

Perceptions of Arkansas Agriculture County Extension Agents Toward Urban Agriculture

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Abstract

As interest in local food development and urban agriculture increases, the Cooperative Extension Service is challenged to serve local and urban food communities in Arkansas. Urban farmers in Arkansas have differing motivations for operation than those in production agriculture, so understanding agricultural county agents' perceptions of urban farmers is critical for program development and implementation in this sector and to bridge any gaps between Extension and urban producers. This study was conducted to determine the perceptions of, awareness of, ability to assist with, and barriers to working with urban farmers in Arkansas. An emailed instrument was sent to Arkansas staff chairs and agricultural county agents and data were analyzed using descriptive statistics. A total of 57 agents participated in the survey. Responses from agents in more populous regions of Arkansas were comparatively analyzed to those from less populous regions. Results indicated agents infrequently interacted with urban farmers in their counties, yet believed Extension was a valuable resource for urban farmers and that more resources should be allocated to developing urban farming programming. Respondents also self-identified as having low levels of personal knowledge relating to urban agriculture, with 72% of respondents indicating they were not knowledgeable or slightly knowledgeable about urban agriculture. There was a significant difference between the responses of agents in more populous counties and those in less populous counties. Future research aims to conduct a similar survey relating to local food in Arkansas, not just urban agriculture.

Keywords: urban farming; extension; rural state; local food; urban food production

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Introduction

Motivations behind urban agriculture development in the U.S. range from food security, local food system development, community development, and social justice (Reynolds, 2011; Rogus & Dimitri, 2015; Stevenson et al., 2007). Many urban farmers view urban agriculture as a way to live sustainably and provide food for themselves outside of the conventional food system and production agriculture (Reynolds, 2011). Ecological sustainability or social equity issues pertaining to food systems generally motivate these growers (Reynolds, 2011). Commercial urban farmers usually operate privately-owned, small-scale farms, and operational activities include production, harvest, and sales (Rogus & Dimitri, 2015). Urban farming operations offer a range of benefits to local communities, including increased social connectedness, improved access to fresh produce, educational and youth development, and employment opportunities (Poulsen et al., 2017).

Cooperative Extension professionals should determine strategies to successfully implement programs in the urban environment, especially given the large percentage of the U.S. population that live near or within cities (Harder et al., 2019). Extension has several access points to urban agriculture, including providing technical assistance through increased horticultural knowledge among practitioners, creation of new types of community markets, management of organizational activities, information on securing land access, and mechanisms for profitability and business activities (Clark et al., 2017; Dunning et al., 2012; Oberholtzer et al., 2014; Reynolds, 2011). To determine these strategies, it is important to explore Extension professionals' interest in developing and expanding programming in urban agriculture (Reynolds, 2011). Recommended activities for Extension to expand into urban agriculture include integrating urban food-system concepts into research and extension programs, building relationships with urban communities, researching ecology and agronomics for urban areas, programming for community leadership development, renewing focus on community food security, and facilitating communication and information exchange between food system actors (Reynolds, 2011). Targeted urban farming programming allows Extension to develop programs based on

demonstrated community needs (Surls et al., 2014). Because of the variety of contact points for Extension within urban agriculture, a next step to develop effective programming is to assess the County Extension Agents (CEAs) perceptions of and engagement with urban agriculture (Surls et al., 2014). Relationships between Extension and alternative food systems, specifically urban farmers, should be categorized by cooperation, dialogue, and co-learning (Reynolds, 2011). Some of these relationships are already in place due to work by Philyaw Perez and McCullough (2017), who organized local food meetups to determine the needs of local food system stakeholders in Arkansas, but limited social science research focused specifically on Arkansas urban farmers is available.

