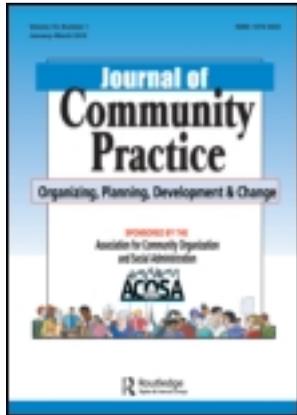


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Review and Analysis of the Benefits, Purposes, and Motivations Associated with Community Gardening in the United States

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Review and Analysis of the Benefits, Purposes, and Motivations Associated with Community Gardening in the United States

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Community gardens have been a part of modern American culture since the late 19th century. Participation in community gardening has ebbed and flowed in response to changing socioeconomic conditions, and thus the current economic recession has reheightened public interest. In a review of the scholarly literature from 1999 to 2010, rigorous quantitative research studies on the effects of community gardens are found to be sparse; however, a larger body of qualitative data is available. Eleven themes related to the purposes, benefits of, and motivations for participating in community gardens are identified. Community gardens can serve as an effective tool for community-based practitioners in carrying out their roles within the arenas of organizing, development, and change.

KEYWORDS *community gardening, youth gardening, sustainability, community organizing, community development, economic development, food security, health promotion*

INTRODUCTION

Motivated by her two young daughters and the desire to instill in them a love for eating fresh fruits and vegetables, First Lady Michelle Obama broke ground on a garden located at the White House, on March 20, 2009. With

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the United States in the midst of an economic recession, often considered to be the worst since the Great Depression, many other individuals and communities quickly followed suit.

Community gardens, in particular, are on the rise across the country, and are producing much more than food. Whether established to promote health or financial security, or for another reason, community gardens provide an effective means for community-based practitioners to carry out their roles within the areas of organizing, development, and change.

The purpose of this article is to examine the current scholarly, peer-reviewed literature available on community gardening in the United States. The following includes a brief history of community gardening in the United States, a review of the contents of the literature available, and a discussion of how the findings inform the work of community-based practitioners and researchers.

BACKGROUND

What is a Community Garden?

According to Ferris, Norman, and Sempik (2001), “what distinguishes a community garden from a private garden is the fact that it is in some sense a public garden in terms of ownership, access, and degree of democratic control” (p. 560). The term *community* in community gardening refers to the fact that this approach to gardening involves the convergence of multiple individuals, joining together in diverse settings (e.g., schools, neighborhoods, city blocks, faith communities, prisons, nursing homes, and hospitals), to grow, among other things, food. Community gardens are used by, and beneficial for, individuals of any age, race, ethnicity, and socioeconomic status, as well as the disabled and nondisabled alike.

History of Community Gardening in the United States

The emergence of community gardening in modern US history is often attributed to World War I. However, the original movement began in the 1890s. As a result of the social, environmental, and economic climates of the time, school gardens and vacant-lot cultivation projects began to take form. Such endeavors served as an “approach to addressing the urban congestion, immigration, economic instability, and environmental degradation” of the late 19th century (Lawson, 2005, p. 21).

Although immigrants, children, and the poor were targeted populations in the formative years, with the hardships associated with the World Wars and Great Depression, community gardening participation became universal (Lawson, 2005). Programs, often coined *victory gardens*, flourished during World War II, providing a way for communities to independently

produce a food source, in the wake of gross shortages (Armstrong, 2000; Saldivar-Tanaka & Krasny, 2004). During this time, former First Lady Eleanor Roosevelt pioneered the establishment of a garden for the people on the White House grounds, just as First Lady Michelle Obama reinstated some 55 years later (Flaccus, 2009).

Throughout history, community gardens have come and gone in conjunction with the socio-economic climate of the country. As the United States recovered following World War II, community gardens diminished, but made a comeback in the early 1970s when food prices soared and a broadening environmental consciousness arose (Lawson, 2005). Following this trend, the recession of 2009 provided for a sharp 19% increase in what are being called *recession gardens*, to decrease individual and family food bills and provide for more self-sufficiency (Sutter, 2009).

Purposes of Review

Although the history of community gardening in the United States is plentiful, the current scholarly literature on the topic is limited. This review seeks to expand on four recent reviews of the available literature (Blair, 2009; McCormack, Laska, Larson, & Story, 2010; Ozer, 2007; Robinson-O'Brien, Story, & Heim, 2009). The purposes of the previous reviews include examining nutrition implications and intervention programs, as well as school gardening. Three out of four of the reviews focus solely on youth (Blair, 2009; McCormack et al., 2010; Ozer, 2007; Robinson-O'Brien et al., 2009).

Nutrition and school gardening are far from an exhaustive description of the purposes, benefits, and motivations associated with community gardening, and populations, in addition to youth, are known to be participants. This review, therefore, identifies a broader array of community gardening research that has been performed since 1999. In doing so, we seek to examine the following, to inform future research and practice implications: the current status of the scholarly literature available on the topic; themes related to the benefits, purposes, and motivations associated with community gardening; and the shortcomings of the identified research.

METHOD

Scholarly, peer-reviewed journal articles with a focus on community gardening in the United States are included in this review. Journal articles from 1999 to 2010 were initially identified using the Google Scholar search engine. Search terms included: *community gardens*, *school gardens*, *gardens and youth*, and *food insecurity and gardening*. References of initially retrieved articles were examined, and additional articles were identified and retrieved. The journals of identified articles were then searched in their entirety, and

any additional articles that fit within the purview of our research criteria were retrieved.

Article abstracts were examined to identify those that focused on community gardening outside of the U.S.; these articles were omitted from this analysis. A content analysis was performed on the remaining 55 articles, through an iterative read and review process. During this process, we considered the following: population; setting; methodology; study results; and the purposes, benefits, and motivations associated with community gardening. A synthesis of the results is available in Table 1.

RESULTS

Population and Setting

The populations studied within existing research and reviews encompass: youth and adults, students and educators, families and households, garden participants and garden leaders, and a community garden or gardening network as a whole. Over one-third of the articles focused on youth gardening activities, within a school or after-school setting (Allen, Alaimo, Elam, & Perry, 2008; Blair, 2009; Doyle & Krasney, 2003; Fusco, 2001; Heim, Stang, & Ireland, 2009; Hermann, Parker, Brown, Siewe, Denney, & Walker, 2006; Klemmer, Waliczek, & Zajicek, 2005; Koch, Waliczek, & Zajicek, 2006; Krasny & Tidball, 2009; Langhout, Rappaport, & Simmons, 2002; Lautenschlager & Smith, 2007a, 2007b; Lineberger & Zajicek, 2000; McAleese & Rankin, 2007; Morris, Neustadter, & Zidenberg-Cherr, 2001; Morris & Zidenberg-Cherr, 2002; O'Brien & Shoemaker, 2006; Ozer, 2007; Parmer, Salisburg-Glennon, Shannon, & Struempfer, 2009; Poston, Shoemaker, & Dzewaltowski, 2005; Rahm, 2002; L. L. Smith & Motsenbocker, 2005; Waliczek & Zajicek, 1999). Only one study specifically looked at older adults, although several others mentioned that older adults were most likely to be the community gardening participants (Austin, Johnston, & Morgan, 2006). Race and ethnicity of the study populations included Caucasian, African American, Latino, American Indians, Asian, Somalia, Hmong, and an undefined mixture of racial groups. In studies that stated the percentages of each race and ethnicity, 22% included a majority of Caucasian participants, 13% African American, and 4% each studied primarily or completely Latino and American Indian populations (see Table 1).

