Urban Agriculture Impacts: Social, Health, and Economic: A Literature Review

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A Literature Review

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Project Background

Across the nation, cities and metropolitan areas and their adjoining peri-urban communities are seeing their landscapes and neighborhoods reflect a growing urban agriculture (UA) movement. Backyard chickens, community gardens, farmers markets, and community supported agriculture programs (CSAs) are gaining popularity, as local food continues to find its place on the tables of urban residents. For many cities, urban agriculture is seen as a strategy for business development, job training, community development, health education, democratic process, sustainable planning, and more.

Urban agriculture is not new or geographically isolated to the United States. The United Nations Development Program estimates that fifteen percent of food worldwide is grown in cities (Smit, Ratta, & Nasr, 1996). Countries such as Cuba successfully used UA as a means to evade food shortages (Murphy, 2004), while many developing countries have long been farming within cities for income and subsistence (Nugent, 2001). In the U.S., institutional efforts to accommodate and promote urban agriculture within U.S. cities are gaining momentum, especially in the last five years.

Land inventories, such as the ones conducted in Portland and Detroit, are being employed by municipal governments to support urban agriculture projects (Colasanti, Litjens, & Hamm, 2010; Mendes, Balmer, Kaethler, & Rhoads, 2008). Just in the last two years, large cities, including Chicago, Atlanta, Boston, Minneapolis, and Portland, revised policies and zoning ordinances to accommodate the changing land-use (Goldstein, Bellis, Morse, Myers, & Ura, 2011; Hodgson, 2012). Non-profits and municipal governments in cities across the country are creating food policy councils, many of which include elements to strengthen urban agriculture (Cohen & Reynolds, 2012; Colasanti et al., 2010; SPUR, 2012). In a report from the American Planning Association, urban agriculture continues to grow as a planning priority, with several cities and counties including local food elements and UA in their comprehensive plans (Hodgson, 2012). In addition to this, a growing number of state land grant universities and their cooperative extension systems are directing and allotting resources towards research in urban agriculture (Hendrickson & Porth, 2012; Reynolds, 2011).

One challenge for urban farmers and municipal decision makers engaged with urban agriculture in California has been a lack of relevant information and technical assistance. The University of California Cooperative Extension (UCCE), part of UC's Division of Agriculture and Natural Resources (ANR), is a logical partner to provide research-based training and information.

However, a study conducted at UC Davis found that urban agriculture tends to fall between the cracks in UCCE's service, because it is beyond the scope of the Master Gardener Program, which focuses on backyard gardeners, and often too marginal commercially to be a focus for Cooperative Extension staff who work with farmers (Reynolds, 2011).

In the fall of 2012, a new project team at UC ANR began the process of developing a web-based information portal that will make it easier to serve the urban farming audience. The development of web-based educational resources will be grounded in a needs assessment that is currently underway. This project team began preliminary efforts to create an urban agriculture online portal that will feature resources for Cooperative Extension staff and community members. The first step in this process is a needs assessment that includes an inventory of current literature, a survey of UC ANR and UCCE staff involvement with UA, as well as a series of interviews with urban agriculture practitioners and policy advocates. The initial task was to create an annotated bibliography and write a literature review focused on the social, economic, and health impacts of urban agriculture. This step is meant to help fully understand and properly advocate for urban agriculture's important role for cities, residents, and farmers.

This literature review seeks to identify current trends, efforts, and gaps in researching urban agriculture impacts in the United States. Using both peer-reviewed research and agency reports, it considers geography, rhetoric, and research methods in order to compile a snapshot of the state of urban agriculture. Although most of the literature is concentrated in the U.S., articles from Canada, the UK, Cuba, and UN reports were included in order to provide international perspective. The review begins with a discussion on the methodology for finding and choosing this literature, followed by a summary of the scope of the literature. The main body of the review addresses various impacts that were identified in the literature and concludes with a review of challenges and barriers, existing gaps, and further research needs.

Methodology

In order to select and analyze the literature, the following process was employed:

- There was a call to ANR's UA Project Team for articles and documents, which yielded six current reports. These were used to frame current conditions and questions in the field.
- The author searched through SAREP's Community Food Systems Bibliography in the sections on Urban Farms, Farmers Markets, Regional Food System, Economic Benefits of Local Food, and Community Gardens and pulled relevant articles.
- The author conducted a search on Google Scholar, using terms such as urban agriculture impacts, community based farming, and urban farming.
- This process created a list of 57 articles. For relevant articles, the author mined the bibliographies of these articles to create a second list of resources until the list reached saturation.
- The list of articles was then sent out to the advisory committee, who provided additional resources that were added to the list. The total number of articles/books in the list grew to 78 (see Text Box for details).
- From this literature, a list of frequently mentioned impacts were created and used to categorize impacts.
- Characteristics, such as impacts, geographical location, type of urban agriculture, and type of research were coded and analyzed.

