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Urban Agriculture in the United States: Characteristics, Challenges, and Technical Assistance Needs

Abstract

Urban agriculture offers potential benefits to urban areas and has captured the attention of residents and policymakers. Some challenges of urban agriculture are unique to the urban setting, and many farmers do not receive adequate technical assistance. Based on a national survey of urban farmers and interviews, this article explores the challenges and technical assistance needs of these farms. The urban agriculture sector is one of young, recently established farms and farmers. Profitability, financing, and production costs were rated the highest challenges. Farmers also reported moderate to high technical assistance needs in many other areas that Extension staff can address.

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Introduction

Urban agriculture offers many potential benefits to urban areas, such as green space and access to fresh food for urban consumers. For these reasons, urban agriculture has captured the attention of city residents and policymakers. Food policy councils and city governments around the country, in cities including New York City, Baltimore, and Chicago, have explicitly incorporated suggestions for their local food environments intended to facilitate the expansion of urban agriculture (Goldstein, Bellis, Morse, Myers, & Ura, 2011; Hodgson, 2012). Integrated into its urban environment, farming in the city uses and reuses urban resources (including labor and natural resources) and returns agricultural products to urban consumers.

Urban agriculture, as used in this article, refers to the growing of plants and the raising of animals within and around cities. Farming in the city presents many challenges, some of which are common to all types of farming, and others unique to the urban setting. Urban farmers face significant knowledge gaps and institutional barriers (Pearson, Pearson, & Pearson, 2010). For instance, regulations, such as zoning, city plans, and building codes, may prevent farms from locating in cities on vacant lots or on rooftops. Other potential obstacles to the expansion of urban agriculture include access to credit and capital, lack of municipal support for composting, land tenure, lack of infrastructure for marketing and processing food raised on the urban farms, environmental contamination, and limited access to water

(Castillo et al., 2013; Hendrickson & Porth, 2012; Kaufman & Bailkey, 2000; Raes Harnes, Presley, Hettiarachchi, & Thine, 2013).

Although a growing number of state land-grant universities and their Extension programs are allocating resources for urban agriculture (Reynolds, 2011; Surls et al., 2014), there is a dearth of research and literature regarding urban agriculture to rely on. This is exacerbated by the fact that most Extension agents are trained to support rural farming and are often located physically distant from urban centers (Pearson et al., 2010). Time restrictions and funding for technical assistance staff are also challenges (Surls et al., 2014). The end result is that potential and existing urban farmers do not receive adequate support.

A national study of urban farms was initiated in 2013 by the authors to assess the risks and economics unique to urban agriculture and to examine the technical assistance needs of urban farmers. This article outlines characteristics of urban farms in the United States and explores their challenges and technical assistance needs within the context of implications for Extension and other service providers.

Methods and Procedures

A mixed methods approach was adopted for the study of urban agriculture. The first part of the study focused on a nationwide survey of urban farmers. The survey collected data about the production and marketing practices of urban farms for the 2012 year. The instrument, developed in consultation with stakeholders, was implemented using Survey Monkey, with paper copies available upon request. Researchers from Penn State University and New York University administered the survey (IRB# 12-9272 NYU; IRB Protocol ID 40596 Penn State). Thirty-five questions inquired about production practices, marketing practices (e.g., products sold, marketing outlets), risks and challenges, information and technical assistance needs, and basic farm characteristics.

The survey was promoted through various listservs nationally. Because no national list of urban farms is available, a snowball sampling method, which relies on the social networks between members of target populations, was adopted to allow the survey to reach the broadest possible sample of urban farms. However, due to the snowball sampling, the results about farming characteristics are not generalizable to all urban farms. As an incentive, all respondents were entered into a drawing for one of ten gift cards worth $75.

All survey data were analyzed using the statistical analysis program Stata (StataCorp LP, College Station, Texas, USA). In total, 315 respondents from across the country identified their farm as an "urban or peri-urban (i.e., suburban area, or outside a suburban area of a city) farm." Because community gardens also grow food in urban areas, we allowed respondents to self-identify as either community garden or urban/peri-urban farm. For this article, we focus on the latter. Respondents were asked to enter their farm name and duplicate respondents were identified via zip code and farm name and deleted from the final results.

