



UC Small Farm Program Preliminary Research Findings



# Urban Agriculture in Alameda County, CA: Characteristics, Challenges and Opportunities for Assistance

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## Introduction

Urban and urban-edge agriculture involves growing food and fiber products in urban areas, and extends to production inputs, processing, transport and marketing, in and around the edges of cities (van Veenhuizen 2006; Smit, Ratta, and Nasr 1996). Urban agriculture includes both commercial and non-commercial operations. In California, many agricultural operations fit this broad definition, though the nature of urban and urban edge operations may differ considerably. At the edges of cities and towns, formerly rural farmers and ranchers find themselves in closer proximity to urban land uses. Within cities, residents and community organizations practice urban farming and gardening for recreation, health and nutrition, community empowerment, and urban greening (the planning and establishment of vegetative landscapes in urban settings).

In recent years there has been renewed public interest in urban agriculture for its potential contribution to ecological health and community food security (CFS).<sup>1</sup> This interest has grown alongside consumer enthusiasm about local food systems, which include the local aspects of food production, processing, distribution, consumption and waste management (UC SAREP n.d.). Urban and urban-edge farmers may have an advantage in certain respects (e.g., transportation costs) over operations located farther outside metropolitan areas. However they also face unique challenges. Past studies have found that issues such as site contamination, governmental impediments, funding, and lack of community interest may limit development of urban food production (Kaufman and Bailkey 2000; Feenstra, McGrew and Campbell 1999). Moreover, in urban edge areas, new housing developments on what had been farmland bring with them potential conflict between farmers/ranchers and non-farming residents.

Cooperative Extension programs may be of assistance in overcoming some of the challenges mentioned above, and some Cooperative Extension programs do work with aspects of urban food production. As examples, the Master Gardener Program trains a



Corn grows near power lines at a six-acre community garden in Hayward.

<sup>1</sup> This term and others are defined in the Terminology box on page 2.

## Terminology

### Urban Agriculture

Urban agriculture is the growing of food and fiber products in and around urban areas, including production inputs, processing, transport and marketing (van Veenhuizen 2006; Smit, Ratta, and Nasr 1996).

### Food System

A food system includes food production, processing, distribution, consumption and waste management. The University of California Sustainable Agriculture Research and Education Program also defines a "sustainable community food system" as a collaborative food system network that integrates the above sectors "in order to enhance the environmental, economic and social health of a particular place."

### Community Food Security

Community food security (CFS) refers to the ability of all persons obtaining, at all times, a culturally acceptable, nutritionally adequate diet through local, non-emergency sources (Gottlieb and Fisher 1996).

### Social Justice

A broad concept in social theory, social justice is applied here in the context of a food system. It refers to a variety of social equity and human rights issues ranging from farmworker wages to food access for those on limited incomes (Feenstra 2002; Allen et al. 2003).

### Food Justice

The concept of food justice includes a consideration of the social and economic inequities in a food system, emphasizing human rights, democracy, and local community control (Levkoe 2006).

### Food Desert

The term food desert describes an area where there are few or no consumer food sources available. This situation often exists in poor urban areas where unhealthy foods (such as potato chips or candy) may be available, but residents have limited access to healthy and affordable food (Hendrickson, Smith, and Eikenberry 2006).

### Culturally Acceptable

Culturally acceptable, in the context of community food security, refers to foods that are both nutritionally and symbolically important to a given ethnic and/or regional culture. While many varieties of foods are available in today's marketplace, certain products are not readily available in all areas or to all people. Thus, the reference to cultural acceptability within the definition of CFS is explicit.

### Urban Homestead

An urban homestead is a household that produces a significant part of the food, including produce and livestock, consumed by its residents. This is typically associated with residents' desire to live in a more environmentally conscious manner.

corps of volunteers to assist home gardeners; the 4-H Program provides youth with diverse opportunities including raising small livestock and landscape design; and the UC Small Farm Program works to extend research-based technical advice to small farmers, many of whom farm at the urban edge. Each of these programs is effective in delivering information to its respective clientele, regardless of their locale. There may also be need for additional Cooperative Extension programming that is developed to address challenges experienced specifically by producers located in urban areas. Challenges such as those mentioned above may limit the financial viability of urban small-scale commercial farmers, as well as the potential for urban food production to increase community food security. Since the mission of Cooperative Extension is to extend research-based information to the public, programs designed to address urban food production challenges via targeted educational programs may be needed in order to enhance the potential for a more socially just, economically viable, and environmentally sustainable agricultural and food system.

