temperature, and diminishes pathogens (Díaz, *et al.,* 1993). Having organic materials in small pieces in compost may accelerate the decomposition process. Small particles may favor microflora and microfauna activity and help the material decompose more rapidly (Martínez, 2000). In two of the neighborhood composting sites, particles were smaller and therefore easier to manipulate, and decomposition occurred rapidly in both pile and worm composts. On the other hand, compost at the institutional site contained many orange peels and whole vegetables, and thus was hard to turn and aerate, had bad odors, and decomposed more slowly. In all sites the compost pile never reached a height of one meter (3 feet), was not built in layers as recommended, and did not reach the desired internal temperatures. Nevertheless, as shown below in table 1, the resulting compost was acceptable in quality.

Many participants in the neighborhood trial composting sites were surprised at how easy composting was. They said they had never composted before because they thought it was very complicated. In additional, many inhabitants (52% according to our survey) buy leaf litter gathered from surrounding forests for their gardens. Composting their waste instead can reduce the use of leaf litter that may cause environmental problems in the area.

Chemical Composition of Conventional and Worm Composts

Nutrient content

Table 1 (next page) compares results of nutrient content analysis for the conventional and worm-based compost trials at the five sites. Samples analyzed from both methods showed nutrient contents within limits established by the FAO for compost. In the analysis of macronutrients, total average nitrogen (N) content was 1.6% for conventional compost and 1.7% for worm compost. These averages are just above the upper limit of 1.6% specified by the FAO (Dalzell, Riddlestone, Gray, & Thurairajan, 1987). The difference between the two averages was not significant when applying the Student's t-test for paired samples ($p=0.78$).

Average potassium (K) content was 0.9% for worm compost and 0.7% for conventional compost. Both were above levels specified by the FAO (0.2%–0.6%). Significant differences existed in the Student's t-test for paired samples for the two methods ($p=0.06$), with a level of significance of 0.10. The 90% confidence interval indicates that worm composting produced from 0.035% to 0.364% more potassium than pile composting.

Averages for phosphorus (P) were 0.3% for worm compost and 0.2% for conventional compost. These averages were within limits specified by the FAO for municipal compost (0.1%–0.4%). Significant differences were found for phosphorus ($p=0.04$), with a significance level of 0.05. We found, with 95% confidence, that worm composting produced from 0.004% to 0.135% more phosphorus than pile compost.

With respect to micronutrients, no significant difference was found between the two methods for magnesium (Mg) ($p=0.90$). Average Mg concentration for worm compost was 630.2mg/kg, compared to 622.2mg/kg for pile compost. According to the FAO based on studies in other areas, Mg content should be between 385 and 1600 mg/kg. In our trials, Mg falls within these limits for both methods.

The carbon/nitrogen relationship (C/N) in all five experimental sites showed an average of 11 for worm compost and 10 for pile compost. The Student's t-test for paired samples (p=0.21) shows that the average difference between the two methods was not significant. According to Tisdale and Nelson (1970), in soils high in organic materials, this relationship should be approximately 10.

No significant difference was found (p=0.49) in average content of organic matter between worm composting (21.2%) and conventional composting (22.7%). The FAO (Dalzell, *et al.,* 1987) indicates that organic matter in compost ranges from 25% to 80%. Compost made with municipal waste is usually closer to the lower limit, while compost made with farm or garden waste tends to be closer to the higher limit. As the compost in this study was composed mostly of municipal waste, it is closer to the lower limit, although neither average reaches 25%.

Heavy metal and pathogen content

Table 1 above also shows results of analysis for heavy metals. Average chromium (Cr) content was 156.6 mg/kg in worm compost and 189.9 mg/kg in pile compost. Lead (Pb) showed an average content of 14.0 mg/kg in worm compost, and 34.0 mg/kg in pile compost. In both cases, no significant differences were found (p=0.30 for chromium, and p=0.14 for lead). For lead, averages found in worm and conventional composts are lower than the established minimum (<300 mg/kg) for biosolids in compost. Chromium is also below the established minimum for biosolids (<1200 mg/kg) in both composting methods (Contreras-Ramos, *et al.,* 2005). With respect to human health, lower lead and chromium contents are safer.

The enteropathogens *Salmonella tiphi* and *Escherichia coli* were not detected in laboratory tests for either the worm or conventional composts in any of the five experimental sites. Absence of these pathogens

Table 1. Nutrients and Heavy Metals Found at Five Trial Sites Using Two Methods of Urban Organic Waste Composting in Chiapas, Mexico

Variable	References	Average		Mean difference	Mean difference 95% confidence interval		p-value
		Worm compost	Pile compost		Upper limit	Lower limit	
Relationship C/N	10[b]	11	10	1.0	–0.86	2.79	0.21
Organic material (%)	25–80[c]	21.2	22.7	–1.5	–6.67	3.79	0.49
Macronutrients							
Total nitrogen (N) (%)	0.4–1.6[c]	1.7	1.8	–0.1	–0.60	0.48	0.78
Total potassium (K) (%)	0.2–0.6[c]	0.9	0.7	0.2	0.035[a]	0.364[a]	0.06*
Total phosphorous (P) (%)	0.1–0.4[c]	0.3	0.2	0.1	0.004	0.135	0.04**
Micronutrients							
Magnesium (Mn) (mg/kg)	385–1600[c]	630.2	622.2	8.0	–151.74	167.74	0.90
Heavy metals							
Chromium (cr) (mg/kg)	<1200[d]	156.6	189.9	–33.3	–110.72	44.12	0.30
Lead (pb) (mg/kg)	<300[d]	14.0	34.0	–20.0	–49.77	9.77	0.14

* Significant difference with a level of 0.10 significance

** Significant difference with a level of 0.05 significance

[a] 90% confidence interval

[b] Tisdale and Nelson (1970)

[c] Dalzell, Riddlestone, Gray, & Thurairajan (1987).

[d] For biosolid compost (Contreros-Ramos, Escamilla-Silva, & Dendooven, 2005).

is very important, as these bacteria present serious risks to human health (Koneman, Allen, Janda, Schreckenberger, & Winn, 1999).

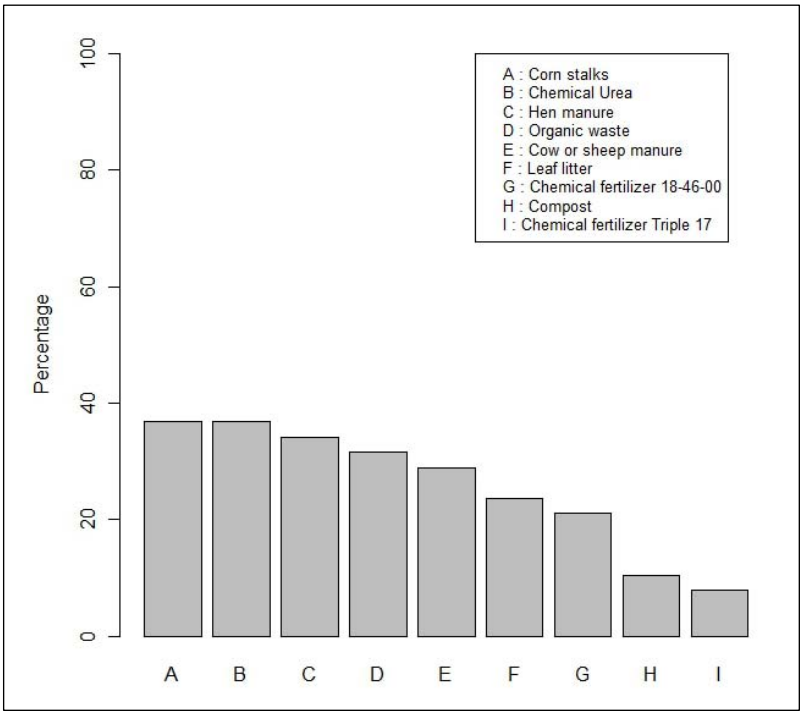
Current Farmer Practices and Willingness To Use Compost from Organic Municipal Waste

Of the 43 farmers interviewed, 76.7% were men and 23% were women; 65.1% were over age 40 and 34.9% were under 40. Of the interviewees, 88.4% reported using some kind of fertilizer, whether organic or artificial, to improve harvests. The interviews of San Cristobal–area farmers indicated that many use organic materials as fertilizer. Organic residues from corn crops are used as frequently as urea, a commonly used synthetic nitrogen fertilizer. Besides crop residues, other organic fertilizers they reported using are "chicken manure," "organic waste (ash, vegetable remainders, and leaves)," "cow or sheep manure," and "leaf litter." The synthetic fertilizers known commercially as "18-46-00" (18% nitrogen and 46% phosphorus) and "Triple 17" (17% nitrogen, 17% phosphorus, and 17% potassium) are also used by San Cristobal farmers (figure 8).

Among the interviewees (n=43), 74.4% of respondents said they would be willing to use compost made with organic city waste, 23.3% said they would not, and 2.3% said did not know. For those who said no, reasons given were "it has a bad odor and could cause illness," "city garbage would contain microbes, plastic, or glass," "bugs would contaminate the vegetables," and "city garbage is filthy."

Of those farmers willing to use compost made with organic municipal waste, 96.9% would be willing to purchase it. However, 29.2% of all farmers surveyed said they must be allowed to try it and test its quality before committing to a purchase and that it must be cheaper than chemical fertilizer. Twelve percent indicated they would use municipal compost if it did not contain inorganic waste. Respondents' support for using municipal compost is supported by the following opinions: two farmers mentioned that it was common for farmers to collect soil for their plants at municipal waste-disposal sites. One farmer interviewed said, "I've always thought that we in the countryside were lacking resources found in city waste." This indicates the potential for introducing new ideas and practices regarding fertilizer to area farmers.

Figure 8. Fertilization Used by San Cristobal Growers From Survey of Farmers in Areas Surrounding San Cristobal (n=43)



Discussion

Organic waste management appears to be an important traditional practice for part of the population of San Cristobal. However, it remains to be determined whether the practical methods developed from people's creativity and the necessity of managing organic waste result in good quality compost and if they could be adapted successfully at a larger scale. These methods have helped local people to dispose of their organic waste in the face of

inadequate municipal waste-disposal programs. Since a considerable proportion of the population does not separate organic and inorganic waste, a great deal of potential compost is not available. For this fairly large portion of the population, an education campaign to explain why and how to separate organic waste should be implemented if the city hopes to establish a successful, long-lasting organic waste management program. In such a campaign, it is important to use terms with which people are familiar. The definitions provided by respondents could be useful in disseminating concepts more widely.

In our first objective for this study, we explored residents' attitudes, perceptions, and knowledge about organic waste management. Many people are not motivated to separate waste, as they see it collected and mixed with other waste in the garbage truck. Others expressed a willingness to separate but currently do not separate for different reasons, such as because they believe they lack the ability to process the waste and manage the compost. At the same time, the high level of willingness to separate organic from inorganic waste may suggest that people recognize the severity of the waste management problem. This is supported by the fact that they mention garbage in the streets, corners, and vacant lots as one of the major problems in the city. A municipal system in which organic and inorganic waste is processed separately might motivate residents to separate.

In general, people who were willing to separate said they preferred to not have to process their own organic waste. This suggests that local residents see a municipal organic waste collection and management system as an attractive option for managing their garbage problem. On the other hand, the high percentage of the population responding positively to community composting indicates potential to initiate neighborhood-level waste separation and composting in certain areas. A more representative sample of each neighborhood would be necessary before initiating programs.

Survey responses indicate support for the need to develop an integrated waste-management system that includes education and training regarding the importance, benefits, and methods of separating waste. According to constructivist education theory (Saldivar, 2001), projects must make use of people's current resources and incorporate local knowledge. Municipal authorities and other parties interested in urban waste problems should promote practices already in use to a wider audience of city inhabitants who might be interested, but are currently uninformed of these practices.

New policies may be intimidating, but when they fully consider residents´ concerns and wishes, these policies are more likely to be adapted (COSUDE, 1991). A municipal organic waste collection and management system should introduce educational programs that take into consideration residents' problems, fears, and insecurities with respect to odors and rats and with managing worms.

Many inhabitants buy leaf litter gathered from surrounding forests for their gardens. This suggests a need for organic fertilizer in the city. While this study did not compare the effects of compost and leaf litter on plant growth, there is a potential local market for compost made with municipal waste. Furthermore, substituting leaf litter with municipal compost may help preserve forests, since germination of forest seedlings may be adversely affected by the loss of leaf litter.

The second objective of our project was to study whether urban waste in San Cristobal is suitable for vermiculture (worm composting), as well as for conventional pile composting. Although worm composting has a higher cost, once established its costs are minimal. Other cost-cutting possibilities are establishing a municipal worm bank or neighborhood worm sharing, which would operate outside conventional market prices; starting with fewer worms and using recycled material for boxes; or worm composting directly in the soil (Biologist M. Anzueto, personal communication, 4 October 2004).

The fact that worm composting requires special care could represent disadvantages to this method (Díaz, *et al.,* 1993). However, some of these diffi-

culties may easily be overcome. For example, we found it takes only about 10 minutes weekly to water the compost. In addition, some participants had fears regarding worms. Those with the strongest fear and repulsion did not want to touch or even see them. This could pose a strong limitation that must be addressed when promoting neighborhood worm composting.

In the neighborhood composting test sites, the resulting compost was acceptable even though the compost piles never reached the recommended height and temperature. This suggests that it is not essential to follow experts` strict rules for proportions of fresh and dry material, size, layers, etc., and that the composting process is fairly flexible and may be simplified to fit urban conditions. Other compost methods already in use in the city, such as burying waste in a hole or liquefying waste to apply to gardens, should be tested to see whether they could be implemented on a larger scale.

Nutrient levels in both compost types complied with requirements of the FAO. Furthermore, the heavy-metal content did not represent a risk for human health, and enteropathogens were absent. Thus, municipal waste in San Cristobal appears to be acceptable for producing compost. Furthermore, according to Diaz (1993), one of the advantages of worm composting is its high mineral content. For example, worm compost has high phosphorus content and could improve the phosphorus-poor soils of the region (Reich & Oleksyn, 2004).

Our final objective was to identify the willingness of San Cristobal–area farmers to use compost made from organic municipal waste, as well as their current fertilization practices. The survey of area farmers indicated that many use organic material as fertilizer. Widespread use of organic fertilizer represents an opportunity for introducing organic compost made with the city waste.

Some farmers' fears related to the quality and sanitation of composted organic municipal waste could reflect real problems and should be addressed if a system for composting city garbage is to be established. Aspects that must be taken into account when defining strategies for producing and marketing these products include quality control, product price, and cost of transport. These concerns are also commonly expressed by farmers elsewhere (for example, see Mohammad, Hodges, & Kiker, 2004).

Conclusions

We conclude that San Cristobal's organic waste is adequate for producing viable compost. In terms of quality, the organic waste produced in these trials contained the nutrients necessary to produce healthy crops. The cost of producing pile compost is much lower than that of worm compost. However, if adequate programs are implemented for reproduction and distribution of worms, such as establishing worms directly in the soil or using recycled material to make worm boxes, costs may be reduced. In terms of operability and management, worm composting requires less work than conventional composting. Both options could be offered to city residents who wish to compost. However, traditional local methods should be tested on a broader level. Many people do not compost because they perceive composting to be a complicated process with strict rules. However, our research shows that composting is not necessarily complicated. Scientists and community organizers should emphasize the wide variety of possible methods and encourage citizens to experiment with new options and to adapt composting techniques to their own conditions. Finally, people's concerns, fears, knowledge, and lifestyles must be taken into account when developing methodologies for promoting composting.

One option for motivating urban residents to compost is to find ways to market the finished compost to the municipality, to neighbors, or to nearby farmers. To achieve this, municipal composting projects must work to increase the acceptance of the product and find stable markets (Gillis, 1992). In the case of San Cristobal, 74.4% of farmers interviewed indicated a willingness to buy and use compost made with organic municipal waste. Other possible consumers of organic compost made from municipal waste are urban resi-

dents themselves. Approximately half of San Cristobal residents traditionally buy forest leaf litter for their gardens and potted plants, and thus represent potential compost buyers. Concerns regarding quality and price, as well as fears that the compost might contaminate crops, must be taken into account when formulating marketing strategies. It is essential to guarantee adequate separation of waste, ensuring that compost does not contain inorganic materials, and also to price the compost competitively with chemical fertilizers. It is also necessary to conduct periodic analyses to ensure that the compost's nutrient content is adequate for obtaining a good harvest.

Organic waste-management practices and vocabulary already used by San Cristobal residents should be considered when taking further steps to implement an organic waste separation and management program. Those who separate waste but do not compost could be informed of composting alternatives already practiced by their neighbors (placing the material in bags or receptacles, or burying it in small holes). They could also be informed of benefits and methods of fertilizing their gardens with organic waste. We recommend helping residents develop systems compatible with their available space and time.

Knowledge and practices of San Cristobal residents should be incorporated in the management of this city's waste. The fact that local organic waste is adequate for producing viable compost, and that farmers wish to purchase high-quality organic compost, suggest that the municipal government together with interested local nongovernmental organizations could create a successful alternative waste-management system based on separating and composting organic waste. Furthermore, composting could represent an important opportunity to start microenterprises or small business whose staff pick up the organic waste, compost it, and sell the resulting compost to local farmers or to residents for use in their gardens.

In many urban areas of Latin America it is common to find livestock, mainly chickens, in residents' yards. Residents might be encouraged to offer their neighbors selected kitchen scraps to feed their animals. With the ongoing food crisis such practices could become even more critical, as urban residents are increasingly motivated to grow their own food (Lynch, Binns, & Olofin, 2001).

Implementing an integrated system of organic waste management offers municipalities alternatives for resolving urban garbage problems. However, urban residents do not need to wait for the city to implement a municipal compost plant. As lack of space is an issue for many urban residents, small composting sites located around the neighborhood — in schools, churches, parks, or abandoned lots, for example — could be an economical and efficient way to dispose of organic waste while producing a useful product.

Another challenge to successful community composting projects is distributing the compost to farmers. Farmers' markets and community supported agriculture (CSAs) or similar programs could help build this bridge. As has occurred in Asia for centuries (McNeill & Winiwarter, 2004), partial exchange of vegetables for compost could contribute to a strong relationship between farmers and consumers. In many parts of the world, urban residents have traditionally planted fruit trees and aromatic herbs in their home gardens. Due to recent worldwide economic and food crises, interest in locally grown food has increased, and many urban residents now plant vegetables as well. Thus, the demand for organic compost is increasing worldwide, and this provides a great opportunity to reduce garbage, find new sources of nutrients, and above all, strengthen links between farmers and consumers.

Acknowledgements

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Appendix

Temperature, Duration, and Composition of Two Methods of Composting Urban Organic Waste in Chiapas, Mexico

Place	Compost method	Temperature (ºC)		pH		Duration	Type of waste
		Mean	Std. dev.	Mean	Std. dev.		
Ecosur	Worm compost	20.6	2.9	6.7	0.3	5 months	• 70% fresh materials: orange, pineapple, lime, banana, lettuce, avocado, carrot, potato, beet, cucumber, eggshell, etc. • 30% dry materials: paper, leaves, pine needles
	Pile compost	21.9	3.6	6.8	0.3	5 months	
Pequeño Sol	Worm compost	25.0	5.2	6.7	0.3	4 months	• 80% fresh materials: orange, pineapple, mango, watermelon, avocado, potato, eggshell, corn husk, corn kernels, etc. • 20% dry materials: paper, grass
	Pile compost	26.1	3.2	6.5	0.3	4 months	
Preparatoria	Worm compost	23.5	3.9	6.3	0.7	4 months	• 80% fresh materials: orange, lime, banana, mango, watermelon, papaya, avocado, carrot, beet, cabbage, cornhusk, etc. • 20% dry material: paper, grass, pine needles
	Pile compost	24.1	2.3	6.3	0.6	4 months	
Tlaxcala	Worm compost	22.1	4.8	6.6	0.3	5 months	• 75% fresh materials: orange, lime, banana, cauliflower, pumpkin shell, potato, carrot, corn husk, corn kernels, etc. • 25% dry materials: paper, leaves
	Pile compost	24.4	4.8	6.5	0.3	5 months	
Santa Lucía	Worm compost	22.9	4.1	6.6	0.3	5 months	• 85% fresh materials: orange, pineapple, banana, mango, watermelon, papaya, cactus fruit, carrot, potato, squash, radish, lettuce, egg shell, corn husk, plantain leaves, etc. • 20% dry materials: paper, grass, leaves
	Pile compost	24.5	2.0	6.6	0.3	5 months	

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Building gardens, rebuilding a city: Baltimore's Community Greening Resource Network

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Abstract

Vacant spaces in urban areas are agents of blight and are prevalent in impoverished neighborhoods with high incidences of food insecurity. However, residents in many cities are reclaiming such spaces and converting them into community assets by installing community gardens. This article describes a program in Baltimore, Maryland, that has enabled low-income citizens to become involved in gardening. Modeled after Detroit's Garden Resource Program Collaborative, Baltimore's Community Greening Resource Network (CGRN) provides gardening resources and materials by coordinating the efforts of multiple partner organizations. By making such resources readily available, CGRN removes barriers that otherwise discourage residents from reclaiming open spaces. In this tangible way, CGRN empowers low-income residents to actively revitalize their own communities. Since its development in 2008, CGRN has served an ever-increasing membership, delivering resources to a steadily expanding community of urban gardeners. Despite these successes, challenges remain with respect to funding and staff retention. Our experience replicating the resource network model from Detroit to Baltimore can provide guidance for other groups interested in implementing similar programs.

Keywords

Baltimore, collaboration, community garden, food security, revitalization, urban

Introduction

Community gardens are emerging in postindustrial cities across the United States. Studies have shown the significant role that green spaces, particularly in

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the form of urban agriculture and urban gardening, can play in food security and community renewal. As Brown and Carter (2003, p. 3) note, "economic development and community revitalization are achieved when neighborhoods take pride in a community garden [and] when inner-city residents gain the ability to grow and market their own food.… Individual health and a sense of empowerment are enhanced when urban dwellers have access to and greater control over their own food system." In addition, community gardens are a powerful tool for creating good dietary practices among low-income gardeners, as they provide an accessible source of affordable, culturally appropriate food (Brown & Carter, 2003). In many areas where neighbors interact with each other only infrequently, gardens also provide an opportunity to build strong community ties (Teig, Amulya, Bardwell, Buchenau, Marshall, & Litt, 2009). Empowering low-income communities to improve and maintain their community gardens can increase property values, improve community food security, offer job-skills development, provide safe outdoor spaces for play and interaction, and connect individuals and community groups to other community-supporting organizations, all of which contribute to bringing communities out of poverty. However, without equitable, consistent access to those resources crucial to maintaining successful community green spaces, citizen involvement can be severely inhibited. One method of addressing this challenge is to develop a capacity-building program that enlists the resources of multiple organizations.

The Community Greening Resource Network (CGRN), based in Baltimore, Maryland, is one such program. CGRN was established in 2008 by a local nonprofit organization, the Parks & People Foundation (Parks & People), and the Baltimore City office of the University of Maryland Extension (Extension), and currently involves more than 26 partner organizations. CGRN aims to unite people of all ages and socioeconomic backgrounds through gardening and greening. In the course of its work, more than 20 new gardens have been developed in Baltimore City and more than 4,000 people are now benefiting from naturally grown food. In this case study we reflect on our experience adapting Detroit's highly regarded community garden development program, the Garden Resource Program Collaborative, to the city of Baltimore, and offer recommendations for other communities considering a similar strategy.

Established in 1984, Parks & People hosts a wide range of recreational and educational programs, creating and sustaining beautiful, lively parks, and promoting a healthy natural environment for Baltimore. Parks & People staff organize and assist community members in implementing greening and gardening projects in vacant lots, schoolyards, public housing projects, streetscapes, and other neighborhood open spaces.

The University of Maryland Extension (Extension) assists citizens in developing, implementing, and maintaining neighborhood beautification projects, community gardens, and vegetable gardens. Extension currently provides two programs in Baltimore that support community greening activities as a way to alleviate the consequences of poverty. Through its Master Gardener program, Extension provides technical support and education to urban gardeners through a "train the trainer" internship and mentorship program. The Gardening for Nutrition initiative builds gardens at schools, recreation centers, and senior centers, serving low-income communities by providing spaces for nutrition education, horticulture training, and local sources of fresh produce.

The Setting

Over the past several decades, Baltimore has experienced steep population decline, resulting in rampant poverty, reduced access to healthy and affordable food, and an abundance of vacant properties. Baltimore City's current population is 636,919 (U.S. Census Bureau, 2009), a decline of 33% from its largest recorded population in 1950 (U.S. Census Bureau, 2010a). Approximately 22% of Baltimore City's population lives in poverty, compared to just 8.3% in the state of Maryland as a whole (U.S. Census Bureau, 2009). Baltimore's

high poverty rate is comparable to that of Pittsburgh and Detroit (U.S. Census Bureau, 2010b), two other postindustrial cities with which it is often compared.

In Baltimore, as in many other postindustrial cities, the phenomena of urban depopulation, food insecurity, and blight are linked. Over 13,000 vacant lots in Baltimore (Parks & People Foundation, 2002a) are concentrated predominantly in neighborhoods where poverty rates are high. Within such neighborhoods, the challenges of poverty are compounded by weak housing markets and severely depressed physical, social, and economic conditions (Project Locus, 2005). Under such conditions, vacant lots and other open spaces often become agents of blight, further depressing property values as they become refuse-dumping sites and havens for illicit activity. In addition to blight, food insecurity is also directly tied to the prevalence of poverty.[1] It is estimated that one in eight low-income families in Baltimore City is food insecure. Twenty-two percent of these families have children who do not eat adequate amounts of food (Black, 2008). In 2007–2008, 30.9% of Baltimore's children were found to be living in poverty, and 73% received meals through the National School Lunch Program (Toldson, 2008).

On the other hand, Baltimore boasts a rich public history of protecting and supporting public green spaces. In 1904, Frederick Law Olmsted Jr. and John Charles Olmsted, sons of the famed landscape architect Frederick Law Olmsted, presented their plan for Baltimore's park system (Olmsted & Olmsted, 1904). This far-reaching city plan envisioned a network of interconnected greenways throughout the city, including parks, playgrounds, stream buffers, tree-lined streets, and verdant residential districts. Such amenities reflected the philosophical belief prevalent at the time that all citizens, regardless of occupational or socioeconomic standing, should enjoy equitable access to public green space (Nicholson, 2004). Through their visionary plan for Baltimore's park system, the Olmsted brothers preserved the possibility for future development of community gardens and green spaces within the fabric of the city.

Indeed, over the years, many organizations around the city have worked to further this vision of a verdant, healthy, urban environment. In recent years, much effort has been targeted toward assisting citizen-led greening projects,[2] including community gardens. However, such support is often limited by individual organizational capacity and geographic focus. Several gardens have failed as program funds ended, gardeners moved on, or resources became more difficult for residents to secure. Other threats to garden existence include loss of land due to redevelopment of city-owned parcels, soil contamination by lead and other toxins, and perceived lack of safety at garden sites.

History of the Community Greening Resource Network

Community-led greening projects existed in Baltimore well before the establishment of CGRN. A 2002 inventory and survey of community-managed open spaces in Baltimore (Parks & People Foundation, 2002b) found evidence of 60 active citizen-led greening projects within the city.[3] In a subsequent survey (Parks & People Foundation, 2003), representatives of 50 such projects were asked to provide additional information about their gardens. Nearly half of survey respondents (46%) characterized their greening projects as flower gardens or beautification projects, while a smaller percentage (28%)

[1] Food insecurity is characterized by a limited ability to secure sufficient food (Holben, 2010) and has been defined as "limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways" (Anderson, 1990, p. 1598).

[2] Such greening projects take a variety of forms, but are all characterized by citizen-initiated efforts to enhance, restore, or beautify urban landscapes through the installation of plants. Examples of greening projects include street-tree plantings, vacant-lot reclamation projects, curbside flowerpots, and community gardens.

[3] This inventory used a mixed-methods research approach consisting of site visits, telephone interviews, written surveys, and information-sharing among local organizations. As with any inventory effort, it is likely that not all existing project sites were captured.

indicated that they were growing vegetables. These greening projects were located throughout Baltimore and were supported by a wide variety of organizations, including Parks & People, Extension, local nonprofits, community associations, and the city Department of Recreation and Parks.