Scope of Literature

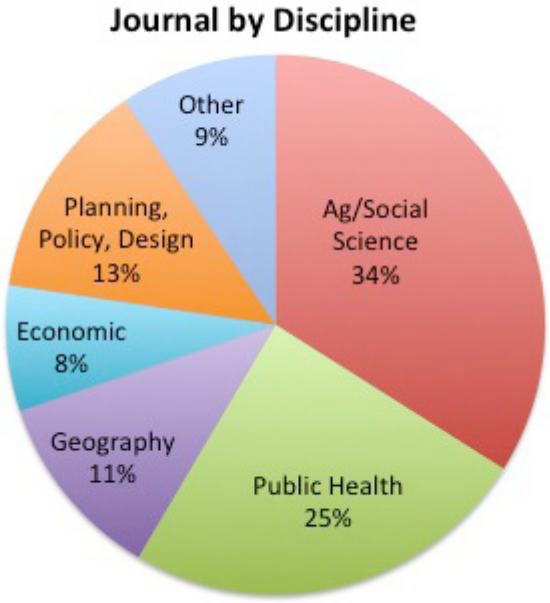
78 total

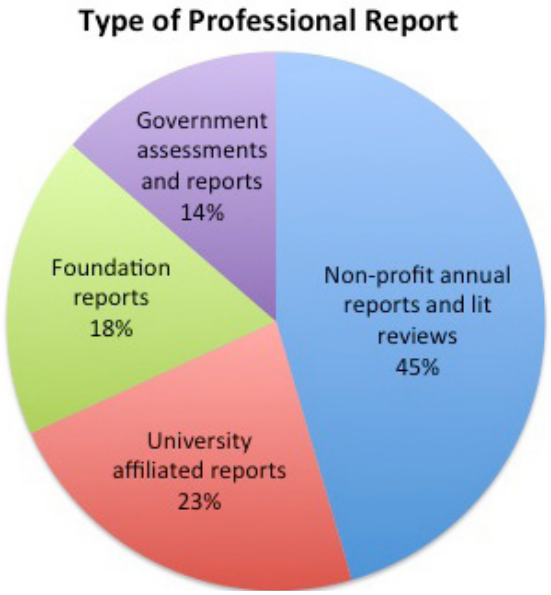
53 peer-reviewed articles
- 36 Original research
- 16 Literature reviews or theoretical

Types of Journals
- 18 Agriculture and Social Science
- 13 Public Health
- 7 Planning, Policy, and Urban Design
- 6 Geography
- 4 Economic
- 5 Other

22 professional or agency reports
- 10 Non-profit annual repots and lit reviews
- 5 University affiliated reports
- 4 Foundation reports
- 3 Government assessments or reports

3 books





What is Urban Agriculture?

The term "urban agriculture" was associated with several different definitions and meanings. ANR describes urban agriculture to include

> *beyond that which is strictly for home consumption or educational purposes, production, distribution and marketing of food and other products within the cores of metropolitan areas and at their edges. Examples include community, school, backyard, and rooftop gardens with a purpose extending beyond home consumption and education, innovative food-production methods that maximize production in a small area, farms supplying urban farmers markets, community supported agriculture, and family farms located in metropolitan greenbelts* (Adapted from the American Planning Association, 2011).

For the purposes of this project, we chose this definition because it included both inner city community garden activities and peri-urban agricultural activities, both of which we felt were important and need attention within UC Cooperative Extension. A study conducted at UC Davis found that urban agriculture tends to fall between the cracks in UC Cooperative Extension's service, because it is beyond the scope of the Master Gardener Program, which focuses on backyard gardeners, and often too marginal commercially to be a focus for Cooperative Extension staff who work with farmers. The definition above provided a way to integrate both aspects of smaller scale food production in urban and peri-urban areas.

When choosing articles for this review, it was extremely difficult to tease out impacts from community gardens that were not related to home consumption. In several articles community gardens referenced entrepreneurial projects or programs that raised food for market or food banks (Armstrong, 2000; Blair, Giesecke, & Sherman, 1991; Cohen & Reynolds, 2012; Feenstra, McGrew, & Campbell, 1999; MacNair, 2002). The data did not differentiate between these two uses. Since community gardens are the most commonly researched aspect of urban agriculture at this time, they were often the most heavily cited within literature on urban agriculture. Therefore, several articles about community gardens were included.

With the current ANR definition, most literature describes two categories of urban agriculture. The first consists of actual cultivation within cities, which includes community gardens and urban farms. These projects are often community driven projects that rely on support of non-profit organizations or government agencies. In addition to improving food access, these projects often provide educational, youth development, job training, and community building opportunities. The other category is peri-urban agriculture that directly markets to urban centers. Farmers markets and CSA's are the most researched topics within this category.