Extension has traditionally focused less on urban food production, due to the organization's history of assisting with rural and conventional agricultural communities (Harder et al., 2019; Webster & Ingram, 2007). However, Extension can incorporate its foundational knowledge of rural agricultural production systems into new programming designed to address areas where urban farmers struggle and provide them with resources to operate in the urban agriculture sector (Clark et al., 2017; Reynolds, 2011; Surls et al., 2014). Extension professionals have historically been involved with community change, as they work with many locally elected officials and are familiar with community political networks (Clark et al., 2017). Thus, Extension can play an important role in community and food system development by providing and connecting local resources. Additionally, Extension professionals have historically focused on the economic aspects of farming, rather than viewing it through a social justice lens as many alternative farmers do (Surls et al., 2014). It is then necessary to understand the various perspectives and goals of Extension professionals for food system change (Clark et al., 2017). Extension is a key community stakeholder due to its relationships with local decision-makers, producers, and consumers, and they have historically connected actors within the food system. By analyzing the baseline need for urban agriculture programming from CEAs' perspectives, Extension specialists can understand the needed direction for future programming to reach the desired audience.

This study addresses to the National Research Priority 6: Vibrant, Resilient Communities, which included the research priority question, "how do agricultural leadership, education, and communication teaching, research, and extension programs impact local communities?" (Graham et al., 2016, p. 51). With population migration from rural to urban areas due to rapid urbanization, a reduction in agricultural labor has occurred, but increases in urban agriculture has been revealed in the recent decade (Rogus & Dimitri, 2015). Increased urban farming generally involves the local community, which can potentially help a community become more resilient, especially as it relates to food security (Poulsen et al., 2017).

Theoretical Framework

It is important to identify the role of Extension within alternative food systems. Traditionally, alternative food system movements are associated with opposition to the conventional food system, which has made Extension cautious of associations with certain change actors (Clark et al., 2017). However, many of these food systems are constructed as viable alternatives to the conventional food system, rather than as entities directly undermining it (Gliessman, 2015). This is more conducive to the function and operation of Extension, as it allows Extension professionals to work within alternative food systems by helping construct market-centric alternatives that do not threaten Extension's relationships with conventional agriculture (Clark et al., 2017).

Understanding change-oriented activities as social movements helps contextualize the nature and limitations of alternative food networks (Stevenson et al., 2007). Social movements create networks consisting of individuals, groups, communities, and organizations that share beliefs about a specific problem and work to create solutions. These change-oriented activities can be analyzed within the Builder, Weaver, Warrior Work theory (Stevenson et al., 2007). This theory focuses on the orientation of change activities within local food movements and it consists of warrior, builder, and weaver work (Stevenson et al., 2007). Warrior work is the political arm of the social change framework, acting as

resistance to the conventional system. Builder work is defined as reconstruction which operates to create alternative food systems and models within the economic sector. Finally, weaver work develops strategic, conceptual linkages between warrior and builder work. It connects these two divergent actors, operating both in the political and economic sectors to mobilize civilians within society (Stevenson et al., 2007). Extension professionals self-identify as builders, working within alternative spaces through economic practices, rather than oppositional spaces through political practices (Clark et al., 2017). Extension respondents in Clark et al. (2017) viewed the marketplace as a mechanism for change. Extension educators also identify as weavers, creating the connections as educators and facilitators, even though their change strategies more closely aligned with builder work. Much of their weaving work would yield future building work. Weaver work is necessary for long-term change strategies (Clark et al., 2017). Food system change depends on creating collaborative initiatives between individuals and organizations, and Extension can play a critical role in cultivating these relationships (Dunning et al., 2012).

Methods

The purpose of this descriptive study was to describe the perceptions, awareness, and abilities of Arkansas agricultural CEAs in relation to urban agriculture. The following objectives guided this study: 1) describe CEAs' perceptions of urban agriculture; 2) determine CEAs' self-reported knowledge related to urban agriculture; 3) determine CEAs' identified barriers to participating in urban agricultural programs, and 4) determine if responses of CEAs in counties serving predominately-metropolitan areas differ significantly from the responses of CEAs in counties serving non-metropolitan areas. With the findings from these four objectives, researchers can connect these perceptions with Builder, Weaver, Warrior Work theory (Stevenson et al., 2007) to determine the best strategies for implementing programs for urban farming in Arkansas.