In addition to providing basic information about citizen-led gardening projects, both surveys offered insight into the challenges faced by community greeners. Participants in the 2002 inventory cited their top five challenges as: (1) lack of a committed volunteer base, (2) water scarcity, (3) lack of equipment, (4) infrastructure needs, and (5) training needs. In response to these findings, Parks & People convened a forum of 70 urban gardeners to discuss the components of long-term project success. Attendees highlighted two such components: training opportunities, and material and infrastructural resources.

Having established baseline data regarding local greening projects and initiated a citywide dialogue with gardeners, staff at Parks & People began seeking a means of providing sustainable long-term support for urban greening initiatives. In 2007, staff from Extension and Parks & People attended the American Community Gardening Association annual conference in Boston and heard a presentation by the founder of Detroit's Garden Resource Program Collaborative (GRPC). The Detroit-based program was actively addressing many of the same needs and concerns expressed by Baltimore community gardeners. Moreover, numerous similarities between Detroit and Baltimore (e.g., socioeconomic characteristics, level of community gardening activity, high land vacancy rates, and pervasive food insecurity) suggested that the GRPC model could be successfully adapted to Baltimore. Parks & People and Extension staff interviewed program representatives from Detroit and developed a proposal to adapt Detroit's model for use in Baltimore. This proposal was then presented to Baltimore stakeholders, including members of the city's greening community, garden advocates, nonprofit organizations, and resident groups. Response to the proposal was enthusiastic, and Parks & People and Extension began making plans to develop and implement a garden resource network in Baltimore.

The Community Greening Resource Network (CGRN) was developed in fall 2008. A three-year plan was drafted and Parks & People and Extension recruited an AmeriCorps*VISTA member to implement the plan. The VISTA member researched and communicated with several community garden support programs around the country. Continued contact with Detroit-based GRPC staff and stakeholders was very instrumental in informing CGRN development plans.

Additional momentum for establishing CGRN came from within Baltimore City government itself. In response to an October 2006 City Council resolution (City of Baltimore, 2006), the Baltimore City Council Task Force on Childhood Obesity was formed to assess the childhood obesity crisis. The resulting task force report drew attention to neighborhood-based food production as a possible means of improving childhood nutrition, and stated that "gardens should be developed on vacant city-owned lots and can be organized by neighborhood groups or non-profits" (Garrett, Gittelsohn, & McGill, 2007). The Baltimore City Food Policy Task Force, jointly established by the Health Department and the Department of Planning in 2009, identifies means for Baltimoreans to access affordable healthy food and highlights community gardens as one such food source (City of Baltimore, 2009a).

CGRN's Organizational Infrastructure

The Model: Detroit's Garden Resource Program Collaborative

Detroit's Garden Resource Program Collaborative (GRPC) is a multitiered, decentralized, stakeholder-driven program that coordinates numerous state, city, neighborhood, and individual initiatives to combat poverty through community gardening. The GRPC supports over 500 family, school, and community gardens in Detroit and Highlandtown, Michigan, by providing resources and information that empower residents to grow, harvest, prepare,

and preserve food (Atkinson, 2009). Through the large network, participating gardeners receive basic resources, including seeds and locally grown transplants, garden-based education, and opportunities to connect with other growers.

Detroit's program consists of a basic framework of opportunities for gardeners to access resources. Evaluation is integrated directly into every aspect of the program, allowing the quality and quantity of resources delivered to change based on evolving needs. Multiple entry points enable people to become involved in individualized capacities. Core partners include a local nonprofit and Michigan State University. A number of other organizations also contribute in a variety of ways.

CGRN's Structure: A Partnership-Based Approach

The Community Greening Resource Network provides an organized system by which community gardeners and greeners can access educational and material resources. A written memorandum of understanding between Parks & People and Extension lays the foundation for collaborative oversight of the program. Parks & People houses CGRN at its headquarters and provides administrative and funding support; Extension provides access to research and evaluation tools, a skilled volunteer base, and connections to the University of Maryland and the state of Maryland. Through the first two years of the program's operation, 2008–2010, both organizations jointly supervised the CGRN coordinator, facilitated development of the CGRN advisory committee, promoted CGRN membership and programs to respective constituencies, and developed strategies for acquiring and distributing resources to CGRN members.

Over 26 partner organizations are involved in CGRN. Partners include community organizations, watershed protection groups, afterschool providers, for-profit and nonprofit greening groups, charitable foundations, city agencies such as the Office of Sustainability, and volunteer organizations. These groups support urban gardeners by providing education, funding, plant material, or tools. Each participating organization completes an annual partnership agreement with CGRN (see appendix A) detailing what the organization will contribute to the network over the course of the year. Their partnership in CGRN allows all CGRN members access to their resources; in return, their programs are advertised to CGRN's citywide audience. This collaboration among existing organizations has allowed project partners, in many cases, to better serve their constituencies. By amplifying partners' ability to reach intended audiences, and providing an array of opportunities for public participation, CGRN ensures that collaborating organizations derive institutional benefits from their affiliation with the network. The problem of "slippage," a disparity between policy and practice that occurs in community collaboration when individual organizations try to protect their interests (White & Wehlage, 1995), is thereby avoided.

Stakeholder-Led Advisory Committee

Hardy (1998) states that an effective advisory committee should work within "mutually-agreed upon directions and boundaries." The 15 member CGRN advisory committee includes gardeners enrolled in the program, community leaders, and representatives from school gardening programs, greening organizations, and city agencies. The advisory committee meets quarterly, evaluating and modifying program practices in order to ensure that CGRN continues to meet the needs of low-income community gardeners.

Program Goals and Activities

According to Ecotrust (2010), fair access to knowledge and resources, full participation in one's community, and self-determination in choosing a life path build local assets and result in reduced socioeconomic disparities. By supporting community gardens and encouraging citizen involvement in neighborhood revitalization, CGRN seeks to achieve such a transformation in Baltimore. Specifically, CGRN aims to effect long-term changes in the availability of healthy food sources and to increase self-reliance in Baltimore's population by promoting community gardens as a system for local food production, amplifying people's exposure to healthy food and gardening practices, and encouraging positive social inter-

action between people of diverse backgrounds and interests. The program's goals, objectives, activities, and 2010 outcomes are summarized in figure 1 (next page).

CGRN membership is open to all members of the public. A tiered system of membership categories, with corresponding fees and benefits, enables members to select the level of involvement and the types of services that best suit their needs (see figure 2). Figure 3 displays CGRN's 2010 members by membership type. Grant funding has enabled CGRN to keep membership fees for community gardens very low; at present, a community garden pays $10.00 in annual fees. This modest fee ensures that financial status does not serve as a barrier to participation. It also supports the philosophy of "cross-fertilization" between gardens: when money is not a deciding factor, people may be more apt to share their resources, trade a skill, or volunteer time in exchange for another resource needed in the garden. Enrollment for all membership types is available year-round; the membership fee, a member enrollment form, and garden site photos are submitted annually. Gardens also agree to participate in an annual site visit through CGRN's Site Share program.

CGRN's members live and garden in diverse neighborhoods and vary in income level, ethnic background, educational attainment, gender, and age. Parks & People and Extension constituencies were initially targeted as the primary beneficiaries of the program. The program was advertised to the constituencies of all partners, promotional brochures were distributed, staff attended many community meetings, and listings were posted with various newspapers. Figure 4 (page 10) displays a map of all CGRN Community Garden and Schoolyard Garden members in Baltimore City during 2010–2011. As the map demonstrates, member sites are distributed across the city. Many are located in neighborhoods characterized by limited access to forest patches and parks, suggesting that they are providing valuable green space in heavily urbanized areas.

Figure 2. CGRN Membership Categories, Annual Fees, and Benefits

Membership Category	Annual Fee (USD)	Benefits
CGRN Advocate	$5.00	Subscription to quarterly newsletter, events calendar, and monthly email blasts
		Access to members-only areas of CGRN website
		Discounts on workshops and educational programs
		Invitations to CGRN members-only events
Private/Family Garden	$15.00	All above benefits
		Free plants and supplies at CGRN Give-Away Days
Community Garden	$10.00	All above benefits
		Free tool loans at Community Tool Banks
		Technical assistance and consultation
Schoolyard Garden	$20.00	All above benefits
		Curricular resources for schoolyard gardening programs

Figure 3. 2010 CGRN Members by Membership Category

Membership Category	2010 Members	Percentage of Total Membership
CGRN Advocate	29	14.8%
Private/Family Garden	36	18.4%
Community Garden	93	47.4%
Schoolyard Garden	38	19.4%
Total members	**196**	

Figure 1. CGRN Goals, Objectives, Program Activities, and Measurable Outcomes in 2010

Overarching Goals	Program Objectives	Program Activities	2010 Measurable Outcomes
Increase access to healthy food for Baltimore residents, prioritizing low-income communities with limited access to sources of affordable, healthy food.	Increase both the number of community gardens in Baltimore City and the total number of residents involved in community gardening.	Assist city residents in developing new community gardens.	2 community gardens and 1 schoolyard garden established with CGRN assistance.
		Assist gardens with recruiting new participants by publicizing garden-based volunteer opportunities, special events, and news items.	10 CGRN volunteer workdays engaged 270 volunteers, providing 550 hours of service.
			225 events publicized through quarterly newsletters and events calendars, member website, and monthly email blasts.
		Inform constituents of grant opportunities to fund citizen-led greening and gardening projects.	CGRN members applied for and were awarded grants from Parks & People, Baltimore Community Foundation, and Chesapeake Bay Trust.
Improve the quality of life in Baltimore by transforming vacant lands into productive, safe green spaces, thereby enhancing the city's green infrastructure and reducing urban blight.	Increase the quantity and accessibility of material and educational resources for community gardeners, thereby increasing the capacity of existing gardens and supporting the success of newly established projects.	Distribute garden supplies to CGRN members through regular Give-Away Days.	Approximately 5,300 seedlings, 3,800 seed packets, compost, wood chips, and other supplies distributed to 100 gardens.
		Operate 5 Community Tool Banks in geographically distributed areas of Baltimore City, providing free loans of hand tools for community projects.	Approximately 50 gardens borrowed tools from Community Tool Banks.
		Host free or low-cost skill-building workshops on gardening topics.	Over 100 CGRN workshops held over the course of the year.
		Provide curricular materials for teachers operating schoolyard gardening programs.	38 School Garden members used CGRN resources.
Build the capacity of citizens to participate actively in the revitalization of urban neighborhoods; build sense of community and shared purpose among residents.	Engage CGRN partners and members in all aspects of program management and operations, contributing to long-term program sustainability.	Host quarterly advisory committee meetings to guide policies, procedures, and program offerings.	Representatives of 15 partner organizations participated in 4 advisory committee meetings.
		Host annual focus group sessions to solicit evaluation from CGRN members.	Over 40 CGRN members attended 4 focus group sessions; their evaluations were used to plan programming for 2011.
		Host annual CGRN Summit to engage partners and members in strategic planning process.	20 CGRN partners and members attended CGRN Summit.
		Through Site Share program, engage members in visiting and collecting data from other CGRN gardens.	20 volunteers completed site visits of CGRN member sites.
		Recognize and celebrate member accomplishments at Parks & People's annual Community Greening Celebration.	Over 100 people attended the Community Greening Celebration; 15 CGRN members and gardens were nominated for or received greening awards.

CGRN's support framework includes three basic components: materials (seeds, plants, hand tools, and other supplies), education (workshops and trainings), and connections (tours, celebrations, and meetings).

Materials — Seeds, Plants, and Tools

At least four times per year, CGRN hosts a Give-Away Day at a partner organization or garden. Representatives from member gardens pick up a share of plant materials and other supplies. Plants and seeds are donated from area nurseries and garden stores, other member gardens, youth programs, seed-donation programs, and from seed-growing workshops. Businesses have been very supportive; in return for donations, they receive a tax deduction, advertising space, and the positive regard of donation recipients. One local business provided samples of a soil amendment product in 2010 and has since increased its customer base. These items are augmented by vegetable seedlings that CGRN arranges to grow specifically for distribution to members. Attendees are also encouraged to bring surplus plants and supplies to Give-Away Days to trade with other gardeners. In addition to providing gardeners with necessary resources, Give-Away Days are intended to nurture a culture of mutuality among members, building a sense of shared purpose and ultimately contributing to the long-term viability of the program.

CGRN also provides free loans of hand tools for members through its Community Tool Bank initiative. CGRN currently coordinates tool banks at five host organizations and is planning additional tool banks in underserved areas of Baltimore. Host organizations make their tools available for use by community-based greening groups; in exchange, CGRN provides a tool inventory, specialized training for tool bank managers, and administrative support. While many tools have been purchased through grant funding, others have been secured through in-kind donations from individuals and local businesses. To date, tool theft has been virtually nonexistent, demonstrating the effectiveness of CGRN's membership-based system. The tool sign-out system permits members to borrow tools free of charge for up to one week and requires that the borrower replace any broken or misplaced items. Due to maintenance costs and potential liability issues, power tools are not currently available for loan. However, CGRN is considering establishing a power-tool lending cooperative, whereby gardens with access to tillers and other power tools would make these implements available for use by other CGRN members. In exchange, borrowers would be required to provide reciprocal support to other gardens within the network.

Education — Workshops and Trainings

More than 15 organizations in Baltimore City provide education on gardening topics throughout the year. Monthly CGRN news blasts and a quarterly newsletter advertise upcoming citywide workshops, funding opportunities, member highlights, and other pertinent garden-related information. The quarterly shared calendar of events is color-coded by topic and month. By aggregating information about upcoming events and opportunities, CGRN provides an important service for Baltimore residents. Reminders are sent out regularly, and some members are telephoned on a regular basis to let them know about events on topics of special interest.

In addition to providing information to CGRN members, the shared events calendar serves two internal purposes. First, it enables participating organizations to coordinate their schedules so that event topics, locations, and times are distributed throughout the year, ensuring that offerings from different organizations complement, rather than compete against, one another. This strategy ensures that city residents are presented with a wide variety of educational opportunities and helps boost attendance at events. Second, having a shared events calendar enables participating organizations to determine gaps in programming. CGRN itself then develops programming to fill any gaps. Workshops and trainings are developed based on CGRN member feedback, and each new workshop is

The seemingly intractable challenges of urban blight and pervasive food insecurity may be successfully combated by effective community revitalization efforts, like those employed by CGRN. For example, the Whitelock Community Farm (figure A) occupies a formerly vacant lot in Baltimore's Reservoir Hill neighborhood, while at the Montessori Public Charter School garden (figure B), vegetables, fruits, bees, and chickens are raised in a schoolyard setting.

Figure A. Whitelock Community Farm was established in 2010 with the goal of providing fresh produce for residents in Baltimore's Reservoir Hill neighborhood.
Photograph courtesy of Whitelock Community Farm.

Figure B. The Baltimore Montessori Public Charter School has established a schoolyard garden that includes vegetable beds (pictured above), a fruit tree orchard, honey bee hives, and a flock of heritage chickens. Garden activities are linked to the school's educational curriculum, and students play an active role in garden management and maintenance.
Photograph courtesy of Parks & People Foundation.

taught and hosted by a different garden, partner organization, or volunteer. Past workshops have included Raised Bed Construction at the Remington Village Green, taught by an experienced gardener; Community Organizing 101 at a community church, taught by a regional nonprofit organization; and Growing in Greenhouses, presented by an Extension agent at a schoolyard garden site.

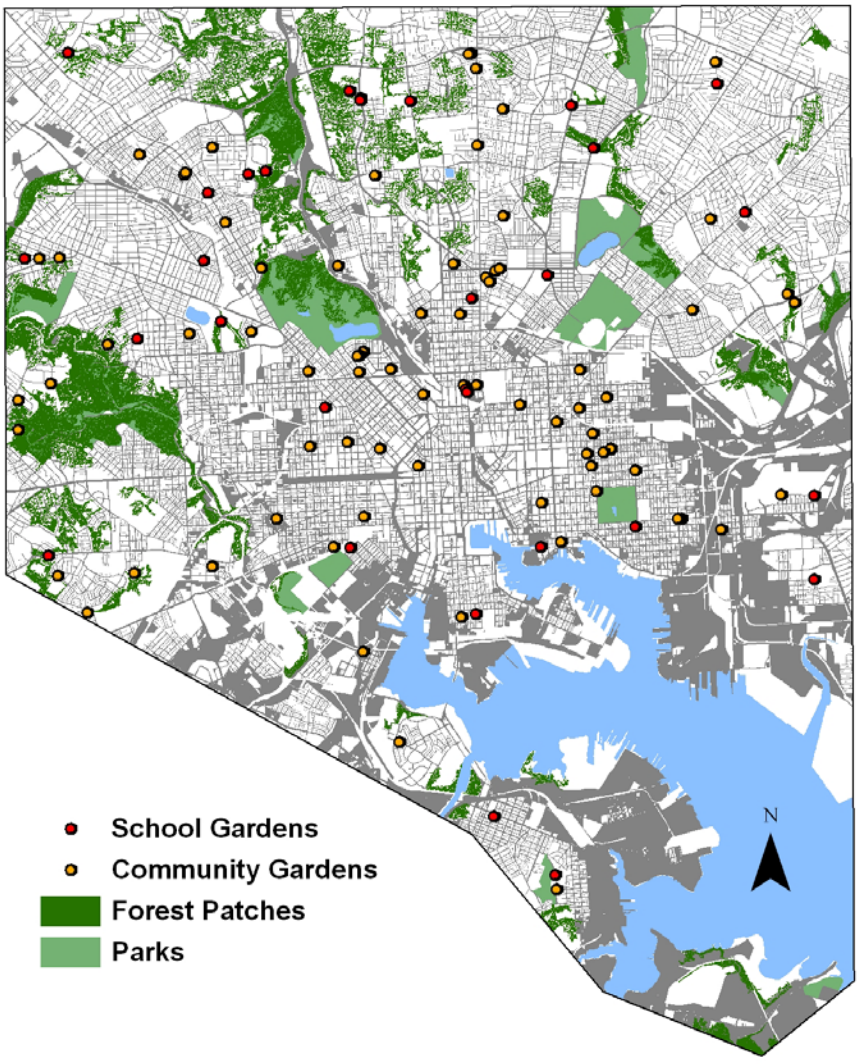
Connections — Tours, Celebrations, and Meetings

CGRN provides members with many opportunities to share experiences and learn from each other. Volunteer Work Days, for example, occur one day per month during the growing season and rotate among different member gardens. Volunteers typically include members of other community gardens, interested citizens, school groups, and

one-time volunteer groups in search of service opportunities. Celebrations provide opportunities for members to share, and be recognized for, their efforts. For example, the spring Urban Agriculture Gala features speakers, local musicians, and food grown in Baltimore City, and the fall Parks & People Community Greening Celebration includes an awards ceremony to honor the achievements of Baltimore gardeners.

In order to foster further connections among members, CGRN maintains an interactive web-based map showing garden locations. When a user clicks on a garden location, additional information is presented, including site images, garden contact information, and visiting hours. This map also allows CGRN to schedule tours highlighting specific neighborhoods or types of gardens. Recently, it was used as a primary planning tool for the Charm City Garden Tour, which introduced participants to several community gardens in one subwatershed within Baltimore City. CGRN also publishes an annual membership directory that is distributed to all members and partners.

Figure 4. Map of 2010-2011 CGRN Community and Schoolyard Garden Sites, displaying locations of affiliated community and schoolyard gardens in Baltimore City. As the map indicates, these garden sites are distributed geographically throughout the city.



Map by A. Reddy, Parks & People Foundation, 2011.

While CGRN's organizational partners provide many of the resources made available through the network, CGRN members themselves are frequently engaged as partners in the development and implementation of the program. Members contribute by participating in seasonal focus groups, conducting garden site visits, hosting workshops, volunteering at plant distribution days, and growing seedlings for other gardens. The CGRN Summit, an annual strategic planning meeting, engages all program constituents in evaluating the past year's progress and planning for the future.

Ongoing Program Evaluation

CGRN is designed to continually adapt and expand based on data and qualitative member feedback. Rather than offering a static

portfolio of programs and resources, CGRN is flexible, providing diverse points of entry that allow participants to determine their own level of participation. Using a logic model (see appendix B), staff members from Parks & People and Extension have developed measures and tools for program evaluation. Staff members from both organizations meet once per year to interpret data and determine whether objectives have been met. An extensive Microsoft Access database is used to track site and gardener information, volunteer hours, workshop attendance, and recommendations from feedback sessions. Additional data is collected through workshop evaluations and the CGRN membership enrollment form, which provides valuable information about member characteristics.

This information has been made available to individuals and organizations researching food security, urban revitalization, and other relevant topics. CGRN data was used by city government staff to define vacant-lot redevelopment policies and assist with citywide sustainability goals (City of Baltimore, 2009b). The Johns Hopkins University's Center for a Livable Future, a research center focused on public health matters, has overlaid community garden data with health statistics to direct funds to the neediest neighborhoods. Data collected by CGRN has played a role in preventing the sale and redevelopment of parcels occupied by community gardens.[4] CGRN has also been discussed and cited in a number of recent masters' theses.[5]

At this early juncture, it is not possible to know whether the program will be successful over the long term. At present, however, only three years since CGRN was initiated, we are meeting and in many cases far exceeding our initial goals. Between 2009 and 2010, community garden membership in CGRN increased by 38.8% and schoolyard garden membership increased by 100%. Resource distribution has kept pace with membership numbers. For example, participation in monthly Volunteer Work Days increased by 95% from 2009 to 2010, enabling CGRN to provide greater labor support for garden projects. The volume of plants and supplies distributed at Give-Away Days, the number of tools loaned through Community Tool Banks, and the number and range of CGRN-sponsored workshops and special events also increased during this period.

Though we may have to wait several years for conclusive data to demonstrate the connection between CGRN's work and reduced poverty levels or health impacts, gardeners and other residents are nevertheless benefiting from the collaborative efforts of this program. Each year, representatives from member gardens have actively participated in feedback sessions and garden site visits. At the 2009 member focus groups, one participant expressed appreciation at being "part of a large, useful, and active network and community." Martha Barss, a CGRN member who manages a vegetable gardening program at a low-income school, said, "We are definitely benefitting from belonging to CGRN. Not only are the tools a great benefit…but we also connect to others in the community who support the same initiatives we do." The Unity Community Garden, established with CGRN's assistance in a neighborhood whose three public schools receive Title 1 services (Baltimore City Public Schools, 2009), has reported increased homeownership in its neighborhood. As a member of the Unity Community Garden noted, "A couple came up to me and said that they are seriously considering buying a house on the block even though there are several abandoned properties, because they saw a garden work day and look forward to living across from the green space."

[4] For example, CGRN and its partners assisted members of the Ash Street Community Garden to successfully retain access to two adjacent parcels that, though legally under the garden's care through Baltimore's Adopt-a-Lot program, had been mistakenly made available for purchase by developers. Since securing long-term access to these parcels, the Ash Street Community Garden has been able to significantly expand its activities. In addition to providing both individual and cooperatively run garden plots, the group now hosts workshops and special events and has become a community hub.

[5] For example, in: Corrigan, M. P. (2010). *Growing what you eat: Developing community gardens and improving food security*. Thesis presented to the faculty of College of Arts and Sciences of Ohio University.

Securing Long-Term Membership

Each year, CGRN members are presented with additional ways to become involved in and benefit from the program, encouraging membership renewal. For example, second-year members may apply to work with a skilled group of volunteers who assist with garden infrastructure. Third-year members may apply for partial scholarships towards advanced horticultural training courses. These opportunities, as well as continued access to CGRN's basic array of program features, build the capacity of long-term members, thereby contributing to the stability and success of individual greening projects. CGRN itself also derives benefits from the long-term participation of its members. Long-term members frequently serve as unofficial program ambassadors, promoting CGRN to potential participants as well as to the general public. As members gain gardening expertise, they also give back to CGRN by teaching workshops and mentoring newer gardeners. Finally, CGRN is able to collect longitudinal data on its long-term members, enabling staff to evaluate the program's impact and develop an accurate picture of community gardening in Baltimore.

Securing Long-Term Staff Funding

Thus far, CGRN has subsisted on a relatively modest operating budget (figure 5), capitalizing on existing resources and securing additional resources through donations. The key to CGRN's initial development has been the recruitment of a series of three AmeriCorps*VISTA volunteers, each of whom has served a year-long term as full-time program coordinator. The CGRN coordinator is responsible for all aspects of program administration, including membership coordination, database management, Community Tool Bank oversight, volunteer training and recruitment, special event coordination, and fundraising. Without the dedicated service of our AmeriCorps*VISTA volunteers, initial development of CGRN would simply not have been possible.

Continued staff funding is necessary, however, to ensure future program operations. Detroit's program is partially supported by its host organization, The Greening of Detroit, and also by the AmeriCorps State program and federal grants. Many of CGRN's programmatic components feasibly could be funded by local sources. However, such local grants are often not large enough to support staff time and the myriad overhead costs associated with program administration. As is true for many nascent nonprofit initiatives, staff funding currently presents one of CGRN's largest challenges.

Future Directions and Additional Partners

As participation in CGRN grows, program staff,

Figure 5. CGRN Summary Program Budget, 2009–2011

	2009	2010	2011
Income			
Nongovernment Grants	$8,333	$10,000	$18,155
Government Grants	$19,467	$19,467	$12,978
In-Kind Contributions	$7,000	$7,000	$10,000
Program Fees	$1,500	$2,000	$2,500
Special Event Revenue (net)	$200	$200	$200
Total Income	**$36,500**	**$38,667**	**$43,833**
Expenses			
Salaries	$27,466	$27,466	$30,000
Benefits	$6,084	$6,084	$6,645
Program Expenses	$2,600	$4,567	$6,438
Publicity, Fundraising and Printing	$150	$250	$350
Travel	$200	$300	$400
Total Expenses	**$36,500**	**$38,667**	**$43,833**

members, and collaborators are actively seeking opportunities to expand offerings and develop new partnerships. Accurate information about soil fertility and toxicity, community leadership training, and GPS-coordinated garden maps are member-generated ideas for future expansion of the program.

Developing our partnership with the University of Maryland, United States Forest Service, United States Geological Survey, and the Baltimore Ecosystem Study will give us access to detailed soil and other environmental information. Lead and arsenic levels in urban gardens are a source of concern, and with accurate knowledge about the safety of each garden location, we can prevent unnecessary risks. Partnerships with community resource centers will allow us to schedule leadership trainings. Developing effective leaders in each of Baltimore's neighborhoods will help prevent garden collapse and has been shown to increase the overall capacity of a neighborhood. One of CGRN's current partners, Baltimore Green Space, is spearheading a community action program to map Baltimore's gardens and link them to lot and parcel numbers, providing information that will aid us in protecting gardens from redevelopment. Also planned for 2011 is a welcoming committee to introduce new members to CGRN. These and other ideas for future directions were generated and discussed at the annual focus groups and strategic-planning meeting.

Furthermore, far-reaching changes to Baltimore City's zoning code set to take effect in 2011 will permit community gardens and urban agriculture projects in most areas and will allow on-site farm stands for the first time in the city's history (City of Baltimore, 2010). These zoning changes have the potential to bring community-grown fruits and vegetables to an unprecedented number of residents in Baltimore's low-income communities.

Finally, CGRN hopes to contribute to the establishment of successful garden resource networks in other cities. Staff from Grassroots Gardens of Buffalo and Brooklyn Greenbridge, both in New York state, have sought advice recently in replicating "CGRN on a smaller scale" and working with their local Extension coordinator and Master Gardener programs.

Recommendations

Based on our experience in implementing the CGRN program, the authors would like to offer the following recommendations for groups interested in establishing similar resource networks:

1. **Evaluate the level of community need and interest**. Convene a meeting of community members and leaders to discuss current needs and identify gaps in existing support for citizen-led greening initiatives. Use the data generated by these conversations to identify the role a resource network might play in meeting current needs. In addition to helping you plan your program's offerings, a firm statement of need, supported by measurable data, is an essential aid in securing financial support.

2. **Garner meaningful support from project partners and clearly define all partners' roles**. Engage nonprofit organizations, government agencies, private businesses, educational institutions, and other service providers in your area to discuss how existing services could be better coordinated in response to identified community need. Establish what resources each partner will make available through the resource network, and secure written partnership agreements or memoranda of understanding from primary partners.