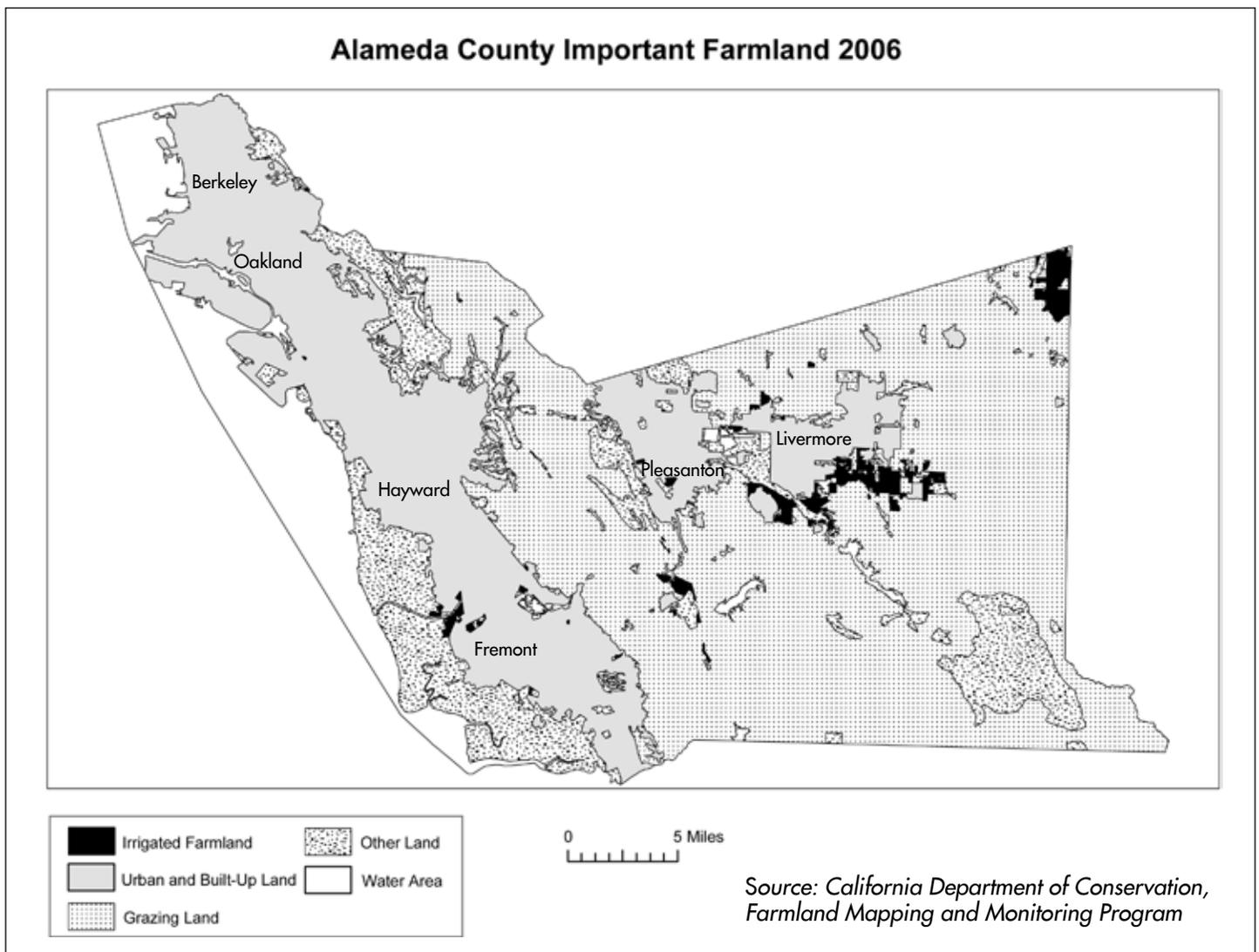
This study sought to assess the types of agriculture in

an urban county; to identify challenges experienced by urban area producers; and to explore potential areas of information and assistance that Cooperative Extension might provide in order to enhance both the sustainability of urban agricultural operations and urban community food security. The research consisted of interviews with practitioners and consultations with supporting organizations. The findings presented here are preliminary. More in-depth analytical findings will be published as part of the author's doctoral dissertation and made available at a later date.

## Overview and Approach

The study was conducted in Alameda County, California during 2007 and 2008, and was guided by an action research framework, which emphasizes a relationship between theory and practice (Herr 1995). Specifically, interviews and site visits were complemented by dialogue with stakeholders at the local level in order to explore characteristics of urban and urban-edge agriculture as part of a local food system, and its potential contribution to community food security. Stakeholders, including staff members

Figure 1. Alameda County important farmland map



and the director of Alameda County Cooperative Extension, as well as several community organizations, were consulted over the course of the study in order to continually refine the research focus to relate to local information needs. Several of these stakeholders indicated a need for local data as they developed programming in urban food systems. The purpose of this research brief is thus to provide timely research-based information to local organizations, including Cooperative Extension, and to inform the development of potential Cooperative Extension programs that are relevant to the specific needs of urban area producers.