This study implemented a researcher-designed, quantitative, web-based, 21-item instrument containing Likert-type questions related to CEAs' activities, opinions, awareness, and attitudes of urban agriculture. This was part of a larger needs assessment study where data collected from face-to-face interviews with urban farmers in a previous study informed constructs for the instrument (Dobbins et al., 2020). Questions were separated into sections within the instrument based on the research objective addressed. To create the questions within the instrument for each research objective, the authors referenced relevant literature (Clark et al., 2017; Dobbins et al., 2020; Dunning et al., 2012; Philyaw Perez & McCullough, 2017; Reynolds, 2011) as well as expert advice from the Extension local food specialist about the relevant issues facing urban agriculture in Arkansas. Seven questions in the instrument addressed objective 1. These included a Likert-type matrix question asking respondents' agreement with various definitions of urban agriculture from the literature. Response items included 1 – *disagree* to 5 – *agree*. Respondents were asked if there were urban farms in their county, defined as small-scale, diversified farms less than 10 acres selling and producing for markets inside the city limits (Dobbins et al., 2020), as well as the level (*unsure, low, medium, high*) these farmers utilized various sustainable practices (i.e. Certified Naturally Grown, organic, no-till, cover cropping). Respondents were asked to identify the concentration of urban farming operations in their county (1 – *nonexistent*, 2 – *low*, 3 – *moderate*, 4 – *high*, and 5 – *extremely high*) and the frequency with which they assisted urban agricultural clients (1 – *never*, 2 – *yearly*, 3 – *monthly*, 4 – *weekly*, and 5 – *daily*). Additional questions included a Likert-type matrix where respondents indicated their level of agreement with statements about Extension as a resource for urban farming. The last question for Objective 1 included a check-all-that-apply question about perceived benefits their county has experienced due to urban farming.

Two questions in the instrument addressed Objective 2. The first was a Likert-type question in which respondents identified their level of self-perceived knowledge related to urban agriculture (1 – *not knowledgeable at all* to 5 – *extremely knowledgeable*). The second question was a Likert-type matrix which asked respondents to indicate how often (1 – *never*, 2 – *not often*, 3 – *about half of the*

time, 4 – often, and 5 – always) urban farmers in their counties sold their products through various outlets (i.e. local restaurants, farmers’ markets, etc.). Five questions addressed Objective 3. Two questions were Likert-type matrices that asked respondents to identify their level of agreement with statements relating to the difficulty of assisting urban agricultural clients and the availability of urban agricultural programming in their county. Another Likert-type matrix question addressed the likelihood (1 – not at all likely to 5 – very likely) with which they would implement various forms of programming (e.g. face-to-face, online modules, etc.). The last question in this section was an open-ended question asking the types of training they need to be better prepared to serve urban agricultural clients.

The final section addressed Objective 4, containing only one question. Respondents were presented with a color-coded map of Arkansas. Counties were assigned a color based on population ranges (presented in Table 7). Respondents were asked to select the color of their county which divided respondents into five groups based on county population density.

The initial instrument was pre-tested with three participants utilizing think-aloud questioning technique commonly referred to as a cognitive interview (Collins, 2003). This complemented the pilot test of the instrument by checking for potential misunderstandings and misinterpretations during the survey process and allowed for an assessment of instrument validity. The pilot test was conducted with 32 non-agriculture CEAs and Extension county staff chairs who had similar characteristics and projects to agricultural CEAs. These respondents included Family and Consumer Science agents and agents with 4-H assignments. Respondents who completed the pilot test did not participate in the final data collection. Split-half correlation was used to assess internal consistency of the instrument for Likert-type questions through Cronbach’s α , which is the mean of all possible split-half correlations for a set of items or constructs (Jhangiani & Chiang, 2015). Associated measurements contributed to the reliability of the instrument. Reliability, as measured by Cronbach’s α , was reported at .97. Face and content validity were determined by a panel of experts at the University of Arkansas and the University of Arkansas Division of Agriculture Cooperative Extension Service. Experts reviewed the instrument twice, once prior to pilot testing and once prior to data collection. Two experts had a background working with Extension, one of whom was the leading local food expert in the state. Three were experts in instrument development ensuring that constructs measured what was intended to be measured. The University of Arkansas Institutional Review Board (IRB) approved this study (Protocol # 1809143362).