3. **Establish shared governance and program oversight.** Establish a program advisory committee and invite partners and community members to play an active role in guiding program policies, procedures, and overarching goals. Hold advisory committee meetings in a convenient location and invite partners to host certain meetings at their own headquarters. To the extent possible, decentralize procedures so program activities are not reliant on one organization. Solicit the input of the program's general membership through annual focus

group sessions, planning meetings, and membership surveys.

4. **Take advantage of opportunities to secure staffing support**. Establishing and administering a resource network takes time, and funding for staff salary can be difficult to secure. The AmeriCorps*VISTA program, operated by the Corporation for National and Community Service, places young adults in year-long, full-time positions at nonprofit agencies around the country. VISTA volunteers can play a major role in establishing new initiatives, and your organization may be eligible to host up to three VISTA volunteers.[6]

5. **Call on the expertise of others with experience in implementing such programs.** Staff members from the Greening of Detroit provided invaluable counsel during the early stages of CGRN's establishment, as did representatives of the Community Food Security Coalition. We encourage you to seek the guidance of those who have gone before you; the value of this advice cannot be overstated.

6. **Determine baseline indicators of poverty and health with which to evaluate the program.** Collecting accurate evaluation standards and linking your program's goals to measurable outcomes can be a great benefit in securing support from local government and financial sources. It might be helpful to partner with a local university or public research center to develop these indicators and to help measure the effect and impact of the program over the long term.

Conclusion

CGRN is an example of a stakeholder-driven coordinating program that identifies the needs of community gardeners and provides access to resources available from organizations, businesses, and peers within the gardening community. By doing so, CGRN provides comprehensive, citywide support for community gardeners and empowers residents to play an active role in urban revitalization. Key program components include partner and member relationships; materials, education, and connections provided for and between gardeners; and ongoing program evaluation. By building citizen capacity to effect positive change, programs such as CGRN may enable cities to become beautiful, green, safe places where all residents enjoy the environmental, socioeconomic, and health benefits of a thriving green infrastructure.

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[6] For more information on the AmeriCorps*VISTA program, see http://www.americorps.gov/for_organizations/apply/vista.asp

Appendix A. Partner Agreement Form for the Community Greening Resource Network

Community Greening Resource Network
UNIVERSITY OF MARYLAND EXTENSION
Solutions in your community
PARKS & PEOPLE FOUNDATION

Partner Agreement Form

The Community Greening Resource Network (CGRN) brings together the resources of many organizations to more effectively and efficiently support Baltimore's community greeners. This Partnership Agreement Form is valid for one calendar year and will be reviewed annually.

CGRN Goals:

- Promote urban agriculture and greening in Baltimore as a tool for revitalizing communities and increasing access to healthy food and opportunities for outdoor recreation;
- Create an organized program through which community gardeners are provided with access to information, training, and material resources;
- Coordinate existing efforts of greening organizations to advertise and increase participation in educational activities;
- Increase the quantity of material resources available to community greening stewards;
- Promote the successful management of green spaces through regular site visits and provision of training opportunities; and
- Recognize and reward Baltimore's urban gardens for their commitment and dedication to their communities.

I,_____, on behalf of my organization_____,

agree that my organization will receive the following from CGRN:

- ☐ Space on the monthly calendar, distributed to all members, for relevant programming
- ☐ Opportunities to have my events hosted at CGRN sites
- ☐ Name/logo on CGRN documents and at CGRN events
- ☐ Direct input in CGRN's policies and procedures through the Advisory Committee
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

In return, my organization agrees to provide or contribute the following to CGRN:

- ☐ Participate in regular calendar setting meetings and add events to the calendar
- ☐ Manage Community Tool Banks and facilitate tool rentals
- ☐ Complete Site Shares for new members
- ☐ Solicit and work with CGRN sponsors
- ☐ Solicit new CGRN partners
- ☐ Provide volunteers for program components
- ☐ Use the CGRN sign-in sheet and evaluation form at events
- ☐ Provide space for workshops
- ☐ Distribute CGRN membership forms and encourage membership
- ☐ Donate plant material to the give-away days
- ☐ Other: _____
- ☐ Other: _____

Name: _____ _____

Organization:_____ Signature/ Date

Appendix B. Logic Model for the Community Greening Resource Network

Situation ⇨	Inputs ⇨	Activities ⇨	Outputs ⇨	Outcomes		
				Knowledge	**Actions**	**Conditions**
Access to education and resources • Insufficient access to necessary gardening resources • Educational opportunities inaccessible **Public health** • High food costs • High quality food not sold in low-income neighborhoods • High risk of diet-related chronic disease among low-income residents • Increasing rates of obesity among low-income residents **Quality of life** • Vacant land creates blight • Insufficient green infrastructure in urban areas • Limited opportunities for neighbors to work together	**For all objectives** • Understanding of requirements for successful urban food gardening • Infrastructure (platform for interorganizational communication and coordination, easily accessible material, and information-distribution sites) • Staff time • Federal, state, and private funds • Staff and community expertise • Resources contributed by businesses and organizations (plants, seeds, tools, volunteer time) • Stakeholder-led program evaluation and input	**Access to education and resources** • Coordinate and provide material and educational resources for urban gardeners • Provide training and opportunities for low-income gardeners • Involve stakeholders in program operations, administration, and evaluation **Public health** • Make locally grown produce available to low-income residents via community and schoolyard gardens **Quality of life** • Encourage transformation of blighted vacant lands into productive, safe, and accessible urban green spaces • Provide opportunities for residents to work together to revitalize communities **Who we reach** • Low-income gardeners • Underserved neighborhoods • Baltimore City consumers • Volunteers • Educators • City government, nonprofit and community organizations, public agencies • Federal, state, and private funders • Private businesses	**Access to education and resources** • Seed and plant Give-Away Days • Community Tool Banks • Public calendar of workshops and events offered citywide • Regular member communication with opportunities, information, and announcements **Public health** • Educational programming focused on gardening and nutrition • Material and technical support for urban food gardening activities **Quality of life** • Material and technical support for expansion of green infrastructure • Regular volunteer work days • Opportunities for positive social interaction	**Access to education and resources** • How to find plants, tools, and workshops • Low-cost methods for growing food **Public health** • Increased knowledge of positive life choices • New healthy food choices **Quality of life** • Improved gardening skills • How to gain access to vacant land for community use • How to connect with other gardeners	**Access to education and resources** • Adopt new skills and apply knowledge • Donate time working in other community gardens and contribute to program research • Participate in resource-sharing **Public health** • Involve low-income community members new to gardening • Choose and consume healthy, locally grown produce • Encourage healthy food choices among others **Quality of life** • Active stewardship • Start new gardens • Community engagement • Share garden experiences	**Access to education and resources** • Higher productivity of urban food gardens • Increased opportunities for low-income communities to grow fresh food • Alleviation of poverty **Public health** • Reduced obesity and improved nutrition and health • Healthier, more accessible food supply **Quality of life** • Greener environment • Better quality of life in urban communities • Opportunities for underserved residents to contribute significantly in building public green spaces

Assumptions: By providing material, technical, and educational resources for low-income gardeners, and by providing support for garden-related entrepreneurship, CGRN will improve food security, positively affect public health, enhance Baltimore's green infrastructure, and encourage community gardening activity among residents.
External factors: Presence and availability of vacant land for gardening use.

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Community-based wastewater farming and its contribution to livelihoods of the urban poor: Case of Nairobi, Kenya

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Abstract

No current and reliable estimates of the number of people participating in urban agriculture exist; however, Smit and Nasr roughly estimated the number to be about 800 million (Smit, Ratta, & Nasr, 1996). Other estimates predict that in 2020, 35 to 40 million urban residents of Africa will depend on urban agriculture to feed themselves (Denninger, Egero, & Lee-Smith, 1998). In 2008 the world's urban population outnumbered its rural population for the first time. It is estimated that the world's urban population will double from 3.3 billion in 2007 to 6.4 billion in 2050, and that by 2030, 6% of the world's population will live in cities (UNFPA, 2007). In most developing countries, more than half of the urban population lives below the poverty level of USD1 per day (UN, 2008). To cope with urban poverty, many people turn to farming; it is estimated that between 15% and 20% of food throughout the world is produced in urban and peri-urban areas (Armar-Klemesu, 2000).

Estimates show that at least two million hectares (4.9 million acres) in both urban and rural areas around the world are irrigated with treated, untreated, or partially treated wastewater (Jimenez & Asano, 2004). We carried out a study in Nairobi aimed at generating data on the contributions of wastewater farming to the livelihoods of the urban poor. The survey among 232 wastewater-farming households was complemented by focus-group discussions in two informal settlements in Nairobi, and revealed that wastewater farming benefited both farmers and their neighbors by providing food, employment, and income. Over 60% of labor was provided by women. Fewer than half the

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farmers used manure or chemical fertilizer, as many believed that wastewater contains plant-based nutrients. The wastewater farmers experienced challenges in insecure land tenure, conflict with the city council, conflict in sharing resources, and competition for space between farming and housing. There was a generally low level of knowledge about the safe use of pesticides among those surveyed, and further research is recommended on this topic as well as on the health risks of wastewater farming. There also is a need to establish platforms to discuss and resolve resource-use conflicts in wastewater farming, as well as on issues related to incorporating urban agriculture into urban land use.

Keywords
Wastewater farming, urban agriculture, informal settlements, Kenya

Background and Research Objectives

Though the crisis in world food prices exploded during 2008, food insecurity in Africa has been a fact of life for many low-income urban dwellers for decades, and especially since the period of structural adjustments in the 1980s (Maxwell, 1995). The problem is not a lack of food; it's that poor urban consumers cannot afford it. This is the stark but simple truth lying behind much of the inequitable distribution of wealth across many African cities. What urban households have known and practiced for generations, urban decision-makers have begun to recognize more recently: urban agriculture is an important livelihood strategy (Prain, Karanja, & Lee-Smith, 2010). Although rural agriculture has a major role to play in meeting urban food needs, urban agriculture (UA) has great potential to help fill the gap during the food shortages that are common in Africa and that especially affect poor urban populations (Haluna, 2002). Some of the advantages urban agriculture has over rural agriculture include proximity to the major demand centers, low transportation cost between the farm gate and retail market, and reduction in postharvest losses due to reduced time between harvest and sales (Gyiele, 2002).

No current and reliable estimates of the number of people participating in UA exist; however, Smit and Nasr roughly estimated the number to be about 800 million (Smit, Ratta, & Nasr, 1996). Of these, 200 million are considered to be market producers, employing 150 million people. Other estimates by Denninger, Egero, and Lee-Smith (1998) suggest that by 2020, 35 million to 40 million urban residents in Africa will depend on UA to feed themselves.

Studies in nine African cities reveal that on average, 35% of households engage in some form of agriculture, but this rises to over 70% depending on their location along the peri-urban to urban transect (Foeken & Mwangi, 2000; Nabulo, Oryem-Origa, & Diamond, 2006; Prain, et al., 2010). Conservative estimates reported by Armar-Klemesu (2000) suggest that between 15% and 20% of the world's food is produced in urban and peri-urban areas. Poverty is a big challenge in developing countries, and in Kenya, for instance, 56% of the population lives below USD1 per day (MoPND, 2003). Nairobi has the highest concentration of unemployment in the country, standing at 243,272 persons (9%). Women make up 54% of this unemployed population (referred to as those seeking work or having no work available as reported under the population census) (GOK, 2010). Urban agriculture provides benefits to the economy in terms of employment and income, particularly for women and other disadvantaged groups among the poor.

The most important reasons why farmers in developing countries use wastewater for farming is its availability throughout the year as the only source of irrigation water, and the presence of plant nutrients in wastewater, which saves farmers the need of spending money for fertilizer. Wastewater in this paper refers to the liquid part of waste from households (black and greywater), farms, and industrial establishments, which may be mixed with groundwater, surface water, and stormwater (Metcalf & Eddy, 2003). Millions of farmers globally use wastewater for agricultural production. Though the actual extent is not known, some estimates show that at least two

million hectares (4.9 million acres) in both urban and rural areas are irrigated with treated, untreated, or partially treated wastewater (Jimenez & Asano, 2004). In recent years wastewater has gained importance in water-scarce regions like the Middle East and North Africa. Projections show that the world population living in countries facing water scarcity will increase to about 40% by 2050 (Hinrichsen, Robey, & Upadhyay, 1998). The expansion of urban populations translates into more fresh water being diverted to cities for domestic use. About 70% of this water returns as wastewater to the environment and could be recycled for farming (Faruqui, Niang, & Redwood, 2004). Urban farmers make use of the nutrients in wastewater to enhance yields and ensure year-round food production. About 2,200 hectares (5,436 acres) are irrigated with water of varying quality within a 20 km (12.4 mile) radius of Nairobi (Hide, Kimani, & Thuo, 2001). These urban and peri-urban farmers use water from streams (upstream) and indirectly or directly reuse untreated urban wastewater.

Irrigation with untreated wastewater, however, can present a major threat to public health (of both humans and livestock), food safety, and environmental quality (Scott, Faruqui, & Rashid-Sally, 2004) since it contains disease-causing micro-organisms. This may affect at least 10% of the world population that has been estimated to consume wastewater-irrigated produce (Smit & Nasr, 1992). Further, untreated wastewater contains industrial effluents that carry toxic organic and inorganic chemicals, some of which can be bioaccumulated in plant tissues (Carr, Blumenthal, & Mara, 2004).

Wastewater farming provides employment opportunities and is a way for urbanites to meet their food requirements and generate income. The potential contribution of wastewater farming to urban food systems is high, but it is not supported by an urban land-use policy framework in many countries, including Kenya. Thus not much attention is given to the activity. The aim of this study was to gain an understanding of the contribution of wastewater farming to the livelihoods of the urban poor, and of challenges that threaten this form of farming in two informal settlements in Nairobi, Kenya.

Methods and Approaches

Study Sites

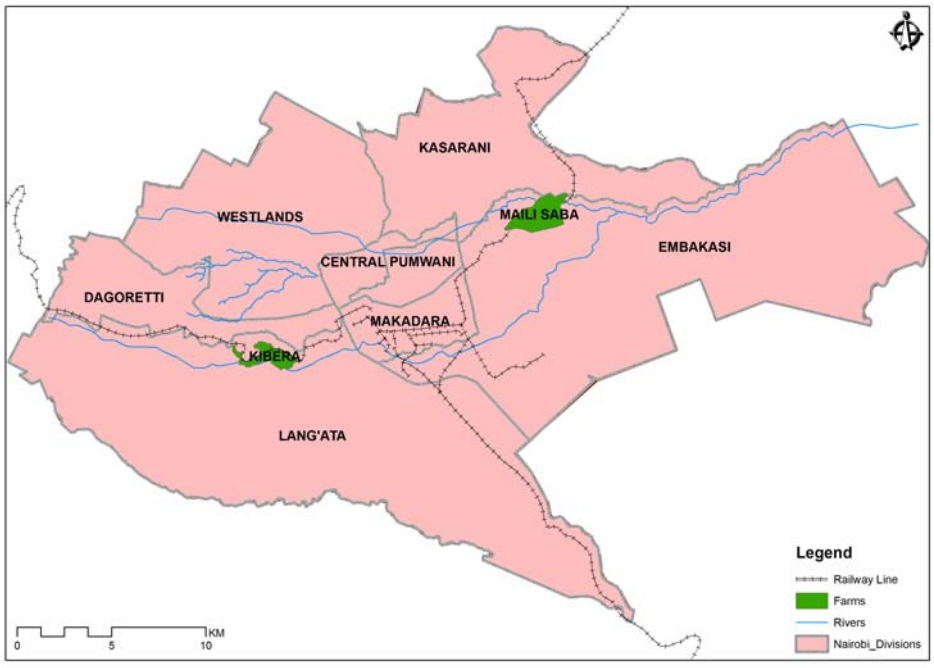
The first study site included in this report is Maili Saba farm in Embakasi division of Nairobi, Maili Saba sublocation, with a population of about 10,000 (see figures 1a and 1b). Sixty-eight percent of the population in the sublocation practiced irrigated urban farming using untreated wastewater tapped from the main sewer line as it flows to the Ruai water treatment plant. The total area of this farm was 61 hectares (151 acres), and the land belonged to one of the residents who allowed farmers to use it on a temporary basis. The farmers are organized into the 1,500-member Siranga, Mwangenya, Ruaka Self-Help Group, most of whom have been farming at Maili Saba since the early 1980s. This group is a legal entity that was registered in 2003 with the Ministry of Gender, Children and Social Development and is managed by an executive committee. The group's activities are guided by a set of objectives that are to conserve and protect biodiversity and the environment along the Nairobi river basin, to generate income and employment through livelihood diversification, and to network urban farmers to enhance their bargaining power.

The second site included in this study was Kibera farm, located 10 km (6.2 miles) southwest of Nairobi and bordering Lang'ata Barracks and Uhuru Gardens on the southern side and the Kibera slum on the northern side (see figure 1b). Most of the farmers came from the Kibera slum, which has a population of about 750,000 and occupies an area of 4 square km (1.5 square miles), making it the largest and one of the most densely populated slums in Africa. The slum is characterized by poor water and sanitation conditions, high food insecurity, health problems (especially high child mortality), unemployment, and insecurity (UN-Habitat, 2006). The farm covered an area of eight hectares (20 acres) belonging to the National Social Security Fund (NSSF), which has

Figure 1a. Map of Nairobi in the Context of Kenya

Map by Dennis Mwaniki.

Figure 1b. Map of Nairobi Showing Study Sites



Map by Dennis Mwaniki.

allowed the farmers to use the land for crop production under informal arrangements. The farmers have cultivated this land for the last 20 years using untreated wastewater.

These farmers, like their counterparts in Maili Saba, belong to an association. Theirs is known as Lang'ata Self Help Group and comprised 36 members (25 men and 11 women) at the time of the study. Lang'ata Self Help Group, as in the case at Maili Saba, is a legal entity registered with the same ministry. The farmers formed this legal entity in order to address their household food and nutrition needs, generate income, be self-employed, and address other challenges posed by the slum. The group is led by an executive committee and guided by a constitution that lays out rules and regulations.

Socioeconomic Survey

Surveys were conducted at 206 households in Maili Saba, a large farm with many farmer households, and at 26 households in Kibera, a small farm with few farmer households. At Maili Saba households were randomly selected from the three villages in the site: 71 households from Maili Saba, 10 from Mwengenye, and 125 from Siranga. A representative sample in each of the three villages was determined based on the total population of wastewater farmers. After determining the sample size for each site, random selection of the respondents was done along footpaths, where every fifth household involved in wastewater farming was interviewed. At Kibera, all the households that were actively involved in wastewater farming formed the sample and those that were available

during the time of the survey were interviewed.

A gender-sensitive and completely structured questionnaire was pretested, revised, and then administered to individual households to gather quantitative data on types of crops grown, land sizes, inputs used, management of community-based irrigation systems, and benefits and constraints faced in wastewater farming. Four focus-group discussions were also conducted separately with men and women farmers at each site (over the course of one week at Kibera and the following two weeks at Maili Saba). At Maili Saba four men and four women among the respondents from each village were asked to volunteer to attend the focus group discussions, while at Kibera all the respondents were invited to attend. A checklist was used to gather information on gender perspectives in the issues addressed in the household surveys as stated above. The members of the executive committees at the two sites supported the implementation of the survey and helped mobilize farmers to participate.

A feedback workshop was held in April 2008 where findings were discussed with stakeholders and recommendations made on strategies to improve sustainability of community-based wastewater farming.

Data Management and Analysis
Quality control of the completed questionnaires was carried out every evening by a supervisor who was also the database manager based at Urban Harvest. Urban Harvest[1] was a systemwide initiative on urban and peri-urban agriculture of the Consultative Groups on International Agricultural Research (CGIAR). Data collected from the survey was entered into the computer using CSPro and analyzed using SPSS (CSPro 3.3; SPSS).

[1] The Urban Harvest program was closed in 2009. Its website is http://www.uharvest.org/

Table 1. Characteristics of the Interviewed Households

Characteristic	Kibera	Maili Saba
Household size (number of persons)	4	5
Female-headed households (%)	42	28
Household heads who had attained primary education (%)	54	63
Households that owned their houses	75	50

Results and Discussions

Socioeconomic and Farming Characteristics
There were an average of four or five persons per household in Kibera and Maili Saba. Forty-two percent of the Kibera households and 28% of the Maili Saba households were headed by women. The mean age for the female household heads was 47.5 years, and 44.3 for the male household heads (see table 1).

Household heads in Kibera were on average older than those in Maili Saba. The majority of household heads had attained primary education (54% in Kibera and 63% in Maili Saba) (table 1). However, a significantly higher proportion of female household heads (23%) had no formal education.

Three-quarters of Maili Saba households owned their houses, compared to half of Kibera households. Since these are informal settlements, this means the households owned the structure but not the land, and as such the households did not have secure land tenure. Sixty percent of children living in the households attended school; the proportion of children attending school did not differ by site or sex of household head.

In both sites the total size of farm per household was small, less than 2,000 m² (0.5 acres). Furrow irrigation, in which water is poured into parallel furrows and flows via gravity, was the most common method of irrigation used; in Kibera it was used by all farmers, while at Maili Saba it was used by 95% of farmers. The remaining 5% of farmers at Maili Saba used other irrigation methods, such as flooding, ground seepage, and watering cans. In

both sites farmers had a schedule for the days of the week and time when each farmer was to irrigate his or her crops. Over 90% of the farmers grew kale (*Brassica oleracea*), followed in frequency by maize (*Zea mays*), which was grown by 86% of households. The two most popular indigenous vegetables were amaranth (*Amaranthus spp.*) and African nightshade (Solanum *villosum*). Other crops grown were spinach (*Spinacia oleracea*), common beans (*Phaseolus vulgaris L*), bananas (*Musa acuminate*), sugarcane (*Saccharum officinarum*), arrowroot (*Maranta arundinaceae* L), and sweet potatoes (*Ipomoea batatas*). Most of the farmers reported that they bought seeds and seedlings, but for amaranth 60% of the farmers used seed from the previous crop. Seed sourcing was an activity mainly carried out by women.

Self-reported use of pesticides in the wastewater-farming households was found to be very high at Kibera and Maili Saba, where 78% and 85%, respectively, of households sprayed their crops. Vegetables were the main crops sprayed. The farmers used various pesticides, most of which researchers found in bottles with missing labels and instructions. This is an indication of the low level of farmers' knowledge of proper use of pesticides. Taking both sites together, use of biological methods was only reported by 17% of the 195 households that used pesticides. The biological methods of discouraging pests involved use of ash and plant materials such as pepper and tobacco.

Use of manure and/or chemical fertilizer was reported among 47% of the households and was applied mainly on vegetables. Use of chemical fertilizer was found to be less common among the wastewater-farming households, where it was only applied by 18% of the surveyed households. The livestock manure was mainly acquired from their own sources, as 67% of the households that used manure kept livestock. Other sources of livestock manure included receiving it free from friends, neighbors, and relatives, and colleting it free from roadsides. A few farmers bought manure from neighbors.

At Kibera, women and married young men were responsible for watering crops. These young men were hired by women mainly when the women's turn to water was before 6 a.m. or after 6 p.m., due to concerns about security. At Maili Saba, while men were involved in preparing watering channels and furrows, women were most often responsible for opening furrow gates to direct irrigation water to different plots — work that took a lot of time. At Kibera, vegetable harvesting was done by women traders. These traders picked what they wanted from the farm and took it to the owner to be measured and priced. Harvesting at Maili Saba was carried out by women farmers who later took the produce to the markets. In both farms, 60% of farm labor was provided by women; these results agree with findings of other studies (for example, Hovorka, De Zeeuw, & Njenga, 2009). It was further found that young adults without families of their own were not involved in wastewater-farming activities. These young people reportedly chose not to be involved in farming because they feared being ridiculed by their peers and were distracted by drinking liquor and idling around shopping centers, while some were employed in various industries in nearby areas. School-aged boys and girls were not involved in farming activities because most were in school during the day and homework took their free time in the evening, while others lacked interest in farm work. As most labor that also took long hours was carried out by women, this implies that women have higher occupational risks emanating from working in wastewater farms. The fact that the younger generation was less involved in this form of farming could pose a sustainability issue for urban agriculture in Kenya.

Contribution of Wastewater Farming to Livelihoods of the Urban Poor

On average, households in both sites had been involved in wastewater farming for over 10 years, and almost all had no other sources of irrigation water besides wastewater that is tapped from sewer lines. About a third of the farmers interviewed stated that they used wastewater because it was the only source available.

About 33% of the respondents mentioned provision of food and ability to generate household income as the most important benefits of wastewater farming (table 2). For instance, over 50% of the farmers who grew leafy vegetables consumed about a quarter of that produce and sold the rest. In contrast, beans, sweet potatoes, Irish (white) potatoes, and bananas were mainly grown for home consumption.

The survey revealed that wastewater farming provides self-employment to households, where 68% used labor provided solely by their family members. Provision of employment to others was high at Kibera, where 65% of the wastewater-farming households hired workers to assist with farming activities in addition to their own labor.

The other benefits of this type of farming were related to social relationships and psychosocial benefits. The farmers provided food to the neighborhood and provided vegetables at no cost to the less privileged, including an orphanage in the Kibera slums. These farmers believed that they were helping society by ensuring a steady supply of produce at a lower price than what is usually available in the market. They were also bound to one another through the self-help group, which gave them a sense of belonging. They reported that they "looked out for and took care of one another, especially in times of difficulties." Female participants in Kibera also identified several psychosocial benefits of farming, such as feeling healthier since they had something to keep themselves busy rather than being idle, and having to do physical work that they considered good exercise.

Table 2. Benefits Derived From Wastewater Farming According to Interviewed Households

Benefits	Percent of respondents
Self-employment where labor was solely provided by household members	68
Ability to provide 75% of leafy vegetables for home consumption	50
Ability to supply food and income	33

Farmers' Voices on the Benefits of Wastewater Farming in Nairobi

In order to expand on the benefits of wastewater farming, narratives by representative farmers drawn from Maili Saba and Kibera were captured during the feedback workshop and are shared below with minimal alterations. The real names of the farmers have been concealed for privacy reasons.

Joyce, a farmer from Maili Saba, started rainfed farming in the 1970s on a large tract of land in neighboring Njiru and Ruai. But over the years she and other farmers were pushed and squeezed out by housing estates. They found an opportunity in the wastewater that came from these estates and started using it for irrigated farming in small plots. Initially they used watering cans to irrigate, but after finding it to be very labor-intensive, they started using furrows. They also realized that the wastewater was rich in nutrients, and therefore they did not need to apply fertilizers. Over the years they have used the income they get from wastewater farming to educate their children, even up to college level. At the time of this study, some of the farmers' children were in senior positions where they work. "During the political unrest in early 2008, there was no food coming into the city for several days, and everyone in the neighborhood depended on what we grew," said Joyce. Therefore she felt that wastewater farming contributes a great deal to food security in Nairobi. She requested any information that would improve their farming. James, also from Maili Saba, is one of the pioneer wastewater farmers in Nairobi, and because of that he has participated in numerous lobbying forums and training courses. He represented Nairobi wastewater farmers in the World Water Forum held in Mexico in 2006, and conveyed his gratitude to the International Development Research Center (IDRC) for supporting his trip. His dream is to see urban agriculture on the policy agenda and wastewater farming as one of its components for safe and sustainable urban foods.

Pauline, a farmer from Kibera, started by working as a laborer on the wastewater farms. In 1988 she got a plot of her own on the same farm and began farming. She now has five children and another

five from her late sister. Though she now has a big family, she is able to feed and educate them using income from the wastewater farm. Pauline stated that there are 36 farmers in the Kibera wastewater farm who live and work as a family despite their different ethnic backgrounds. They share farm implements and inputs such as seeds with each other. Over the years they have acquired a lot of experience in wastewater farming and also learned a lot from their interaction with Urban Harvest and its partners' research.

Margaret has farmed at the Kibera wastewater farm for over 20 years and sells over 80% of her produce. She supported and educated her family using income she got from selling amaranthus, black nightshade, kale, and spinach to Kibera residents. She was able to purchase a piece of land in her rural home area for her family's retirement. She said that she was happy to have created job opportunities for urban youth; she had two full-time employees on her farm and engages several casual workers during peak planting and weeding periods. Using wastewater enabled her to have produce throughout the year and more so during the dry season, when less produce is received in the city center from rural areas.

Figure 2. Ruth Weeding Vegetables Irrigated Using Wastewater in Nairobi, May 2008

Photo by Mary Njenga.