Urban Agriculture Typology

Of the articles:

20 focused on community gardens
5 focused on urban farm or entrepreneurial gardens
8 focused on CSA's
13 focused on farmers markets
31 considered all typologies of urban agriculture

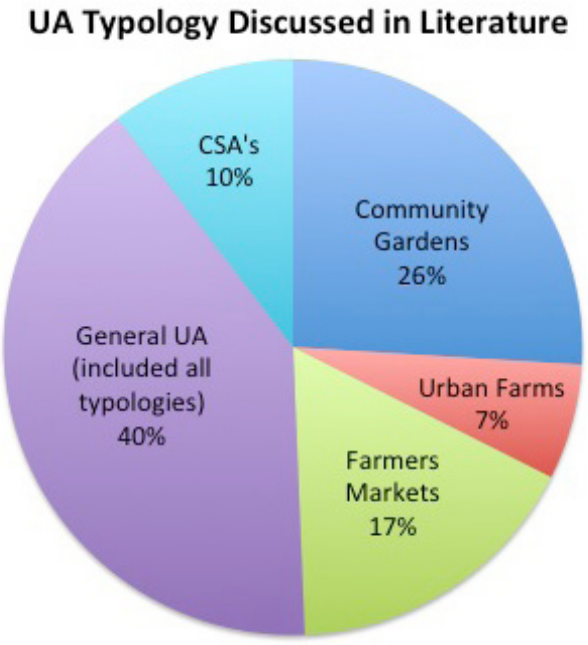


Photo of rooftop garden at Tenderloin Development Corporation's Curran House in San Francisco. Several gardens are grown by residents for food access. Photo courtesy of Sheila Golden

Community Gardens

Community gardens are the most researched form of urban agriculture in terms of social, economic, and health impacts. Of the 75 articles reviewed, 24 looked exclusively at community gardens. Most of this literature is comprised of original qualitative research. The majority of these studies used surveys, interviews, and case studies to document impacts. There are also a couple of literature reviews, mostly examining health impacts (K. H. Brown & Jameton, 2000; McCormack, Laska, Larson, & Story, 2010) as well as non-profit and agency reports that address barriers and policy needs (Balmer et al., 2005; Cohen & Reynolds, 2012; MacNair, 2002).

According to the literature, the most geographically researched community gardens are in larger cities in low-income neighborhoods. The research ranged from New York City and Philadelphia, to Denver and Detroit. Some articles were based in Canada. In general, the research discussed in this review focused on health and community development impacts, particularly in regard to food access, healthy eating, and social contributions.

The non-profit reports primarily discussed difficulty with land access and tenure and made policy recommendations. Many of the reports discussed a growing demand for community gardens, which often have long waiting lists (Balmer et al., 2005). Several make policy suggestions regarding zoning and planning that would eliminate the current barriers of infrastructure and available land. Many of the most successful community garden ventures cited within the literature are operated under the city's parks and recreation departments or partner with other public agencies for land access (Balmer et al., 2005; Cohen & Reynolds, 2012; MacNair, 2002; SPUR, 2012).

Urban Farms or Entrepreneurial Gardens

Urban farms and entrepreneurial gardens refer to projects that go beyond home consumption and grow produce for market. Research on these topics focused on areas in New York City, the Bay Area, Burlington, VT, LA, and Detroit. Many of these projects are discussed in annual

reports and agency publications (Balmer et al., 2005; M. Broadway, 2009; Cohen & Reynolds, 2012; Feenstra et al., 1999; Hendrickson & Porth, 2012; Kaufman & Bailkey, 2000; SPUR, 2012). These reports indicate job creation and training, business incubation, and food access as major impacts. Most of the evidence is found in annual reporting of how many families are served, jobs created, etc.

Although limited, there were a handful of peer-reviewed case studies reflecting theoretical frameworks of self-determination and social justice (Bonacich & Alimahomed-Wilson, 2011; Bradley & Galt, 2013; McClintock, 2013; White, 2010). These articles discussed the balance between sound community development practices that encourage empowerment and autonomy and creating financially sustainable business operations.

Farmers Markets and CSAs

According to ANR's definition, urban agriculture is not limited to food grown within city limits, but also includes distribution of this food. There is a fair amount of research on farmers markets and CSAs that specifically grow for urban markets. Several studies have found that direct marketing efforts in urban centers allow farmers to expand their business and encourage many small added-value businesses (Bregendahl & Flora, 2007; C. Brown & Miller, 2008; Feenstra, 2007; Feenstra & Lewis, 1999; Gale, 1997; Jarosz, 2008). Much of this research was done nationally, with a focus on California.

WOW Farm in Oakland, CA supports a youth development program. Photo courtesy of Aziz Baameur

Some research looks at the health impacts of farmers markets, such as improved food access and increased vegetable and fruit consumption Kremer & DeLiberty, 2011; Larsen & Gilliland, 2009; McCormack et al., 2010; Park et al., 2011; Suarez-Balcazar, 2006). Several articles point out that the demographics targeted in direct marketing strategies can perpetuate socio-economic inequities (Fisher, 1999; Jarosz, 2008; Kremer & DeLiberty, 2011; Macias, 2008; Park et al., 2011; Suarez-Balcazar, 2006), and that more efforts should be made to overcome barriers that prevent low-income individuals from accessing these markets.