## Study Site Description

### Agricultural Land and Economy

Alameda County was chosen for this study because its geographic, economic, and social characteristics provided the opportunity to observe a dynamic agricultural and food system in a region comprised of

urban, suburban and urban edge landscapes. Located in the eastern San Francisco Bay Area, Alameda County is home to 14 incorporated cities and six unincorporated areas. As of 2006 there were 253,386 acres of agricultural land in the county (see fig. 1) and land in agricultural production had been decreasing at an average rate of 0.58 percent during each two-year period since 1984 (CA Dept. of Conservation 2008). According to the USDA Census of Agriculture there were a total of 525 farms<sup>2</sup> in the county (including pasture, cropland and other uses) as of 2007. This represents a 23.8 percent increase in farm numbers since 2002, with the greatest rate of increase in farms under 50 acres. Average farm size was 390 acres, and median farm size was 21 acres (USDA 2009).

<sup>2</sup> The USDA defines a farm as “any place from which \$1,000 or more of agricultural products (crops and livestock) were sold or normally would have been sold” under normal conditions in a given year. (USDA ERS, 2008)

Total economic value of all agricultural products in 2007 was \$42.4 million (Alameda County Dept. of Weights and Measures 2007). This included nursery products, cut flowers, field crops, fruit and nut crops, livestock, poultry and apiary products. Nursery products comprised over 50 percent of the market value. Much of the county's agricultural industry consists of products that are not for direct human consumption. Ornamental nursery production totaled \$20.39 million; range/pastureland totaled \$3.2 million. Additionally, wine grapes totaled \$6.45 million. These three products totaled 70 percent of the agricultural products in the county's economy (ibid). Conversely, all other fruits, nuts, and vegetables reported in county agricultural statistics amounted to roughly 1.5 percent of the economic value. These data do not include many of the urban sites identified in this study, due to the way that agricultural operations are defined and measured in the USDA Census of Agriculture.

Food processing facilities are present in the county, which suggests the possibility for more locally produced goods beyond fresh produce. One study found 71 food processing firms in Oakland alone (Unger and Wooten 2006). However, at the time of the study, there were no USDA-certified livestock processing facilities, requiring meat producers to travel outside the county for processing of their products.

### Food System and its Stakeholders

There are 1.5 million residents in this ethnically diverse county, where no single ethnic group comprises a majority. At least 83 percent of residents lived in cities of 50,000 or more in 2002 (Cozad et al. 2002), and population densities currently average 2,069 people per square mile (Alameda County Dept of Weights and Measures 2007). Median household income was \$57,659 in 2004 (U.S. Census State and County Quick Facts 2006), yet areas of poverty persist in urban centers.

An area in which access to healthy foods is constrained can be considered food insecure and is often referred to as a "food desert" when lack of access to food is due to the absence or near-absence of retail establishments that stock fresh and healthy products. In Alameda County the total number of food retailers—including grocery, supermarkets, convenience stores and specialty food stores—increased by 4 percent (from 997 to 1041) between 1997 and 2002 in Alameda County (U.S. Census Bureau), but this may have affected County



Kale growing in a community garden plot in Berkeley.

residents unevenly. In a 2002 study, Cozad et al. found that while a diversity of market opportunities existed for specialty and organic agricultural products in wealthier sections of the county, lack of food outlets, coupled with poverty and other social factors, resulted in food insecurity in less wealthy sections. In some neighborhoods with per capita income of \$17,000 or less, there were no grocery stores contributing to the creation of a food desert in those areas (Cozad et al. 2002).

### Local Governmental and Community-Based Food System Initiatives

To confront trends of declining farm acreage and rising levels of food insecurity, local government representatives and community-based organizations have taken measures in recent years to protect farmland, increase urban sustainability, and to address public health related to food and its production. For instance, in eastern portions of Alameda County, a committee of agriculturalists, community members, and business and government representatives released a regional working landscape plan in 2005, called "Vision 2010." The plan sought to identify new ways to protect and enhance the region's agriculture and open space (Tri-Valley Business Council 2008).

In 2002, the UC Sustainable Agriculture Research and Education Program conducted a countywide foodshed assessment, referenced previously (Cozad et al.). The report provided an overview of the regional agricultural and food system. An additional food system assessment was conducted for the Oakland Mayor's Office of Sustainability in 2006. The study was commissioned

to assist in the development of a local food policy and plan for 30 percent local food production in the Oakland area (Unger and Wooten 2006). Most recently Health for Oakland's People and Environment (HOPE), a collaborative network of agencies and stakeholders, was formed with leadership from local agencies and funding from the W.K. Kellogg Foundation. The mission of the collaborative is "to create fundamental and sustainable environmental changes that will significantly improve the health and wellness of Oakland residents" (HOPE 2008). These and other initiatives in the county demonstrate the multi-tiered efforts to grapple with the complexities of agriculture and food systems in this highly urban area.