Joseph's farming system changed after 2004, when a scientist from Senegal assisting with an urban agriculture course visited the farm accompanied by Urban Harvest. He advised Joseph to start growing high-value crops such as vegetables from which he could get income throughout the year. Since then he has had continuous employment and his income has allowed him to meet his family's needs throughout the year. In fact, he confessed that he had no plans to retire to his rural home in Nyeri, as urban agriculture was providing him with the income he needed.

Farmer's Perceptions and Knowledge About Health Risks Associated With Wastewater Farming

Twenty-seven percent of the interviewed farmers in Kibera and 56% in Maili Saba mentioned that using untreated wastewater posed health risks to them. In addition, 34% of these households reported that at least one member of their families had health problems that may have been caused by wastewater. The gender of those affected was 33% of male adults, 63% of female adults, 26% of youth (13–25 years), and 26% of children. More female adults were found to be affected, which could be associated with the fact that, as previously described, most

farming activities were performed by them and hence they were more exposed to the risks. Farmers had devised ways of minimizing biological contamination of the crops, such as applying water through furrow irrigation, which was practiced by all farmers at Kibera and by 95% of farmers at Maili Saba. Fifty-eight percent and 63% of respondents in Kibera and in Maili Saba, respectively, used protective clothing while working in the wastewater farms. The most commonly used type of protective clothing was gumboots, used by 54% of those in Kibera and 50% of those in Maili Saba who used protective clothing. Other protective clothing used include gloves (6%) and dust coats (3%). Other mitigation measures adopted by the farmers included growing crops on ridges, washing them before eating, and cooking them properly. There was no mention by the farmers of mitigating the effects of heavy metal contamination, which may imply that they were not aware of such issues.

Challenges Faced by Wastewater Farmers

During the focus-group discussions and feedback workshop, farmers identified insecure land tenure, conflict with the city council, and competition for land between agriculture and housing and other uses as some of the major threats to their farming. A summary of these challenges is presented below with some unique elements from each site.

Challenges in Maili Saba

- *Private vs. public interest:* Most of the land is privately owned by an influential politician who has rented to the farmers at USD8 per year. Farmers had no problem with this informal arrangement, but were suspicious of how the land was acquired by the owner.

- *Agriculture vs. housing:* Due to rapid population increases (brought about by rural-urban migration) and manipulation of political votes, there was uncontrolled settlement in the wastewater farm areas.

- *Agriculture vs. environmental conservation:* One of the objectives of forming the self-help group was to protect the environment, which translates into sustainable utilization of resources. While the older generation embraced communal protection of the farmland, the younger generation was more interested in getting quick money from quarrying (for building stones) with little consideration for tomorrow's environmental effects.

- *Agriculture vs. politics:* Politicians won youth votes by promising free allotments of the same land farmers had been using for over 30 years. The central government had agriculture extension staff visiting farmers while the city council and the Nairobi Water and Sewage Company were enforcing regulations against the use of wastewater. This confused the farmers as to the long-term policy support for their wastewater-farming activities.

Challenges in Kibera

- *Private vs. public interest*: Farming took place on land owned by a parastatal institution that had an informal agreement with farmers, but the continuation of their tenure was unsure despite the fact that the farmers had been farming there for the last 20 years.

- *Ethnocultural and social groupings:* Farmers were still linked to their original socioeconomic groups. These were very diverse in terms of activities and cultural backgrounds, where for example some preferred to grow certain traditional vegetables based on the types they grew in their original rural homes, which in turn affected the group's farming approaches.

- *Agriculture vs. development:* The farming area was being encroached on by construction of bypass roads to ease congestion in the city center and by construction of high-rise buildings.

- *Male vs. female access to irrigation water:* There was insufficient wastewater, and men had the advantage of being able to water at night when it was too risky for women to do the same.

- *Agriculture vs. law enforcement:* Farmers were unwilling to abide by regulations that stipulated that the height of crops should be below one

meter (3.28 feet). This was because they are accustomed to selling maize, sugarcane, and fodder crops. The blocking of sewer lines by farmers to source wastewater also resulted in conflicts with local government law-enforcement officers.

Sharing of Findings with Stakeholders

A feedback workshop on the "benefits and risks in wastewater irrigation in urban and peri-urban agriculture" project was held on 28 April 2008 in Nairobi, where findings of the project were discussed among stakeholders. These included farmers and staff from national and international research and training institutions, nongovernmental organizations, government departments from both central and local governments, and development partners. Following presentations of the research findings, participants worked in groups to propose recommendations on research and development for the sustainable use of wastewater for poverty alleviation and food security. These recommendations and those of the research team are presented in the following section. Farmers elaborated on benefits accrued and challenges that they faced in this type of farming (presented above).

Conclusions and Policy Implications

Wastewater farming contributes to improved livelihoods for the urban poor. The food supplied from wastewater farms, for example, not only benefits the farmers, but also their neighbors in these informal settlements. Families in the informal settlements can buy food at lower prices than what is offered in markets. Some of the less privileged members of these societies receive food from the farmers at no cost. Farmers generate income they use to meet their household needs as well as to acquire assets such as land in rural areas. This type of farming creates employment and strengthens social networks through which the urban poor take care of each other in times of need. It was also noted that wastewater farming contributed to psychosocial health, particularly among women. Fewer than half the farmers were using either manure or fertilizer, citing the presence of plant nutrients in the wastewater, which helped them to save on the costs of inputs.

The high rate of pesticide application, coupled with a low level of knowledge about pesticide safety, calls for (1) research on the impacts on human beings and the environment, and also (2) technical capacity-building on the safe use of pesticides. Women were faced with security issues whenever their turn to access the irrigation water was at dawn or late in the evening, and as such they needed to spend part of their income hiring young men to water their crops. This indicates a need to consider gender issues when designing irrigation systems in urban areas. The farmers also faced the challenges of insecure land tenure and experienced various forms of conflict over resource use that threatens sustainability of their livelihoods from wastewater farming. There is a need to establish platforms and networks to form avenues for conflict resolution in wastewater farming, as well as holding dialogues on issues affecting farmers with government departments such as Nairobi City Council and the ministries of agriculture and livestock. This includes involvement of stakeholders in the ongoing process of developing a national policy that incorporates urban agriculture into urban land-use planning. While farmers were often aware of the health risks emanating from biological contaminants, they had absolutely no knowledge about the presence of heavy metals and possible risks that these might bring. There is a need for testing, dissemination, and communication of appropriate, cost-effective, and sustainable technologies such as irrigation methods, stabilization ponds that minimize risks, and growing of high-value crops and plants (such as forestry products, ornamentals, and seed).

Public and environmental risks associated with wastewater farming have been studied in the same sites and findings shared in various stakeholder forums as well as through publications such as Karanja, et al. (2010).

The time has come, however, when any form of urban agriculture demands government recognition so that the necessary institutional frameworks can be put in place to integrate these activities into existing urban planning.

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Smallholder peri-urban organic farming in Nepal: A comparative analysis of farming systems

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Abstract

Farming in the peri-urban areas of Nepal is increasingly characterized by monocropping and the imprudent use of agrochemicals. This intensification has raised questions about the sustainability of farming systems in the region. In this paper, we do a comparative assessment of these farming systems, focusing on organic production in the densely populated Kathmandu Valley. The relative inaccessibility of farming accessories and of modern farming technologies usually leads rural farmers to follow traditional farming methods, sometimes referred to as "default organic." In contrast, access to infrastructures opens avenues for further development of ecological farming in peri-urban areas. Gross margin analysis indicates that organic vegetable production is a lucrative endeavor in the area under study. Urbanites are willing to buy organic vegetables, but the higher price and lack of certification of organically produced vegetables are factors that should be taken into account by producers and organizations working in organic production. We suggest that nongovernmental bodies, along with government-run institutions, cooperatives, and community-based organizations, can play a facilitating role for a smallholder organic growers certification program. They should also support peri-urban farmers in their efforts to enhance the environment and agrobiodiversity.

Keywords

farm-family income, Nepal, organic vegetables, peri-urban areas, spatial sampling, indigenous knowledge, smallholder

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Introduction

Urban and peri-urban farming are usually located within or on the fringes of the urban and peri-urban areas. It has become a very visible economic activity in cities all over the world. In South Asia, some 11 million urban residents are associated with urban and peri-urban agriculture, and it contributes substantially to food security in cities in that region (Van Veenhuizen & Danso, 2007). By growing foods in the city, financially challenged members of urban society can generate income and also help protect the environment by recycling urban wastes (Cofie, Adam-Bradford, & Drechsel, 2006; Midmore & Jansen, 2003) and make the urban and peri-urban areas more sustainable places to live in (Yves, 2004). Urban agriculture also assists in filling the gap between urban food demand and supply (Umoh, 2006). Additional environmental and human health benefits of urban and peri-urban agriculture include management of solid and liquid city waste, provision of combustion-free zones, management of green space and biodiversity, and improvement of the urban microclimate (Konijnendijk, Gauthier, & van Veenhuizen, 2004; Midmore & Jansen, 2003). Peri-urban farmers also assist in reducing the city's ecological footprint by producing fresh foods close to consumers, thereby saving energy during transport and postharvest operations (Van Veenhuizen & Danso, 2007).

Peri-urban areas (PUAs), however, are subjected to dramatic changes due to urban sprawl, declining farm size, and increasing population density (Van Veenhuizen & Danso, 2007). Market-driven farming methods, such as shifting from staple and resilient crops toward more perishable vegetable and commercial crops, and increasing market-oriented intensive production, which uses a huge amount of agrochemicals and monocropping, raise many issues pertaining to the sustainability of peri-urban agriculture (Brook & Dávila, 2000; Smit, Ratta, & Nasr, 1996).

In Nepal, agro-inputs such as inorganic fertilizers and pesticides entered into accessible farming areas in the early 1980s, and since then their use has accelerated (Pokhrel & Pant, 2008). With an increase in the commercialization of vegetable production, there has been a simultaneous growth in pest and disease infestations, resulting in growth in the use of the synthetic pesticides (Pokhrel & Pant, 2008). Almost 348 tons of active ingredients of pesticides were imported to Nepal in 2007, which was 250% higher than imports in 2006 (Pesticide Registration and Management Division, 2009). Reports suggest that the use of pesticides in vegetable cultivation in Nepal is higher than in other crops (Koirala, Dhakal, & Tamrakar, 2009). As compared to other areas such as hills and mid-hills, the PUAs in the Kathmandu Valley alone account for a huge amount of agrochemicals. Decreasing farmland availability and adverse effects of the inputs used in farming have given birth to organic production (Bhatta, Doppler, & KC, 2009a). As a result, organic production techniques are becoming popular and are gaining support from producers and consumers alike.

Growing environmental concerns in the 1970s, development of environmental and resource conservation strategies in the 1980s, and implementation of those strategies in the 1990s have made sustainable agriculture a mainstream issue all over the world and organic agriculture an important niche for the development of agriculture. This is particularly true in urban and peri-urban areas (Kotschi, 2010). Organic agricultural practices have shown rapid growth and dynamic development worldwide in recent years and are now practiced in more than 141 countries (Willer & Klicher, 2009). About one-third of the world's organically managed land — almost 11 million hectares, or over 27 million acres — is located in developing countries. On a global level, organically farmed land area increased by almost 1.5 million hectares (3.7 million acres) from 2006 to 2009, and Asia constitutes 9% of the world's organic agricultural land (Willer & Klicher, 2009).

Spatial location of farm families has conspicuous effects on organic farming development (Bhatta, Doppler, & KC, 2009b). Organic farming development benefits from certain infrastructure and information systems to raise consumers' awareness about the importance of organic food and to create an efficient marketing system for the provision of

inputs and dispersal of outputs (Aryal, 2008; Bhatta, 2010). These attributes are common in the PUAs, while infrastructure facilities are lacking by and large in rural areas. Peri-urban agriculture in general, and organic farming in particular, are more profitable and sustainable due to nearby large populations, relatively lower transportation costs, and low postharvest losses (Midmore & Jansen, 2003). In addition, urbanites who are well aware of the harmful effects of pesticide residues, particularly diplomats, tourists, and the well-educated, create a demand for produce free of chemical residues. It has been noted that about 2% of households in the urban areas of Nepal regularly consume organically cultivated produce, and another 29% have a desire for its availability (Sharma, 2005). Similarly, urban consumers are willing to pay a premium for organic vegetables (Aryal, Chaudhary, Pandit, & Sharma, 2009; Bhatta, Ranabhat, & Subedi, 2008). Thus there is potential for enlarging domestic organic vegetable production and marketing in the urban and peri-urban areas of Nepal.

One of the goals of this research is to explore the unique history of organic farming development in Nepal and the various aspects that should be taken into account to further develop organic farming practices in the PUAs of developing countries. This research is based on a comparative descriptive analysis of the different farming systems (subsistence farming, commercial conventional and smallholder organic vegetable farming), discerning consumer attitudes toward organically cultivated vegetables, and assessing the relevance of smallholder organic farming practices in the PUAs of Nepal. These findings can help urban planners, environmentalists, agriculturists, and development workers in developing countries to understand the capacity of organic farming to improve peri-urban environments and to enhance sustainable food production for city inhabitants.

Development of Organic Agriculture in the Peri-Urban Areas of Nepal

Many of the rural farmers in Nepal still practice traditional farming methodologies (Sharma, 2005), which may be considered an uncertified "default organic" system (Scialabba, 2000). Although inorganic pesticides were introduced in Nepal as early as 1952 for the control of malaria (Shrestha et al., 2010), the widespread use of inorganic fertilizers and pesticides began in the 1980s (Pokhrel & Pant, 2008). Government authorities also encouraged farmers to use agrochemicals for higher productivity, and subsequently devised the proproduction policy in the 1980s (Bhatta et al., 2009a). Use of chemical pesticides accelerated after 1983 with the introduction of methyl parathion, a contact pesticide (Sharma, 2005). In the beginning, bags of inorganic fertilizers were distributed free of cost to farmers. The then–village heads and junior technical assistants (JTAs) were forced to distribute a set number of bags of fertilizers. Many farmers buried these bags in their fields to avoid the use of forcibly distributed fertilizers, and many JTAs broadcast fertilizers in the farmers' fields during the night in order to convince the farmers with their results (Sharma, 2005). Farmers realized a better harvest in crops cultivated using fertilizers. This was a turning point in the use of agrochemicals and created a new era of production methods.

Urban farming couldn't ignore the use of the newly introduced agrochemicals. The adopted use of agrochemicals rapidly changed Nepalese from indigenous knowledge–based integrated farming practices to more market-oriented, intensive, and monoculture practices. Introduction of new technologies, use of high-yield varieties, and the commercialization of agriculture have contributed to such changes (Gautam, Upadhyay, Choudhary, & Khatri, 2004). Road access, along with proximity to input markets, is a precursor of commercial farming (Brown, 2003; Brown & Shrestha, 2000) and expansion of roads has motivated farmers to continue indiscriminate use of agrochemicals (Bhatta et al., 2009a), leading to agro-ecological degradation. There was a target set by government authorities regarding the usage of fertilizers (NPC, 1995). The import of fertilizers increased significantly after the 1997 Fertilizer Deregulation Policy and the 2002 National Fertilizer Policy were implemented, putting in place subsidies for the transport of fertilizers, particularly for farmers in the hills and mid-hills.

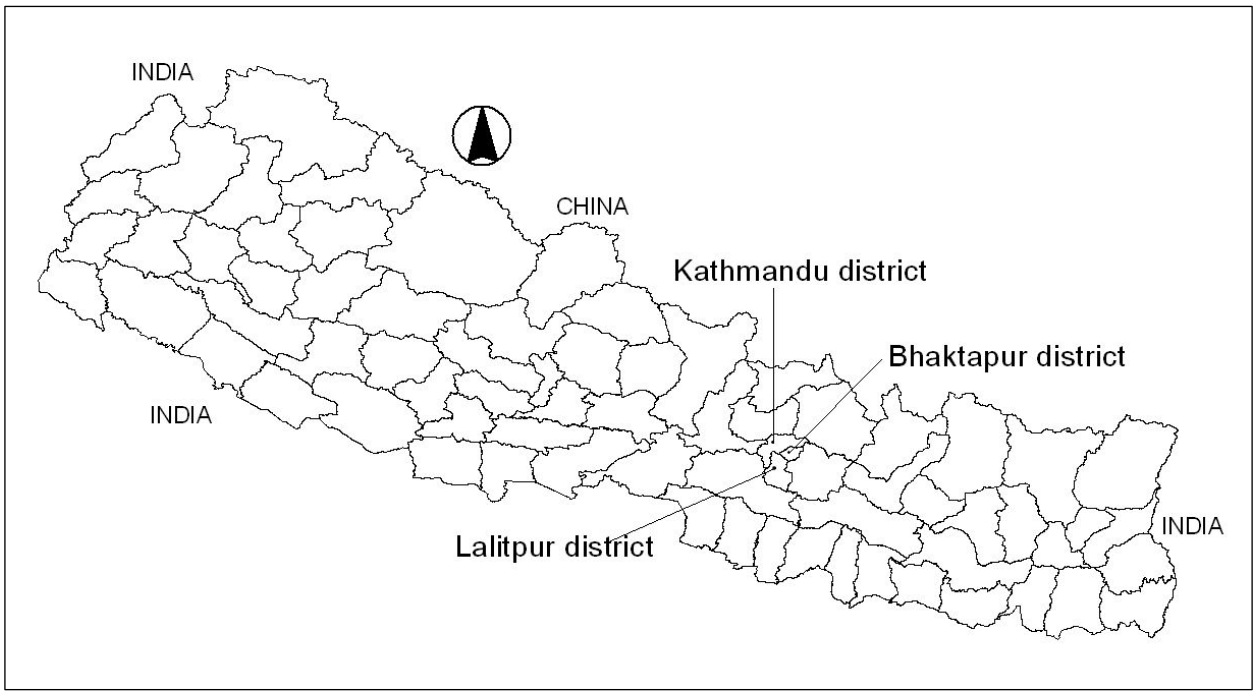
After almost a decade of using agrochemicals in urban and peri-urban farming, declining yields and increasing pest tolerance have become apparent (Bhatta, 2010). Farmers, who generally have lower literacy levels and are unschooled in the scientific application of agrochemicals, have continued to increase their usage of agrochemicals far above the recommended levels, which complicates the problems further. Some other impacts of agrochemicals include declining soil fertility and negative repercussions on the environment and health of farmers. Grim reminders of the negative repercussions of agrochemicals on farming eventually sparked the movement toward organic production in Nepal, particularly in peri-urban areas (Bhatta & Doppler, 2010).

Institutionally, scientific and modern methods of organic agriculture in Nepal began with the establishment of the Institute of Sustainable Agriculture in Nepal (INSAN) in 1986 (Sharma, 2008). This is a nongovernmental organization (NGO) working in the PUAs that promotes permaculture, a system similar to organic production. Another milestone of organic production in Nepal was the establishment of the Appropriate Agricultural Alternatives (AAA) farm in Kathmandu Valley in 1987 by an American named Judith Chase. Chase came to Nepal in 1976 to study the functional art of native artists. Chase moved to the countryside of the valley in 1987 to escape the urban lifestyle and experience the rural flavor in the mid-hills of Nepal. Chase began to cultivate vegetables using organic methods in the mid-hills. She soon realized that she could sell all of her produce to the expatriate community at prices twice the normal market prices of fruits and vegetables cultivated using agrochemicals. This enabled her to cover the costs of transportation and management, thus ensuring sustainability of her operation. For a short while, this effort remained isolated, with no sign of being replicated. After a couple of years and with a closer examination of niche marketing opportunities, a new wave of organic agriculture began in the surrounding areas (Weiss, 2004). With the onset of democracy in Nepal in 1990, many NGOs started working on various aspects of organic farming. After 2000, a number of cooperatives and private initiatives based on organic production were also started. As a result, production, productivity, availability, and commerciality of organic agriculture have been trending upward. Since then more than 80 NGOs and private-sector organizations have been involved in promoting organic farming methods in Nepal, particularly in the peri-urban areas (Ghimire, 2005). In the beginning, the authorities of the government of Nepal were reluctant to accept the concept of organic agriculture. However, they soon started their own initiatives to promote organic farming practices once they realized the negative repercussion of farming using agrochemicals.

Certification of organic agricultural produce (particularly of tea, coffee, and some herbal products) began in 1996 (Vaidya, 2006). However, the national norms and standards required for production, inspection, and certification of the organic products are yet to materialize. Some internationally recognized certifying agencies have worked on certification of organically cultivated produce (Pokhrel & Pant, 2008), especially of high-value and export-oriented crops. The area under organic production in peri-urban locations is gradually increasing, thanks mainly to the enthusiasm of farmers. That area was around 1,000 ha (2,471 acres) in 2005, and increased to 8,187 hectare (20,231 acres) in 2007, of which 7,737 hectare (19,118 acres) are fully converted to organic (FiBL & IFOAM, 2009). There were about 26 registered farms practicing organic production as of 2005 (Shakya, 2005), while 1,424 farms were identified as practicing organic farming methods in 2009 (FiBL & IFOAM, 2009).

Some supermarkets and grocery shops have started selling organic vegetables, and many restaurants nowadays are serving foods produced from organically cultivated agricultural products. Recently there has been growing interest in promoting organic production and marketing from both government and nongovernment sectors (Pokherel & Pant, 2009). Demand for organically cultivated vegetables has been increasing in urban areas (Aryal et al., 2009; Bhatta et al., 2009a) due to

Figure 1A. Location of the Study Area in Nepal



several factors, such as increase in purchasing power, education and awareness about the health and quality of organic foods, and willingness of consumers to eat healthy and safe foods (Bhatta et al., 2009a). However, peri-urban organic agriculture requires partnerships between public and private interests to achieve its potential (Smit et al., 1996).

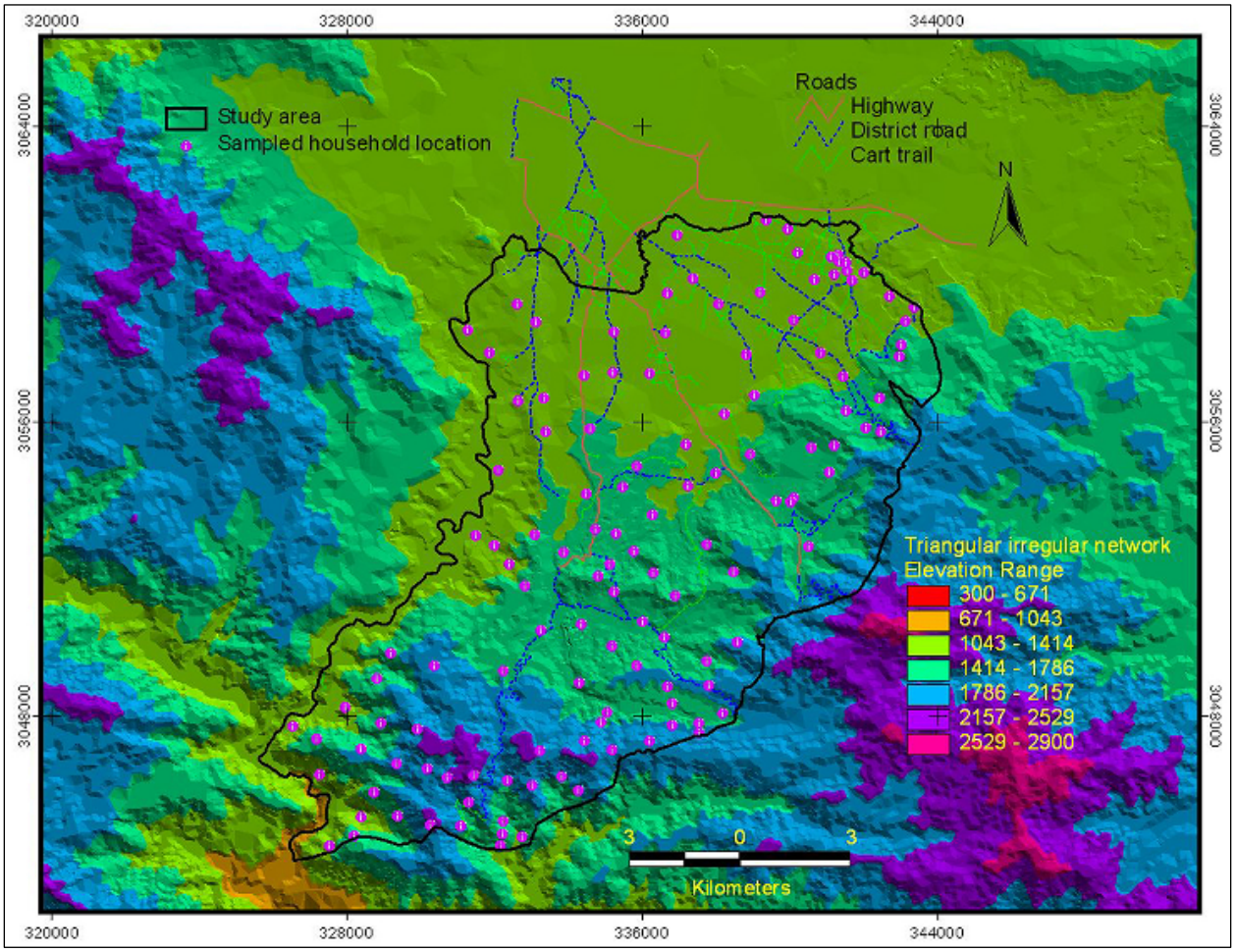
The Study Area

The peri-urban areas in and around the densely populated Kathmandu Valley were selected for this study. The valley comprises three districts (figure 1A) situated between the latitudes 27°32'13" and 27°49'10" north and longitudes 85°11'31" and 85°31'38" east and located at a mean elevation of about 1,300 meters (4,265 feet) above the mean sea level. Figure 1B shows the altitudinal gradients within the study area as represented by the digital elevation model (DEM). The region under study has more than 1.5 million inhabitants, who have access to most elements of urban infrastructure, such as roads, electricity, markets, and information centers (Pant & Dongol, 2009). Peri-urban farmers of the valley pursue intensive nonorganic and niche market–based organic vegetable production. It has been estimated that close to 23% of the vegetables consumed in Kathmandu are produced by farmers in the PUAs of the Kathmandu Valley (Pradhan & Parera, 2005). Similarly, the urban demand for organic vegetables is mostly met by the peri-urban growers in the valley.

In order to make comparisons between the diverse farming systems in the PUAs, three zones with farms using relatively homogeneous farming methods were identified: (i) subsistence farming, (ii) commercial conventional, and (iii) smallholder organic. Parameters such as location, main crops cultivated, degree of market orientation, and production intensity could be used for locating homogeneous production systems in the PUAs (Van Veenhuizen & Danso, 2007). In order to identify the criteria to define homogeneity in farming practices and to delineate the farming zones used in this study, we explored the site and interviewed local farmers and agricultural experts.

The first criterion used in this study was the degree of market orientation, which was also a criterion used by Nugent (2000) for selecting a homogene-

Figure 1B. Study Area Represented by the Digital Elevation Model with Road and Market Infrastructures
(elevation expressed in meters above sea level)



ous group of farmers in the PUAs. It identified a first group of farmers who were mainly subsistence producers using traditional modes of cultivation and almost having no market orientation. These were followed by a second group of farmers who were commercially motivated and were cultivating crops, mainly vegetables, using agrochemicals. The third group comprised farmers who practiced organic methods of vegetable cultivation in a small parcel of land, mainly for niche markets in the urban cores.

The second criterion was related to the biophysical setup of the area under study. It included the slope, altitude, and infrastructure availability (e.g., roads, markets, electricity, and extension services). Looking at this criterion, subsistence farming was prevalent in the higher altitude remote areas, some 20 to 25 km (12.4 to 15.5 miles) away from the urban core, with hilly terrains and relative lack of fundamental infrastructure, while commercial (inorganic) farming was prevalent in the low-lying valley areas where irrigation and infrastructure were in place. Smallholder organic farming was practiced in the middle altitude near the urban market and information center.

The third criterion is related to the practice of farming itself. Subsistence farmers followed traditional farming, often referred to as "organic by default." The integration of forestry and raising of livestock along with raising crops was a common

feature of subsistence farming. Commercial (conventional) farming was dependent on the use of agrochemicals, while farming was practiced using natural and/or organic inputs in the smallholder (organic) zone. Many farms in this zone had a two-tier production system: organic for the income-generating crops like vegetables, and conventional for the subsistence production.