In order to get a richer picture of policy and other trends in urban agriculture, in the second part of the project, informant interviews were completed primarily via telephone (with some in-person interviews) in 15 cities where urban agriculture is purported to be increasing. These cities include both large and smaller cities, and an effort was made to include cities from different regions of the country. The cities

included Atlanta, GA; Austin, TX; Cleveland, OH; Denver, CO; Kansas City, MO; Minneapolis, MN; Missoula, MT; New Orleans, LA; New York, NY; Philadelphia, PA; Portland, ME; Portland, OR; Oakland, CA; Salt Lake City, UT; and Washington, D.C. These semi-structured interviews were undertaken with approximately 10 stakeholders in each city, including Extension personnel, farmers, businesses, and government staff, among others. The interview results are used in this article to highlight and provide context for the survey results on challenges and technical assistance needs.

For this article, we hypothesized that start-up urban farms may have different challenges and technical assistance needs than more established urban farms. We define start-up farms as those farms established within the last 10 years and the primary farmer having five years or less experience. Pearson chi-square tests were used to ascertain whether there were any differences in challenges/risks and training needs. All variables used are categorical, with the challenges and training variables coded as binary (1=very/extremely challenging or highly needed, 0=otherwise), as well as the two farm types (start-up and established).

Characteristics and Practices of Urban Farms

Like many rural and suburban farms, urban farms often undertake production on multiple sites. In the respondent population, approximately 37% reported having multiple production sites, and an average of 78.1% of all total production was reported being grown within city boundaries. The respondents also reported that the urban farms had been in operation an average of 13 years. However, many farms and farmers were new to the sector. Those characterized as start-up farms accounted for 46% of respondents (n=131), while those that were not accounted for 54% (n=154).

The top product grown by the respondent urban farms was fresh vegetables (67.5% of all production output), followed by nursery items such as seedlings and herbs (8.2%), fresh fruits (8.1%), and meat and poultry (5.5%). Although aquaponics are a frequently discussed topic in urban agriculture circles, only 0.2% of production output was reported in fish.

The survey also asked about production practices common to urban agriculture (Table 1). The highest share of respondents reported using raised beds for production, followed by greenhouses, container gardens, and high tunnels (a freestanding or gutter-connected covered structure, without heating or electrical power, using passive ventilation for air exchange and cooling). Vertical farming (farming within urban buildings—such as high-rises—or vertically inclined surfaces in a technologically advanced manner), aquaponics (a system of aquaculture in which the waste produced by farmed fish or other aquatic animals supplies nutrients for plants grown hydroponically), hydroponics (a method of growing plants in water rather than in soil), and rooftop farming—all generally more capital intensive—were reported by fewer respondents.

Table 1.

Production Practices and Structures Used on Urban Farms

Practices/Structures	Frequency	Percent of Respondents

Raised beds	203	64.4
Greenhouse	130	41.3
Container gardens	118	37.5
High tunnel	92	29.2
Vertical farming	56	17.8
Aquaponics	24	7.6
Hydroponics	17	5.4
Rooftop farming	9	2.9

Of the urban farms that sold some amount of products grown on the farm, farmers markets and Community Supported Agriculture (CSA) were the top marketing outlets (Table 2). Given the farms' close proximity to the urban consumer markets, the use of these markets is not surprising. Direct-to-retail and institutions (e.g., schools), as well as distribution through wholesale and other higher volume outlets were limited for urban farms. These results are also supported by the interviews in the study's 15 cities, suggesting that urban farms have a difficult time providing a high-volume of product due to their small acreage and tend to focus on high-value, niche products to low-volume customers, focusing on quality and price over quantity.

Table 2.

Use of Marketing Outlets by Urban Farms

Marketing Outlet	**Percentage of Gross Sales Mean (*St. Dev*)**
Farmers market or farm stand	40.7 (*38.3*)
CSA	22.4 (*32.7*)
Restaurants	12.0 (*22.0*)
Other outlets	10.7 (*27.1*)
Direct-to-retail (e.g., grocery stores, food cooperatives)	4.9 (*15.1*)
Other institutions (such as schools)	2.6 (*13.3*)
Wholesale outlets	2.5 (*11.8*)
Distributed through cooperative of farms/other farmers	2.3 (*11.2*)
Regional or local food hub	0.9 (*6.1*)
N=247	

Farm viability and profitability were raised as key concerns in the interviews with urban farmers and other stakeholders in 15 study cities. The survey hints at these concerns as well. Only 32.9% of farmers reported that the primary farmer earned a living by farming in 2012. Sixty percent of farmers reported relying on off-farm income as a source for the primary farmer's income, and another 31.0% reported using grant funding and fundraising. This concern is confirmed by the gross sales data for the farms (Table 3). Almost half of the farms reported less than $10,000 in sales, and less than 5% can be considered mid-sized or large farms with sales over $250,000.