In determining the setting of studies, we looked at urban versus rural and the specific location of the community garden(s), if available, in the United States. Only three studies included community gardens in rural locations, with one citing differences found when comparing rural and urban settings (Armstrong, 2000a, 2000b; Waliczek & Zajicek, 1999). Regionally, 33% occurred in the Midwest, 18% in the South, 22% in the Northeast (primarily New York City), and 22% in the West (percentages do not add up

TABLE 1 Synthesis of Scholarly Article Review and Thematic Analysis of Community Gardening in the United States

Reference	Population	Setting	Type and method	Results	Thematic analysis
Alaimo, Packnett, Miles, and Kruger (2008)	N = 766 (adults) African American (61.5%), Caucasian, other ^d	Flint, MI Urban	Intervention, quantitative (E/C) ²	FV ³ consumption ↑ among households participating in CG ^{4*}	CP, H(n)
Allen, Alaimo, Elam, and Perry (2008)	N = 32 (youth, community members, and police officers) African American (100%)	Flint, MI Urban	Case study	CG promoted youth development (e.g., fostered relationships and interpersonal skill development) and ↑ access and consumption of healthy foods	CP, F, H(n), NB, SC, Y(ed, d)
Armstrong (2000a)	N = 1 (tribe) American Indians	northwest Rural	Intervention, qualitative	CG + diabetes education program ↑ availability of fresh produce, served as an educational site and created open space for sitting and walking	F, H(p, m, n), O, SC
Armstrong (2000b)	N = 20 (CG program coordinators)	Upstate New York Urban (75%), rural	Review of a series of CG, mixed-methods	Most common reasons for participating in a CG were: access to fresh/better tasting food, to enjoy nature, and health benefits (including mental health). Results varied among rural versus urban and high- versus low-income settings and participants.	CO, CP&E, E, F, H(p, m), LR, O, SC
Austin et al., Johnston, and Morgan (2006)	N = 6 (older adults)	Upstate New York	Intervention (PP) ⁵ , quantitative	Social support and total emotional score ↑ among participants*	H(p, m), LR, O, SC

Blair (2009)	<i>N</i> = 21 (studies pertaining to youth)	Literature review, mixed-methods	Quantitative studies showed consistent ↑ in areas of science achievement and dietary behavior after participating in school gardening. Qualitative studies showed a broader scope of desirable outcomes related to positive social and environmental behavior changes. By combining a community land trust and a conservation land trust, a 31-acre site for a CG was preserved and land security guaranteed	SC, Y(ed, d)
Campbell and Salus (2003)	<i>N</i> = 1 (CG)	Madison, WI Urban	Case study	CO, O, SC
D'Abundo and Carden (2008)	<i>N</i> = 11 (participants African American (100%))	NC	Intervention, qualitative	F, H(n), SC
Doyle and Krasney (2003)	<i>N</i> = 142 (educators, youth, gardeners) African American, Hispanic ^{6,7}	Allentown and Philadelphia, PA; Baltimore, MD; Buffalo, Rochester, and New York City (Bronx and Harlem), NY Urban	Case study	NB, SC, Y(ed, d)

(Continued)

TABLE 1 (Continued)

Reference	Population	Setting	Type and method	Results	Thematic analysis
Ferris, Norman, and Sempik (2001)	<i>N</i> = 8 (CG types)	San Francisco Bay, CA Urban	Review of types of CG, qualitative	CG types identified: leisure gardens, child and school gardens, entrepreneurial gardens, crime diversion gardens/work and training gardens, healing and therapy gardens/quiet gardens, neighborhood pocket parks, ecological restoration gardens/parks, and demonstration gardens	CP, E, LR, H(m), Y(ed, em)
Fusco (2001)	<i>N</i> = 15 (youth participants)	Urban	Intervention, qualitative	CG created a practicing culture of science learning where, through participatory-learning opportunities, science became "real" to participants—starting with the youth-driven decision to turn a vacant lot into a CG through the formation stage and beyond.	NB, SC, Y(ed, d)
Glover (2003)	<i>N</i> = 14 (members of neighborhood association) Caucasian (86%), African American, Latino	Midwestern United States Urban	Case study	CG ↓ neighborhood crime, ↑ collective efficacy, and acted as persuasive devise to mobilize and empower participants.	CO, CP, SC
Glover (2004)	<i>N</i> = 14 (CG volunteers) Caucasian (86%), African American, Latino	Midwestern United States Urban	Case study	CG formed as a consequence of social capital, and once established, served as a source of social capital and a tool to ↓ crime.	CP, E, SC

Glover, Parry, and Shinew (2005)	$N = 16$ (gardeners, program staff) Caucasian (56%), African American	St. Louis, MO Urban	Case study	Participants reported that accessing resources for the CG required: sociability, recruiting outside immediate social and garden networks, and acquiring resources through strong and weak social ties.	SC
Glover, Shinew, and Parry (2005)	$N = 191$ (leaders and gardeners) Caucasian (66%), African American, other	St. Louis, MO Urban	Intervention, quantitative	When comparing garden leaders and gardeners both were highly motivated to participate in CG with the intent to socialize. Leaders were more likely to: talk or visit with other gardeners and spend more hours in the garden in a typical week*	SC
Graham, Beall, Lussier, McLaughlin, and Zidenberg-Cherr (2005)	$N = 4194$ (school principals)	California Urban (73%), Rural	Cross-sectional, quantitative	Principals reported the following reasons for having a school garden: academic instruction enhancement (e.g., science, environmental studies, and nutrition), extracurricular activities, and provide edible produce.	F, Y(ed, d)
Graham and Zidenberg-Cherr (2005)	$N = 592$ (4th grade teachers)	California	Cross-sectional, quantitative	School teachers reported the following reasons for having a school garden: academic instruction enhancement (e.g., science, nutrition, and environmental studies) and provide edible produce. Teachers reported that the gardens were moderately to very effective at enhancing science and social skills	H(p, n), Y(ed, d)

(Continued)

TABLE 1 (Continued)

Reference	Population	Setting	Type and method	Results	Thematic analysis
Hannah and Oh (2000)	N = 14 (gardens) N = 44 (gardeners) African American (57%), Caucasian, Asian	West Philadelphia, PA Urban	Case study	CG served the following functions: provided fresh produce to consume, donate, and/or sell; allowed for physical activity; reconnected participants with the earth; improved neighborhood; and promoted a sense of community.	E, F, H(p), IR, NB, SC, Y(ed)
Heim, Stang, and Ireland (2009)	N = 93 (4th–6th graders) Caucasian (78%), Hispanic, Asian American, mixed/other, African American	Minnesota	Intervention (PP), quantitative	A 12-week garden-based nutrition intervention ↑ the number of FV ever eaten, V ⁸ preferences, and FV asking behavior at home among participants*	H(n), Y(ed, d)
Henderson and Hartsfield (2009)	N = 5 (cities with city-run CG programs)	Seattle, WA; New York City, NY; Sacramento, CA; Chicago, IL; Houston, TX Urban	Case study	CG were found to be an effective way for local governments to engage citizens, if the CG: met a clear public need and fit with the municipality's capacity for implementing and sustaining it, and had strong political and administrative support, sufficient public land, and a multiyear commitment of public funds	CO, CP, F, NB, Y(ed)
Hermann et al., 2006	N = 43 (3rd–8th graders) Native American (72%), Caucasian, Hispanic	Stillwater, OK Urban	Intervention (PP), quantitative	An after-school gardening program ↑ number of participants who reported "I eat vegetables every day" and "I am physically active every day"*	CP&E, H(n, p), SC, Y(ed)