## Study Population and Methods

While the community networks and institutions named above operate at a systems-level, gardeners, farmers and ranchers continue at the ground level to produce a diversity of food products. Municipal and community-based organizations engage in urban agricultural production within cities, and a handful of small-scale urban and urban-edge producers within the county continue to sell their products in local markets. This diverse set of urban agriculture practitioners formed the population of interest for this study. Due to the variety of producers present in the county, multiple methods were used to select a study sample.

Registered farms and ranches were identified using official pesticide permit and organic certification registers from the Alameda County Agricultural Commissioner, and certified farmers market lists obtained from the California Department of Food and Agriculture. Sorting and preliminary screening (a short phone questionnaire) of potential key informants were used to identify a sample of producers who grew, harvested, and sold the following items: fresh fruits and vegetables, culinary mushrooms, honey, and livestock products.

A second set of operations in the study sample was not registered with the agricultural commissioner or the department of agriculture. This included operations that produced food: a) on publicly available land for personal consumption; b) specifically for free distribution within low-income communities; c) for nutrition education programs run by the same organization; and d) as part of an urban homestead (a household that produces a significant part of the food, including produce and livestock, consumed

by its residents). These operations were identified through Internet searches in each of the cities and unincorporated areas. The resulting list was sent to local individuals engaged with urban agriculture for review, and additional names were added based on this feedback until no new operations were identified.

Apart from urban homesteads, individual backyard gardens were not included in the study, nor were school gardens. Nurseries were not included in the study because of the focus on food products, and because nurseries do not directly provide edible products to consumers. Wine grape and olive producers were also excluded from the study because wine and olive oil are products with considerable industry support, often destined for high-end markets. Given the emphasis on community food security, producers of these three product types (nursery stock, wine, and olive oil) were not contacted, nor were cattle producers, whose main sales destinations were livestock auctions in other counties.

Data on 52 urban agricultural operations were gathered using key informant interviews. An interview guide was first developed with input from key informants, Alameda County Cooperative Extension staff, and members of several non-profit organizations involved in food systems at the local level. Interviews with farmers, ranchers, and gardeners were then conducted between August 2007 and July 2008 at the production location, when possible, and lasted from 30 minutes to 1-1/2 hours. Interviews were digitally recorded for later transcription and coding into SPSS (a statistical software package) for analysis. Responses were grouped into categories for analysis, as presented in the following sections.

## Preliminary Findings

### Production Management

Three categories were derived from responses about the way that production was managed by each operation:

- Community gardens with plots or areas assigned to individuals

Key informants from 27 community garden-type operations were interviewed. This represented 52 percent of the respondents. Community gardens typically consist of members who have assigned plots that they manage individually or with a family member. At some sites in this study gardeners worked together