The Impacts

The following section discusses the social, economic, and health impacts found within the literature. Although several environmental impacts, such as recycling waste, managing storm water, remediating toxic land, and reducing heat island effects, were listed in the literature, the scope of this review is limited to social, economic, and health. Overall, social impacts were the most frequently documented, with health impacts second. Economic impacts were the most difficult to find, and often used modeled projections rather than primary data. Most of the impacts listed were recurring and found within at least two articles each. Sub-categories are defined and used to structure the discussion.

Social Impacts
- Creating Safe Places/ Reducing Blight
- Access to Land
- Community Development/Building Social Capital
- Education and Youth Development Opportunities
- Cross-Generational and Cultural Integration

Health Impacts
- Food Access and Security
- Increased Fruit and Vegetable Consumption
- Food and Health Literacy
- General Well-Being (Mental Health and Physical Activity)

Economic Impacts
- Job Creation, Training, and Business Incubation
- Market Expansion for Farmers
- Economic Savings on Food
- Savings for Municipal Agencies
- Increased Home Values

Social Impacts

Social impacts are the way something influences or affects the social fabric of communities and their residents. For the purpose of this review, social impacts will incorporate impacts on human relationships and interactions with each other and their built environment.

Creating Safe Places and Reducing Blight

Community gardens and urban farms create safe spaces to recreate and improve the physical space of the neighborhood. Research found that gardens and farms beautified the neighborhoods and employed and benefited residents, which, in return, created more local pride and attachment to the space. (Bradley & Galt, 2013; Ober Allen, Alaimo, Elam, & Perry, 2008). This resulted in safe spaces that were less likely to be vandalized or crime-ridden (Bradley & Galt, 2013; Ober Allen et al., 2008; Teig et al., 2009). Community gardens, in particular, were cited as a place where people built trust (Teig et al., 2009), which encouraged neighborhood watches and a general concern for others in the neighborhood (Armstrong, 2000).

Access to Land

Another benefit that was frequently found in the literature, is that urban agriculture creates access to land, which is often limited in urban areas, by creating space within cities for


Photo courtesy of Aziz Baaumeur

residents to cultivate. With the majority of urban land often owned by corporations or private entities, space for residents (particularly in high-density housing and low-socioeconomic neighborhoods) is difficult to secure for people to grow food and gardens. In interviews, participants felt that one of the most important benefits of community gardening was "providing a piece of land for people to call their own for a season" (Patel, 1991), where they could develop a sense of pride and ownership (Armstrong, 2000). The growing urban agriculture movement has created access to this land. In an evaluation on USDA Community Food Project grants, more than 53,000 acres of land were made available for farming and gardening. Well over half of this land was donated or used free of charge (Kobayashi et al., 2010).

Peri-uban farms, which are often smaller in size compared to conventional farms, have found direct marketing through CSAs and farmers markets to be a critical tool for fostering public buy-in and political awareness to advocate for keeping land available to and affordable for farmers (Feenstra & Lewis, 1999; Gale, 1997; Jarosz, 2008). On the edges of urban areas, farmland is constantly threatened by profit-yielding commercial and housing development. Farmers markets and, even more, CSA's connect eaters to producers, fostering civic agriculture that turns consumers into stakeholders who value having near-by land in agriculture production (Bregendahl & Flora, 2007; DeLind, 2002).

Community Development and Building Social Capital

The most observed impact of urban agriculture was its effect on communities and the lives of residents and participants. Throughout the literature, it was clear that urban agriculture goes beyond the scope of growing food and has valuable community development potential, serving as an "agent of change" (Holland, 2004) for communities. This was particularly true for community gardens, which were important spaces for gathering and socializing (Patel, 1991; Saldivar-Tanaka & Krasny, 2004; Teig et al., 2009). In one study, gardeners claimed that the presence of plants modified behavior in a way that broke down barriers and promoted social interaction that built friendships (Patel, 1991). Many articles analyzed how these interactions involved decision-making and planning processes that required consensus, making community gardens important places for fostering democratic values and citizen engagement (Glover, Shinew, & Parry, 2005; Mendes et al., 2008; Patel, 1991; Teig et al., 2009; Travaline & Hunold, 2010).

For urban farms and businesses, self-determination, self-reliance, and activism were seen as major impacts (Bonacich & Alimahomed-Wilson, 2011; Bradley & Galt, 2013; Colasanti et al., 2010; McClintock, 2013; White, 2010). Many project participants discussed improved self-esteem and pride in their work (Feenstra et al., 1999). As in the case of Detroit and other cities, these

projects were driven by community leadership and were often motivated by a desire to control food supply and gain food sovereignty (Colasanti et al., 2010; White, 2010). In both community gardens and urban farms, the advocacy and coalition building needed to overcome structural barriers of zoning, land-use conflicts, and resource shortages, created "networked movements (Mendes et al., 2008)". As a consequence, these cities are experiencing a new generation of activists and engaged citizens (Levkoe, 2006; Sumner, Mair, & Nelson, 2010; White, 2010).