Hess and Winner (2007)	$N = 11$ (CG)	Austin, TX; Boston, MA; Cleveland, OH; Denver, CO; Detroit, MI; New York City, NY; Philadelphia, PA; Portland, OR; Sacramento and San Francisco, CA; and Seattle, WA Urban	Case study	Municipal efforts in enhancing sustainable CG were found to include: CG goals in city plan, partnering with a nonprofit advocacy organization, providing access to public land and the city's police force as a resource, drawing on the resources of the public educational system, and forming a food policy council and food charter.	CP, F, H(p), O, SC, Y(ed)
Hoffman, Knight, and Wallach (2007)	$N = 32$ (college students)	Los Angeles, CA Urban	Intervention (PP, E/C), quantitative	CG was found to ↓ levels of ethnocentrism and ↑ self-esteem among participants*	SC
Klemmer, Waliczek, and Zajicek (2005)	$N = 647$ (3rd–5th graders)	Temple, TX Urban	Intervention (E/C), quantitative	School gardens ↑ science achievement test scores among student*	Y(ed)
Koch, Waliczek, and Zajicek, (2006)	$N = 56$ (2nd–5th graders)	TX	Intervention (PP), quantitative	Knowledge about the benefits of eating FV and eating healthy snacks ↑ among youth after participating in a summer garden program.	H(n), Y(ed)
Krasny and Tidball (2009)	$N = 420$ (youth and educators)	6 cities Urban	Intervention (PP—one measure-mixed-methods)	An intergenerational educational program designed around a CG fostered the following types of learning: learning as acquisition and interaction, learning as participation in a CG community, and social learning among group.	SC, Y(ed), em, d

(Continued)

TABLE 1 (Continued)

Reference	Population	Setting	Type and method	Results	Thematic analysis
Kurtz (2001)	<i>N</i> = 3 (CG)	Minneapolis, MN Urban	Case study	Differences were found between individually versus collectively plotted CG in regards to structure, purpose, and experiences fostered for participants.	E, F, NB, O, LR, SC, Y(ed)
Langhout, Rappaport, and Simmons (2002)	<i>N</i> = 2 (classroom projects)	Chicago, IL Urban	Case study	CG served as an example of community and school cooperation, rather than collaboration, and community members felt they had crossed the bridge into the school, but not vice versa.	SC, Y(ed)
Lautenschlager and Smith (2007a)	<i>N</i> = 40 (youth) African American (30%), Asian, Hispanic, White, Multiracial, Somali, other	Minneapolis/St. Paul, MN Urban	Intervention (E/C), qualitative	CG participants were more willing to eat nutritious food and try ethnic and unfamiliar food, showed a stronger appreciation for other individuals and cultures, and were more likely to cook and garden on their own.	CP&E, H(n, p), SC, Y(ed)
Lautenschlager and Smith (2007b)	<i>N</i> = 96 (youth) African American and White (33%), Hispanic/other Hispanic, Hmong, American Indian, other	Minneapolis/St. Paul, MN Urban	Intervention (PP), quantitative	Using the Theory of Planned Behavior model to assess a gardening and nutrition program, found (a) ↑ FV consumption, (b) attitude was most predictive of presurvey intention to change behaviors for boys and girls, and (c) gender differences existed in regards to intention and behavior.	H(n), Y(ed)

Lawson (2007)	<i>N</i> = 350 (gardening families in 1 CG) Latinos	Los Angeles, CA Urban	Case study	CG formation and participation included the following benefits: nutrition, food source, household income savings, recreation, social interactions, and cultural preservation and expression. CG served as a community organizing and mobilizing tool when its existence became threatened.	CO, CP&E, E, F, H(n), LR, SC
Lineberger and Zajicek (2000)	<i>N</i> = 111 (3rd–5th graders)	Texas	Intervention (PP), quantitative	V and FV snack preference scores ↑ after participating in garden activities*	H(n), Y(ed)
Macias (2008)	<i>N</i> = 4 (CG site coordinators)	Burlington, VT Urban	Case study	CG provided: moderate food equity, due to low cost of participation; high social integration, due to participant collaboration and relationships fostered; and high natural human capital, due to opportunities to learn from each other and through direct experience.	E, F, SC
McAleese and Rankin (2007)	<i>N</i> = 95 (6th graders)	Pocatello, ID Urban	Intervention (PP, E/C), quantitative	FV consumption ↑ due to participation in a garden-based nutrition education program*	H(n), Y(ed)
McCormack, Laska, Larson, and Story (2010)	<i>N</i> = 4 (CG studies)	Urban	Literature review, mixed-methods	Each study reviewed indicated an ↑ in FV consumption among CG participants.	E, H(n)

(Continued)

TABLE 1 (Continued)

Reference	Population	Setting	Type and method	Results	Thematic analysis
Morris, Neustadter, and Zidenberg-Cherr (2001)	<i>N</i> = 97 (1st graders)	California	Intervention (PP, E/C), quantitative	CG participants were more likely to try freshly grown produce.	H(n), Y(ed)
Morris and Zidenberg-Cherr (2002)	<i>N</i> = 213 (4th graders) Caucasian (66.5%), Hispanic, African American, Asian-American	California	Intervention (PP, E/C), quantitative	After a 1-year intervention: NL(nutrition only) and NG (nutrition and gardening) site participants had ↑ nutrition knowledge after the intervention; NL and NG site participants ↑ their preference for carrots and broccoli*; and NG students also reported greater preference for snow peas and zucchini.*	H(n), Y(ed)
O'Brien and Shoemaker (2006)	<i>N</i> = 38 (4th graders) Caucasian (71%), African American, Other, Hispanic and Asian	Manhattan, KS Urban	Intervention (PP, E/C), quantitative	An after-school gardening and nutrition curriculum showed no improvement in nutrition knowledge or FV preference. The experimental group had high self-efficacy and outcome expectations at baseline, which were maintained after the intervention.	SC, Y(ed)

<p>Ohmer, Meadowcroft, Freed, and Lewis (2009)</p>	<p>$N = 48$ interviewed (garden volunteers, funders, and community partners) $N = 459$ surveyed (program volunteers, Garden Stewards, community partners, and funders) White (91%); African American; Hispanic (refers to only garden volunteers who responded through mail survey)</p>	<p>Pennsylvania Urban</p>	<p>Intervention, mixed-methods</p>	<p>CG participants within a community conservation program were most motivated to be involved in order to: beautify and give back to the community and support conservation of green space. ↑ engagement in the CG related to greater motivation, conservation ethic, and volunteerism in other community activities.</p>	<p>CO, CP, NB, O, LR, SC</p>
<p>Ozer (2007)</p>	<p>$N = 5$ (studies pertaining to school gardens)</p>		<p>Literature review, mixed-methods</p>	<p>School gardens as a model of meaningful school-based intervention encompass: nutrition and exercise, school bonding and attachment, academic performance, conservation and ecological commitment, characteristics of school setting, parent involvement, and school-community relationships.</p>	<p>H(n),SC, Y(ed)</p>

(Continued)

TABLE 1 (Continued)

Reference	Population	Setting	Type and method	Results	Thematic analysis
Parmer, Salisburg-Glennon, Shannon, and Struempfer (2009)	<i>N</i> = 115 (2nd graders)	Southeast	Intervention (PP, E/C), quantitative	Nutrition knowledge and taste ratings ↑ for NE (nutrition only) and NE+G (nutrition and gardening) participants, including nutrient-food association, nutrient-job association, and FV identification.* The NE+G group was more likely to choose and consume V in a lunchroom setting at posttest.*	H(n), Y(ed)
Poston, Shoemaker, and Dziewaltowski (2005)	<i>N</i> = 29 (3rd–5th graders) Caucasian (66%), African American, Asian, unknown	Kansas	Intervention (PP, E/C), quantitative	Gardening-enhanced nutrition program ↑ gardening self-efficacy.*	Y(ed)
Pudup (2008)	<i>N</i> = 2 (CG) prisoners, ex-offenders, “at-risk” youth, and middle-school students	San Francisco and Berkeley, CA Urban	Case study	CG in a prison setting ↓ rate of recidivism, provided jobs for ex-offenders and “at-risk” youth, and provided food for senior and community centers. A school garden was fully integrated into classroom curriculum and the kitchen.	CP, E, F, H(m, n), SC, Y(ed, em)