Figure 2. Number of operations

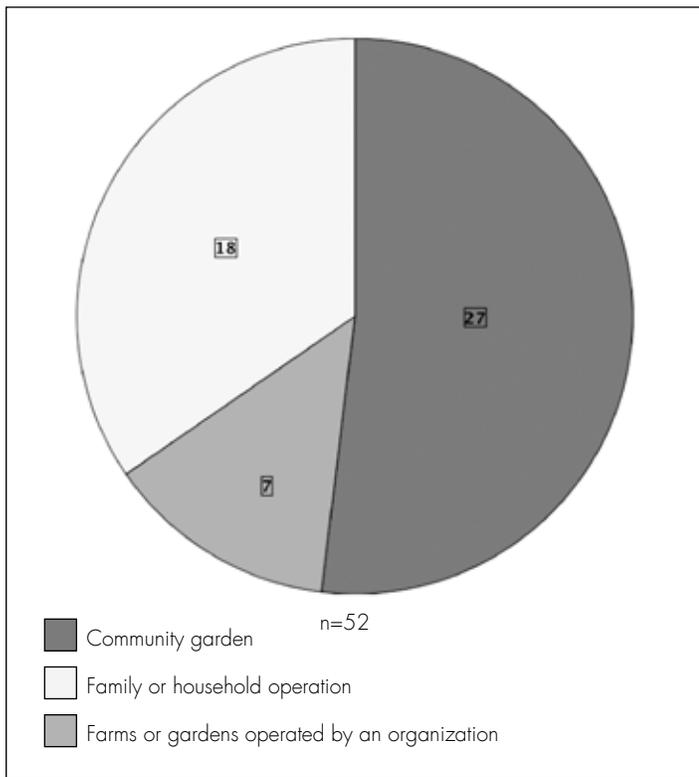
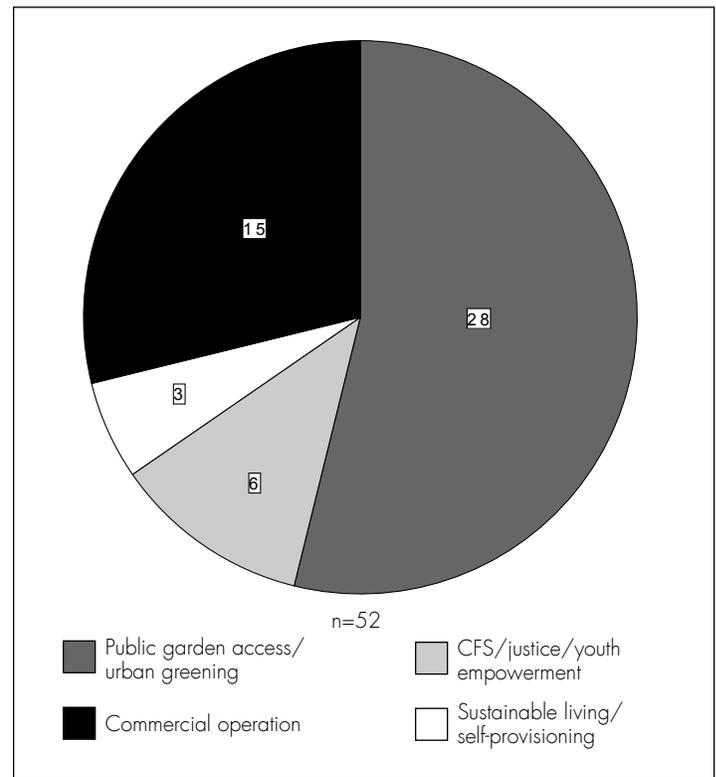


Figure 3. Main purpose of urban agriculture operation



on a large area, or with fluid boundaries between areas, rather than having defined plot assignments. Most gardens in this study were part of an organized network supported (at least in part) by a city agency, sometimes in conjunction with a non-profit organization. Most gardens did not allow sales of produce; however, one larger community garden did allow gardeners to sell their products.

- Family or household operations, including small family farms and urban homesteads  
Eighteen family/household operations were identified, representing 35 percent of the key informants. These were operations managed and operated by a family or household at one or more sites. Some had employees and/or volunteers, and some did not. The key characteristic of these operations is that they were privately held. Some of these operations were fully commercial, while others produced mainly for household consumption.

- Farms or gardens operated by community organizations  
Seven farms or gardens were operated by a single organization. This represented 13 percent of the key informants. These were operations directed, managed and operated by community organizations.

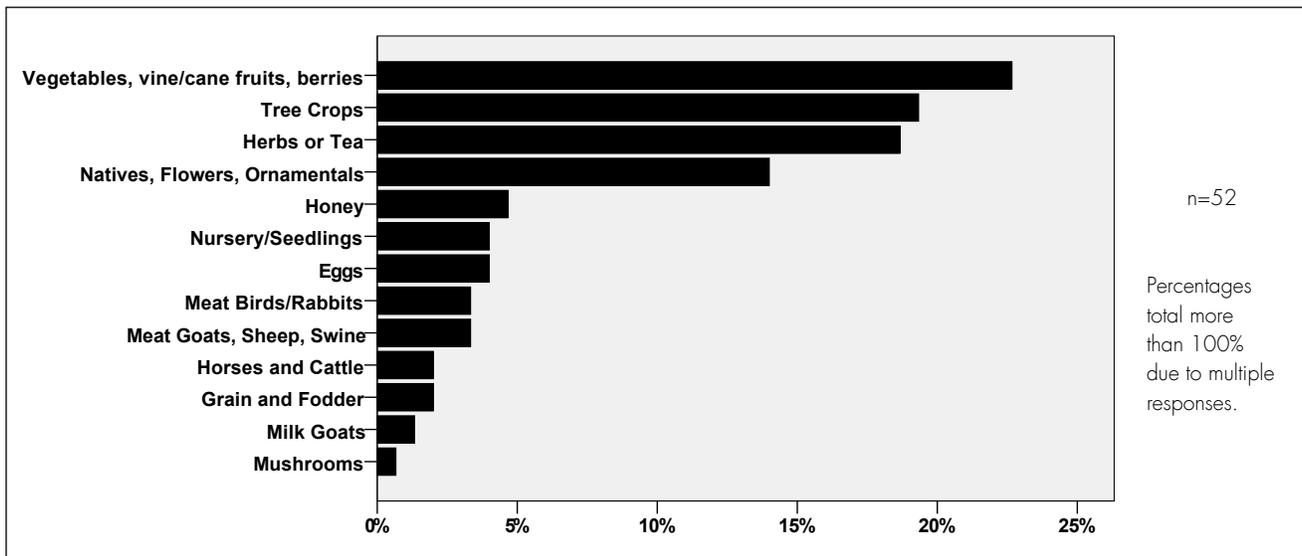
Actual garden or farm work was accomplished by a mix of organization employees—adult and youth—and occasional or regular volunteers. Some of the organizations managed up to five production sites within their respective city. Most of these operations sold products through various market outlets, as discussed later in this article.