The target population for the instrument was agricultural CEAs in Arkansas. This study implemented census sampling for the identified agricultural CEAs and county staff chairs ($N = 100$), acquired from the Extension personnel directory. Because Extension professionals use email as a communication tool, it was determined that this would be an effective mechanism for dissemination (Dillman et al., 2014). Email invitations were sent to the CEAs and staff chairs to participate in the online instrument through the Extension email system, which contained a description of informed consent and scope of the study. Questionnaires were emailed to the CEAs on February 1, 2019, with follow-up reminders on February 7, February 19, and February 27 respectively to improve response rates (Dillman et al., 2014). Attempts were limited to one per Internet Protocol (IP) address to prevent respondents from multiple attempts. The total number of responses received at the conclusion of data collection (February 28, 2019) was 57, yielding a 57% response rate. Data collected from respondents were stored in a password-protected database.

Data Analysis

Data analysis occurred primarily through descriptive statistics analyzed through SAS and SPSS. The authors used frequencies and percentages to describe each question within the first three objectives, based on the use of Likert-type scales in the instrument. For open-ended response questions, responses were included in the results section as is, due to the few responses received, which limited the potential for any thematic analysis. To address Objective 4, the authors used inferential statistics through independent t -tests to compare responses between respondents in more populous counties to

those in less populous counties. Final data gathered was assessed for normalcy and data was found to be normal allowing the use of parametric analyses. Further, respondents were grouped based on their county region identification on the Arkansas map provided in the instrument.

To report nonresponse bias, recommendations from Johnson and Shoulders (2017) were followed. Early respondents (those who responded prior to the third mailing, $n = 40$) were compared to late respondents ($n = 17$), on three questions that represented each of the three constructs present in the instrument: perceptions, awareness, and barriers. These responses were analyzed using a two-tailed independent t -test at the .05 alpha level. The effect size for the perceptions construct was $d = -0.64$ (a medium effect), the effect size for the barriers construct was $d = -0.08$ (a negligible effect), and the effect size for the awareness construct was $d = -0.02$ (a negligible effect). There were no significant differences between early and late respondents for any of the three constructs, $t(57) = -2.22, -.07, -.29$ respectively with corresponding significance values indicating no significant differences found ($p = .17, .31, .40$). Based on analysis of respondents (early, late), findings are able to be generalized to the population of study but caution should be used if generalizing to similar populations in other areas or states.

Results

Sections of the questionnaire related to the four objectives: agent perceptions of urban agriculture, agent awareness of urban agriculture, potential barriers to assisting urban farmers, and differences between agent perceptions in metropolitan and non-metropolitan areas. Findings in this section are segmented by construct, with each construct relating to a research objective. All statements were analyzed to determine potential significant differences between regions in the population, and while discussed within each section briefly, this data is presented in the final section in Table 8.

Objective 1: Participating Agents' Perceptions of Urban Agriculture

Respondents were asked to describe their perceptions of urban agriculture addressing research objective 1. Table 1 displays the number of agents who agreed with various definitions of urban agriculture. Analysis of the results indicated that most respondents "agreed" or "slightly agreed" with the definition "farming in and around urban areas" (90%), followed by "small farms (fewer than 10 acres) located within city limits that actively engage with the market either through direct-to-consumer sales, coordinator, or institutional/retail buyers" (88%), and "farming within city limits" (84%). Respondents indicated least agreement with the statement "farming that involves education" (57%) when considering their definition of urban agriculture. All definitions demonstrated at least a majority agreement or slight agreement amongst respondents.