Rahm (2002)	$N = 6$ (youth) African American (100%)	Midwestern United States Urban	Case study	Science became accessible to the youth in a CG setting by way of actions, talk, and sustained involvement in activities. Garden-based nutrition education programs showed mixed results. Some ↑ participants' F and/or V intake, F and/or V snack preference, willingness to taste F and/or V, and nutrition knowledge. Some showed no improvements in these areas. One showed gender differences, in that only boys' FV intake ↑.	Y(ed, em, d), E CP&E, H(n), Y(ed, d)
Robinson-O'Brien, Story, and Heim (2009)	$N = 11$ (studies pertaining to youth)		Literature review, mixed-methods	CG project: helped fulfill nutrition and family and consumer sciences curricular needs, instigated student engagement in issues around sustainable food practices, and fostered a sense of community on campus that transcended disciplines.	
Roubanis and Landis (2007)	$N = 1$ (CG) college students	Raleigh, NC Urban	Case study		CO, SC
Saldívar-Tanaka and Krasny (2004)	$N = 20$ (CG) Hispanic	New York City, NY Urban	Case study	CG served the following roles: community development (e.g., cultural preservation and affirmation), open space (e.g., safe place to gather), and civic agriculture (food cost savings). Community development appeared to serve as the priority role.	E, F, CO, CP&E, O, SC, Y(ed)

(Continued)

TABLE 1 (Continued)

Reference	Population	Setting	Type and method	Results	Thematic analysis
Schmelzkopf (2002)	<i>N</i> = 1 (city)	New York City, NY Urban	Case study	CG were threatened due to their incommensurability, in that their benefits to individuals and the city were difficult to justify within the framework of a market economy. The CG served as a mechanism in which gardeners and other activists were able to mobilize and engage in collective action and tactics of resistance to give a voice to the societal value of the CG.	CO, CP, O, SC
Shinew, Glover, and Parry (2004)	<i>N</i> = 180 (gardeners) Caucasian (71%), African American	St. Louis, MO Urban	Intervention, quantitative	Participants viewed CG as a way to bring together people of different racial groups and people who would not normally socialize.	F, NB, LR, SC
C. M. Smith and Kurtz (2003)	<i>N</i> = 1 (CG coalition)	New York City, NY Urban	Case study	Tactics used (e.g., internet usage) to fight the auctioning off of CG land to the private housing market provided for an expansion of politics of scale, in that the citywide garden coalition was able to broaden its spaces of engagement to scales beyond that of New York City	CO, O, SC

L. L. Smith and Moisenbocker (2005)	<i>N</i> = 119 (5th graders)	East Baton Rouge Parish, LA Urban	Intervention (PP, E/C), quantitative	Science achievement was found to be significantly different between the experimental classes' pre-test and post-test scores.* The CG conflict set the stage for CG <i>publics</i> to exercise their right to public space through: empowerment and mobilization; working together, while recognizing and valuing differences in status, class, age, gender, immigration status, and race; and developing a collective voice and image that was visible within the larger city.	SC, Y(ed)
Staheli, Mitchell, and Gibson (2002)	<i>N</i> = 1 (city)	New York City, NY Urban	Case study	CG produced the following social processes: social connections, reciprocity, mutual trust, collective decision-making, social norms, civic engagement, and community building.	CO, NB, O
Teig et al. (2009)	<i>N</i> = 67 (garden leaders and gardeners) Caucasian (78%), Hispanic/Latino, African American, other	Denver, CO Urban	Case study		CO, SC
Twiss et al. (2003)	<i>N</i> = 6 (cities)	California Urban	Case study	CG established through the CA healthy Cities and Communities Model initiative resulted in ↑: weekly physical activity, daily consumption of FV, and the number of students gardening at home. Two cities passed policies to support CG.	CO, H (p, n), NB, SC, Y(ed, d)

(Continued)

TABLE 1 (Continued)

Reference	Population	Setting	Type and method	Results	Thematic analysis
Waliczek and Zajicek (1999)	N = 575 (3rd–8th graders) Caucasian (50%), African American, Hispanic, Native American	Texas and Kansas Urban (88%), Rural	Intervention (PP), quantitative	Environmental attitudes ↑ after participating in a gardening project.	Y(ed)

Note. E/C = Experimental/control group, FV = Fruits and vegetables, CG = Community garden(s), PP = pre-and post-test, CO = community organizing and empowerment, CP = crime prevention, CP&E = cultural preservation and expression, E = economic development, F = food source/food security, H = health (n = nutrition, p = physical activity, m = mental health), LR = leisure and recreation, NB = neighborhood beautification, O = open space, SC = social interaction/cultivation of relationships, Y = youth (d = development, ed = education, em = employment).

¹Race/ethnicity is listed in descending order of proportion represented in each study. ²Experimental and control group included in the study. ³Fruit and vegetable. ⁴Community garden(s). ⁵Pre- and posttest measurements performed. ⁶Applies to only the youth participants. ⁷Percentages not available. ⁸Vegetable. *Results are significantly significant.

to 100 because not all of the studies stated a geographical location; See Table 1). Although a few studies included community gardens from more than one region, regional differences were not discussed (Henderson & Hartsfield, 2009; Hess & Winner, 2007; Waliczek & Zajicek, 1999).

Methodology

Through the iterative read and review process, we found four study design types: case study, intervention, cross-sectional, and review. Studies were considered a case study if they provided an in-depth analysis of a community garden as a whole or a component of a single or small number of gardens or garden networks; 40% of the articles fit this criteria (Allen et al., 2008; Campbell & Salus, 2003; Doyle & Krasney, 2003; Glover, 2003, 2004; Glover, Parry, & Shinew, 2005; Hannah & Oh, 2000; Henderson & Harsfield, 2009; Hess & Winner, 2007; Kurtz, 2001; Langhout et al., 2002; Lawson, 2007; Macias, 2008; Rahm, 2002; Roubanis & Landis, 2007; Saldivar-Tanaka & Krasny, 2004; Schmelzkopf, 2002; Smith & Kurtz, 2003; Staeheli, Mitchell, & Gibson, 2002; Teig et al., 2009; Twiss et al., 2003). Intervention studies looked at community gardens as a tool for manipulating some variable (e.g., diet, collective efficacy, access to food) within a population, and made up 45% of the studies reviewed (Alaimo, Packnett, Miles, & Kruger, 2008; Armstrong, 2000a; Austin et al., 2006; D'Abundo & Carden, 2008; Fusco, 2001; Glover, Shinew, & Parry, 2005; Heim et al., 2009; Hermann et al., 2006; Hoffman, Knight, & Wallach, 2007; Klemmer et al., 2005; Koch et al., 2006; Krasny & Tidball, 2009; Lautenschlager & Smith, 2007a, 2007b; Lineberger & Zajicek, 2000; McAleese & Rankin, 2007; Morris et al., 2001; Morris & Zidenberg-Cherr, 2002; O'Brien & Shoemaker, 2006; Ohmer, Meadowcroft, Freed, & Lewis, 2009; Parmer et al., 2009; Poston et al., 2005; Shinew, Glover, & Parry, 2004; L. L. Smith & Motsenbocker, 2005; Waliczek & Zajicek, 1999). Cross-sectional designs were used in 4% of the studies, where the authors surveyed teachers and principals to determine the reasons why schools implement gardens (Graham, Beall, Lussier, McLaughlin, & Zidenberg-Cherr, 2005; Graham & Zidenberg-Cherr, 2005). Eleven percent of the articles fell into the review category, in that they focused on patterns and themes related to community gardens: four articles were literature reviews, and two reviewed a series of gardens (Armstrong, 2000b; Blair, 2009; Ferris et al., 2001; McCormack et al., 2010; Ozer, 2007; Robinson-O'Brien et al., 2009).