Sampling and the Data

The study was based on results of a survey of farm households. The farm households were selected using spatial and random sampling procedures. Through spatial sampling,[1] 60 and 35 farm households were selected from the subsistence and commercial inorganic farming zones, respectively, while 35 farm households from the smallholder organic farming zone were selected through simple random sampling method. All the sampled households in the study area are shown in figure 1B.

The survey of consumers was conducted at the urban organic and conventional vegetable markets in Kathmandu Valley. Using purposive sampling, 100 consumers were selected, 50 each from the local and the specialized markets.[2] Cattin and Wittink (1982) indicate that the median sample size for finding consumers' preference for particular food product ranges from 100 to 1,000.

Data were collected using the standard questionnaires (prepared after pretesting) and administered through personal interviews. Two methods were employed to analyze the collected data: (1) Descriptive analysis consisting of calculating percentages over the group, mean, and standard deviation. This also includes the nonparametric tests such as the Mann-Whitney test and group comparison. (2) Gross margin analysis to estimate the cost and return from key vegetables such as cauliflower. It is given as:

$$GM = TR - TVC$$

Where GM = gross margin, TR = total revenue, and TVC = total variable cost

Results and Discussion

Sociodemographic Description of the Respondents

Efforts were made to understand the sociodemographic characteristics of the peri-urban farmers in the study area. This was done because farming activities are guided mostly by the socio-economic characteristics of the farmers and their families. Most of the respondents interviewed were males, except in the smallholder organic zone. This reflects the patriarchal family structure in which the females are largely responsible for the household and farm activities (Brown, 2003), so they do not have time to give information to the researcher. Even if they have time, they are hesitant. However, the tendency of females to be restricted to household chores is weakening in urban areas. In the cases where males were not available when we were gathering data, we requested to speak with and refer to females.

The educational level of farmers is known to affect their farming activities. Farmers with higher levels of education adopt improved technologies more readily than those with low levels of education (Umoh, 2006). Table 1 (next page) indicates that half the respondents practicing subsistence farming were illiterate, while 31% of respondents in the commercial conventional and 40% of respondents in the smallholder organic farming zones were illiterate. This relationship is further supported by the substantially lower percentage of the respondents with higher levels of education in the subsistence farming zone, compared to the sizeable percentage of respondents with higher levels of education in the urban farming zones. The most important factors leading to lower levels of education in the rural areas are lack of access to educational institutions and to public transportation (Thapa & Murayama, 2010).

[1] The spatial sampling method is based on the concept of spatial dependency, which relies on the principle of proximity of locations to one another. Closer locations are expected to have more similar attributes than those farther away (Tobler, 1970).
[2] "Specialized markets" include all those markets selling organic vegetables, such as supermarkets, grocery shops, home-delivered groceries, and restaurants offering organic vegetables in their products.

Table 1. Sociodemographic Attributes of the Respondents in Three Farming Zones

Variables	Subsistence (n=60)	Commercial conventional (n= 35)	Smallholder organic (n= 35)
Sex (%)			
Male	68	86	37
Female	32	14	63
Education (%)			
Illiterate	50	31	40
Primary^λ	28	23	17
Secondary‡	17	34	31
Above secondary§	5	12	12
Marital status (%)			
Married†	69	83	81
Unmarried	31	17	19
Main profession (%)			
Farming	95	60	54
Government job	5	23	26
Job in other sectors∂	0	17	20
Personal income (¶NRs/month)			
<5,000 (<USD68.49)	45	15	12
5,000-9,999 (USD68.50–USD136.88)	25	20	28
10,000-15,000 (USD137–USD205.50)	20	40	30
>15,000 (>USD205.50)	10	25	30
Age (year)	42.60 (14.38)	42.95 (16.60)	43.17 (11.95)

Figures in parentheses after years are standard deviations.
^λ Formal education up to 7th grade, ‡up to 10th grade and §above 10th grade
∂ Involvement in NGOs, private firms, industries, private schools and colleges, self-employed, etc.
† Also includes divorced and widowed individuals
¶ 73 NRs = 1 USD

Analyzing other sociodemographic characteristics, we found that the PUAs included a higher percentage of married respondents. Farming was the main profession and a key source of income for farmers in the subsistence zone. Although farming still contributes to family livelihoods in the other zones, the share of family income from off-farm work such as government jobs, self-employment, and jobs in the private sector and with NGOs is higher in the more accessible areas. This is because of the centralized governance system and availability of industries and other infrastructures in the urban areas (Thapa, Murayama, & Bajimaya, 2008). This, in turn, has created various types of jobs for a significant portion of the population (Thapa & Murayama, 2010).

A majority of the respondents in the subsistence farming zone had low incomes (<5,000 NRs[3]/month or <USD68.50), while a majority of respondents in the remaining zones had higher incomes (10,000–15,000 NRs/month, or USD137–USD205.50). This is due to the respondents' off-farm employment in addition to their farm activities. Most of the farmers in the rural areas have farming activities as their sole source of livelihood. Off-farm employment opportunities are lacking in the rural areas.

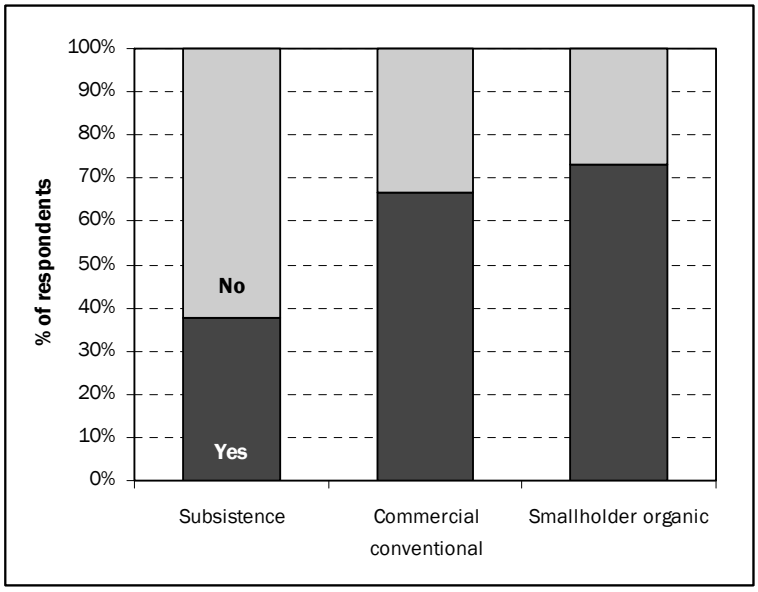
Familiarity With and Views of Organic Production by Peri-Urban Growers

Despite the fact that farmers had been following traditional methods of farming for centuries that can be considered "organic by default" in the subsistence farming areas, a majority of the

[3] NRs: Nepalese rupees; 1 USD = 73 NRs.

farmers are still not aware of the term "organic farming." Farming in these areas was based on use of local resources. A majority of the subsistence farmers had never used agrochemicals in their farming, either due to the lack of inputs and the farmer's inability to afford them, and/or a lack of knowledge about their availability and use. Many farmers in the commercial inorganic and smallholder organic farming zones had already heard of organic farming, and the percentage of farmers who had heard of it was higher in the smallholder organic farming zone (see figure 2). This is likely because most of the farmers there had been engaged in organic production, and many developmental organizations were generating awareness about organic and ecological farming in this area.

Figure 2. Are Respondents Acquainted with Organic Farming ?



Considerable confusion surrounding the term "organic" still exists among the farmers in the PUAs (Bhatta, 2010). Application of farmyard manure as a source of nutrients would be considered an organic practice by farmers in the subsistence zone (table 2). Most of the farmers in this zone relied on farmyard manure because the input market was relatively far away and agrochemicals were costly. Farmers who were cultivating vegetables using organic inputs for niche market were of the view that this method of farming is only possible with the ample availability of farmyard manure. They also pointed out that organic farming aims at producing quality products and stabilizing agro-ecology. This shows that these cultivators have a better understanding of organic production and its environmental aspects. This is

Table 2. Farmer's Perception of Organic Farming Practices in the Peri-Urban Areas

	Percentage of respondents		
Farmer's knowledge of organic farming	Subsistence (n=60)	Commercial conventional (n=35)	Smallholder organic (n=35)
No use of chemicals in farming	26.1	34.8	19.2
Use of farmyard manure only	43.5	0	0
No use of urea in farming	8.7	0	0
Use of farm manure, environmentally safe	8.7	26.1	3.8
Traditional agriculture	8.7	4.3	0
No use of pesticides in farming	0	8.7	3.8
Adoption of Integrated Pest Management techniques	0	4.3	7.7
Farming using local resources, quality production, and is safe for health and the environment	4.3	21.7	57.7
Products for foreigners and rich people	0	0	7.7

Table 3. Importance and Benefits of Organic Agriculture as Perceived by Respondents

Importance and/or benefits realized	% of respondents (n = 66)
For health benefit/chemical-free products	33.33
Use of local resources	18.17
Maintenance of soil fertility	15.15
Conservation of nature	13.64
Independence on obtaining external resources	9.09
Lower cost of production	7.78
Earning foreign currency	3.02

the reason why farmers in this zone were motivated to use organic production. Most of the farmers in the commercially inorganic farming zone held the same view as those cultivating in the subsistence farming zone.

While most of the farmers in the area where farming is organic by default had heard of and were aware of organic farming practices, particularly the use of local resources in farming for producing quality products, most of them were still unfamiliar with organic standards or organic certification. For them, lower production costs, proper soil management, avoidance of toxic substances and agrochemicals, self-reliance in inputs, and harmony with nature were the main motivating factors for practicing organic farming methods. The above explanation highlights the rudimentary stage of organic farming practice. However, farmers' motivations related to ecological conservation, supported by NGOs, have fueled the organic movement in the region and have shown better prospects in Nepal.

Motivations for Organic Farming in the Peri-Urban Areas

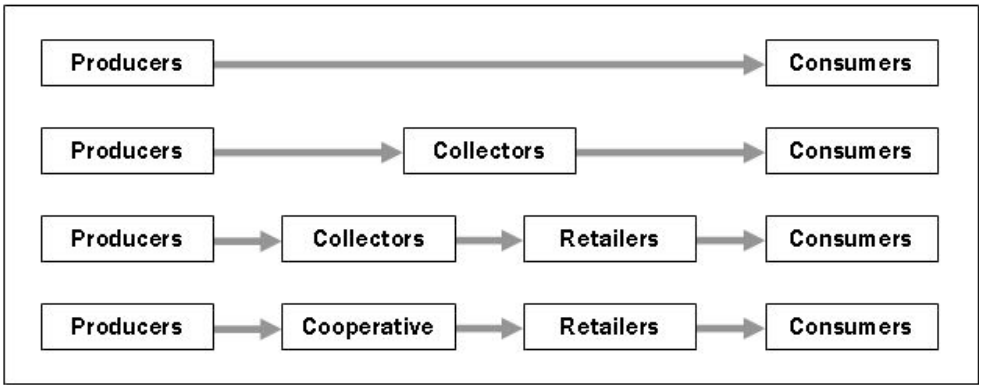
The intensified use of agrochemicals has affected and is further expected to affect surrounding natural resources, either directly or indirectly. Farmers are now realizing the need to care for the soil, their own health, the health of their family members, and also the health of their consumers, and they feel they can do this by curtailing the amounts of agrochemicals they use or by avoiding their use entirely. With this awareness, most of the farmers following conventional farming have shown their willingness to shift from their present farming practices.

Table 3 ranks the benefit or importance of various aspects of organic farming as listed by the respondents. A majority of the farmers opined that organic farming is important for health, as the agricultural produce obtained using organic methodologies are free from agrochemical residues and are thus safe for consumption. The second important issue, highlighted by nearly 18% of the farmers, was that organic farming is important for efficient use of local resources. Some other benefits realized by the farmers were maintenance of soil fertility, conservation of nature, independence from the use of external resources, and a lower cost of production.

Marketing of Organically Cultivated Vegetables

Marketing of vegetables cultivated using organic methodology is characterized by scattered

Figure 3. Existing Organic Vegetable Marketing Channels in the Kathmandu Valley



concentrations of consumers, lack of awareness about the existence of organic products in the market, lack of credibility of organic products, and lack of market regulation (Bhatta et al., 2009a). Marketing channels for organic vegetable were relatively simple, involving only few intermediaries (see figure 3).

Table 4. Marketing Channels Usually Used by Respondents Cultivating Vegetables through Organic Protocols

Supplied from growers	% Respondents (n = 35)	Rank
Directly to consumers	28.57	2
Collectors to consumers	11.43	4
Collector to retailers to consumers	20.00	3
Cooperatives to retailers to consumers	40.00	1

Four prominent channels of organic vegetables marketing have been observed to be prevalent in the Kathmandu Valley. The common market chains include producers, collectors,[4] retailers, cooperatives, and consumers. The most important marketing channel for organic vegetables in PUAs was cooperatives (table 4). Cooperatives, most of which are functional groups of local farmers, play a predominant role in Nepalese society. Generally, these cooperatives have multiple roles in the community. In addition to marketing the organic vegetables, they also play a role as microfinance institutions, assisting the producers by providing small but timely credit. The linkage between producers and consumers through direct home delivery of produce follows the cooperative channel. In this case, growers themselves deliver the volume of vegetables that were ordered to the consumers. The cultivators have direct contact with the consumers and vice versa. Most of the vegetables cultivated using the organic methods are marketed based on earlier agreements between traders and producers; the agreements are often contractual in nature, which indicates the dominance of the traders in the channel. In general, consumers who received home delivery are from the upper strata of society and were of the opinion that the vegetables supplied to them were cultivated following the organic methodology. Therefore, they are more willing to pay for home-delivered produce. When collectors were involved in marketing the organic vegetables, they were either local traders or local organic growers who collected from the specified community and sold to the retail shops in the heart of the city.

Currently, organically produced vegetables cost 50% to 100% more than their nonorganic counterparts. These high-priced vegetables are mostly unaffordable to less affluent consumers (Aryal et al., 2009). Table 5 (next page) indicates that almost 60% of consumer respondents were willing to buy vegetables cultivated by organic methods, provided they were informed about the benefits of organic production. Almost 47% of the respondents said that price was an important factor when considering purchase of organically cultivated vegetables. Almost 78% of the respondents indicated that they would be willing to buy organic vegetables if their prevailing price were reduced by 20% to 30%. This indicates the potential for large-scale production of vegetables cultivated through organic means to moderate the general price of organic produce. There is also a need to disseminate knowledge and create awareness among consumers about organic vegetables.

In regard to certification and labeling, a majority of consumers said that these are essential for enlarging the market for organically cultivated vegetables and assisting in appealing to consumers. Currently, organic vegetables are not certified. Therefore consumers have been circumspect in their faith in these products. Various studies have demonstrated that the presence of a label instrument or indicator that guarantees the quality of the product significantly affects consumers' preference (Misra, Huang, & Ott, 1991; Schupp & Gillespie, 2001; Souza & Ventura, 2001). This implies that certification and labeling are needed to convince

[4] A "collector," common terminology in many developing nations in Asia, collects vegetables from individual farmers and then supplies them to different channels.

Table 5. Consumer Attitudes Toward Organic Vegetables (% distribution, n = 100)

	Alternatives			
	Extremely (1)	Somewhat (2)	Somewhat (3)	Don't know (4)
How willing are you to buy organic vegetables from the market?	60.0	37.8	2.2	0.0
How willing are you to consume organic vegetables if their prices are reduced?	77.8	22.2	0.0	0.0
How important is the price factor when you decide whether to buy organic vegetables?	46.7	37.8	5.6	10.0
How willing would you be to purchase organic vegetables if you knew they were safer for health?	90.0	10.0	0.0	0.0
How safe or risky are organic vegetables to human health?	50.0	44.5	0.0	5.5
How important is it to certify and label organic vegetables?	71.1	21.1	0.0	7.7
How willing would you be to pay for environmental services (PES) of organic production if you knew inorganic methods of farming were environmentally degrading?	80	15	0.0	5.0

Note: 1, 2: willing/important, 3: unwilling/unimportant

consumers to buy and for farmers to get a reasonable price for the produce.

Potential health hazards resulting from excessive and indiscriminate use of agrochemicals have been indicated by Midmore & Jansen (2003). Nearly 80% of the consumers were aware of these potential hazards and were willing to contribute toward the "pay for environmental services" (PES). PES is the practice of offering incentives to farmers, communities, and economies in exchange for managing their lands to provide ecological services (Boyd and Benzhaf, 2006). Several factors lead to a growth in demand and willingness to pay for environmental services. Public awareness of the value of environmental services is the most important factor that stimulates PES (FAO, 2007). Smallholder farmers in the developing world can be efficient producers of environmental services of value to larger communities and societies (Swallow, Meinzen-Dick, & Noordwijk, 2005). Relative to monocropping, positive effects on biodiversity have been noted for a variety of farming practices including organic agriculture and conservation farming (McNeely & Scherr, 2003). Willingness of the consumers to comply with PES through organic vegetable production to reduce the city's ecological footprint could be another aspect that defines the apparent potential of organic farming in the PUAs.

Gross Margin Analysis of Vegetables

The scope of agriculture production can be expanded and sustained by farmers through efficient use of resources. Efficiency measurement is also an important subject of empirical investigation, mainly in the developing countries, where a majority of the farmers are resource-poor (Umoh, 2006). Gross margin analysis helps assess the performance of individual crops or an enterprise (Wachholtz, 1996). It can also find the most efficient crops, cropping pattern, or enterprise.

In this study, different types of vegetables were cultivated by farmers in the different zones; the crop chosen also depended on the needs of the family cultivating it and on the market demand for it. Only a few vegetables, such as cauliflower, cabbage, tomatoes, potatoes, chilies, leafy vegetables, and cucurbits, are usually cultivated in the inorganic or commercial zone, while diverse vegetables, including asparagus, lettuce, Swiss

Table 6. Gross Margin of Different Types of Vegetables in the Study Zones, 2008

Variables	Subsistence (n= 15)	Commercial conventional (n= 20)	Smallholder organic (n= 30)
Variable cost (NRs§)	942[c] (±386)	4213[a] (±779)	3297[b] (±245)
Gross margin per unit of land (NRs/ropani)	3841[b] (±1262)	20659[a] (±7220)	25748[a] (±2756)
Gross margin per unit of labor used (NRs/man-day)	219.60[b] (±58.2)	772.42[a] (±330.78)	690.34[a] (±77.25)
Gross margin per unit of variable cost (NRs/variable cost)	4.84[b] (±1.42)	4.97[b] (±1.62)	7.89[a] (±0.74)

Note: Figures in the parentheses are 95% confidence interval of the mean; superscripted letters show significant difference between the groups at 5% level of significance according to the Mann-Whitney test. Values with similar letters are not significantly different.
§73 NRs = 1 USD

chard, fenugreek, pea, cowpea, and celery, which fetch a higher market value, are usually cultivated organically in addition to all the vegetables cultivated using agrochemicals. In the subsistence farming zone, farmers cultivated tomatoes, potatoes, cucumber, pumpkin, onion, coriander, and ginger. The results thus indicate that organic farms have greater agro-biodiversity, while inorganic farms tended to accommodate only a few crop species.

Gross margin analysis of vegetables was carried out by converting the yields of the individual crop into the crop-equivalent yields of cauliflower, as this was the most important vegetable crop cultivated by both organic and inorganic growers.[5] Gross margin per hectare was significantly higher in the smallholder organic farming system and was at par with the commercial inorganic zone (table 6). The higher gross margin in the organic group is due to the diverse vegetable species produced with their higher prices in the niche market. Gross margin of labor was higher in the commercial conventional farming, which was at par to the smallholder organic farming, and both of them were significantly higher than in the subsistence farming. Return per rupee invested on vegetable production was significantly higher for the vegetables cultivated using the organic methodologies than for the others. This proves that resource-use efficiency was higher with organic vegetable production.

Higher gross margin per hectare and per unit of variable cost on the farms where the vegetables are cultivated using organic methods also indicate that organic methods of cultivation can be a lucrative enterprise. Relatively higher gross margin per hectare was associated with organic vegetables, along with positive environmental externalities such as amelioration of the urban environment, providing safe and healthy foods, and enhancing agro-ecology. This supports the idea that organic farming can be a perfect match in peri-urban settings of developing nations, and Nepal is no exception to this.

Farm-Family Income

Farm income generally comes from sales of food crops, vegetables, and livestock. Food crops include cereals such as rice, wheat, maize, and

[5] We collected the market price and yield of several vegetables produced by the farmers. It is not possible to analyze each of the crops produced by farmers since most produce over a dozen kinds of vegetables. Therefore, for the sake of convenience and in order to have uniform measurement, cauliflower yield for each crop was calculated using prices and yields of all crops. For instance, the cauliflower yield of radish was calculated using this formula:

$$\text{Cauliflower-equivalent yield of radish} = \frac{\text{Yield of cauliflower} + (\text{Yield of radish} \times \text{Price of radish})}{\text{Price of cauliflower}}$$

Table 7. Structure of Farm-family Income in the Study Zones, 2008

	Farm-family income (NRs§/family/year)		
	Subsistence (n= 60)	Commercial conventional (n= 35)	Smallholder organic (n= 35)
Total farm revenue	*93,122 (±19,547)*	*102,767 (±24,343)*	*98,082 (±26,695)*
Food crop revenue	49,996^{ab} (±12,987)	56,578^{a} (±18,026)	35,223^{b} (±8,080)
Vegetable crop revenue	7,421^{c} (±5,125)	30,514^{b} (±14,268)	47,364^{a} (±15,236)
Livestock revenue	35,705^{a} (±9,808)	1,5674^{b} (±8,790)	15,496^{b} (±11,751)
Total farm expense	*36,476 (±5,940)*	*37,569 (±8,252)*	*35,008 (±11,771)*
Farm income	***56,646 (±15,681)***	***65,198 (±17,346)***	***63,073 (±20,790)***
Farm income/ha food crops	52,660^{b} (±12,781)	134,334^{a} (±40,487)	123,033^{a} (±30,536)
Farm income/ha vegetable crops	289,008^{b} (±178,721)	443,963^{b} (±197,462)	862,294^{a} (±201,790)
Farm income/family labor unit	15,217^{a} (±3,514)	23,623^{b} (±6,568)	19,907^{ab} (±5,845)
Off-farm income	***72,550^{b} (±23,974)***	***169,386^{b} (±74,593)***	***354,117^{a} (±185,672)***
Family income	***129,196^{b} (±33,879)***	***234,583^{b} (±72,829)***	***417,188^{a} (±187,391)***
Family income/family member	18,160^{c} (±3,496)	42,458^{b} (±11,361)	67,009^{a} (±25,156)

Note: Figures in the parentheses are 95% confidence interval of the mean; superscripted letters show the significant difference between groups at 0.05 level of probability according to the Mann-Whitney test. Values with similar letters are not significantly different.
§ Nepali currency (73 NRs = 1 USD)

some other coarse cereals[6] like buckwheat and millets, legumes, and oilseed. Table 7 shows farm-family income under different methods of cultivation. The results show that in subsistence farming areas, a large portion of farm revenue was generated from cereal crops (53.69%) and livestock (38.34%), while in the commercial inorganic and smallholder organic farming, a major portion of income was obtained from cereals (55.06%) and vegetable crops (48.29%). Significantly higher revenue was generated from vegetable crops in smallholder organic farming, because this is the zone where diverse and high-value species of organic vegetable are usually cultivated. Similarly, higher revenue from livestock was obtained from subsistence farming. This may be because dairy farming is usually given high priority in this zone. Furthermore, integration of agriculture with livestock and forestry is a rule of thumb in subsistence farming. This integration is very important in rural areas due to lack of access to improved inputs such as fertilizers.

Farm income per hectare of food crops cultivated was significantly higher on the commercial (non-organic) farms and was at par with the smallholder organic farms, while farm income per hectare of the area under vegetable cultivation was significantly higher in the smallholder (organic) farming. It was almost two or three times higher than that obtained by commercial nonorganic and subsistence farming systems, respectively. This further indicates that there are better prospects for vegetables cultivated organically in this area. Farm income per family member was significantly lower in subsistence farming. This may be due to the larger family size of the cultivators in this group. Farm income per family member employed on the farm also followed a similar trend, while family

[6] These are the crops grown by resource-poor farmers and on land which is not suitable for cultivation of rice, wheat, and maize (major cereals in Nepal). Sometimes coarse cereals are called "the poor men's food" (Rajbhandari & Bhatta, 2008).

income per family member was significantly higher in smallholder organic farming.

Off-farm income was mainly generated from salaries obtained by the cultivators in all the zones studied. The contribution was significantly higher in the smallholder organic farming group. This may be because most of the smallholder family members had a higher level of education and they were near the centers of opportunity. Significantly higher income from wages was obtained by the farmers in the subsistence group, as many of the family members were poorly educated and employment opportunities were limited. Significantly higher income through enterprise and business was obtained by the smallholder organic farmers. In this group, some of the farmers had a poultry farm and some had a small- or medium-sized shop.

Family income was significantly higher for the smallholder organic farms, while the remaining two groups were at par. The contribution to family income from farm income was 45% in the subsistence group, while it was almost 30% for the commercial inorganic farms, and 15% for the smallholder organic farms. This clearly demonstrates that farming is getting less attention and off-farm activities are gaining prominence in the PUAs, whereas agriculture is still a mainstay of the livelihoods of rural people.

Figure 1B, above, also shows that year-round accessible roads do not exist in the rural areas, while extensive and good-quality roads are available in most part of the PUAs. In the rural areas, the quality of roads is very poor and vehicles are not able to navigate them all year. The market externalities associated with such roads are extremely high compared with that of the PUAs (Bhatta et al., 2009b). In addition there is a conspicuous lacking of effective extension services in rural areas. These are some of the key reasons why rural farming still remains traditional, and such a vast array of "organic by default" cannot be promoted as niche market–based organic production. In contrast, because of the greater accessibility of fundamental urban amenities coupled with consumer willingness to pay more for organic products, market-based organic production is thriving in the peri-urban areas.

Conclusions

Gross margin and farm-family income analyses show that smallholder organic production in peri-urban areas (PUAs) is a profitable endeavor. Urban locations are suffering from environmental damage due to imprudent farming practices and pollution caused by urban sprawl. Therefore, organic production is one of the best strategic approaches to both minimize this ecological degradation and to provide better returns for smallholder producers. The high potential for organic farming in the PUAs is also buttressed by the farmers' inclinations toward organic production, the availability of niche markets, increasing consumer awareness, and consumer willingness to pay more for organic products. The fact that organic production in the PUAs is initiated, motivated, and promoted by NGOs, but supported and continued by farmers, also indicates that organic production has a strong potential to proliferate.

Recommendations

Considering the broad agro-ecological and environmental benefits of organic farming in the PUAs, the Nepalese government should subsidize organic producers, at least during the conversion period. This would motivate growers already using organic methods and also attract their fellow farmers to pursue organic cultivation methods. Imprudent agro-chemical–based farming is undesirable. If it is allowed to continue in the urban and peri-urban areas, it will have undesirable effects on urban dwellers. Therefore, organic production and marketing should be strengthened in order to keep soil healthy and foods free from chemical residues. Furthermore, a campaign to raise awareness should be initiated in order to make all stakeholders in the food system aware of the negative repercussions of agrochemical-based farming and the need for production and consumption of organic foods.

Consumers' interest in organic vegetables shows that price and certification are the decisive factors. However, certification is a very costly affair. The higher cost of production of organic vegetables,

accompanied by the cost of organic certification, increases the price of organic commodities. Similarly, as a majority of peri-urban growers are smallholders, it is not economical for them to seek certification as individual farms. Therefore, attempts should be made to consolidate smallholders' organic farms and initiate cooperative certification through internal quality-control systems in order to minimize the costs of complying with organic standards, particularly for the local market. Similarly, participation in and promotion of organic production would require awareness-raising, motivation, and training among the growers, consumers, and marketers. This should be done by the governmental and nongovernmental organizations working to promote organic farming.

The ability of fringe agriculture to continuously supply food for urbanites will depend on better planning and focusing socio-economic and spatial aspects of smallholder farm families. Spatial aspects such as lack of access to roads would be given due consideration, and roads and transportation systems should be improved. This would help transform "organic by default" into niche market–based organic production, and hence provide benefits to rural farmers living in the peri-urban hinterlands.