Again, of the 52 operations visited, 27 were classified as community gardens with plots or areas assigned to individuals or families; seven were farms or gardens operated by community organizations; and 18 were family or household operations (see fig. 2). An additional three community gardens were identified but not reached.

### Purpose

Another defining characteristic of the operations in this study was their main purpose. As has been found in other studies, urban food production is often just one of many activities conducted by operations focused on a variety of social goals (Feenstra et al., 1999). Respondents in this study were asked to identify the main goals of their farm, ranch, or garden operation. Categories were derived from this information and formal mission statements, when applicable. The following four themes emerged:

Figure 4. Percentage of operations producing/harvesting each product



- Public Access to Gardens or Urban Greening

These were garden programs sponsored by city agencies or districts, directed by non-profit organizations in some cases. The main purpose of the garden programs was to provide garden access to community members (i.e., city residents) and to contribute to urban greening (defined previously).

- Commercial Operations

These operations were privately held urban and urban edge farms/ranches whose main activities were production, harvest and sales through various channels.

- Community Food Security; Food Justice; Youth Development/Empowerment

This included urban farms and gardens run by community organizations focused on one or more of these social goals. Though all of the operations in this study produced food, the operations in this category engaged in a wide set of activities focused on food systems change, of which food production was one part. Food justice expands the concept of community food security and considers the social and economic inequities in the food system, emphasizing local community control (Levkoe 2006). Youth development and empowerment programs work with at-risk youth to develop a sense of personal empowerment and responsibility by teaching life skills such as healthy eating, job responsibility, and community leadership.

- Sustainable Living/Self-provisioning

These include privately held urban farms and gardens with operators seeking to live sustainably with a limited impact on the natural environment and to demonstrate

urban homesteading.

The total number of operations in each category is shown in figure 3.

### Products

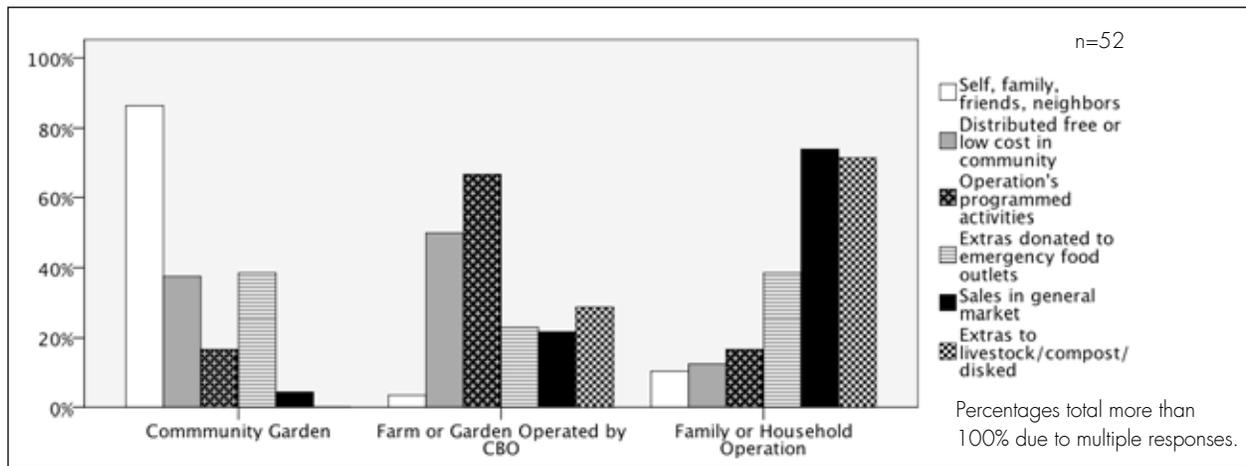
Vegetables, vining/cane fruits, and berries were produced by nearly one-fourth of operations. Tree crops (including tree fruits and nuts) and herbs/tea were produced by about one-fifth of operations in this study, and a variety of animal products were produced at both urban and urban edge sites, as shown in figure 4.