Table 3.

Gross Sales of Urban Farms (N=243)

Total Gross Sales Categories (from all products)	Frequency	Percent
Less than $10,000	119	49.0%
$10,000-$24,999	54	22.2%
$50,000-$99,999	17	7.0%
$25,000-$49,999	25	10.3%
$100,000-249,999	18	7.4%
$250,000-$499,999	5	2.1%
$500,000-$999,999	1	0.4%
$1 million or more	4	1.6%

Challenges and Training Needs for Urban Farms

Production challenges were rated by survey respondents (Table 4). Production costs were rated as the most challenging aspect of urban farms, with managing pests, weeds, and climate viewed as very to extremely challenging by at least a quarter of urban farmers. Because few urban farms have substantial livestock numbers, it is not surprising that animal health is the least challenging aspect on these farms. Some topics raised in the literature as challenges in the urban setting—access to water, infrastructure, and environmental pollution—were raised as a concern by fewer farmers in our survey. However, interviews with stakeholders seem to suggest that these topics of are of greater concern in certain cities, mostly likely due to policy differences. For instance, access to water may be addressed in some city policies, while in other areas farmers have major problems with access and prices for water usage due to the lack of policy mechanisms. Rejecting our hypothesis that start-up and more established farms may face different types of challenges, no significant differences were found between the two types of urban farms.

Table 4.

Production Risks and Challenges for Urban Farms

Production Aspects of Urban Farm	Very to Extremely Challenging	Slightly to Moderately challenging	Not at All Challenging	X^2 (Difference Between Start-Up & Established Farms)
	Percent			
Production costs	31.9	54.6	10.3	0.20
Managing pests	27.1	65.3	7.6	0.94
Managing weeds	26.9	60.9	11.5	0.29
Climate (e.g., shade, temperature, wind)	26.2	64.1	9.1	0.55
Maintaining adequate yields	21.3	68.2	9.4	1.02
Infrastructure	20.9	60.8	16.8	0.89
Soil health	16.5	70.5	12.3	2.54
Access to water	14.3	46.4	38.7	2.15
Environmental pollution (e.g., toxins in the soil)	11.3	41.4	45.3	1.64
Food safety	6.8	55.6	31.2	1.14
Animal health	3.6	32.9	27.2	0.14

N=315
Note: Do not add to 100% because a percentage of respondents also reported "not applicable."
*Significant at P<.05.

In terms of other challenges for urban farms (Table 5), not surprisingly given the results of the study's informant interviews, profitability was the number one topic of concern and was viewed as very to extremely challenging for almost half of the respondents. Related to this, financing was reported as very or extremely challenging by more than a third of the respondents. Farm labor is another major concern for about one-fifth of the respondents, and established urban farms find accessing farm labor more often challenging than their counterparts. Surprisingly, access to land, security, and community

relations were not reported as major concerns from respondents, even though informants often raised these issues as a concern in the interviews. Distribution and logistics and marketing venues are also not a major concern, and informant interviews have supported this notion, with most farmers reporting adequate local markets for their products.

Table 5.

Other Challenges for Urban Farms

Challenges	Very to Extremely Challenging	Slightly to Moderately Challenging	Not at All Challenging	X^2 (Difference Between Start-Up & Established Farms)
	Percent			
Profitability	45.6	37.2	8.0	2.92
Financing	34.8	38.7	16.4	0.29
Farm labor	21.2	51.9	22.3	4.19*
Managing business activities	18.4	65.1	10.8	0.07
Access to land	17.7	41.7	33.0	0.47
Distribution and logistics	15.7	58.1	20.6	1.09
Marketing venues for your products	12.6	51.4	29.7	0.17
Security/vandalism	9.3	50.7	36.4	0.01
Community relations (neighbors)	7.3	45.3	46.7	0.35

N=315
Note: Do not add to 100% because a percentage of respondents also reported "not applicable."
*Significant at P<.05.