Further Research

This study focuses on the peri-urban settlements of the Kathmandu Valley. The finding of this research might be applicable to similar areas, particularly in the densely populated PUAs in the developing world. High-value crops with international trade implication, such as tea, coffee, cardamom, ginger, and herbal products, are grown organically in some of the PUAs of Nepal. Research focusing on multiple products is also needed to give a broader picture of the organic movement in the PUAs and its future implications in socio-economic and spatial realms. Similarly, research that focuses mainly on organic farming in the peri-urban areas and attempts to quantify the positive externalities it generates is also needed to further justify the adoption of organic farming methods. The concerns about higher prices and the legitimacy of certification should be also duly incorporated in the research agenda.

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Integrating agriculture and food policy to achieve sustainable peri-urban fruit and vegetable production in Victoria, Australia

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Abstract

Efforts to increase fruit and vegetable consumption are a significant aspect of national approaches to preventive health. However, policy frameworks for increasing fruit and vegetable consumption rarely take an integrated food-systems approach that includes a focus on production. In this policy analysis and commentary we examine fruit and vegetable production in peri-urban areas of Melbourne in Victoria, Australia, and highlight the significance of emerging environmental and economic pressures on fruit and vegetable production. This examination will be of interest to other locations around the world also experiencing pressure on their peri-urban agriculture. These pressures suggest that the availability and affordability of fruit and vegetable supplies cannot be taken for granted, and that future initiatives to increase fruit and vegetable consumption should include a focus on sustainable production. Threats to production that include environmental pressures, together with the loss and cost of peri-urban agricultural land and a cost-price squeeze due to rising input costs and low farm-gate prices, act in combination to threaten the viability of the Victorian fruit and vegetable industries. We propose that policy initiatives to increase fruit and vegetable consumption should include measures to address the pressures facing production, and that the most effective policy responses are likely to be integrated approaches that aim to increase fruit and vegetable availability and affordability through innovative solutions to problems of production and distribution. Some brief examples of potential integrated policy solutions are identified to illustrate the possibilities and stimulate discussion.

Keywords

Peri-urban agriculture, food policy, land use, zoning, Victoria, Australia

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Introduction

Victoria is Australia's most significant agricultural state (Victorian Government, 2009) and one of Australia's two main horticultural crop-growing states. Fruit and vegetables grown in Victoria are sold mainly in Victoria and other states of Australia (Crooks, 2009). The peri-urban areas, defined as the rural land on the fringes of urban areas (Larsen, Ryan, & Abraham, 2008) of the state's capital city Melbourne are primary production districts due to good quality soil and proximity to water infrastructure. The Melbourne region accounts for large proportions of Victoria's horticultural produce, including 72% of the state's vegetable production (VGA, 2008) and at least 10% of the state's fruit production (ABS, 2009a). However, the population of Victoria, and in particular peri-urban Melbourne, is growing rapidly (Parbery, Wilkinson, & Karunaratne, 2008). This population growth has lead to strong competition between land used for housing and land used to grow food, while simultaneously increasing the need for an adequate supply of nutritious food such as fruit and vegetables. Thus, efforts to plan for and accommodate the growth of the urban fringe of Melbourne have the potential to contradict efforts to support the horticultural industry and efforts to provide fresh, local and environmentally friendly produce to consumers. Land speculation in the peri-urban areas puts pressure on policy-makers to stop protecting land from development (Parbery, Wilkinson, & Karunaratne, 2008). Further, there is a lack of integration between policies and initiatives to increase fruit and vegetable consumption in Victoria, and the fruit and vegetable production industry.

These threats to peri-urban agriculture are not exclusive to Victoria. There are a number of cities in Australia and around the world that are experiencing similar pressure for land-use change that may affect the availability of fruit and vegetables (Nasr et al., 2010; OSISDC, 2010) This paper provides a case study examining the benefits of, and threats to, local fruit and vegetable production in Victoria, with a particular focus on peri-urban Melbourne. We outline the importance of maintaining local food production and of linking food security to land-use planning in order to build a sustainable, equitable, and healthy food system. We argue for the need to integrate policy on sustainably produced fruit and vegetables with policy for consumption for the health of Victorians.

The authors have specifically limited the focus of this paper to peri-urban Melbourne in order to provide a case study of one of the most important agricultural production areas in Australia. As noted above, Victoria is one of Australia's two most productive agricultural states, and the majority of its vegetable production comes from peri-urban Melbourne. Melbourne is also a rapidly growing city, and the combination of these two characteristics necessitates an analysis to inform current government policy-making for solutions to protecting fruit and vegetable production for this region.

These recommendations may not always transfer directly to other places, but both popular and academic literature suggest that many urbanizing regions throughout the world are experiencing similar tensions over land use and therefore the study is relevant to informing the debate about land-use planning for food production nationally and internationally.

Benefits of Local Fruit and Vegetable Production

A community benefits in multiple ways from having a strong fruit and vegetable sector (Gorsuch, 2009). The most commonly recognized benefits are the economic benefits of creating and maintaining both employment and export earnings. Indeed, the contribution of fruit and vegetable production to Victoria's economy is substantial, with a gross value of fresh fruit and vegetable sales of over $AUS1.4 billion (ABS, 2009b). In addition to the direct contribution that Victoria's fruit and vegetable farming industry makes to the state's economy, it also supports the local fruit and vegetable processing industry as well as providing produce to the state's retail sector.

Other benefits of a strong fruit and vegetable industry are often overlooked. The health benefits are of particular importance, and the health implications of production, land use, and trade policies

are often not recognized (Gorsuch, 2009). There is a broad consensus that fruit and vegetables are essential components of a healthy diet. Internationally, leading public health organizations including the World Health Organization (WHO, 2003), the World Cancer Research Fund, and the American Institute for Cancer Research (World Cancer Research Fund/American Institute for Cancer Research, 2007) recommend that fruit and vegetables be the foundation of a diet to help promote health and protect against diet-related diseases. Fruit and vegetables are classified as "protective" foods, meaning they have been shown to protect human health (Riboli & Norat, 2003). Epidemiological evidence consistently indicates that people who consume diets that contain plenty of fruits and vegetables have a lower risk of cardiovascular disease (Bazzano et al., 2002; Joshipura et al., 2001; Liu et al., 2000; Ness & Powles, 1997; see also Dauchet, Amouyel, Hercberg, & Dallongeville, 2006; He, Nowson, Lucas, & MacGregor, 2007 for meta-analytic reviews), several major cancers (Block, Patterson, & Subar, 1992; Riboli & Norat, 2003), and possibly hypertension (Moore et al., 1999) and Type 2 diabetes (Williams, Wareham, Cox, Byrne, Hale, & Day, 1999). Almost all national dietary guidelines include a recommendation to increase fruit and vegetable consumption as a foundation for healthy eating. For example, the current Australian dietary guidelines recommend "eat plenty of vegetables, legumes and fruits" and specifically suggest that adults consume two servings of fruit and five servings of vegetables per day (National Health and Medical Research Council, 2003). However, fewer than 10% of Victorian adults consume this recommended daily intake of fruit and vegetables (DHS, 2008). An additional consideration is that highly perishable products like fruit and vegetables are subject to loss of food nutrient value with extensive transportation and storage (Stringer, 2010), and thus maintaining a strong local production capacity can contribute to the health of the population. Reducing the need for fruit and vegetable imports also reduces the health and biosecurity risks due to quarantine breaches (DPI, 2010). Budge and Slade (2009) argue that productive peri-urban land should be recognized in terms of its health value as such land is a potential source of a secure supply of fruit and vegetables for the population.

The contribution of a local fruit and vegetable industry to environmental sustainability should also be considered as a significant benefit. The use of peri-urban land for the production of fruit and vegetables rather than housing reflects many of the key principles of an environmentally sustainable food system, including opportunities for carbon storage in soil and vegetation (Campbell, 2008), reduced carbon emissions through shortened distribution chains, increased biodiversity, and protection of water catchment. Although there is a lack of data on the benefits of supporting regional food systems in the context of Victoria, regional supply chains are likely to have significant environmental benefits and reinforce food security. Resource constraints are likely to make it increasingly difficult and expensive to transport and store fresh food in the future (Larsen, Ryan, & Abraham, 2008), with continuing demand for fossil fuels increasing food prices (Woodcock, Banister, Edwards, Prentice, & Roberts, 2007).

In addition, horticulture production is reported to be responsible for only a small proportion of total agricultural greenhouse gas emissions, and thus promoting fruit and vegetable production in this manner also is benefiting the environment (DPI, 2010).

Further, a strong fruit and vegetable industry is an essential component of a robust and resilient food system. A resilient food system is able to withstand the impact of global and local supply interruptions due to climate or other extreme events, such as breakdowns in transportation systems or fuel shortages. The need to improve the resilience of the Victorian food system has been the focus of recent attention (Larsen et al., 2008). Victoria is in the enviable position of having significant local production capacity; however, this production capacity is currently under threat due to multiple economic and environmental pressures, which are outlined in the next section.

Finally, there is strong consumer interest today in local and regional food products. Consumers increasingly want to know where their food comes from and how it was produced, and are becoming more interested in purchasing regional food products (Victorian Government, 2010). Farmers also value knowing where their products are sold and getting feedback from consumers. There are several methods available for farmers to sell their produce direct to the public in Melbourne's peri-urban areas, including roadside stalls, farmers' markets, community supported agriculture (CSA), and farm shops. By offering the promise of high-quality food experiences, the local food industry also plays an important role in attracting tourists to Victoria (and Melbourne specifically), and thereby generates increased visitation and total tourism receipts (VLGA, 2009).

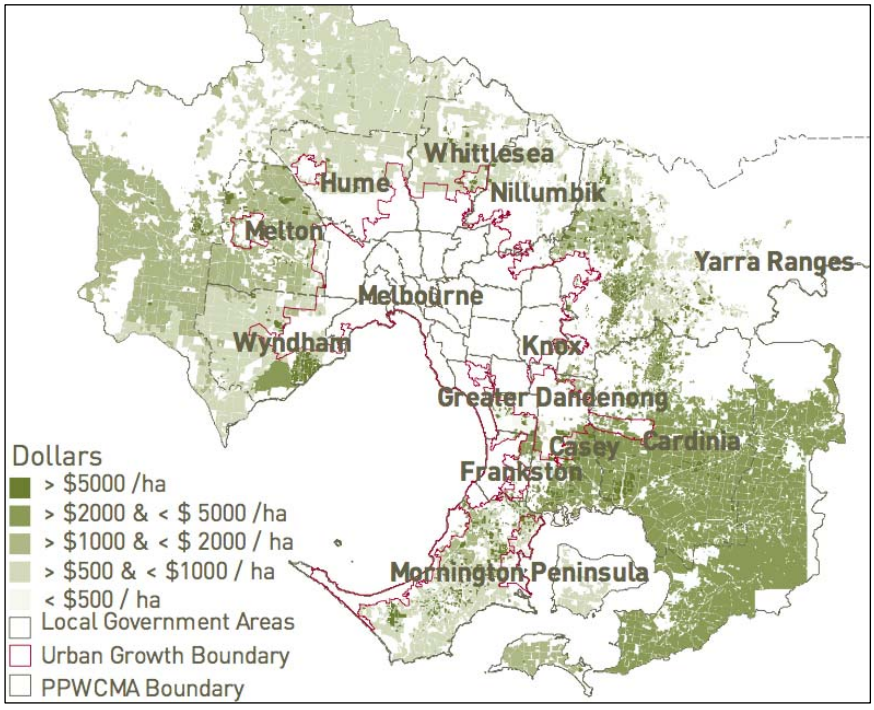
The benefits of a strong, local, sustainable horticulture industry are clear, and thus it is apparent that a continuation and strengthening of production in peri-urban Melbourne would be advantageous on a number of accounts. Yet it is the health benefits that are most frequently emphasized in health-promotion initiatives in an attempt to increase fruit and vegetable consumption among Victorians. That these efforts are not integrated with policies related to production is limiting and problematic. Peri-urban fruit and vegetable production in Melbourne is under threat, meaning that gains made through promotion could be counteracted by access and cost-related pressures.

Threats to Fruit and Vegetable Production in Peri-urban Melbourne

The fruit and vegetable industries in Victoria, and peri-urban Melbourne specifically (see figure 1), are currently facing multiple pressures that threaten the viability of production and the security of the supply of these nutritious foods that are essential to a healthy diet. These pressures include competition for productive agricultural land, a reduction in the quality of soils due to intensive agricultural practices, climate and water pressures, natural disasters such as flooding and bushfires, and economic pressures, each of which is discussed here in turn.

Melbourne's population is growing rapidly, with the city's population likely to reach 5 million before 2030 (Victorian Government, 2008c). This rapid population growth trend is generating competition for land for housing and agriculture (Victorian Government, 2010). Agricultural lands in Victoria, especially in the peri-urban area of Melbourne, are threatened by urban sprawl. For every person moving to the inner suburbs, five are moving to the city's fringe (OSISDC, 2009). Melbourne's peri-urban areas are of high agricultural value due to the

Figure 1. Agricultural Production in Victoria in 1999-2000

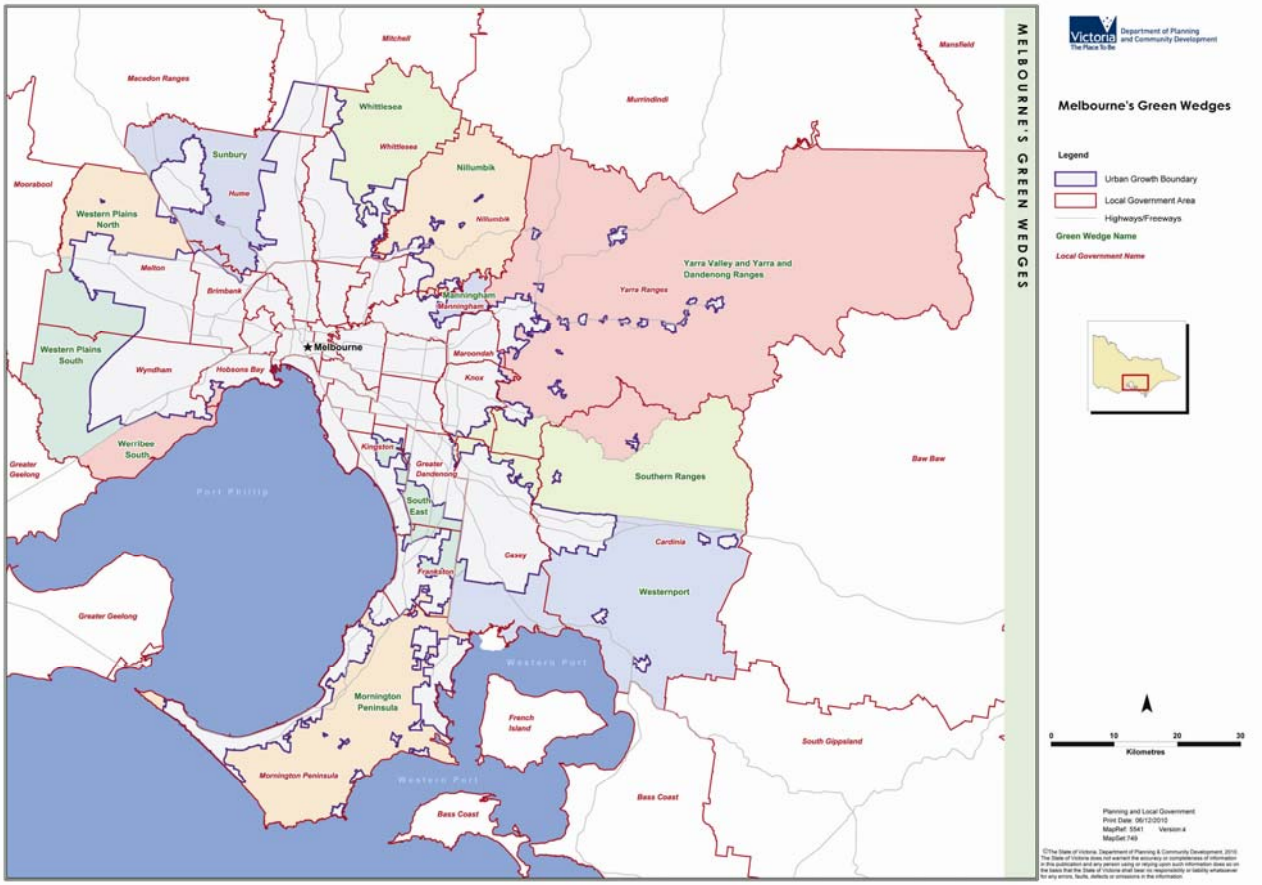


Source: Melbourne Atlas, retrieved from http://www.dpcd.vic.gov.au/__data/assets/pdf_file/0003/31179/Agriculture.pdf

quality of the soil, their proximity to water infrastructure, and their access to a large customer base. As such, this land is highly productive, producing 16% of Victoria's total agricultural value on just 5.3% of its total land (Houston, 2005). These areas are likely to be increasingly important to the state's future food security in the context of reduced availability of water and petroleum-based inputs.

The city's "green wedges" are part of the peri-urban agricultural areas of Melbourne. Green wedges are productive rural areas that have been designated as nonurban areas outside the Urban Growth Boundary (UGB) of Melbourne (see figure 2). Farmers located within the green-wedge areas of Melbourne need to rely on the UGB being fixed for a period of at least 10 to 15 years in order to provide certainty for their decisions in making long-term investments in their land. The green-wedge zoning offers some protection to this agricultural land. However, on 29 July 2010 the Victorian Parliament approved planning changes to redevelop the green wedges by expanding the urban boundary around Melbourne by 43,600 hectares (107,738 acres) in order to accommodate an additional 134,000 homes for the city and provide 20 years of land supply for new housing (Dowling, 2010). This is the third time the UGB has been moved since its introduction in 2002. This rezoning will significantly diminish the amount of prime food-growing land on the city's fringe. The lack of certainty and stability around green-wedge zoning presents a threat to the continuation of farming in these fertile areas, as the value of the

Figure 2. Melbourne's Green Wedges. In mid-2010, Melbourne's Urban Growth Boundary was expanded, adding another 43,600 hectares. This expansion overlaps with some green wedge land.



Source: The Melbourne Atlas, State of Victoria, Department of Planning & Community Development, copyright © 2010; available at http://www.dpcd.vic.gov.au/__data/assets/pdf_file/0017/56123/Melbournes_Green_Wedges.pdf

land increases speculatively along with the taxes (Victorian Government, 2010). Soaring land values in these peri-urban areas limit farm expansion (Commissioner for Environmental Sustainability, 2008), and farmers then often sell their land to buy cheaper land further from the city fringe.

Other land-related threats exist in the form of land degradation as a result of unsustainable agricultural practices (Larsen et al., 2008). Soil quality is decreasing dramatically due to erosion, salinity, sodicity, acidification, loss of biodiversity, and loss of organic matter, and thereby also suffering nutrient exhaustion, compaction, and contamination. All of these issues reduce the productive capacities of the land (Larsen et al., 2008; Wood, Lenzen, Dey, & Lundie, 2006).

Climate and water pressures also threaten the production of fruit and vegetables in Victoria. Victoria has experienced significant climate variations over the last decade. The average annual temperature in Victoria has increased since 1950, while the total annual rainfall for the state has decreased by 13% over the past decade compared with the previous 30 years. Commonwealth Scientific and Industrial Research Organisation's s climate change projections for Victoria suggest that annual temperatures will rise by between 0.6°C and 1.2°C by 2030, and the annual average rainfall is expected to decrease by around 4% by 2030. Both parameters are likely to increase the frequency of drought by between 10% and 80% (Victorian Government, 2008a).

Fruit and vegetable production is sensitive to environmental extremes. Temperature increases affect the quality, yield, and production windows for fruit and vegetable crops (Deuter, 2008). Since 2000–2001, the main constraints on the fruit and vegetable industry's production capacity have been climate variability and water availability (National Land and Water Resources Audit, 2008). More than half (58%) of Victorian agricultural businesses have reported that they have needed to modify the management practices on their farms in response to perceived changes in climate (ABS, 2009b). Further, the impact of two severe droughts in quick succession has had a significant effect on production and farm profitability. Drought reduced the gross value of Australian fruit and vegetable production by about 9% between 2002 and 2003 (Apted, Berry, Short, Topp, Mazur, & Van Mellor, 2006) and led to an increase in prices (Quiggin, 2007). Climate modeling suggests that Australia could experience fruit and vegetable supply interruptions and price spikes once every two to four years in a warming climate, rather than the current average of about once every 10 years. An increase in the frequency of heat waves and drought could make it difficult for the fruit and vegetable industries to recover in the more temperate years, leading to permanently higher prices (Quiggin, 2007).

This "big dry" in the state of Victoria has now been replaced by a fresh round of heavy rain and flash floods brought on by some of the heaviest and most sustained rainfall on record in January 2011. The implication for food producers of this major flooding across much of the eastern and southern parts of Australia is yet to be determined.

Related to these climate pressures are the threats presented by water scarcity. Land use in Australia is strongly related to water supply. The agriculture sector is responsible for more than 65% of Victoria's water use (Victorian Government, 2008b), and access to water is seen as a major constraint to the sustainable development of agribusiness (Victorian Government, 2010). Horticulture in particular is highly dependent on water availability for irrigation. In recent years, drought has reduced the amount of available water and thereby led to financial stress for some producers (Crooks, 2009). Climate modeling suggests that Victoria can expect further reductions in the amount of water available for irrigation over the coming decades (Victorian Government, 2008a), which is likely to result in more frequent interruptions to fruit and vegetable supplies and price spikes. Recent floods, however, have complicated and added further complexity and impact that was unforeseen. Further, the huge volumes of water extracted to support food grown for export have left major river systems over-allocated (Commissioner for Environmental Sustainability, 2008), while fruit and vegetable growers

struggle during drought to access sufficient water to maintain production. In a recent survey, over 75% of Victorian farmers said that the availability of irrigation water presents a barrier to the future viability of vegetable production (Crooks, 2009).

Economic pressures also threaten the local production of fruit and vegetables in peri-urban Melbourne. While food production is a significant component of the Victorian economy, the vulnerability of the current food system could undermine its future economic contribution to the state. The profitability of Victoria's horticulture industry is affected by a complex range of factors that include a cost-price squeeze due to the rising cost of inputs such as fertilizers and pesticides, and low farm-gate prices (Crooks, 2009). This cost-price squeeze is intensified by price pressure from the major supermarkets (Apted et al., 2006) and by competition from the Asia-Pacific region, which can produce fruit and vegetables more cheaply due to lower labor costs (James, 2006).

The multiple pressures currently facing the fruit and vegetable industry in peri-urban Melbourne threaten the viability of production and the security of the supply of these nutritious foods that are essential to a healthy diet. Given the necessity of a sustainable, local supply of fruit and vegetables for health, environmental and economic benefits, policies and systems that address and manage these threats are essential.

Policy Challenges and Opportunities

Past policy responses have attempted to address the unprecedented changes in Victoria's food system as it relates to health, environment, and productivity in isolation. The discussion above has shown that it is clear these have not worked, and an integrated policy response is required. As previously mentioned, policy approaches to increasing fruit and vegetable consumption in Victoria have often focused on social marketing strategies, such as increasing the availability of fruit and vegetables to low-income groups.

Unfortunately, there are few examples of policy approaches that link fruit and vegetable consumption to production, either in Victoria or internationally. The Victorian government has invested resources to help reduce diet-related illness. It has also undertaken considerable policy work to support regional economies and grow the agricultural sector. Food-production issues in the context of population growth, climate change, drought, and environmental degradation are also being addressed by the Victorian government. However, these activities are disconnected from one other. Government funds used to increase fruit and vegetable consumption should also contribute to the incomes of Victorian fruit and vegetable growers. Efforts to plan for the growth of Victorian towns and cities should not contradict the simultaneous efforts to support economic growth of the horticultural industry. The issue of food security should not be addressed in isolation, but instead with consideration to land-use planning. Policy development should aim to reap the multiple benefits of a healthy population and environment, along with the vibrant growth of cities and rural economies. Rather than being seen as competing interests, these areas should be addressed in an integrated policy environment. Possible opportunities for integration of policy to this end are introduced below as an initial response to some of the threats that face fruit and vegetable production in Victoria, particularly production in peri-urban areas. The policy options presented below are not intended to be a comprehensive suite of policies, but instead to stimulate thinking about integrated policy-making by illustrating potential points of integration. These suggestions may prove relevant not only to Melbourne, but also to other cities experiencing similar pressures on agriculture in the city fringe areas, such as Sydney, Australia (see Armstrong & Allison, 2003), and cities in England (Whitehand & Morton, 2006) and Canada (Bourne, Bunce, Taylor, & Luka, 2003), among others.

Land-Use Planning

Changes to the land-use planning system are required to protect Melbourne's highly productive peri-urban land, to stabilize Melbourne's UGB, and to provide certainty to agribusiness. Protecting land is also about protecting the quality and fertility of

its soil in order to keep it arable for future generations. Increasing the proportion of foods grown sustainably, which focus on building healthy soils and using natural methods of disease and weed control, can reduce greenhouse gas emissions, reduce air, water, and soil pollution, and ensure the durability of these vulnerable lands (Stringer, 2010). One potential mechanism for encouraging good environmental management is to internalize environmental costs in product prices (Pretty et al., 2000), such as levying an environmental tax on pesticides or fertilizers. However, input costs have already risen dramatically in recent years, and additional increases could affect vegetable prices and farm viability (Crooks, 2009). Another approach to supporting better environmental management (also posited by Pretty, et al.) is to direct public funds to support more sustainable production practices. While this is already happening to some degree, continuing or even increasing this investment would improve the economic viability of sustainable environmental farming practices. A transition to agro-ecological production has the potential to decrease use of inputs, reduce adverse environmental and public-health impacts, and increase the resilience of the sector to climate pressures. While the Victorian government has recently provided some support to the development of the Victorian organic industry (DPI, 2010), there is a need for farm-scale trials of agro-ecological production systems under Victorian climatic and soil conditions (Larsen, et al., 2008).

The Victorian Parliament recently commissioned an inquiry into sustainable development of agribusiness in outer suburban Melbourne (conducted by the Outer Suburban/Interface Services and Development Committee [OSISDC]), which concluded that "operating a farm in peri-urban Melbourne is more complex, more frustrating and in some ways more costly than elsewhere in the state…with agriculture being 'one of the best uses of green wedge land'" (OSISDC, 2009, p. ix). Serious consideration should be given to the committee's 84 recommendations for supporting peri-urban agriculture, but using an integrated approach.

To protect arable land, it first must be identified. The Department of Primary Industries has developed the Victorian Resources Online database describing characteristics of Victoria's Catchment Management regions, including climate, soil type and degradation, water availability, landform, and more. These data could be analyzed and interpreted in order to identify areas with fertile land and potential for secure water sources that are suited to grow fruit and vegetables for current and future use. The government in the Australian state of Queensland has developed planning guidelines for identifying good-quality agricultural land and a policy framework for protecting such land (Department of Environmental and Resource Management, 2010). These initiatives provide a strong example for other Australian cities such as Melbourne.

Finally, recognition of the health benefits related to peri-urban land should be enshrined in criteria when decision-makers are considering extension of the UGB and investment in water infrastructure. In addition, research about costs and benefits for urban versus peri-urban housing density is needed to inform decisions about UGB extensions, especially cost differences of infrastructure.

Climate and Water Policy

Victoria's fruit and vegetable production in the peri-urban regions of Melbourne presents an opportunity for use of recycled water to support production due to its proximity to water infrastructure, which may offer some protection against threats of climate change and water scarcity. Melbourne has two large water-treatment plants. A trial of recycled water for vegetable production from one of these plants allowed farmers in one peri-urban area of Melbourne to continue production during the recent drought (DPI, 2010). However, as yet, only a small number of Victorian horticulture farms use recycled water (Crooks, 2009). There is a need for government funding to extend the infrastructure for use of recycled water from these plants to secure production. Investment in water infrastructure to support peri-urban production is particularly important because farmers in these areas have less access to extra water via trad-

ing on the water markets than farmers in Victoria's rural food-producing regions (OSISDC, 2009) and because of the higher cost of water in peri-urban areas (Top & Ashcroft, 2005). However, trials of recycled water for vegetable production in peri-urban Melbourne have also encountered problems with water quality due to high salinity levels (Ker, 2009) and measures to improve the quality of recycled water are needed to ensure a viable, long-term water source.