Research methods used included: 40% quantitative, 49% qualitative, and 11% mixed-methods. Out of the studies, 1 out of 5 included control groups; 29% used pre- and posttest measurements; and approximately 1 out of 7 used both within their methodologies. The overwhelming majority of the intervention studies measured dietary changes, and only two included nonyouth populations (See Table 1).

Published Results

By examining the results of each study, we were able to determine the community gardening topics that have been explored in recent years, as well as the utility of community gardens as a method for social change. The majority of the studies were based on qualitative findings, and very few quantitative studies were rigorous in nature (e.g., contained a control group, took pre- and post-test measurements) or used large sample sizes. Therefore, results largely serve to illustrate gaps in the available community gardening research (discussed in-depth in the following), as well as qualitative research study topics that ought to be explored quantitatively to solidify outcomes.

Study results varied widely in terms of the factors examined, but generally showed positive individual and community outcomes. Common topics included: youth gardening programs and projects; health (e.g., dietary, mental, and physical) outcomes; advocates versus land holder conflicts; social capital; and personal motivations and perspectives.

Youth gardening programs and projects. Youth gardening programs and projects were found to produce positive dietary, academic, and developmental results. Gardening-enhanced nutrition programs increased participants' nutrition knowledge; fruit and vegetable consumption, preference, and eating behaviors at home; physical activity; and gardening self-efficacy (Heim et al., 2009; Hermann et al., 2006; Koch et al., 2006; Lineberger & Zajicek, 2000; McAleese & Rankin, 2007; Poston et al., 2005; Robinson-O'Brien et al., 2009). Two studies showed no differences between students participating in a garden-enhanced nutrition program versus only the nutrition education component, except that youth in the garden-enhanced programs increased their preference for a greater number of types of vegetables (Morris & Zidenberg-Cherr, 2002; O'Brien & Shoemaker, 2006). Similarly, Parmer and colleagues (2009) found that nutrition knowledge improvements were the same for control and experimental group youths, except that the nutrition-plus-gardening participants were additionally more likely to choose and consume vegetables in a lunchroom setting at posttest. Youth gardening programs, not designated as a nutrition intervention, were found to promote youth development (e.g., social relationships, respect for other individuals and cultures), improve access and consumption of healthy foods, and increase science achievement and environmental attitudes (Allen et al., 2008; Blair, 2009; Lautenschlager & Smith, 2007a; Waliczek & Zajicek, 1999). Articles also discussed community gardens as a means to provide an effective participatory learning opportunity for youth, which led to improvements in academic performance and social skill development (Doyle & Krasney, 2003; Fusco, 2001; Rahm, 2002). Related to youth gardening, researchers surveyed teachers and principals to determine the reasons for having a school garden. Academic instruction enhancement, edible produce production, and extracurricular activities were most frequently reported (Graham et al., 2005; Graham & Zidenberg-Cherr, 2005).

Health outcomes. Community gardens were found to enhance positive dietary habits, such as increased fruit and vegetable consumption and preference among participants, regardless of setting or population (Aliamo et al., 2008; D'Abundo & Carden, 2008; Heim et al., 2009; Hermann et al., 2006; Lawson, 2007; Lineberger & Zajicek, 2000; McAleese & Rankin, 2007; McCormack et al., 2010; Morris et al., 2002; Robinson-O'Brien et al., 2009; Twiss et al., 2003). Aliamo and colleagues (2008) found that this effect also held true for household members who did not personally garden. Studies pointed to improvements in multiple areas of health due to participation, such as a significant increase in Total Emotional Score among an older adult population, and a greater amount of physical activity among youth and adults (Austin et al., 2006; Armstrong, 2000a; Hannah & Oh, 2000; Twiss et al., 2003).

Advocates versus land holder conflicts. Multiple studies examined community gardens that were threatened due to land rights issues. The conflict between garden advocates and the Giuliani Administration in New York City was most studied (Schmelzkopf, 2002; Smith & Kurtz, 2003; Staeheli et al., 2003). Authors found that the conflict served as an instigating force for the organizing and mobilization of gardeners. This occurred with gardeners from multiple sites, who would not normally interact with one another, as well as people outside of the immediate gardening network and even city. Hundreds of community gardens were saved due to the collective voice that was produced and tactics of resistance that were used, such as through internet usage and protests (Schmelzkopf, 2002; Smith & Kurtz, 2003; Staeheli et al., 2003).

Although the South Los Angeles Community Garden and Urban Community Gardening Program was eventually destroyed after a private land owner took over, community gardeners organized and mobilized through letter campaigns, marches, protests, site occupation, and speaking at city council meetings (Lawson, 2007). As was the case in New York City, the efforts led to the involvement of people outside of the community garden network, including celebrities which made the garden conflict a national news story (Lawson, 2007). From another perspective, Campbell and Salus (2003) discussed a partnership between a community land trust and a conservation land trust as an effective way to preserve a 31-acre community garden in Madison, WI, and guarantee future land rights.

Social capital. Numerous studies examined the social processes that take place within a community garden setting, and how these processes often translate to situations outside of the immediate garden context. Five of these studies appeared to use samples obtained through the same community gardening database, in St. Louis, MO. Study purposes varied, but each showed positive results in regards to the production of social capital (Glover, 2003, 2004; Glover, Parry, et al., 2005; Glover, Shinew, et al., 2005; Shinew et al., 2004). Glover (2004) found that the community garden formed due to

social capital, and additional studies showed that such a garden also served as a source of social capital once established; to elaborate, researchers concluded that: collective efficacy increased; participants accessed resources needed for their community garden from inside and outside their immediate garden network, and through weak and strong social ties; and participants viewed the community garden as a way to successfully bring together people of different races and other people who would not normally socialize (Glover, 2003, 2004; Glover Parry, et al., 2005; Glover, Shinew, et al., 2005; Shinew et al., 2004). Teig and colleagues (2009) found that the multiple social processes (e.g., mutual trust, reciprocity) fostered during participation translated into situations outside of the community garden setting, and other studies found that the relationships formed led to a stronger overall sense of community (D'Abundo & Carden, 2008; Hannah & Oh, 2000; Lawson, 2007; Macias, 2008; Roubanis & Landis, 2007).

Personal motivations and perspectives. In studies that looked at personal motivations for community garden participation, results included: access to fresh and better tasting food, time to enjoy nature, health benefits, opportunities to socialize, a chance to beautify and give back to the community, and efforts to support the conservation of green space (Armstrong, 2000b; Glover, Shinew, et al., 2005; Ohmer et al., 2009).

Thematic Analysis

The following thematic analysis of the article contents extends beyond the stated results and analysis of each article. The themes identified and discussed in the following also include additional information mentioned throughout each article that illustrates purposes and benefits of and motivations for participating in a community garden. Solely focusing on the authors' purposes and published outcomes of the studies reviewed excluded important information that more fully depicts the current state of community gardening in the United States, and the breadth of community-based practitioner arenas in which such a tool can be utilized. The additional information from each article was compiled and categorized into themes. Eleven themes were identified, and are discussed in the following.