Table 1*Level of Agreement with Various Definitions of Urban Agriculture (n = 57)*

Statement	Frequency and Percentage of Likert-Type Responses											
	No Response		Disagree		Slightly Disagree		Neither Agree nor Disagree		Slightly Agree		Agree	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Farming in and around urban areas	0	0.0	1	1.8	2	3.5	3	5.3	14	24.6	37	64.9
Farming in city limits	0	0.0	1	1.8	1	1.8	6	10.5	15	23.6	34	59.6
Farming involving community	0	0.0	1	1.8	3	5.3	12	21.1	19	33.3	22	38.6
Farming that involves education	0	0.0	4	7.0	5	8.8	16	28.1	10	17.5	22	38.6
Production, distribution, and marketing of food and products in metropolitan areas	2	3.5	3	5.3	2	3.5	5	8.8	16	28.1	29	50.9
Small farms within city limits actively engaged with the market	1	1.8	2	3.5	1	1.8	3	5.3	18	31.6	32	56.1

In addition to describing perceptions of urban agriculture, respondents were asked to identify if there were small-scale, diversified farms in their counties. Of the 57 responses, 61.4% ($n = 35$) said yes, 29.8% ($n = 17$) said no, 7.0% ($n = 4$) said they were unsure, and 1.8% ($n = 1$) provided no response. After responding to this question, respondents were informed that urban agriculture, as it was used in the rest of the instrument, pertained to “small-scale, diversified farms less than 10 acres inside the city limits selling and producing for markets” (Dobbins et al., 2020). Respondents were then asked to identify the concentration of urban agriculture in their counties. The most frequent response to this question was “low” (43.9%), followed by “nonexistent” (26.3%).

To further describe perceptions towards urban agriculture by the concentration of urban agriculture in their counties, respondents were asked to identify the frequency with which urban farmers in their county engaged with various practices. Table 2 displays the number and percentage of perceived level of usage for various practices attributed to urban farmers. Few practices were determined as highly practiced, such as crop rotation at 22.8% ($n = 13$) and sustainable farming practices at 14.0% ($n = 8$). The highest response rates included 56% ($n = 32$) reporting a medium-level usage of sustainable practices, and 56% ($n = 32$) reporting a low-level usage of certified organic practices (Table 2). As demonstrated in Table 3, between 5.3% ($n = 3$) and 42.1% ($n = 24$) were unsure of the levels to which these practices were used in their counties by urban farmers.

Table 2*Certain Practices Use by Small-Scale Diversified Farms in Respondents' Counties (n = 57)*

Statement	Frequency and Percentage of Responses									
	No Response		Unsure		Low		Medium		High	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Sustainable Practices	5	8.8	3	5.3	9	15.8	32	56.1	8	14.0
Certified Naturally Grown (CNG)	5	8.8	12	21.1	25	43.9	15	26.3	0	0.0
Organic (Certified)	5	8.8	12	21.1	32	56.1	7	12.3	1	1.8
Organic (Non-Certified)	5	8.8	10	17.5	24	42.1	15	26.3	3	5.3
Permaculture	5	8.8	24	42.1	23	40.4	5	8.8	0	0.0
Chemical-Free	5	8.8	9	15.8	30	52.6	13	22.8	0	0.0
No-till	5	8.8	10	17.5	27	47.4	11	19.3	4	7.0
Cover Cropping	5	8.8	8	14.0	20	35.1	22	38.6	2	3.5
Crop Rotation	5	8.8	7	12.3	6	10.5	26	45.6	13	22.8

The majority of respondents interacted with clients who require urban agricultural assistance “never” (35.1%), “yearly” (22.8%), “monthly” (22.8%), or “weekly” (10.5%). Five respondents provided no response (8.8%). No respondents indicated that they dealt with these types of clients daily.