CSA's and farmers markets were directly connected to social capital and building communities. Interviews with both farmers and members of CSAs mentioned the that frequent interactions through farm events and weekly pick-ups fostered strong relationships (Bregendahl & Flora, 2007; Sumner et al., 2010). The fact that consumers knew the families and land that grew their food created a sense of ownership, which helped them feel like part of a larger community (Bregendahl & Flora, 2007; Sumner et al., 2010). Farmers markets were also discussed as places for gathering and fostering community. However, a number of articles discussed barriers, such as lack of affordability and culturally appropriate food and space, that exclude low-income and minority residents (Fisher, 1999; Suarez-Balcazar, 2006).

Many urban agriculture programs benefit youth of all ages. Photo courtesy of The Children's Ecological Garden in Davis, CA

Education and Youth Development Opportunities

Another social impact of urban agriculture includes providing a medium for learning experiences, educational programs, and youth development opportunities. Many of the case studies and agency reports describe projects that include education services or youth leadership opportunities (Bradley & Galt, 2013; Kerton & Sinclair, 2009; Krasny & Doyle, 2002; Ober Allen et al., 2008; Travaline & Hunold, 2010) . Some research found that learning experienced by urban agriculture participants often occurred organically without formal instruction (Kerton & Sinclair, 2009; Levkoe, 2006).

Learning outcomes included awareness of environmental issues and ethics, sustainability, and food systems (Bregendahl & Flora, 2007; Kerton & Sinclair, 2009; Travaline & Hunold, 2010). Much of this learning and knowledge sharing effectively raised awareness of environmental and social justice and empowered residents to increase activism and advocacy to alleviate inequities (Levkoe, 2006; White, 2010). Many youth programs included nutrition education elements, as well as job training and youth leadership opportunities, and several researchers found that these programs were successful in achieving their goals (Krasny & Doyle, 2002; Ober Allen et al., 2008).

Cross-Generational and Cultural Integration

Urban agriculture is also a way to promote cultural and cross-generational integration.

There are several urban farm and community garden projects that allow immigrants to cultivate food to sell and consume (Balmer et al., 2005; Beckie & Bogdan, 2010; Feenstra et al., 1999). Since many immigrants have substantial experience in agriculture, these programs allow them to use their existing skill set to grow and sell produce and provide food access to immigrant families and communities. Urban agriculture gave immigrants an opportunity to share their cultural varieties of vegetables and fruits with neighborhood markets. This not only helped them network with other immigrants but also created shared opportunities with non-immigrant residents (Krasny & Doyle, 2002 Beckie & Bogdan 2010).

There were also examples of cross-generation sharing between youth and seniors. Since the majority of community gardeners are seniors (Armstrong, 2000; Patel, 1991; Schukoske, 2000; Teig et al., 2009), these gardens are an ideal venue for seniors to pass on knowledge and work with youth. Gardens also created opportunities for seniors to socialize and revisit skills learned during their childhood. These garden spaces sometimes helped seniors transitioning from home ownership adjust to senior homes and more high-density living (Armstrong, 2000).

Health Impacts

In planning and policy, health impacts are extremely valuable for advocacy, particularly when these impacts can be tracked and quantified. The literature discusses the health benefits of urban agriculture at length, an area which continues to gain momentum as a popular research topic. The following were some of the most common health impacts documented and discussed in the research.

Food Access and Security

Urban agriculture has been a successful strategy for improving food access to food insecure areas (Armstrong, 2000; Balmer et al., 2005; Corrigan, 2011; Larsen & Gilliland, 2009). Despite the fact that studies have shown that urban agriculture cannot provide all the nutritional needs of communities, it can be an effective way to take direct action and can catalyze more comprehensive food-access strategies (SPUR, 2012). Urban agriculture food projects evaluated by the Community Food Security Coalition produced 18.7 million pounds of food with over 726,000 pounds donated for community food consumption (Kobayashi et al., 2010).

As documented in earlier impacts, community gardens are an affordable way to access fresh produce for people willing to participate (Armstrong, 2000; Patel, 1991; Teig et al., 2009). However, many community garden programs grow beyond personal consumption and share excess fruits and vegetables with other community members and local food banks (Balmer et al., 2005; Corrigan, 2011). One particular garden program studied found that half of the gardeners donated their produce back to the neighborhood, and that the space itself was known as a place for people to access food (Corrigan, 2011). In addition to community gardens, farmers markets also successfully give residents access to fresh fruits and vegetables (Larsen & Gilliland, 2009; Park et al., 2011; Suarez-Balcazar, 2006). In low-income neighborhoods, this may only be true if these markets attempt to address barriers by accepting EBT credits and subsidizing markets (Fisher, 1999; Suarez-Balcazar, 2006).