County-level agricultural statistics are collected by governmental authorities, (agricultural commissioners, USDA, etc.), and were not the focus of this study. Still, the variety of products grown and raised by respondents in this study demonstrates the potential contribution of urban agricultural production to local provision of culturally acceptable foods. Data on production yield were not available from all respondents, but some community-based organizations had tabulated production records for 2007 in terms of pounds of food produced. One organization reported growing 7,798 pounds of produce at its urban farm sites, and a second organization reported growing 2,450 pounds of produce at its urban sites and an additional 16,700 pounds at its urban edge site.

### Distribution

Though a typical market analysis would focus solely on producers selling goods in the market, this study also included community gardens, and operations whose products were distributed

Figure 5. Product sales and community distribution: Percent of operation type using each outlet



through non-market outlets. Six outlets were identified based on interview responses.

- Products consumed by self, household, or informal social networks;
- Products grown specifically for consumption in low-income communities and sold/given directly to consumers at little to no-cost;
- Products used in community-based organizations' programmed activities (i.e., healthy cooking classes run by the organization);
- Products sold in the market (including farmers markets, direct sales to restaurants, roadside stands, community supported agriculture, etc.)
- In combination with one or more of the above, excess products donated to third-party social agencies for community distribution (i.e., food banks; women's shelters);
- In combination with one or more of the above, unsold/non-useable products fed to livestock, composted, or disked into fields.

Figure 5 shows the percentage of each operation type using each of the six distribution outlets. Many operations used multiple distribution outlets, combining market sales with low-cost/free distribution in their communities, for instance, or donations of extra garden produce/unsold farm products to food banks.

## Challenges

There have been numerous accounts of the challenges experienced by urban agriculture operators. The findings of this study generally concur with past studies, which have also found challenges such as time

Table 1. Biggest challenges to achieving operation's goals

Responses, by topic	Respondents mentioning each topic
Lack of community within operation (garden)	16%
Time	12%
Farm/Business/Organization management	9%
Funding	9%
Regulations/Lack of government support	9%
Production/Biophysical	9%
Theft, safety, vandalism, etc.	8%
Horticultural skills	7%
Community relations	6%
Costs and returns of production	6%
Lack of agricultural infrastructure	4%
Land tenure/cost	4%
Agriculture not viewed as "urban"	4%

n=52  
Percentages total more than 100% due to multiple responses.

constraints, funding, and complex project management to be common among urban agriculture practitioners (Feenstra, McGrew and Campbell 1999; Kaufman and Bailley 2000).

Respondents in this study were asked about the biggest challenges to achieving their operation's goals. As displayed in table 1, lack of community within a garden operation and time constraints were the most frequently cited challenges. "Lack of community within the operation" summarizes community gardener comments about the lack of collective work or commitment to the garden as a whole, beyond gardeners' individual plots. This is contrasted with "community relations," which was lack of participation/interest by neighborhood

Tables 2a-2d. Information/assistance needs

Table 2a. Commercial operations

Responses, by topic	Respondents mentioning each topic
Farm/business management	13.3%
Extension or technical research service	6.7%
Production or distribution of inputs	6.7%
None needed	73.3%

n=15

Table 2b. CFS/justice/youth empowerment

Responses, by topic	Respondents mentioning each topic
Compilation/where to find info	33.3%
Extension or technical research service	33.3%
Funds or staff	33.3%
Networking/collective work	25.0%
Gardening info	16.7%
Soil testing or contamination info	16.7%
None needed	0%

n=6

Table 2c. Public garden access/urban greening

Responses, by topic	Respondents mentioning each topic
Networking/collective work	25.0%
Gardening info	14.3%
Soil testing or contamination info	10.7%
Farm/business management	7.1%
Production or distribution of inputs	7.1%
City services	3.6%
Compilation/where to find info	3.6%
Funds or staff	3.6%
None needed	42.9%

n=28

Table 2d. Sustainable living/self-provisioning

Responses, by topic	Respondents mentioning each topic
Extension or technical research service	33.3%
Gardening info	33.3%
None needed	33.3%

n=3

Totals in tables greater than 100% due to multiple responses.

residents, and/or other strained relations between the operators and the surrounding community.

Interestingly, three challenges that have been discussed in the urban agriculture literature—lack of agricultural infrastructure; land tenure/costs; and agriculture not being recognized as a legitimate urban activity—were each only cited by 4 percent of respondents. It is important to note, however, that the preliminary findings presented here have not yet been subject to detailed analysis, which may shed light on relationships between the types of farms/garden and their challenges. For example, it is likely that the high proportion of community gardens in this study (over 50 percent of respondents) influenced the relative importance of community (i.e., “lack of community” and “community relations”) in reaching the operation’s goals. More detailed analysis will explore relationships between type of operation and challenges experienced.

### Information Needs

The final topic discussed in this article relates to an overall research question: How might various Cooperative Extension programs (e.g., farm and livestock advisors, Master Gardeners) and local community agencies assist urban and urban edge farmers and gardeners in creating and sustaining successful operations? Respondents were asked an open-ended question about whether there was information or assistance that was not available that would be useful to their operation. Categories reported here summarize topics offered by respondents.