Respondents were asked to determine and identify their level of agreement with statements relating Extension and its urban agriculture resources, as well as Extension’s potential value as a resource for urban farmers (Table 3). The highest percentage of agreement (73.6%) was reported for the statement “Extension is a valuable resource for urban farmers” ($n = 42$), while the highest percentage of disagreement (38.6%) was reported for the statement “Extension should not focus on developing programs related to urban agriculture” ($n = 22$). Out of the 57 respondents, 61.4% ($n = 35$) “agreed” or “slightly agreed” with the statement “Extension should provide more urban agriculture resources”, 42.1% ($n = 24$) with “more time should be set aside for Extension agent training for urban agriculture”, and 42.1% ($n = 24$) with “more funding should be set aside for Extension agent training in the area of urban agriculture”. The statement “more time should be set aside for Extension agent training” had a relatively high percentage (35.1%) of “neither agree nor disagree”.

Table 3*Level of Agreement with Statements Regarding Extension and Urban Agriculture (n = 57)*

Statement	Frequency and Percentage of Likert-Type Responses											
	No Response		Disagree		Slightly Disagree		Neither Agree nor Disagree		Slightly Agree		Agree	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Extension is a valuable resource for urban farmers	5	8.8	0	0.0	1	1.8	0	0.0	9	15.8	42	73.7
Extension should provide more urban agriculture resources	5	8.8	0	0.0	2	3.5	15	26.3	14	24.6	21	36.8
More time for agent training in of urban agriculture	5	8.8	4	7.0	4	7.0	20	35.1	8	14.0	16	28.1
More funding for agent training in urban agriculture	5	8.8	4	7.0	4	7.0	20	35.1	10	17.5	14	24.6
Extension should not focus on developing programs related to urban agriculture	5	8.8	22	38.6	10	17.5	13	22.8	4	7.0	3	5.3

One question required respondents to check all that applied to the question “have you observed any of the following benefits as a result of urban agriculture in your county?” A majority of respondents (63.2%) did not select one or more of the provided responses to this question. From those who provided responses, 28.1% of respondents identified increased access to healthy food, 24.6% identified improved local economy, and 15.8% identified increased food security as observed benefits. Respondents were provided an open-response option to this question in addition to provided responses. Of those who responded ($n = 5$), benefits included “it brings farmers together to share ideas”, “local farmers marketing”, “increased agricultural understanding/appreciation”, and “more producers selling at farmer’s markets”.

Objective 2: Participating Agents’ Self-Reported Knowledge of Urban Agriculture

Respondents were asked to identify their level of self-reported knowledge relating to urban agriculture. The most frequent response about perceived level of knowledge was “not knowledgeable at all” (36.8%) closely followed by “slightly knowledgeable” (35.1%). Ten respondents did not respond to this question.

One section of the instrument attempted to identify respondents’ self-reported knowledge of where urban farmers in their county sell their products. The highest reported location for this section was farmers’ markets, where 35 respondents (61.3%) indicated urban farmers “often” or “always” sold

there, followed by on-farm or direct-to-consumer sales, reported “often” or “always” by 24 respondents (42.1%) (Table 4). Respondents ($n = 35$) reported community-supported agriculture and schools most frequently as “never” or “not often” (61.4%).

Table 4

Respondent Identification of Where Urban Farmers Sell Their Products (n = 57)

Statement	Frequency and Percentage of Likert-Type Responses											
	No Response		Never		Not Often		About Half of the Time		Often		Always	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Local Restaurants	10	17.5	10	17.5	26	45.6	4	7.0	6	10.5	1	1.8
Farmers' Markets	9	15.8	5	8.8	3	5.3	5	8.8	32	56.1	3	5.3
Community Supported Agriculture (CSA)	11	19.3	26	45.6	9	15.8	4	7.0	7	12.3	0	0.0
Grocery Stores	10	17.5	18	31.6	19	33.3	7	12.3	2	3.5	1	1.8
On-farm Sales	10	17.5	5	8.8	3	5.3	15	26.3	20	35.1	4	7.0
Schools	10	17.5	21	36.8	20	35.1	4	7.0	2	3.5	0	0.0

Objective 3: Participating Agents' Reported Barriers to Assisting Urban Farmers

Objective 3 was investigated with responses to the question “how confident are you in your ability to advise and assist urban agricultural clients?”. The highest reported response was “confident” (29.8%), followed by “neither confident or not confident” (19.3%) and “somewhat confident” (19.3%). The lowest response was “not confident” (7.0%).