Increased Fruit and Vegetable Consumption

Two literature reviews discussed evidence that urban agriculture increases fruit and vegetable consumption among participants (K. H. Brown & Jameton, 2000; McCormack et al., 2010). Research shows that people who participate or have family members that participate in community gardens "were 3.5 times more likely to consume fruits and vegetables at least 5 times per day than people without a gardening household member" (Alaimo, Packnett, Miles, & Kruger, 2008). This data was supported through other studies, as well (Blair et al., 1991; Corrigan, 2011; Teig et al., 2009; Twiss et al., 2003). Youth involved in community garden programs discussed eating more fruits and vegetables and less junk food as a result of their participation (Ober Allen et al., 2008).

Photo courtesy of Aziz Baameur

Farmers markets are also associated with more healthful food consumption. Neighborhoods with farmers markets had higher fruit and vegetable consumption rates among people of color (Park et al., 2011). This was particularly true in low-income markets where WIC funds were available (Fisher, 1999; McCormack et al., 2010). Studies on CSA member consumption found that people belonging to CSAs use most of their issued produce (Landis et al., 2010) and are likely to consume greater amounts and more varieties of fruits and vegetables (Kerton & Sinclair, 2009; Landis et al., 2010; Sharp, Imerman, & Peters, 2002).

Food and Health Literacy

Some reports suggest that more important than producing food, urban agriculture is a strategy to increase food and health literacy (SPUR, 2012). Several community and urban farm programs included nutrition information that discussed healthy food choices at the request of communities (White, 2010). These programs, as well as CSAs and farmers markets, raised nutrition awareness and increased healthy cooking and eating practices (Alaimo et al., 2008; Bregendahl & Flora, 2007; Krasny & Doyle, 2002; Levkoe, 2006).

General Well-Being (Mental Health and Physical Activity)

Community gardens are places for residents to recreate and engage in physical activity (Armstrong, 2000; Patel, 1991; Saldivar-Tanaka & Krasny, 2004; Twiss et al., 2003). They create opportunities for individuals to be active for sustained amounts of time, which has been found to prevent disease and other ailments (Magnus, Matroos, & Strackee, 1979). Many gardeners found that the presence of plants helped reduce stress and improved over-all well-being (Armstrong, 2000; Patel, 1991; Teig et al., 2009).

Economic Impacts

Although literature exists on economic impacts, it is very limited. The majority of information found for this review was referenced from interviews or annual reports, or found within published materials from government and non-profit organizations (Balmer et al., 2005; Cohen & Reynolds, 2012; Kaufman & Bailkey, 2000; Kobayashi et al., 2010; Nugent, 2001; SPUR, 2012). Some articles ran models or used estimations based on other programs to project potential job creation and revenue (Colasanti et al., 2010; Conner, Knudson, Hamm, & Peterson, 2008; Moreau & Hodgson, 2012). The majority of economic research was centered on farmers markets, although there were a fair number of studies focused on economic benefits to consumers and gardeners involved with urban agriculture. The following are the most frequently discussed economic impacts in the literature.

Job Creation, Training, and Business Incubation

Many urban agriculture projects provide skills training and jobs. Community food projects funded by the USDA provided an estimated 2,300 jobs and incubated over 3,600 micro-businesses (Kobayashi et al., 2010). Many programs employ youth to run gardens and farms or provide paid stipends in addition to skills training (Metcalf & Widener, 2011). Many of the food justice projects are located in neighborhoods where unemployment is high and serve as viable employment and catalysts for entrepreneurial endeavors (Bradley & Galt, 2013; White, 2010). Community food projects also were responsible for training an estimated 35,000 farmers and gardeners in farming, sustainable agriculture, business management, and marketing (Kobayashi et al., 2010). One particular study from the UK found that participants of city farming projects felt that the job related skills they developed were the most significant outcome of their experience (Holland, 2004).

A few articles discussed how farmers markets and CSA's successfully incubated new businesses (Bregendahl & Flora, 2007; Feenstra & Lewis, 1999). The low-risk and flexible nature of farmers markets allowed many participants to refine their operations and develop a devoted customer base (Feenstra & Lewis, 1999). Several of the businesses were small farms or food processers that produced value-added products to sell. Urban farm projects served as catalysts for

Photo Courtesy of Aziz Baameur

entrepreneurial projects that benefited residents and gardeners (Bradley & Galt, 2013; Cohen & Reynolds, 2012). The urban agriculture movement in Detroit continues to produce more micro-businesses (Colasanti et al., 2010; McClintock, 2013; White, 2010).

A couple of articles used economic modeling to determine potential job creation and revenue. One analysis computed the scenario that moving towards locally supplied fruits and vegetables in Michigan would result in nearly 1,800 jobs and $211.5 million in income (Conner et al., 2008). In a planning scenario for a region in British Columbia, Canada, it was estimated that with strong management and government support, urban farms had the potential to create 26 full time jobs and $2.39 million dollars in revenue for farmers (Moreau & Hodgson, 2012).