History shows Australia has floods dispersed with droughts, and it is necessary to plan for these occurrences. Early commentary has discussed the merits of additional dams, buying back flood-prone land, and limiting building on riverine areas.

Economics

A cost-price squeeze currently threatens the viability of the Victorian fruit and vegetable industry due to high input costs, low farm-gate prices, and competition from cheap imports from elsewhere in the Asia-Pacific region. Rising input costs and increasing environmental pressures suggest that the cost of fruit and vegetables may need to rise if horticulture in the region is to continue to be viable. Yet fruit and vegetable consumption is likely to be adversely affected by increasing prices, particularly among low-income consumers. This conflict between the needs of farmers for viable farm-gate prices and of consumers for affordable, nutritious food is currently resolved in favor of low prices for consumers, driven largely by the major supermarkets that compete on price. However, mounting environmental pressures suggest a need to find new ways to resolve this dilemma in the future. Reports from around the world suggest that taxes for unhealthy foods and subsidies for healthy foods could play a part in alleviating this dilemma. Fruit and vegetable prices are already being affected by environmental pressures, as seen in the price spikes during recent drought periods (Quiggin, 2007). The major supermarkets needed to adjust their practices in order to maintain supply during the droughts, altering product specifications to accept heat-affected produce and also encouraging consumers to adjust their expectations of product appearance (Palmer, 2009).

Stakeholders within the policy environment have different views about the best way of addressing the economic pressures. While state and federal governments favor increasing exports, only a minority of Victorian farmers perceive the development of export markets as a satisfactory strategy, due to high freight costs (Crooks, 2009). Instead, the association representing Victorian vegetable growers (Vegetable Growers Association, or VGA) favors increasing domestic consumption (VGA, 2008). Government support to address economic pressures (many of which are consequences of other threats such as environmental pressures) is warranted, but there are limits to the types of support that would be acceptable within Australia's World Trade Organization obligations and its political orientation towards trade liberalization. Successive Australian governments have progressively dismantled financial support for agriculture, such that Australian agriculture now receives less support than most other farm sectors in the world (NFF, 2009). Consequently, measures such as minimum vegetable prices and subsidies for inputs are unlikely to be implemented in Australia. Recommendations for the future should take into consideration these barriers to maximize the potential for implementation by government.

There is a need to re-examine conventional supply chains and explore models for alternative supply chains to find new ways to deliver affordable fruit and vegetables to consumers while also paying a viable price to farmers in the face of mounting economic and environmental pressures. Proposed solutions need to move beyond the traditional dichotomies of supporting health or the environment, farmers or consumers. Current pressures demand that we explore the possibilities for achieving both. The Victorian government should fund a collaborative initiative that brings together stakeholders from across the supply chain to explore integrated solutions.

New distribution channels might aim to increase the accessibility of farm produce for low-income groups, enable consumers to purchase products during the week (rather than just at weekend farmers' markets), and facilitate the purchase of

fruit and vegetables for public-sector institutions and workplaces direct from Victorian farmers. Finally, encouraging cooperation between local producers and retail and hospitality industry outlets such as supermarkets and restaurants to increase the proportion of local products sold in these outlets would have a great impact. A government-supported feasibility study on new ways for consumers to purchase fruit and vegetables directly from Victorian farmers to complement existing farmers' markets may point to additional possibilities for shortening the supply chain.

Despite their success in the United States and Europe (Larsen, et al., 2008; Victorian Government, 2010), community supported agriculture (CSA) programs are rare in Australia, with only two existing in Victoria. CSA is a relatively new socio-economic model of food production, sales, and distribution. CSAs usually offer a weekly or monthly delivery or pick-up of fruit, vegetables, and other agricultural products. In this model, CSA members are actively involved in the production process, providing a form of direct financing through advance purchase of produce, and assisting with distribution by picking up their produce. It can also provide an opportunity to reintroduce old varieties of fruits and vegetables rejected by supermarkets, and thereby increase biodiversity. Increasing the number of CSAs in Victoria has the potential to both alleviate some of the economic pressures, and improve access to fresh, locally produced fruit and vegetables for consumers. Community supported agriculture models that are able to provide lower-cost shares are essential to address food security issues.

Other strategies to address the economic pressures may include differentiating Australian produce in markets by developing new varieties of fruit and vegetables (for example, the Pink Lady apple) and new technologies and shortening the supply chain between producers and consumers. A shorter supply chain allows for a higher price return for the producer and has the additional benefit of making fresh produce more easily available to Victorians. To this end, there has been a rapid proliferation of farmers' markets in Victoria in recent years, with an estimated 70 markets with approximately 2,000 participating farmers in 2009 (Victorian Government, 2010).

The Victorian Planning Provisions prohibit retail premises in the green wedges, except for markets, plant nurseries, fresh produce sales, and restaurants. Primary produce sales are restricted to unprocessed products sourced from the property on which they are sold, or adjacent land (with the exception of wineries, which are allowed to sell their own wines on their property). This legislation limits what can be sold from roadside stalls and farm gates within the green wedges, and thereby does not support on-farm diversification, which is preventing farmers from selling on-farm processed products. A relaxing of this legislation may offer direct relief from some of the economic pressures faced by Victorian farmers, strengthening the local economy and creating jobs. It also assists in ensuring a safer food supply, as food can be traced to its source more easily. Furthermore, direct sales of farm-processed products could offer tourism potential.

Other Government Policies

There is no specific government policy that focuses on issues within the peri-urban area. It is evident that farmers need support, especially those from the peri-urban areas. Most, if not all, of the recommendations from the Victorian Parliament's OSISDC hold merit, such as improved bicycle paths and walkways, and a sustainable fruit and vegetable production mark or logo to allow consumers to support sustainable production. Additionally, support could be offered to fruit and vegetable producers to hold farm visits and tours and to create an agritourism plan bringing urban Victorians, not just tourists, to peri-urban and rural Victoria. As governments plan for "sustainable population growth," aligning policy so that efforts to plan for the growth of regional Victoria do not contradict the simultaneous efforts to support economic growth of the horticultural industry makes sense from an integrated perspective.

Viewing the food system with an integrated approach opens up possibilities across the food

supply for improvements that will result in health, economic, equity, and environmental benefits. It is necessary to re-examine the supply chain of both conventional and alternative operations to find innovative solutions with this approach in mind. Consultation needs to occur with multistakeholder groups to analyze the issues and propose improved systems for food. This consultation needs to address how needs of the disadvantaged are best met. Some of the integrated solutions could also include peri-urban Melbourne producers as stakeholders when developing health-promotion campaigns to ensure that consumers are aware of the need for sustainable production and the importance of purchasing in season and buying locally. Minimum, mandatory health and sustainability standards for public-sector food purchases would create significant demand, while role modeling good practice. Innovative and diverse stakeholder groups could be brought together to address the competition over land for housing and land for food, and to promote increased housing density as a possible solution. Organizational links between the many government departments that have a vested interest in food would benefit from formally recognized coordination. This could take the form of a department of food, a food commissioner, or a food policy council. Creating a structure is necessary to carry on the whole of government food-policy work that has recently begun in Victoria with the forming of an Inter-Departmental Committee for a Victorian Food Strategy. Lessons for integrating food policy can be learned from the recently passed Transport Integration Act 2010. This act sets out a vision, objectives, and principles for transport, making it clear that any decisions made by any government agencies about the transport system need to be integrated and sustainable — in economic, environmental, and social terms. It requires all Victorian transport agencies to work together toward the common goal of an integrated and sustainable transport system. Another example of government legislating for integration of policy is the state of Illinois (U.S.) Local Food, Farms, and Jobs Act 2009 (Illinois General Assembly, 2009), which establishes a policy council to ensure that government activity on food and farming is integrated with activity on increasing employment in Illinois.

Potential Areas for Policy Integration

This paper has identified a range of potential points of policy integration to support sustainable fruit and vegetable production and consumption in peri-urban Melbourne. We have argued that the most effective policy responses are likely to be integrated approaches that aim to increase fruit and vegetable availability and affordability through innovative solutions to problems of production and distribution. The top 10 examples of potential integrated policies that emerge from this paper are:

1. Integrate food policy and regional planning so that efforts to plan for the growth of Victorian towns and cities do not contradict efforts to support the economic growth of the horticultural industry. Also create organizational links between the state government departments of Health, Primary Industry, and Regional Development.

2. Fund research initiatives to investigate the health, economic, social, and environmental benefits of regional supply chains in the Victorian context, including the link between the loss and cost of peri-urban agricultural land to the cost of food in Victoria.

3. Ensure that future initiatives to increase fruit and vegetable consumption, such as public marketing campaigns and government provision of fruit and vegetables, include a focus on sustainable production and involve Victorian producers, either buying from them or promoting them in the campaigns.

4. Create minimum, mandatory health and sustainability standards for public-sector food purchasing. For example, hospitals, as tax-funded organizations, should have nutritional and sustainable criteria on which they base their food procurement.

5. Legislate for the recognition of rural land and green wedges in terms of health benefits, not

just economic benefits (that is, when making decisions about extending the UGB, these health benefits must be entered into the cost benefit analysis).

6. Carry out a feasibility study and implementation plan to provide support for food provision initiatives that link producers to consumers, focusing on consumers who do not already have good access to fruit and vegetables. These would include box schemes, CSAs, farmers' markets, coordinated, cooperative networks, mobile fruit and vegetable vans or markets, and farm open days.

7. Create an agritourism plan that appeals to both urban Victorians and tourists.

8. Determine the best use of peri-urban farmland by analyzing the soil and using land-mapping data to identify areas with fertile land and potential for a secure water source that are well suited to grow fruits and vegetables for current and future consumption.

9. Protect this rich agricultural land through exclusive, noncontestable zoning of land designated for agriculture, resulting in "exclusive farming zones" that support sustainable farming practices.

10. Investigate the development of a Victorian "sustainable fruit and vegetable production" mark or logo to allow consumers to support sustainable production.

Summary and Conclusions

Victoria's peri-urban agricultural land hosts productive horticulture farms that not only make significant contributions to Victoria's economy, but also offer health, environment, and food security benefits. With the understanding that regular consumption of fruit and vegetables offers a protective effect against lifestyle and diet-related illnesses, it is particularly important to consider the health benefits of having fresh, local, and sustainably grown produce available to consumers. However, the viability of the Victorian horticulture industry is under threat as land and environmental and economic pressures increase. A lack of integration between consumption policies and production policies has contributed to, or at least maintained, the vulnerability and reduced potential benefits of fruit and vegetable agribusinesses in Victoria. Policy initiatives to increase fruit and vegetable consumption should include measures to address the pressures facing their production.

The discussion in this article of the threats to peri-urban fruit and vegetable production in Victoria will have relevance for other locations around Australia and the world that are experiencing similar pressure. We have argued that the most effective policy responses are likely to be integrated approaches that aim to increase fruit and vegetable availability and affordability through innovative solutions to problems of production and distribution. This integrated approach is beginning in Victoria with the recent forming of an Inter-Departmental Committee for a Victorian Food Strategy. Advancements in this policy will be of interest to land-use planners and public-health professionals.

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Expanding technical assistance for urban agriculture: Best practices for extension services in California and beyond

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Abstract

Past studies have suggested the expansion of extension programs for urban agriculture (UA). With the growing interest in UA, the case for such programs is even stronger. In order to develop effective extension programs, it is important to begin with an understanding of the diversity of UA activities and the types of assistance that may be useful to operators. It is also important to explore whether extension staff are interested in expanding their programs in urban areas. This study sought to address these questions. It examined characteristics of UA in the study area, Alameda County, California; operators' challenges and assistance needs; and Extension staff members' interest in expanding programming for urban agriculture. Data was collected through the University of California Small Farm Program from 2006 to 2009, and consisted of on-site interviews with 52 urban farmers and gardeners as well as surveys of Extension staff members and participant observation, which took place throughout the study.

Keywords

Alameda County, community gardens, Cooperative Extension, food justice, small farms, University of California, urban agriculture, urban farming, urban gardening, USDA

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Disclosures: The author was employed with the UC Small Farm Program from 2003 to 2009. In 2010 she joined the board of one of the urban agriculture operations included in this study. This was after the data-collection stage of this study ended in 2008. This paper follows up and expands on a research brief that presented preliminary findings from this study, as noted in the Research Methods section of this paper and included in the reference list under Reynolds, K. (2009).

Introduction

The three sisters — squash, beans, and corn — flourish on a street corner in a wealthy section of town. Cattle graze within view of suburban housing developments. A beekeeper tends his hives under a highway, just blocks from an emergency food provider. Though perhaps surprising to the unknowing eye, these are typical scenes in many metropolitan areas today. They are examples of

urban agriculture (UA), which can be defined as *agricultural production located in and near urban centers, and that which is integrated in the urban economic, social, and ecological system* (see Mougeot, 2005; van Veenhuizen, 2006).

Urban food production is not a new phenomenon. Since at least the nineteenth century, cities as well as their surrounding landscapes and communities have been host to backyard farms, large-scale public gardens, and educational and market gardens, to name a few examples of UA (Bellows, Robinson, Guthrie, Meyer, Peric, & Hamm, 2000; Blecha, 2007; Hyden-Smith, 2009; Lawson, 2005). The most recent turn toward urban agriculture has been bolstered by the economic crisis, widespread recognition of climate change, rising costs of fuel and food, and the need among many households reduce their food expenditures. This new UA movement has been led by operators, researchers, advocates, and public officials who have recognized the positive role of UA in today's agrifood system. At a federal level, this recognition was symbolized by first lady Michelle Obama's kitchen garden, installed at the White House in 2010 (Burros, 2009). Still, despite enthusiasm from various sectors, support for UA has only begun to address the many social, political, and technical barriers that have limited its success.

In the mid-1990s, U.S.-based research began to explore the multiple community- and personal-development aspects of urban agriculture (see Bellows, Brown, & Smit, 2003; Brown, 2002; Brown & Carter, 2003; Feenstra, McGrew, & Campbell, 1999; Hynes, 1996; Kaufman & Bailkey, 2000; Lawson, 2005). Since then, studies have documented the many benefits of UA, which range from food access to environmental conservation; drawbacks, such as the contaminated state of many urban soils; and challenges, which one study categorized as being related to procedure, government, production site, and perception (Kaufman & Bailkey, 2000). These benefits, drawbacks, and challenges are summarized in tables 1 and 2.

More recently, studies have inventoried land suitable for food production and reviewed municipal policies that might support or hinder urban agriculture (Balmer et al., 2005; Jones, Ona, Rimkus, & Wells, 2005; McClintock & Cooper, 2009; Unger & Wooten, 2006). In addition to providing useful baseline data, these studies have stood as calls for government agencies and city planners to recognize the potential role of UA in urban resiliency and to take measures to ensure agriculture as a long-term use of urban land.

Over the past two decades, several studies have also made recommendations about overcoming challenges to UA, including raising awareness about the benefits of urban food production; addressing food production through city planning; developing policy measures that facilitate urban agriculture; increasing public acceptance of food production in cities; and increasing technical support and extension services for UA (Brown & Carter, 2003; Feenstra et al., 1999; Kaufman & Bailkey, 2000; Pothukuchi & Kaufman, 1999; Smit, Ratta, & Nasr, 1996). Suggestions for expanding extension services have included:

- integration of urban food-system topics within research and extension programs (Brown & Carter, 2003; Feenstra et al., 1999);
- a return of extension to urban areas (Brown & Carter, 2003; Feenstra et al., 1999);
- applied ecological and agronomic research for urban and culturally diverse settings (Brown & Carter, 2003; Feenstra et al., 1999; Schertenleib, Forster, & Belevi, 2002);
- community-based leadership development for UA and community food security (Brown & Carter, 2003);
- education and demonstrations related to the environmental- and public-health risks of soil contamination (Brown & Carter, 2003; Drescher, 2002); and
- facilitation of information exchange between regions (Smit et al., 1996).

This study sought to explore how related California Extension programs might expand assistance for urban agriculture.

Table 1. Benefits and Drawbacks of Urban Agriculture Cited in U.S. Literature

Benefits[a]
Food access and public health
• increased access to healthy, fresh, culturally acceptable foods
• increased affordability of healthy, fresh, culturally acceptable foods
• opportunity for exercise and physical activity through food production
Community and environment
• personal or community development
• community and economic development
• increased or maintained open and green space
Education and training
• educational and job training
• employment opportunities for socially marginalized groups
• youth development
Psychological and cultural
• access to open/green space
• stress relief
• contact with nature
• control of public space
• relaxation
• spiritual connections
• cultural continuity for some immigrant groups
• feeling of creating and participating in an alternative food system
Drawbacks[b]
Public health and environmental risks related to:
• improper organic waste disposal (i.e., food and animal waste) due to lack of knowledge and/or lack of access to proper disposal facilities
• incomplete knowledge about sanitation and safety when keeping livestock
• use of brownfields or other contaminated sites
• lack of knowledge and resources (funds, land, etc.) to remediate soil

[a] Sources: Ashton, 2003; Bellows et al., 2003; Blecha, 2007; Brown, 2002; Brown & Carter, 2003; Eizenberg, 2008; Feenstra et al., 1999; Francis, 1987, 1989; Hynes, 1996; Kaufman & Bailkey, 2000; McGrew, 1999; Monroe-Santos, 1998; Pothukuchi & Kaufman, 1999.
[b] Sources: Dufour, 2009; Kaufman & Bailkey, 2000

Table 2. Challenges to Urban Agriculture Cited in U.S. Literature[a]

Procedure-related
• inadequate financial resources for start-up costs, ongoing operations, or staff
• difficulties of integrating food production with social objectives
• lack of financial self-sufficiency and/or reliance on grants for funding
• lack of sound business planning
• lack of access to markets
• seasonal limits
• health risks
Government-related
• zoning
• city planning
• governmental restrictions
• lack of political support
Site-related
• site contamination
• security
• land tenure
• vandalism
• crime
Perception-related
• perception that agriculture is not a legitimate urban activity
• negative perception of cultivating food in cities
• association between food production and exploitation among some cultural groups (e.g., African Americans, Latinos)

[a] Categories based on Kaufman & Bailkey, 2000. Sources: Brown, 2002; Brown & Carter, 2003; Feenstra et al., 1999; Kaufman & Bailkey, 2000; Pothukuchi & Kaufman, 1999; Smit, Ratta, & Nasr, 1996.

Precedents: USDA and Cooperative Extension Programs

Cooperative Extension is the national system through which the U.S. Department of Agriculture (USDA)'s National Institute of Food and Agriculture (NIFA) partners with land grant universities in each state to provide research-based information to the public (National Institute of Food and Agricul-

ture (NIFA), 2011). Today, the Cooperative Extension (CE) system includes six major areas: youth development, agriculture, leadership development, natural resources, family and consumer sciences, and community and economic development (NIFA, 2011). Urban agriculture may encompass these issues as well, yet CE has often overlooked the scope of urban food production, resulting in the gaps mentioned above (Brown & Carter, 2003; Feenstra et al., 1999).

Although there is currently no systemwide Cooperative Extension program focused on urban agriculture, USDA programs have facilitated urban food production in the past. The first of these UA-focused USDA programs was the Victory Garden campaign of World War II. Following on the tails of government-driven urban garden programs of World War I and the Depression era (which were sponsored by the War Department and the Works Progress Administration, respectively), the Victory Garden campaign urged residents to grow their own food so that a greater proportion of commercial agricultural products could be sent to armed forces abroad (Hyden-Smith, 2009; Hynes, 1996; Lawson, 2005). Up to 44% of the nation's vegetables were grown in Victory Gardens during World War II (Hyden-Smith, 2009, p. xii; Hynes, 1996). Despite the success and popularity of Victory Gardens, USDA support for urban food production tapered off after World War II.

The USDA's next urban food production program began in 1964, when a county Cooperative Extension director in Philadelphia began to establish community gardens on vacant city lots (Stephens, DelValle, Daniels, & Oehler, 1996). This program developed alongside community-led urban garden initiatives in the wake of that decade's race riots, which had resulted in injuries, arrests, and the closing of local businesses in many urban communities (Stephens, DelValle, Daniels, & Oehler, 1996). Eight years later, a CE agent in Washington state began the Master Gardener Program (MGP), which trained volunteers to provide horticultural advice to home gardeners (Malakoff, 1994). The MGP eventually expanded to 45 states with funding from state departments of agriculture and the USDA (Geisel & Feathers, n.d.; Gibby, Scheer, Collman, & Pinyuh, n.d.). Today, MGP focuses primarily on home horticulture and pest management issues, and is coordinated at the state and county levels. MGP is complemented in some areas by related "master" programs in composting, food preservation, and/or beekeeping.

At the federal level, legislators initiated a *national* USDA Urban Garden Program (UGP) in 1976. In contrast to the MGP, which relies on volunteers to conduct education for home gardeners in general (with no explicit focus on urban areas), the UGP employed CE agents to "assist in teaching and demonstrating gardening and 4-H type work [e.g., small livestock husbandry], as well as nutrition assistance for low-income families" in large cities (Schaller, 1977, as cited in Stephens et al., 1996, p. 294). Volunteers from the MGP and related master programs were trained to work alongside CE staff. During its first year of operation, the UGP helped create opportunities for low-income residents to grow and preserve vegetables in New York City, Chicago, Los Angeles, Philadelphia, Detroit, and Houston (Hynes, 1996). By 1989 over 3,000 UGP staff and volunteers worked with 200,000 low-income urban gardeners, producing US$22.8 million worth of produce on a budget of US$3.5 million (Hynes, 1996, p. 90).

The UGP eventually expanded to 23 cities, until changes in the 1994 federal budget reduced its funding and eventually brought it to an end (Malakoff, 1994; see also Hynes & Howe, 2002; Lawson, 2005; Stephens et al., 1996). A handful of regional CE agencies have continued to operate urban agriculture programs, including the Los Angeles County Common Ground Garden Program, which targets low-income city residents and traditionally underrepresented families for its food production and nutrition education program (Los Angeles County Cooperative Extension, n.d.). However, the UGP's dual focus on food production (including animal husbandry) and nutrition education for low-income urban residents has not been replicated at a national level.

Although CE has faced budget shortfalls in recent

years, its mission to deliver research-based education to the public remains intact. This, along with the growing number and diversity of UA operations, suggests that a more comprehensive focus on UA within the CE system is needed. This paper seeks to address this gap by assessing the needs for and possibility of expanding extension services for a diversity of UA operators.

Overview of Study

This study was conducted in Alameda County, California (in the San Francisco Bay Area) and within the University of California's Small Farm Program and Small Farm Workgroup from 2006 to 2009. The goals of the study were to (a) assess the types of urban agriculture in the study area; (b) explore UA operators' need for technical assistance; and (c) assess county and statewide Extension staff members' understanding of and interest in expanding technical assistance for UA.

Three extension programs were integral to this study. Alameda County Cooperative Extension (UCCE Alameda) is the extension office that serves the study area. Although UCCE Alameda does not have an UA program, it does have environmental horticulture, nutrition education, youth development, MGP, and school garden programs (University of California Cooperative Extension Alameda County, n.d.). The county director has also been involved with urban food-systems research and has expressed interest in expanding assistance for UA operators. The statewide UC Small Farm Program (SFP) was established in 1979 to provide extension assistance to California's small-farm community. The related UC Small Farm Workgroup is composed of extension advisors[1] and other small-farm stakeholders who address small-farm issues. Each of these programs is part of UC's Division of Agriculture and Natural Resources, which houses California's Extension system.[2]

Study Context

As a part of the nine-county San Francisco Bay Area, Alameda County is home to the densely populated cities of Oakland and Berkeley on the bay, as well as less dense yet growing suburbs to the east. Land use in the eastern part of Alameda County currently includes cattle grazing, parklands, and a limited amount of crop production, as well as housing developments and ranchettes.[3] As of 2006 there were 253,386 acres of agricultural land in Alameda County, with 1,727 acres having been converted to nonagricultural use between 2004 and 2006 (California Department of Conservation, 2008). In 2007, the Census of Agriculture counted 525 farms, with an average farm size of 390 acres (U.S. Department of Agriculture (USDA), 2007). This represented a 24% increase in the number of farms, and a 24% decrease in average farm size as compared with the prior census (USDA, 2002). The majority of agricultural production consists of hay, pasture, plant nurseries, and wine grapes, with produce and nuts totaling only 1.5% of the economic value of agriculture in 2007, the first year of the field research (Bray, 2008). There are also many urban farms and gardens in the county that produce fruits, vegetables, herbs, honey, and/or livestock products. However, these activities have generally not been reflected in agricultural statistics.[4]

As a whole, Alameda County is demographically diverse and includes sizable populations of White, Asian, Hispanic/Latino, African American, and American Indian/Native Alaskan persons. Median household income in the county was US$68,263 in 2007 (U.S. Census Bureau, 2008), yet historical economic inequalities persist. In 2006, for example, 11.2% of the overall population lived in poverty, yet African American and Latino groups were overrepresented in these statistics when compared

[1] "Extension advisors" in the California extension system are equivalent to agricultural extension agents in other states.
[2] UC DANR announced that it would close the UC Small Farm program in 2009, although the program has restructured and continues to operate (Jolly, 2009; Small Farm Program, n.d.).
[3] The American Farmland Trust (n.d) describes ranchettes as residences built on lots of 1.5 acres or more.
[4] The Alameda County Department of Agriculture, Weights, and Measures began to include community gardens in its annual crop report in 2009.

with White and Asian groups (Beyers et al., 2008, pp. 41–54).

In addition to income and poverty, inequalities also extend to the food system in Alameda County. For instance, while parts of the county are known for upscale restaurants, farmers' markets, and specialty grocers defined by their focus on farm-fresh products, numerous studies have documented lack of access to fresh, healthy, affordable, and culturally appropriate foods in certain communities (see Alkon, 2008; Beyers et al., 2008; Cozad, King, Krusekopf, Prout, & Feenstra, 2002; Farfan-Ramirez, n.d.; Farfan-Ramirez & Kelly, n.d.; Fuller, n.d.; Guthman, 2003; Heynen, 2009; Short, Guthman, & Raskin, 2007; Tsai, 2003). A recent countywide health assessment, for instance, found that access to healthy food (e.g., fresh produce, meat, and dairy) was "highly dependent on the neighborhood in which one lives" (Beyers et al., 2008), and past studies have noted that low-income residents of West Oakland (a historically African American district that also has a sizable Southeast Asian population) have struggled for decades with these issues (Alkon, 2008; Farfan-Ramirez, n.d.; Farfan-Ramirez & Kelly, n.d.; McClintock, 2008). Urban agriculture has surfaced as a way to address some of the food system issues mentioned here.

Research Methods

There were two populations of interest in this study: (1) key informants from urban agriculture operations (UA operators); and (2) Farm advisors and staff members (Extension staff) from the UC Small Farm Program, Small Farm Workgroup, and UCCE Alameda. Multiple methods were used to collect data, as described below.

Study Population 1

The UA operators in this study were gardeners and production managers from 52 farms, gardens, and apiculture and/or mushroom-foraging operations located in Alameda County. Operations were included in the study if they: (a) made edible products available to the public through sales and/or community distribution; (b) provided land to urban residents for food production; and/or (c) consisted of household members producing a significant part of their own food at their place of residence. (This study did not examine smaller backyard gardens, school gardens, or agricultural operations that produced only non-edible products, such as nurseries or hay producers.) Individual participants were selected through snowball sampling, which uses stakeholder input to identify key informants.

Data collection with UA operators took place between mid-2007 and early 2008, and consisted of site visits and interviews. A set of open- and close-ended interview questions was developed with input from local stakeholders. Questions probed characteristics of the operations, agronomic techniques, community development strategies, challenges, and needs for technical assistance. At the beginning of each interview informants were given the most recent SFP newsletter in order to familiarize them with the focus of the program.

Interviews were recorded and transcribed by the author. Responses were analyzed for common themes and subsequently coded for further analysis using the SPSS software package, although the author recognizes the limitations of this approach. UA operations can have numerous functions and, more generally, categories imposed by a researcher risk oversimplifying groups' and individuals' roles and motives. In order to minimize this risk, preliminary findings were shared with a selection of UA operators and Extension staff in the form of a 12-page research brief, and feedback was incorporated into the final analysis (see Reynolds, 2009). This helped verify the validity of the research findings and maintained study participants' voices in the research process.