When asked about technical assistance and information needs, urban farmers reported business and financial planning, marketing and distribution assistance, and product development as the most needed technical assistance topics (Table 6). Throughout interviews nationwide, land access was also raised as a key topic in most urban settings, and this shows up in the survey results for technical assistance as well, with almost half the respondents noting that legal assistance for land access is

moderately to highly needed. Key differences between start-up and established urban farms can be seen in three topics—soil fertility and compost, urban production practices, and farm security. In each case, start-up farms reported a higher need for education in these topics than established farms. In general, however, many urban farmers reported a moderate to high need for many of the topics covered in the survey, showing demand for technical assistance in the sector.

Table 6.

Technical Assistance and Information Needs for Urban Farms

Technical Assistance / Information Topics	Moderately to Highly Needed	Slightly Needed	Not Needed	X^2 (Difference Between Start-Up & Established Farms)
Business and financial planning	60.8	16.4	18.5	0.73
Marketing and distribution	52.7	23.3	19.6	0.29
Product development (value-added)	46.6	24.7	21.3	0.68
Land access (legal aspects)	46.1	14.8	30.3	1.35
Food safety	43.9	30.6	22.1	2.49
Water Use	42.9	31.1	23.6	1.48
Zoning and permitting	42.0	18.6	32.9	0.39
Labor	41.7	24.9	28.3	0.02
Soil fertility and compost	41.1	35.7	21.5	6.44*
Urban production practices	40.1	29.0	24.9	4.26*
Environmental contamination (soil, water, and air)	37.1	29.4	28.7	1.63
Farm security	34.6	28.7	28.0	5.82*

N=315

Note: Do not add to 100% because a percentage of respondents also reported "not applicable."

*Significant at P<.05.

Implications for Extension and Outreach

Urban farms can provide many benefits for urban areas, including access to fresh food for urban consumers and open space for communities. Interest in urban agriculture seems to be growing. The national survey of urban farms in the United States reported here revealed that the profile of the sector is one of young, recently founded farms and farmers. Almost half of the farms surveyed can be characterized as start-up farms. Although this suggests that there may be differences in terms of challenges and technical assistance needs for start-up and more established urban farms, the survey results did not bear this out. Urban farms, regardless of the length they have been in business or the experience of their farmer, have similar challenges and technical assistance needs, and demand for technical assistance is generally high for most topics.

Profitability, financing, and production costs were rated the highest challenges for urban farms in the survey. These results are supported by the informant interviews completed across the 15 study cities. That is, like many farms outside of urban areas, urban farms are struggling to remain viable and to increase farm profitability. Unlike many of their rural counterparts, however, in addition to the unique challenges of raising food in urban areas, urban farms have higher rates of inexperienced farmers and lower gross sales. As the informant interviews have suggested, urban farms seem more likely to rely heavily on other sources of funding (e.g., grant funding) to support the farms and, as a result, often have to focus on educational and related programming (e.g., school and youth programming or farm tours) to remain in business.

Farmers reported moderate to high technical assistance needs in a variety of areas that Extension staff and other technical assistance providers can fill. In general, informant interviews revealed that urban farmers do not currently rely on Extension personnel for their technical assistance needs. There are also some cities where Extension staff is starting to focus on urban and peri-urban farms and to modify their training and outreach to fit the needs of these farms. Still, there is great potential for Extension staff to assist urban farmers. In many ways, urban farms have the same needs as other farms, especially small, diversified rural and peri-urban farms, and many Extension personnel are already providing assistance to these types of farms and should look to adapt those materials and methods.

However, there are unique challenges to urban agriculture that require special attention, such as access to land, city zoning issues, access to water and water management, and livestock issues within the urban context, and environmental contamination, to name a few. Informant interviews suggest that urban farmers, in general, are likely to look to networks of other farmers in their cities for technical assistance and advice. Facilitating and using these networks to enhance technical assistance provision can be one role that Extension staff can play given the time and financially strapped environment that many function within. Another may be facilitating urban farmer training programs, providing assistance with business planning, which was rated as highly needed in the survey, as well as production practices and marketing and distribution. Urban farmers often seek out training when available in their area, but often this training is provided by urban garden groups and not-for-profit organizations, and often lacks the focus on scale and business that many urban farmers are seeking. Extension personnel are uniquely placed to provide this type of assistance.

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