Health benefits. Nearly 50% of the articles reviewed mentioned health benefits, in the form of physical activity, diet, and/or mental health (Alaimo et al., 2008; Allen et al., 2008; Armstrong, 2000a, 2000b; Austin et al., 2006; D'Abundo & Carden, 2008; Ferris et al., 2001; Graham & Zidenberg-Cherr, 2005; Hannah & Oh, 2000; Heim et al., 2009; Hermann et al., 2006; Hess & Winner, 2007; Koch et al., 2006; Lautenschlager & Smith, 2007a, 2007b; Lawson, 2007; Lineberger & Zajicek, 2000; McAleese & Rankin, 2007; McCormack et al., 2010; Morris et al., 2001; Morris & Zidenberg-Cherr, 2002; Ozer, 2007; Parmer et al., 2009; Pudup, 2008; Robinson-O'Brien et al., 2009; Twiss et al., 2003). Community gardens are often used to promote

individual health and also to serve as components of broader community-based health promotion strategies (Armstrong, 2000a; Twiss et al., 2003). For example, California Healthy Cities and Communities encouraged the formation of community gardens through a public health initiative spanning six cities; participants experienced positive outcomes, such as increased physical activity and consumption of produce (Twiss et al., 2003). Hess and Winner (2007) identified community gardens as a way for local governments to encourage sustainability, while also promoting health by making communities more walkable through the expansion of open space and getting local produce into schools. In the San Francisco Bay area, healing and therapy gardens served as a component of rehabilitation programs for individuals with mental illnesses or learning disabilities (Ferris et al., 2001).

Food source/food security. Another purpose or benefit of community gardening is access to food to promote food security. For a household to be considered food secure, all household members must “have consistent, dependable access to enough food for active, healthy living” (US Department of Agriculture [USDA], 2009, p. iii). The USDA (2009) found that 14.6% of US households were considered food insecure at some time in 2008, an increase from 11.1% in 2007. One-fourth of the studies reviewed mentioned food production as a benefit or motivating force for participation (Allen et al., 2008; Armstrong, 2000a, 2000b; D’Abundo & Carden, 2008; Graham et al., 2005; Hannah & Oh, 2000; Henderson & Hartsfield, 2009; Hess & Winner, 2007; Kurtz, 2001; Lawson, 2007; Macias, 2008; Pudup, 2008; Saldivar-Tanaka & Krasny, 2004; Shinew et al., 2004).

A one-acre vegetable garden, established as a component of a diabetes education program on an American Indian reservation, produced 6,000 pounds of fresh produce, in 1 year, which was distributed primarily amongst tribal elders (Armstrong, 2000a). Similarly, 501 West Philadelphia community gardens produced \$1,948,633 worth of fruits and vegetables in a single year, helping to feed, at a minimum, the 2,812 families directly involved in the gardens. Gardeners consciously planted foods that were either unavailable or expensive in local stores (Hannah & Oh, 2000). Gardeners often chose to donate a portion of their produce, typically to senior citizens, homeless, or poor individuals and families, improving food access for those within the larger community (Macias, 2008; Pudup, 2008; Saldivar-Tanaka & Krasny, 2004; Shinew et al., 2004; Teig et al., 2009).

Economic development. Ferris et al. (2001) coined certain community gardens in the San Francisco Bay area “entrepreneurial gardens” (p. 563), due to the economic development opportunities they offered. As mentioned previously, a small plot of land can yield large amounts of produce, equating to significant monetary value and savings (Hannah & Oh, 2000). Saldivar-Tanaka and Krasny (2004) estimated that in New York City, an investment of \$5 to \$10 in plants for a garden plot provides for a profit of \$500 to

\$700 worth of fruits and vegetables. Other than helping supplement individual and family income, another way participants reaped the economic benefits of participation was through selling the produce to markets or restaurants (Ferris et al., 2001; Hannah & Oh, 2000). Slightly over 20% of the articles reviewed mentioned the economic development benefits, purposes, or motivations associated with community gardening (Armstrong, 2000b; Ferris et al., 2000; Glover, 2004; Hannah & Oh, 2000; Krasny & Tidball, 2009; Kurtz, 2001; Lawson, 2007; Macias, 2008; McCormack et al., 2010; Pudup, 2008; Rahm, 2002; Saldivar-Tanaka & Karsny, 2004).

Youth education, development, and employment. The benefits and purposes of youth geared community gardens were mentioned in more than half of the studies ($n = 34$; Allen et al., 2008; Blair, 2009; Doyle & Krasney, 2003; Ferris et al., 2001; Fusco, 2001; Graham et al., 2005; Graham & Zidenberg-Cherr, 2005; Hannah & Oh, 2000; Heim et al., 2009; Hermann et al., 2006; Henderson & Hartsfield, 2009; Hess & Winner, 2007; Klemmer et al., 2005; Koch et al., 2006; Krasny & Tidball, 2009; Kurtz, 2001; Langhout et al., 2002; Lautenschlager & Smith, 2007a, 2007b; Lineberger & Zajicek, 2000; McAleese & Rankin, 2007; Morris et al., 2001; Morris and Zidenberg-Cherr, 2002; O'Brien & Shoemaker, 2006; Ozer, 2007; Parmer et al., 2009; Poston et al., 2005; Pudup, 2008; Rahm, 2002; Robinson-O'Brien et al., 2009; Saldivar-Tanaka & Krasny, 2004; Smith & Motsenbocker, 2005; Twiss et al., 2003; Waliczek & Zajicek, 1999). Nutritional or educational enhancements (discussed previously) were often intentional purposes of youth gardening; however, employment opportunities and skill and interpersonal development also exist as benefits. Four articles looked at a community garden that provided wage-earning opportunities for youth, especially for ones considered at-risk or from low-income families (Ferris et al., 2001; Krasny & Tidball, 2009; Pudup, 2008; Rahm, 2002). In addition to the monetary benefits, youth employment provides for job-skill development, and community gardening experiences in general produce interpersonal skill improvements. Behavioral improvements related to respectfulness, commitment, and positive teamwork were noted (Allen et al., 2008; Blair, 2009; Doyle & Krasney, 2003; Fusco, 2001; Graham & Zidenberg-Cherr, 2005; Krasney & Tidball, 2009; Lautenschlager & Smith, 2007a; Ozer, 2007; Rahm, 2002; Robinson-O'Brien et al., 2009).

Use and preservation of open space. According to the US Department of Agriculture Forest Service (n.d.), open space is defined

as land that is valued for natural processes and wildlife, agricultural and forest production, aesthetic beauty, active and passive recreation, and other public benefits. Such lands include working and natural forests, rangelands and grasslands, farms, ranches, parks, stream and river corridors, and other natural lands within rural, suburban, and urban areas. (p. 2)

Based on this definition, community gardens are open spaces. Within the articles reviewed, 20% explicitly stated open space use or preservation as a benefit, purpose, or motivation associated with community gardens (Armstrong, 2000a, 2000b; Austin et al., 2006; Campbell & Salus, 2003; Hess & Winner, 2007; Kurtz, 2001; Ohmer et al., 2009; Saldivar-Tanaka & Krasny, 2004; Schmelzkopf, 2002; Smith & Kurtz, 2003; Staeheli et al., 2002). Community gardens can provide a safe space for individuals and families to gather and relax, especially for those who would not otherwise have easy access to such areas. For example, Latino community gardens in New York City were identified as the only open spaces available within the neighborhood (Saldivar-Tanaka & Krasny, 2004).