A series of maps was also created with site location and U.S. Census data using GIS software. This enabled further geographic and demographic analysis. Analysis of these maps is included in the author's dissertation (Reynolds, 2010).

Study Population 2

Extension key informants (Extension staff) consisted of SFP advisors, members of the UC Small Farm Workgroup, and staff members from

UCCE Alameda, who had expressed interest in urban agriculture. Data were collected through participant observation[5] of three types of intervention: (a) a study tour of Bay Area urban production and marketing sites, organized in fall 2006 to familiarize Extension staff with urban agricultural and food issues; (b) facilitated discussions about UA, which took place between 2007 and 2009; and (c) email surveys of Extension staff, which were administered immediately after the study tour and the facilitated discussions. Field notes and written survey responses were analyzed for common themes.

Limitations of This Study

One limitation of this study was that Alameda County Cooperative Extension has no farm advisors. This, along with budgetary constraints within the entire University of California Extension system, limited the potential to develop a new UA program. Nevertheless, the study addressed issues that could be approached through innovative program planning and that are applicable beyond the study area.

The small sample size among the UA operator population (n=52), also limited the inferences that could be drawn from the findings. Nonetheless, use of characteristic themes for analysis and discussion may be a useful framework for communicating about the diversity of UA operations.

Findings Part One: Urban Agriculture Operators

Main Purpose

Key informants were asked questions about the characteristics and main purpose of their operations. The following four themes emerged through analysis of these responses.

Theme one: Community gardens and orchards (CG). Community gardening is perhaps the most familiar example of UA. Community gardens and orchards (CGs) in this study provided garden space to community members to grow produce, herbs, and flowers for themselves and family members. Many gardens also integrated native plants into the garden space. Sales of garden products were prohibited in most cases.

City agencies, regional government districts, and/or nonprofit organizations provided resources and oversight of garden sites for most of the community gardens in this study. These included one or more of the following: a staff coordinator, land tenure, water supply, basic site maintenance (e.g., trash collection), and other resources (tools, donated seeds, etc.). Gardeners typically paid a small annual fee (between US$10 and US$75) to the coordinating agency or organization for these services. In some cases the staff coordinator was highly involved with all aspects of the garden, from registering new members and assigning plots to providing supplies. In other cases, gardeners themselves formed committees that managed these and other activities, including public garden days and seasonal garden clean-ups.

Theme two: Community food security; food justice; youth development (CFS/FJ/YD). Several of the UA operations in this study focused on social justice and community empowerment, which they addressed through food production and related activities. These community-based operations differed from the community gardens described above in that their activities reflect a *de facto* critique of the social system. Three concepts were integral to these operations' activities:

(a) *Community food security* (CFS), which is defined as "the ability of all persons [to obtain], at all times, a culturally acceptable, nutritionally adequate diet through local, non-emergency sources" (Gottlieb & Fisher, 1996, p. 24);

[5] Participant observation is a qualitative research methodology in which an investigator establishes and maintains a many-sided and situationally appropriate relationship with an individual or group in a natural setting for the purpose of developing a social scientific understanding of that association. This may entail participation in and intentional observation of normal activities or planned interventions, as well as documentation of observations through field notes (Lofland, Snow, Anderson, & Lofland, 2006, pp. 16–19).

(b) *Food justice* (FJ), which considers social and economic inequities that give rise to food insecurity among various social groups, emphasizing local community control (Gottleib & Joshi, 2010; Levkoe, 2006; People's Grocery, 2009); and

(c) *Youth development* (YD), which has been described as "as the natural process through which youth grow into adults; as a set of principles underlying youth programs that encourage thriving among youth; or as a set of practices that foster the development of young people" (Heck & Subramaniam, 2009).

Figure 1. Community Garden (CG) Plot Photo by the author.

Figure 2. Vegetable Beds at a CFS/FJ/YD Farm Photo by the author.

CFS/FJ/YD operators produced food specifically for low-income communities, fostered youth development among underprivileged youths, and/or provided job training to local residents. Each operation employed a garden or farm manager who oversaw the production of vegetables, fruits, and herbs, along with chicken- and beekeeping in some cases. Sales and distribution methods included corner farm stands, sliding-scale pricing, and a model of community supported agriculture (CSA) in which shares for lower-income members were subsidized by higher-income members' shares. Some of the operations also used direct sales through farmers' markets and high-end restaurants to increase revenue and support other activities.

The operations that incorporated YD into their programs worked mainly with youth of color in underprivileged communities to help them develop a sense of empowerment and personal responsibil-

ity. Education about life skills such as healthy eating, seeking and maintaining employment, and community leadership was incorporated into activities that included food production, produce sales, and peer nutrition education.

Theme three: Sustainable living and self-provisioning (SLSP). Several informants practiced UA as a personal effort to live more "sustainably" and/or engage in a degree of food self-provisioning. These operators generally questioned the ecological sustainability and/or social equity of the agrifood system. As a response, they opted to produce a significant amount of their own food using what they believed to be more sustainable methods. All of these informants grew produce and herbs, and some also kept bees and/or raised small livestock, including chickens, goats, pigs, and rabbits, in their backyards. Although focused on self-provisioning, each of these operations engaged in some form of community education, including hosting occasional farm or garden tours and providing informal consultation to other urban residents.

Figure 3. Goats at SLSP Site Photo by the author.

Theme four: Commercial production. The commercial UA operations in this study were privately held, small-scale farms and ranches, and apiculture and mushroom-foraging operations. Primary activities were production, harvest, and sales through various channels. Products included a wide variety of fruits and vegetables, chicken, beef, lamb, honey, and mushrooms. Sales outlets included farm stands, farmers' markets, CSAs, restaurants, agritourism, and wholesalers. Many of these operators also donated a part of their unsold produce to local food banks and other emergency food providers.

Figure 4. Commercial Cattle Ranch at a City's Edge Photo by the author.

While commercial production was the common theme among this set of operations, informants also expressed concerns about wider agrifood systems issues, including the decline of small farms and small-farm profitability, the ecological impacts of agricultural production, and the need to educate nonfarmers about food and agriculture.

Figure 5 shows the number of operations within each of the four themes. Figure 6 shows the distribution of sites throughout the county. In some cases multiple operations were located at one site. These are noted on the map. Additionally, some operations had multiple sites.

Figure 5. Number of Operations with Each Theme (*N*=52)

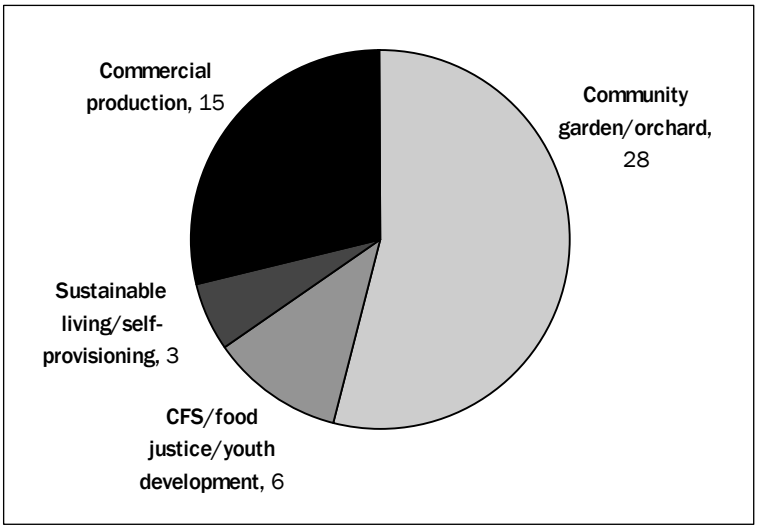
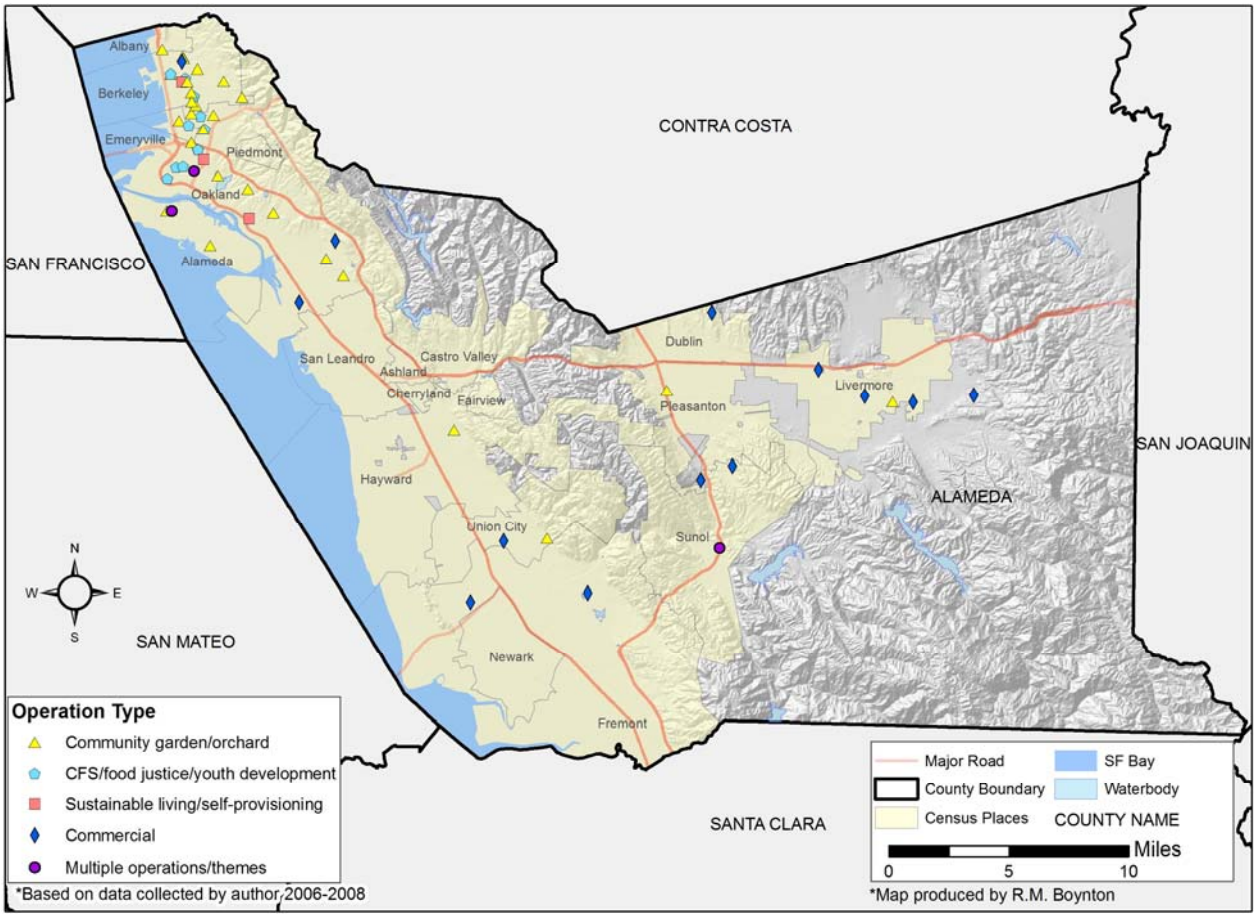


Figure 6. Urban Agriculture Sites in Alameda County, California



Challenges

Key informants were asked an open-ended question about their biggest challenges: *What would you say are the biggest challenges to achieving your operation's goals?* Responses were analyzed and grouped by the operation's main purpose, as shown in table 3. Top challenges for each group are discussed below.

CG challenges. Top challenges mentioned by community garden informants were interpersonal relationships within the garden and time constraints. According to some key informants, community gardeners did not always come together to accomplish common tasks such as weeding paths, even when cooperation was one of the garden's stated missions. As an informant from one garden explained, a main challenge was:

> to keep the work in communal areas. To develop our sense of community that goes beyond being a good gardener…to avoid the possessive sense that people always have…[to develop a sense that] this is a public place and we have a *privilege* to be here, that we don't have a *right*. [But this is an attitude that] you confront.

A coordinator from another garden expressed similar sentiments, noting that the "number one challenge" was the attitude of the gardeners. "They don't band together the way the South L.A. Farm and others did," she explained, making reference to the 2006 standoff between community gardeners and the landowner of a 14-acre community garden in Los Angeles (see Barraclough, 2009). She also mentioned racial tension within the garden as an example of the challenges to creating community. (The membership of this garden was ethnically diverse and was made up mostly of Mexican, but also Caucasian, West African, Japanese, and Afghan gardeners.)

Lack of time was mentioned as a challenge related to gardeners needing to schedule their gardening activities around their jobs, as well as the fact that some gardeners did not live in the neighborhood surrounding the garden. Time was a more significant issue during the winter months because early nightfall limited visibility in many gardens and contributed to concern about personal safety, especially for women.

Table 3. Top Challenges Mentioned for Each Theme

Challenges (number of responses)	CG (*n*=28)	CFS (*n*=6)	SLSP (*n*=3)	Commercial (*n*=15)
Lack of time	**8**	1	**2**	1
Relationship with surrounding community	1	2	1	2
Funding (start up, expansion, paying staff)	2	**4**		3
Lack of agricultural infrastructure	1	1		2
Crime and/or misuse of garden[a]	6	2		
Ag not seen as a legitimate urban activity	1	2		1
Biophysical and/or environmental factors[b]	6			3
Lack of institutional support[c]	6			3
Horticultural skills and/or knowledge (among gardeners, youth, and/or volunteers)	3	**3**	1	
Interpersonal relationships within garden	**15**	1		
Land tenure and/or cost	2		**2**	
Managing farm and/or organizational activities		**4**		**5**
Costs of farming and/or cost of supplies	1			**5**
Creating community market farm		**3**		
No response	1			

[a] Violence, theft, vandalism, drug use, drug sales, and/or other use of garden for nongardening activities.
[b] Pests, weedy species, shade, climate, etc.
[c] Lack of governmental, municipal, and/or university support.
Note: Numbers total greater than the number of respondents due to multiple responses.

CFS/FJ/YD challenges. The top four challenges mentioned by CFS/FJ/YD informants were funding; managing disparate farm and organizational activities; lack of horticultural knowledge among gardeners, youth staff, and volunteers; and creating a new type of community market farm.

Since all of the CFS/FJ/YD operations in this study were managed by nonprofit organizations, it is not surprising that funding was one of the most frequently mentioned challenges. (Funding is often a challenge for nonprofit organizations.) Specific funding issues related to starting or expanding agricultural production and paying staff. In terms of managing diverse activities, challenges related particularly to balancing farming with other responsibilities, including tasks not directly related to food production (e.g., youth counseling, fundraising, and grant-writing). These findings concur with those of past studies (see Feenstra et al., 1999; Kaufman & Bailkey, 2000; Lawson & McNally, 1998).

Half the CFS informants mentioned lack of horticultural skills among youth participants and volunteers as a challenge in terms of production efficiency. This challenge pertained mainly to the youths' and volunteers' limited gardening experience, whereas the adult staff members did have these skills. Rather than viewing this as wholly problematic, however, informants reiterated that youth development was one of the main goals of their UA operation; youth participants were there *in order to* gain these and other skills.

Half the informants also discussed the challenges associated with creating a new type of farm that was neither a community garden nor a fully commercial operation. One informant described this as "community market farming":

> We call them [community market farms] to make a distinction with community gardens. But if you just say that they're market farms, that implies that they're a purely commercial endeavor, which would mean that you'd be marketing [the products] at as high a price as you could. "Community market farms" means it's run like a market farm as much as possible in terms of trying to be as productive as possible and as efficient as possible, but the food benefits — is *for* the community. And there's a lot of community involvement.

Other informants expressed similar concerns, noting that despite having significant gardening experience, they had needed to develop additional agronomic skills in order to manage food production for community distribution and/or sales. As one farm coordinator explained:

> For us, we're like in the no-man's land between small farmers and gardeners. We're really trying to produce…on a larger scale using those types of methods, but [we] don't have all the skills and knowledge around that. [We] have never started it from the ground up.

Two of these informants mentioned that they learned farm management skills (such as strategizing successional plantings for consistent harvests and marketing) during their operation's first season.

SLSP challenges. The top challenges mentioned by SLSP informants were time and land tenure and/or cost of land. Time as a limiting factor was related to the fact that the operators of each site held one or more paid jobs that were not a part of their food-production activities. As for land tenure, each of the operations had a different land access situation, so no clear pattern emerged.

Commercial operation challenges. The two challenges cited most frequently by commercial operators were managing diverse farm activities, and the costs of farming and related effects on profitability and the ability to stay in business. While these are issues faced by small-scale farmers in general, being located in or near a city may have intensified the impact of these challenges. For example, the cost of land is typically higher in urban areas, which has been found to necessitate a higher degree of diversification and more complex

business-management skills in order for farms to remain financially sustainable (Heimlich & Anderson, 2001). Several other issues related more specifically to being located in an urban area. These included lack of governmental and/or institutional support for agriculture; lack of an agricultural infrastructure, including a skilled labor force, supply stores, and equipment repair services; and a lack of a network of local operators. Again, these findings concur with those of past studies (see, for example, Esseks, Oberholtzer, Clancy, Lapping, & Zurbrug, 2008; Sokolow, 1996).

Information and Assistance Needs

In addition to discussing challenges to their operations, key informants were asked, *Are there any types of information or assistance that are* not *available that would be useful to your operation?* Again responses were aggregated and grouped by theme (see table 4).

CG needs for information and assistance. The top information and assistance needs mentioned by CG informants were networking among gardeners and collective work within the garden. Technical aspects of gardening, soil testing, food production and/or distribution resources, and business management were also mentioned. (Although most community gardens prohibited sales of produce, a few did allow gardeners to sell their produce.)

Nearly half of CG informants indicated that they did *not* need additional information or assistance. In a separate line of questioning, many of the informants reported getting horticultural and soil-testing information from the Internet and books, as well as the MGP. This likely explains the high percentage of "none needed" responses among these informants.

CFS/FJ/YD operation needs for information and assistance. Informants from CFS/FJ/YD operations cited three information and assistance needs equally: extension and technical research assistance (beyond gardening information); funds and staff; and compilation of information about UA practices.

Again corresponding to the challenges discussed above, specific technical needs included assistance with scaling-up from small gardens to market gardening, and periodic on-farm consultations. For instance, one farm coordinator explained her vision of an urban farming extension agent as "someone who just kind of came around and, you know, spent a few hours every other month… checking in, helping you do some farm planning," adding that "production is just a part of what I do… there's a lot of literature out there, but I don't learn by reading."

Table 4. Needs for Information and Assistance by Number of Responses

	CG (*n*=28)	CFS (*n*=6)	SLSP (*n*=3)	Commercial (*n*=15)
Extension or technical assistance[a]		**2**	1	1
Production or distribution resources	2	1		1
Gardening information	4	1	1	
Soil testing and/or contamination information	3	1		
Farm business management	2			2
Funds or staff	1	**2**		
Information compilation and guidance on finding information	1	**2**		
Networking or collective work	**7**			
City services	1			
None needed	**12**		1	**11**
No response	1			

[a] That is, beyond gardening information.
Notes: Numbers total greater than the number of respondents due to multiple responses.

Another informant felt that CE and other governmental agencies should do more to assist UA operators. She explained:

> Through collaborative system of agricultural support in the United States, urban areas are shut out. Farm subsidies for urban agriculture [would be helpful]. Extension, government offices, a city department of food…The Extension service at the county level should have programs for urban agriculture, and cities should have a Department of Agriculture — a Department of Food.

One CFS/FJ/YD informant had specific suggestions about how to deliver information to a broad range of UA operators. He explained that "there is a lot of information, but it's hard to get because it's time-consuming." He also pointed out that "not everyone is online, or uses Internet, or can download and print documents — especially seniors who are not as familiar with computers. Having hard copies and flyers would be good for them."

SLSP operation needs for information and assistance. SLSP operators mentioned only two needs for information and assistance: gardening information and an urban agriculture extension agent. One operator explained that she and her urban-farming peers spent a considerable amount of time teaching others about farming techniques, including urban livestock husbandry. Although she was glad to share her knowledge with others, the growing number of requests had begun to take away from the time this operator was able to spend on her own farming activities. She explained that an extension agent would be very useful because "hundreds of people are getting backyard chickens and they need support — they're confused!" She also expressed a need for more technical support with raising goats: "I know there's books, but I need a person to tell me what to do. So that would be really nice if there was an urban farming extension agent…That would be awesome."

Again, the small sample size limits the inferences that can be drawn from these responses. Still, they do provide preliminary information about the types of assistance that could help individual UA practitioners.

Commercial operation needs for information and assistance. Eleven of the 15 commercial operators stated that no additional information or assistance was needed. Several informants, especially beginning operators, indicated that they typically accessed information through the Internet or other resources, and/or had personal connections with other farmers on whom they called for assistance when needed. Some of the more seasoned commercial operators indicated that they relied upon their own experience in making management decisions.

Despite the fact that the majority of commercial operators in this study indicated not needing additional assistance, several informants did mention that information about farm business management would be useful. One operator explained that producing in an urban area meant that he did not have connections with other producers who might provide him with guidance on managing his farm business. Another operator stated that more extension personnel were needed "to buffet resistance to agriculture" in the area. He explained: "It's working in reverse. We need more [help] to educate the urban people, and we're not gettin' it from Extension. They've cut out the personnel [but] people take food for granted in this country."

"None Needed" responses. As discussed above, many informants indicated no need for additional information or assistance. It is important to reiterate that this question specifically addressed *assistance and information needs*. It did not probe other issues such as policy, zoning, or advocacy. Moreover, informants' knowledge that the study was being conducted through an extension program likely influenced responses. For instance, policy change was not mentioned as a "need," although comments made during some of the interviews suggested that policy changes would help overcome certain challenges. To this end, future research should explore UA practitioners' opinions of

needed policy changes, zoning, and advocacy more explicitly.

Findings Part Two: Extension Staff

As described above, the second population of interest in this study (Extension staff) consisted of SFP advisors, members of the UC Small Farm Workgroup, and staff members from UCCE Alameda. Facilitated discussions and email surveys revealed several key points about their understanding of UA and interest in working with UA operators.

Definition of urban agriculture. Over the course of the study, several Extension staff indicated a lack of clarity about the term "urban agriculture." This was surprising since each facilitated discussion and survey was prefaced with the definition used in this study.[6] One farm advisor wrote:

> To be honest, I still have trouble with the definitions — "Urban" [is] agriculture within the city boundaries; "peri" [is] just on the edges and outside the city. But where do you draw the line between rural and peri [urban]?? And is one more commercial (peri-) and the other community garden (urban)? I don't think so. In the context of our jobs both are commercial to me. I used to just call it all "commercial farming on the urban-rural interface."

Several advisors also mentioned that most of their clientele would be considered urban producers, as explained in an email from another advisor:

> I would say that the majority of farmers I work with (>80%) are strongly influenced by the ag-urban interface and would have major concerns over most, if not all, of the areas mentioned [as characteristics of urban agriculture]…Essentially all of [southern California] west of Riverside, as well as all of the coast, as well as a solid wide band from San Bernardino thru Bakersfield, Fresno, and then the [northern San Joaquin] Valley. There would only be pockets of areas that would be NON urban or peri-urban by the definition here.

This lack of clarity about urban agriculture is important to note in terms of its potential effects on expanding UA extension programs. As a case in point, this study relied upon definitions typically used within the UA movement, yet these were not meaningful to farm advisors. While the study was developed in order assess the need for a UA extension program, much of the dialogue between Extension staff members during the three-year study process centered on how urban agriculture was defined rather than whether or not a new program should be developed.

Identifying and working with clientele. Just as farm advisors did not conceptualize agriculture itself as "urban" or "nonurban," several advisors emphasized they did not identify their target clientele based upon location (i.e., whether they produced in urban or rural areas). Rather, advisors distinguished between commercial and noncommercial operators, explaining that they viewed small-scale commercial producers as their target clientele, and referred noncommercial operators to the MGP for assistance.

As discussed above, not all UA operators in this study were involved in the commercial sector, but this did not mean that they were growing food simply as a hobby or leisure activity. Some operators grew and distributed food that essentially bypassed the conventional market structure, which had failed (whether by design or neglect) to meet the needs of their communities. Others relied upon food they produced themselves, including animal products, to feed household members. This suggests a need for more extension assistance for UA operators whose food-production goals are neither leisure nor fully commercial, and/or whose farming activities extend beyond horticulture.

Past work with UA operators. Despite farm

[6] The term "peri-urban" was replaced by "urban edge" over the course of the study because it became apparent that nonacademic stakeholders often were confused by the term as used in much of the UA literature.

advisors' focus on commercial operations, it is important to point out that several advisors had worked with noncommercial urban gardeners and farmers in the past, and continued to do so. Activities ranged from conducting crop variety workshops for gardeners to helping establish noncommercial urban farms and community gardens. Additionally, several Extension staff members indicated an interest in addressing additional UA topics in the future. Responses to surveys emailed at strategic points throughout the study indicated particular interest in community-based food systems research and efficient use of vacant land for food production, along with a more general interest in connecting small-scale farmers with urban markets. To be clear, some farm advisors questioned whether certain issues such as nutrition or urban food policy fell within their domain. Still, the interest expressed by several advisors and staff members suggests the possibility of moving beyond a piecemeal approach to assisting UA operators, to a more coordinated one.

Discussion and Recommended Practices

This article has attempted to provide baseline information about the dynamics of urban agriculture in one California county, as well as perspectives about UA held by farm advisors and other Extension staff. The findings of this study build upon past research by offering a framework for conceptualizing UA based on main purpose, and exploring how purpose may correlate with challenges and operators' need for technical assistance. It has also provided perspective on how operators' and farm advisors' understandings of urban agriculture may differ, and how this might affect future efforts to expand UA Extension programs. Four overarching recommendations may be useful to this end.

First, as suggested by its six areas of focus, the Cooperative Extension system has the institutional capacity to address many (though perhaps not all) of the information and assistance needs identified by UA operators in this study. In addition to topics addressed by existing programs, Extension programs for urban agriculture should include assistance with:

- **market gardening** (i.e., crop planning for community food production and distribution);
- **urban livestock husbandry** (e.g., basic livestock and beekeeping skills);
- **soil testing,** including information about the importance of testing soils in urban areas, where to have tests done, how to interpret results, and how to minimize risks of contamination;
- **marketing;**
- **business management** for both commercial and noncommercial operations;
- **community development**, including networking, community relationships, intercultural relationships, and antiracism; and
- **educating nonfarmers** about the importance of agriculture in urban areas.

Second, because the way in which UA is defined can affect the availability of extension assistance, efforts to expand technical support and educational programs should begin with the development of a context-specific definition of UA. Care should be taken to include all types of UA activities in a given area, as well as systematic assessments of clientele (i.e., the full spectrum of UA operators), their diverse needs, and the accessibility of Extension services regardless of location, technological capabilities, etc. All stakeholder groups should be represented fairly in such processes.

Third, an important factor related to social justice in the food system that has not been addressed in this article is the history of discriminatory practices enacted by the USDA toward African American, Native American, Latino, and women farmers (see Farm and Food Policy Diversity Initiative, 2009; Hoffman, 2009; MacPherson, 2006; Myers, 2001; Treviño, 2009). This, along with the links between race, income, and urban food access discussed in the beginning of this article, underscores the need to place priority on serving the full spectrum of UA operators from all racial and ethnic groups. Program development should evolve with the

expectation that some groups may need more substantial assistance than others, whether this is due to economic status, educational attainment, access to technology, or systemic inequalities. To this end, USDA agencies, including Cooperative Extension, might learn effective strategies from UA operators who have actively worked to address issues of food justice and community empowerment through their programs.

Finally, as noted above, the CE system is in a budget crisis that has brought an end to many programs in recent years, as the budgetary changes did for the Urban Garden Program in the 1990s. While this reality may limit the development of new programs that require additional financial and human resources, it may also present an opportunity for CE to engage more fully in cooperation with urban farming and gardening communities.

As discussed in this article, UA operators have innovated production, marketing, and community-empowerment approaches through experience and knowledge exchange. A commitment on the part of CE to learning from, along with providing assistance to, UA operators may be a next step in expanding the practice of sustainable urban food production. This work should be approached through cooperation, dialogue, and a commitment to co-learning. By integrating these approaches into future work with urban agriculture, the Cooperative Extension system may be able to participate more fully in realizing the profound and lasting changes that are needed to create a more sustainable and socially just urban food system — in California and beyond.

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