Respondents were asked to respond to several statements or questions relating to potential barriers to serving or assisting with urban farmers and related programming outlined in objective three of this study. Constructs included difficulty assisting with clients, resource availability, current programming, and potential programming. Of the 57 respondents, 24.6% “agreed” or “slightly agreed” with this statement “it is difficult to assist with urban agricultural clients’ needs”, while 42.1% “disagreed” or “slightly disagreed” with this statement. Equal numbers of respondents ($n = 14$) responded “disagree” and “neither agree nor disagree”, or 24.6% each. Five (8.8%) provided no response.

Table 5 displays frequencies and percentages of responses about the availability of Extension resources for training and assistance with urban agriculture. The barrier associated with the highest percentage of “agree” or “slightly agree” (50%) was “there is not enough need for it in my county” ($n = 28$). Statements relating to time, including “not enough time to assist with” (54.8%) or “to seek training” (49.1%) reported relatively higher levels of disagreement. Between 17.5% and 45.6% of respondents indicated they “neither agreed nor disagreed” with the statements. Five respondents (8.8%) did not provide a response to any questions in the matrix.

Table 5

Level of Agreement with Statements Regarding Extension Resource Availability for Urban Agriculture (n = 57)

Statement	Frequency and Percentage of Likert-Type Responses											
	No Response		Disagree		Slightly Disagree		Neither Agree nor Disagree		Slightly Agree		Agree	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
There is not enough Extension funding to support urban agriculture	5	8.8	10	17.5	9	15.8	23	40.4	8	14.0	2	3.5
I do not have enough time to assist urban farmers	5	8.8	21	36.8	10	17.5	10	17.5	9	15.8	2	3.5
I do not have enough time to seek training about urban agriculture	5	8.8	20	35.1	8	14.0	12	21.1	9	15.8	3	5.3
There is not enough need for it in my county	5	8.8	8	14.0	6	10.5	10	17.5	10	17.5	18	31.6
I have enough time, but not enough Extension funding to support urban farmers	5	8.8	13	22.8	9	15.8	26	45.6	4	7	0	0.0
I have enough Extension funding, but not enough time to support urban farmers	5	8.8	13	22.8	10	17.5	26	45.6	0	0.0	3	5.3

Table 6 provides the response frequency and percentage to statements about urban agriculture programs in respondents' counties. Of the 57 respondents, 18 (31.8%) "agreed" or "slightly agreed" that there were urban agriculture programs in their counties, while 21 respondents (36.7%) "disagreed" or "slightly disagreed" with that statement (Table 6). Of the respondents that indicated there were programs in place, 13 (22.8%) indicated clients were unaware of them, but 31.6% indicated they "neither agreed nor disagreed" with this statement, which demonstrated significant differences between

regions within the population (see Table 8). Thirty (53%) “agreed” or “slightly agreed” that they had interest working with urban farmers, while four (7%) indicated the opposite.