Market Expansion for Farmers

Research on famers markets and CSAs found that these direct marketing strategies created reliable markets for small famers to expand operations (Feenstra, 2007). Farmers markets draw consumers from a larger radius than supermarkets (Gale, 1997), and markets in metropolitan areas yield the highest gross sales and show an increased demand for value-added products (Feenstra & Lewis, 1999). This is particularly critical for small farmers who earn more profit by directly selling produce instead of using wholesale strategies that require larger yields (Kremer & DeLiberty, 2011). Since CSAs rely on members who value supporting local farmers, farmers are able to rely on stable and diversified income (Bregendahl & Flora, 2007).

Economic Savings on Food

There was substantial research indicating that urban agriculture saves participants money on their food expenditures. Community gardeners who participated in research studies frequently discussed the cost savings of growing food (Blair et al., 1991; Patel, 1991; Suarez-Balcazar, 2006). Some reports quantify the savings which ranges from $475 a season for individual gardeners (Patel, 1991) to $915,000 worth of food a year for an entire community garden program (Bellows, Brown, & Smit, 2005). Since most gardeners have to pay little or nothing for plots and many programs provide tools and utilities, the average cost of gardens was $25 per plot, giving gardeners a high return (Patel, 1991).

Famers markets and CSAs can also provide consumer benefits through cost savings. One study found that CSA members benefited from a savings of up to 150% of share prices compared to equivalent amounts of organic and conventional produce at retail grocery stores (Cooley & Lass, 1998). Other studies found that farmers markets in food insecure areas had more affordable and quality produce (Park et al., 2011; Suarez-Balcazar, 2006) than neighborhood corner stores and supermarkets, and in some cases provided enough competition to lower supermarket prices on produce (Larsen & Gilliland, 2009).

Savings for Municipal Agencies

The idea that urban agriculture can save municipal agencies money by maintaining vacant lots was often listed in agency reports as a positive impact (Balmer et al., 2005; Cohen & Reynolds, 2012; Hodgson, 2012; SPUR, 2012). According to a report by SPUR, an advocacy group in San Francisco, community management of vacant lots transformed into urban agriculture sites saved the Department of Public Works an estimated $4,100 a year per site by preventing vandal-

ism, dumping, and labor-intensive upkeep (SPUR, 2012).

Increased Home Values

A few studies correlate urban farms and community gardens to increasing home values and household income (Liu, 2008; Voicu & Been, 2008). The presence of gardens raised property values as much as 9.4% within five years of establishment (Voicu & Been, 2008). Tax revenues from these property increases were estimated at half a million dollars per garden over twenty years, making initial investments from government agencies for community garden and farm projects cost productive (Voicu & Been, 2008). However, McClintock (2013) notes that these gardens and farms can attract younger, more affluent populations which can often lead to gentrification, culturally changing neighborhoods and alienating long-time residents.

Challenges and Barriers

Many professional reports and literature reviews discuss the challenges and barriers for urban agriculture projects (Balmer et al., 2005; K. Brown et al., 2002; Goldstein et al., 2011; Hagey, Rice, & Flournoy, 2012; Hendrickson & Porth, 2012; L. J. Pearson et al., 2010; SPUR, 2012; Viljoen, Bohn, & Howe, 2005). The following are the two most frequently discussed in the literature.

Maintaining Social Equity

Most urban agriculture projects include a social component meant to benefit the public or specific clientele. Many are run by non-profits and/or are located in low-income areas. Because of the race and class-based disparities of farmers and gardeners in these projects, grants, fundraising, and other information on funding are difficult to access (Cohen & Reynolds, 2012). In addition, the culture around local and healthy food has often been associated with those that have higher-educations and incomes (Bradley & Galt, 2013; McClintock, 2013) and many UA programs are designed and implemented from this perspective. This can be alienating for UA's target audience, low-income residents with limited food access. At times, limitations such as mobility and affordability, are not considered (Macias, 2008; Metcalf & Widener, 2011).

Seeds @ City Farm, and urban agriculture project operated by San Diego City College in downtown San Diego, CA. Photo Courtesy of Valerie Borel

Urban agriculture projects that are initiated and driven by the community tend to be more successful because of their local knowledge and understanding of resident's needs and assets (Bradley & Galt, 2013; White, 2010). Efforts such as considering cultural preferences

for food, accepting WIC and EBT benefits, and attracting minority farmers are successful strategies for farmers markets that have been able to overcome some of these barriers (Fisher, 1999; Park et al., 2011; Suarez-Balcazar, 2006). There is a strong food justice presence in the literature that turns a critical lens on the services offered by urban agriculture. This persistent critique has influenced research trends and discourse, with the intention of keeping the grassroots and social justice essence of these projects as a focused priority (Bradley & Galt, 2013; Macias, 2008; McClintock, 2013; White, 2010).