Assistance needs differed by main purpose of urban agriculture operation, as displayed in tables 2a-2d.

Among respondents whose main purpose was *commercial sales* 13 percent indicated a need for farm or business management information, and 6.7 percent indicated that both extension/technical research assistance and production/distribution of inputs (e.g., animal feed; equipment) would be of use. The majority of the commercial operation respondents indicated that no additional assistance was needed. However, in interviews, several of these respondents discussed in detail local regulatory and zoning constraints that had limited or eliminated their ability to operate their farms. It is likely that these respondents held policy change at the forefront of what they would need to continue successful and profitable operations.



Photos, from left:  
Cattle at the edge of Pleasanton;  
Honey bees raised in Oakland.

Respondents from operations focused on *community food security/food justice/youth empowerment* mentioned compilation of information; extension/technical research assistance; and funding/staff equally (33 percent) as top information or assistance needs. These urban agriculture operations were motivated by specific social goals that involved both production (e.g., providing food to community members and participants) and various community development programs requiring time and financial resources. As such, these data support past findings about challenges to urban agriculture, and recommendations to expand Cooperative Extension programs to make professional outreach more available to urban clientele (Borich 2001; Fehlis 1992; Kaufman and Bailkey 2000).

The top information or assistance need mentioned by the *public garden access/urban greening* respondents was networking or collective work within the garden (25 percent). Fourteen percent indicated that garden information would be useful, and 10.7 percent indicated an interest in soil testing or contamination information. These responses highlight the importance of community within these operations, as well as the focus on the activity of gardening and greening in general.

The respondents in the *sustainable living/self-provisioning* group indicated a need for both gardening and extension/technical/research assistance for their operations. Though there were only three respondents in this category, it is reasonable to conclude that these operations, too, would benefit from existing Cooperative Extension programs on gardening, food

safety, and food preservation, as well as programs developed specifically to adapt small-scale farming techniques to urban settings.

Numerous respondents in this study indicated that they were not lacking any assistance or information, but this point warrants clarification. Many respondents commented that useful information on agricultural topics was available through personal contacts, libraries or the Internet, and therefore information/assistance was indeed available, even if they had not sought it out. Respondents may have also distinguished between challenges that they believed would be effectively addressed through outside assistance, and those that would not. For example, although regulations and lack of government support were cited as challenges to operations, respondents may not have considered policy change or governmental support as types of assistance available to their operation. Likewise, overcoming the challenges of land tenure and costs might have been viewed by respondents as fundamentally zoning and/or funding issues, and thus beyond the reach of either Cooperative Extension or community organizations.

The objective here is not to diminish the relative importance of the information/assistance needs mentioned by respondents. It is conceivable that programming developed to address both challenges and assistance/information needs cited by respondents in this study would be useful. These preliminary findings thus underscore the importance of local assessments and two-way communication between agencies and on-the-ground practitioners.

## Conclusion

These preliminary findings may help refine the conceptualization of agriculture in an urban area and the types of information that Cooperative Extension programs can provide to assist urban producers. Information presented here serves as an exploration into characteristics of various types of urban agriculture; what and how urban producers contribute to the local food system; and areas where technical assistance that could be provided to address a slate of challenges in the study area.

The fact that urban producers in this study used both sales and non-market outlets to distribute produce and animal products underscores the notion that urban agriculture contributes to the urban food system. Further, these data suggest that urban agriculture can contribute to community food security by making a wide range of products available to consumers of various economic and social groups. The diversity of urban agriculture operations in Alameda County, coupled with efforts to support local farmers and food systems in the San Francisco Bay Area, suggests a need for coordination of resources aimed at assisting urban-area producers. Such coordination is already occurring to some extent and these research findings may inform further efforts to link Cooperative Extension's research-based resources with other community groups.

In addition to coordination of resources, respondents indicated a need for assistance with many other topics including information that is available from various Cooperative Extension programs, such as the Master Gardener Program, 4-H Programs, and farm, livestock, and nutrition advisors. If these findings resulted from operators' lack of knowledge about existing programs, there may be a need to increase awareness of



Leafy greens in a hoop house in Berkeley.

All photos by Kristin Reynolds.

Cooperative Extension and the services that it already provides. Additional analysis of the data will explore this issue further

Finally, regional economic trends, community relations, local institutional support, and the stage of urban agricultural development all affect the challenges (and successes) experienced by gardeners, farmers, and ranchers. Further analysis, along with local dialogue, will aim to uncover trends based on characteristics and geographic location within Alameda County. Beyond the study area, these research findings will add to the understanding of urban and urban edge agriculture in the United States and actions needed to enhance its sustainability.

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