Crime prevention. Related to community gardens serving as a safe space, almost one-fifth of the articles mentioned crime prevention as either the driving force behind their formation, or as an unintended benefit once established. Although no articles quantitatively measured the effects of community gardens on crime rates, community members stated that there was a noticeable difference in their surrounding area once one was established (Alaimo et al., 2008; Allen et al., 2008; Ferris et al., 2001; Glover, 2003, 2004; Henderson & Hartsfield, 2009; Hess & Winner, 2007; Ohmer et al., 2009; Pudup, 2008; Schmelzkopf, 2002). Allen and colleagues (2008) mentioned that grants from the Neighborhood Violence Prevention Collaborative, in Flint, MI, provided the initial funds for community gardens in the city, which served as the impetus for larger community-based violence prevention initiatives.

Neighborhood beautification. Additional grants were used to sustain the gardens in Flint, MI, as a way to not only continue to deter crime, but as a mechanism to beautify the city (Allen et al., 2008). Sixteen percent of the articles reviewed mentioned neighborhood beautification as either an intentional purpose or unintended benefit of community gardens (Allen et al., 2008; Fusco, 2001; Hannah & Oh, 2000; Henderson & Hartsfield, 2009; Kurtz, 2001; Ohmer et al., 2009; Shinew et al., 2004; Staeheli et al., 2002; Twiss et al., 2003). Ohmer et al. (2009) found this to be a primary motivation for people to participate in a community conservation program, which focused on establishing gardens throughout Western Pennsylvania as a way to help revitalize distressed areas.

Leisure and outdoor recreation. Some individuals partake in community gardening activities purely because they view it as a leisure or recreational activity. Fifteen percent of the articles stated enjoyment or relaxation as the motivating force or benefit of participation (Armstrong, 2000b; Austin et al., 2006; Ferris et al., 2001; Hannah & Oh, 2000; Kurtz, 2001; Lawson, 2007; Ohmer et al., 2009; Shinew et al., 2004). Among these, Ferris and colleagues (2001) found that the most prominent type of community garden found in the San Francisco Bay area was leisure gardens; they often served as a sites for apartment-dwellers to garden or to simply enjoy the outdoors (Ferris et al., 2001).

Cultural preservation and expression. Community gardens were discussed as a mechanism through which individuals and communities preserved, expressed, and affirmed their culture. Latino community gardens in New York City exemplify this purpose. Saldivar-Tanaka and Krasny (2004) found that the structures, design, and plants within the 20 Latino-operated gardens that they studied reflected the participants' country of origin (e.g., use of *casitas*: wooden-structures originally found in Puerto Rico). Events held in the gardens provided opportunities for cultural expression through dance, musical performances, and food focused activities (Saldivar-Tanaka & Krasny, 2004). On a smaller scale, a garden used within an afterschool program in Oklahoma helped affirm and preserve Native American culture (e.g., the traditional "three sisters" garden was planted with corn, beans, and squash; Robinson-O'Brien et al., 2009). Six articles illustrated similar opportunities for cultural preservation, expression, and affirmation (Armstrong, 2000b; Hermann et al., 2006; Lautenschlager & Smith, 2007a; Lawson, 2007; Robinson-O'Brien et al., 2009; Saldivar-Tanaka & Krasny, 2004).

Social interactions/cultivation of relationships. The collective nature that differentiates community gardens from private gardens means that social interaction is inevitable and the cultivation of meaningful relationships are likely to occur. Almost two-thirds ($n = 33$) of the articles reviewed support this claim; they mentioned the social actions that facilitate the establishment of community gardens and help ensure their sustainability (Allen et al., 2008; Armstrong, 2000a, 2000b; Austin et al., 2006; Blair, 2009; Campbell & Salus, 2003; D'Abundo & Carden, 2008; Doyle & Krasney, 2003; Fusco, 2001; Glover, 2003, 2004; Glover, Parry, et al., 2005; Glover, Shinew, et al., 2005b; Hannah & Oh, 2000; Hermann et al., 2006; Hess & Winner, 2007; Hoffman et al., 2007; Krasny & Tidball, 2009; Kurtz, 2001; Langhout et al., 2002; Lautenschlager & Smith, 2007a; Lawson, 2007; Macias, 2008; O'Brien & Shoemaker, 2006; Ohmer et al., 2009; Ozer, 2007; Pudup, 2008; Roubanis & Landis, 2007; Saldivar-Tanaka & Krasny, 2004; Schmelzkopf, 2002; Shinew et al., 2004; Smith & Kurtz, 2003; Smith & Motsenbocker, 2005; Teig et al., 2009; Waliczek & Zajicek, 1999). The cultivation of relationships does not solely apply to interactions that take place between individual garden participants, but also includes the involvement of those outside of the immediate garden context. Collaborative efforts with entities such as universities, Cooperative Extension offices, summer youth programs, not-for-profit organizations, banks, and health centers were some of the many examples mentioned regarding involvement of the larger community; these relationships provided resources for gardens (e.g., volunteers, financial assistance, technical assistance) that were not available among garden participants themselves (Doyle & Krasny, 2003; Langhout et al., 2002; Saldivar-Tanaka & Krasny, 2004).

Community organizing, empowerment, and mobilization. Because community gardens provide a social space for individuals to join together,

community organizing often results through the interactions. Nearly 25% of the articles highlighted this effect, and discussed how community garden participants mobilized themselves and others within the larger community to address further community needs or push back against threats of losing garden land (Armstrong, 2000b; Campbell & Salus, 2003; Glover, 2003; Henderson & Hartsfield, 2009; Lawson, 2007; Ohmer et al., 2009; Roubanis & Landis, 2007; Saldivar-Tanaka & Krasny, 2004; Schmelzkopf, 2002; Smith & Kurtz, 2003; Staeheli et al., 2002; Teig et al., 2009; Twiss et al., 2003). The land rights disputes that took place in New York City between garden advocates and the Giuliani administration illustrates this effect on a citywide scale, and even beyond. Community gardeners, along with other supporters, gathered in force and were able to preserve 500 gardens through organizing efforts such as protests, parades, community festivals, and press conferences (Staeheli et al., 2002). On a smaller-scale, Armstrong et al. (2000b) spoke on the organizing that took place within community gardens in upstate New York, which led to successfully keeping a supermarket in the area, and gardeners engaging in local politics for the first time.

DISCUSSION AND LOOKING FORWARD

Summary of Review

This review of the scholarly literature depicts the current status, research trends, and individual and community outcomes related to contemporary community gardens in the United States. The thematic analysis encompasses not only published study results, but also additional information presented in each article on the purposes, benefits of, and motivations for participation. This analysis provides a holistic understanding of community gardens as change agents, and further highlights the gaps in the current research.

Study populations varied in terms of age, race and ethnicity, and roles fulfilled within the community garden context, with the largest percentage looking at youth and Caucasian participants. With a strong push for school gardens, as seen through initiatives such as California's "a garden in every school," a large number of youth focused studies was expected (Ferris et al., 2001, p. 562). The settings for community gardens also varied. One article studied a rural community garden, two articles discussed urban and rural (with urban as the significant majority in each study), and the remaining (95%) were set solely in an urban environment. Studies examined community gardens found in each region of the United States, with New York City, NY; St. Louis, MI; and California cities as the most prevalent geographic locations. Although three studies included community gardens from multiple regions, regionally-based differences were not mentioned. Based on the typical layout of rural locations (e.g., houses further apart and lack of

defined neighborhoods), community garden success is likely to be more challenging. This, along with the expansive public and professional interest in urban agriculture as a whole, makes the lack of studies performed in rural settings predictable but problematic.