Accessing Land

Accessing land was commonly cited as a major barrier for urban agriculture projects (Armstrong, 2000; M. C. Campbell & Salus, 2003; Hagey et al., 2012; Kaufman & Bailkey, 2000; MacNair, 2002). While this is a major challenge, many U.S. cities have a substantial acreage in vacant lots according to land inventories and public records (Balmer et al., 2005; M. Broadway & Broadway, 2011; Kremer & DeLiberty, 2011; Mendes et al., 2008). There are several efforts, such as in Portland (Balmer et al., 2005), Vancouver (Mendes et al., 2008), and Michigan (Colasanti et al., 2010), to identify these spaces and utilize them for agriculture. However, many vacant lots are Superfund sites, or have toxic soil, requiring costly infrastructure and remediation (Colasanti et al., 2010; Hagey et al., 2012; Kaufman & Bailkey, 2000). Overcoming these financial barriers require large amounts of capital that can often only be attained with major institutional support.

Research Needs

The following are research needs or gaps found within the literature.

Longitudinal and Macro-scaled Studies on Economic Impacts

Most skepticism for urban agriculture in the U.S. is centered around the idea that it can be a profitable and viable economic driver (Cohen & Reynolds, 2012; Kaufman & Bailkey, 2000). Outside of farmers markets, little research is available on economic impacts within the United States. A few reports found for this review synthesize annual report numbers and finances of a handful of urban agriculture projects (Goldstein et al., 2011; Kaufman & Bailkey, 2000; Kobayashi et al., 2010). However, most data is only available on a case-by-case basis making it difficult to forecast an entire movement. In order to justify urban agriculture as a viable economic development tool, more comprehensive and longitudinal studies need to be done within the U.S. that look at how these projects are financed and how they can be seen as more worthwhile than other industrial land uses and financially viable for farmers (Nugent, 2001; L. J. Pearson et al., 2010; SPUR, 2012).

Comprehensive Inventory of Urban Agriculture Projects

The true scale of urban agriculture is still not represented in the literature because most inventories and research have been isolated to a few cities and are often limited in scope, only looking at a few aspects of UA (Balmer et al., 2005; Cohen & Reynolds, 2012). One interesting study that took a comprehensive approach to inventorying UA used GIS to look at the location and movement of local food and UA projects (Kremer & DeLiberty, 2011) and used qualitative case studies to verify data. More projects like this would allow for larger scale inventories. A national database and protocol would be beneficial in collecting this data in order to create a compelling

and comprehensive data set. This may exist, but was not discussed within the literature.

Partnership Models and Best Practices

The most successful UA projects described in the literature were products of fruitful partnerships (M. C. Campbell & Salus, 2003; Hendrickson & Porth, 2012; Krasny & Doyle, 2002; MacNair, 2002; Mendes et al., 2008; Teig et al., 2009). There have been attempts to document some of these partnerships, particularly in regard to land access gained through partnering with government agencies or land trusts (Balmer et al., 2005; M. C. Campbell & Salus, 2003). However, many of these efforts are documented in the same handful of programs in New York and Seattle. A more comprehensive look at partnerships and best practices that reflect diverse and unique circumstances among programs and cities would be a useful document for cities wanting to facilitate more UA projects.

Community-Action Based Research

Most studies on urban agriculture are ethnographic, observational, and case study based. In order to truly measure social impacts, publishing more participatory action research studies should be a priority. As of now, there are few (L. J. Pearson et al., 2010). Using participatory action research allows residents to collect and generate data. Community driven data is likely to create new perspectives and better represent and serve the people most impacted by urban agriculture.

Conclusion

Urban agriculture continues to gain momentum in the U.S. In 2000, Kaufman and Bailkey launched a discussion on urban agriculture in their book *Farming Inside Cities*. At that time, they concluded that support for UA from government officials was sparse (Kaufman & Bailkey, 2000). However with the increase in local food policy councils and advocacy groups, the last few years have seen many successful outcomes in changing land-use policies and developing partnerships to promote urban agriculture (Balmer et al., 2005; M. Broadway & Broadway, 2011; Goldstein et al., 2011; Hagey et al., 2012).

This new "readiness" and "institutional climate" (Kaufman & Bailkey, 2000) that was very limited thirteen years ago, makes the next few years critical for the future of UA. Despite the recent achievements in several cities, according to the American Planning Association, there have been only a few municipalities that have moved urban agriculture onto their planning agenda with only nine percent of cities and counties including food elements in their comprehensive plans (Hodgson, 2012). Building a strong case through consistent and peer-reviewed research is an important step in furthering the movement. In addition to the impacts found in this review, there was an overwhelming amount of research on UA's ecological and sustainability impacts. This will continue to prove important as the growing demand to address climate change becomes inevitable. For now, looking at the social, economic, and health impact of urban agriculture is enough to justify moving forward. Looking deeper into the field will build a strong and convincing case that investing in urban agriculture is a worthwhile endeavor.

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