The majority of studies used a case study or intervention design, and a smaller number were considered cross-sectional or reviews. Methods varied, but included only seven quantitative studies with findings based on pre- and posttest measurements taken for experimental and control groups with sample sizes over 30 participants (Hoffman et al., 2007; McAleese & Rankin, 2007; Morris et al., 2001; Morris & Zidenberg-Cherr, 2002; O'Brien & Shoemaker, 2006; Parmer et al., 2009; L. L. Smith & Motsenbocker, 2005).

The published results of the studies highlight five main purposes and/or concerns related to community gardening: (a) engaging youth, (b) health (e.g., dietary, mental, and physical) benefits, (c) gardener versus land holder conflicts, (d) social capital, and (e) participant motivations and perspectives. Youth gardening included garden-enhanced nutrition programs, and participatory learning opportunities. Among youth gardening studies, favorable results were reported in regards to changes in dietary habits, physical activity, and/or academic scores during and after garden participation (Allen et al., 2008; Blair, 2009; Doyle & Krasney, 2003; Fusco, 2001; Heim et al., 2009; Hermann et al., 2006; Klemmer et al., 2005; Koch et al., 2006; Krasny & Tidball, 2009; Lautenschlager & Smith, 2007a, 2007b; Lineberger & Zajicek, 2000; McAleese & Rankin, 2007; Morris et al., 2002; Parmer et al., 2009; Poston et al., 2005; Rahm, 2002; Robinson-O'Brien et al., 2009; L. L. Smith & Motsenbocker, 2005; Waliczek & Zajicek, 1999). In addition to youth health improvements, other studies showed improvements in adult dietary, mental, and/or physical health (Alaimo et al., 2008; Armstrong, 2000a, 2000b; Austin et al., 2006; D'Abundo & Carden, 2008; Lawson, 2007; McCormack et al., 2010; Twiss et al., 2003). Articles that discussed conflicts between advocates and land owners illustrated how the community garden setting facilitated effective organizing that mobilized participants and nonparticipants to action (Lawson, 2007; Schmelzkopf, 2002; Smith & Kurtz, 2003; Staeheli et al., 2003). Articles related to the social aspects of community gardening reported positive outcomes related to socializing opportunities and experiences, including accessing resources from social connections outside of the garden environment (another example of the involvement of nongardeners; D'Abundo & Carden, 2008; Glover, 2003, 2004; Glover, Parry, et al., 2005; Glover, Shinew, et al., 2005; Hannah & Oh, 2000; Lawson, 2007; Macias, 2008; Roubanis & Landis, 2007; Shinew et al., 2004; Teig et al., 2009). Last, participant motivations for and perspectives on the benefits of community gardening included: access to fresh and better tasting food, to enjoy nature, health benefits, opportunities to socialize, to beautify and give back to the community, and to support the conservation of green space (Armstrong, 2000b; Glover, Shinew, et al., 2005; Ohmer et al., 2009).

The analysis of the additional information mentioned in each article provided for a broader understanding of community gardening in the United States, especially in terms of the purposes, benefits of, and motivations for participating. Eleven themes were identified: (a) health benefits; (b) food source/food security; (c) economic development; (d) youth education, employment, and skill development; (e) open space use and preservation; (f) crime prevention; (g) leisure and recreation; (h) neighborhood beautification; (i) social interaction/cultivation of relationships; (j) cultural preservation and expression; and (k) community organizing and empowerment. The results of our analysis greatly expand upon the focus of previous reviews, in that they reveal how the purposes and benefits of community gardens extend far beyond youth involvement and nutritional outcomes.

Implications for Practice and Research

This review demonstrates that community gardens can help fulfill the mission and goals of community-based practice, as well as the need for additional evaluative research on the effectiveness of community gardens as tools for promoting social, health, economic, and environmental change. Rigorous evaluations of community gardening interventions would provide more evidence for developing and implementing this model of intervention in more communities across the United States.

Practice implications. Considering the breadth of community deficits and assets that community gardens are shown to simultaneously address and highlight, community-based practitioners may use this as a tool to fulfill multiple goals within a given community (e.g., economic development, food security, leisure and recreation). Moreover, community gardens may be implemented with any community population, ranging from prisoners to nursing home residents to students and more. An advantage of using this versus other interventions is that community gardens can be formed and easily manipulated based on the needs, abilities, and interests of a specific population. They may, for instance, be developed to express and preserve the cultural heritage of a population such as the Latino-based gardens in New York (Saldivar-Tanaka & Krasny, 2004) or the Native American-based garden in the northwest (Armstrong, 2000a) or to promote safety and reduce crime (Alaimo et al., 2008; Allen et al., 2008; Glover, 2003, 2004). The varied purposes and benefits of community gardening make it an ideal interventional strategy for community-based practitioners because myriad goals may be addressed through this approach.

The published literature demonstrates how community gardens can serve as a powerful tool to help fulfill the overall mission of social work: to enhance the basic needs of all people, especially the vulnerable, oppressed, and impoverished (National Association of Social Workers [NASW], 2008, p. 1). The social interaction/cultivation of relationships and community

organizing and empowerment opportunities available through a community garden environment are particularly meaningful. The social capital that is formed illustrates the profession's value of the importance of human relationships, which can serve as a vehicle for individual and community change (NASW, 2008). The empowerment and mobilization effects that are often instigated from these relationships lead to the enactment of policies, making the profession's agenda more visible and secure on a local, state, and federal level. In this sense, community gardens can serve as a bridge between community organizing and legislative advocacy work.

Research implications. With the current sharp increase of community gardens in the United States, the push by President Obama's administration for more sustainable agriculture methods, and national obesity elimination movements like the First Lady's "Let's Move" initiative, the opportunity presents itself for researchers to make more strides in performing rigorous, evaluative studies of community gardening interventions. This type of research would greatly increase the understanding of the effectiveness of community gardens as a tool for health promotion, fostering positive interracial and intergenerational relationships, creating jobs, increasing food security, and much more. Increased knowledge and evidence in these areas would provide more support for why community gardens should be established, valued, and sustained.

Although the research discussed in this review points to a multitude of benefits rendered through community gardening participation, the overwhelming majority did not measure changes before and after the actual establishment of the garden. Furthermore, most of the studies were performed qualitatively, and few quantitative studies used moderate to large samples. Dietary changes, especially in youth, have been studied repeatedly, but other variables, such as how significantly crime rates are affected by the establishment of community gardens, still need to be examined. These gaps should be considered within future research. Studies should also be designed to determine the best practices for forming and sustaining community gardens with diverse populations and in diverse settings.

CONCLUSION

Community gardening is a more than a century old tradition in the United States, and is still just as needed today as during the formative years of the 1890s. With high unemployment rates, increasing food insecurity, and the ever-growing prevalence of obese Americans, community gardens have the potential to simultaneously alleviate multiple societal ills, while at the same time highlighting the assets of communities. Current research serves as a positive beginning in discovering the benefits, purposes, and motivations associated with community gardening, but there is a need to expand upon the variables

and populations examined, utilizing more rigorous research methodologies. Community-based practitioners ought to be involved in the development of this new line of evidence related to community gardening because many of the goals of community practice may be achieved through gardening models of change. With more compelling evidence to support community gardens, this tool for change may become even more common in American communities, and the social, health, economic, and environmental benefits associated with gardening will be realized on a broader scale. Moreover, community gardening ought to be adopted by community-based practitioners because it easily lends itself to the work of the profession, as gardens are shown to be meaningful within a wide variety of settings where practitioners are already present, such as schools, hospitals, prisons, residential treatment facilities, not-for-profit organizations, and within the political realm.

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