Table 6

Level of Agreement with Statements Regarding Urban Agriculture Programs in Respondents’ Counties (n = 57)

Statement	Frequency and Percentage of Likert-Type Responses											
	No Response		Disagree		Slightly Disagree		Neither Agree nor Disagree		Slightly Agree		Agree	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
There are urban agriculture programs in my county	6	10.5	18	31.6	3	5.3	12	21.1	9	15.8	9	15.8
There are no urban agriculture programs in my county	7	12.3	11	19.3	9	15.8	10	17.5	3	5.3	17	29.8
There are urban agriculture programs in my county, but clients are unaware of them	6	10.5	14	24.6	6	10.5	18	31.6	13	22.8	0	0.0
I have interest in working with urban farmers	6	10.5	2	3.5	2	3.5	17	29.8	13	22.8	17	29.8
I have no interest in working with urban farmers	6	10.5	22	38.6	12	21.1	13	22.8	2	3.5	2	3.5

Respondents indicated the likelihood with which they would work with potential programs for urban agriculture, including, but not limited to, educational workshops, face-to-face communication, and on-site farm demonstrations. Agents were most likely to engage with face-to-face communication (73.7%), followed by on-site farm demonstrations (66.7%), educational workshops (64.9%), and meetings (64.9%). Respondents were least likely to engage with online learning modules (35.1%).

The last item on the instrument asked respondents to identify, in an open-response question, what types of training would be helpful for assisting with urban agriculture. Only 10 respondents provided a response. Usable responses included “any”, “web-based learning”, “IPM”, “marketing”, “vegetable production”, and “hands-on in-services and fact sheets”.

Objective 4: Participating Agents’ Responses in Metropolitan and Non-Metropolitan Areas

Responses in this section relate to the final research objective, to determine if responses of CEAs in counties serving predominately metropolitan areas differ significantly from the responses of CEAs in counties serving non-metropolitan areas. Respondents were asked to indicate the region, from a color-coded map, that included the county in which they worked for Extension (Figure 9). Counties

were grouped this way to protect anonymity of the responses, as some counties only have one agricultural CEA. The color regions were developed so similar county populations were grouped to form a region (Table 7).

Table 7

Respondents' County Identification Based on Population Range (n = 57)

County Group	Counties in Region	Population Range	<i>n</i>	Percentage
Group 1	Benton, Craighead, Faulkner, Pulaski, Saline, Sebastian, Washington	99,920 - 388,953	11	19.3
Group 2	Crawford, Garland, Jefferson, Lonoke, Pope, White	61,943 - 96,889	4	7.0
Group 3	Baxter, Boone, Carroll, Cleburne, Crittenden, Greene, Hot Spring, Independence, Johnson, Miller, Mississippi, St. Francis, Union	25,788 - 50,088	9	15.8
Group 4	Arkansas, Ashley, Bradley, Chicot, Clark, Clay, Cleveland, Columbia, Conway, Cross, Dallas, Desha, Drew, Franklin, Fulton, Grant, Hempstead, Howard, Izard, Jackson, Lawrence, Lee, Lincoln, Little River, Logan, Madison, Marion, Montgomery, Nevada, Ouachita, Perry, Pike, Phillips, Poinsett, Polk, Randolph, Scott, Sevier, Sharp, Stone, Van Buren, Yell	8,639 - 25,389	10	17.6
Group 5	Calhoun, Dallas, Lafayette, Monroe, Newton, Prairie, Searcy, Woodruff	5,317 - 8,462	19	33.3
No Response			4	7.0

Independent *t*-tests were used to determine any potential differences between the responses in the five regions analyzed. Significant differences ($p < 0.05$) between regions were found when respondents were asked their agreement with various statements relating to practices used, concentration of urban agriculture, difficulty assisting with client needs, urban agricultural programming, and where urban farmers sold products. Table 8 displays the statements where significant differences between responses by population range were found. Differences primarily occurred between groups 1 (highest county populations) and 2 (second highest county populations), as well as between groups 1 and 4 (second lowest county populations) (Table 8).

Table 8*Significant Differences in Responses Based on County Population Range Groupings*

Statement	Groups	<i>t</i>	<i>df</i>	<i>p</i>
Please indicate the level to which the small-scale, diversified farms in your county practice crop rotation	2,1	2.58	21	0.01
How would you describe the concentration of urban agriculture in your county?	2,1	3.07	21	0.001
It is difficult to assist with urban agricultural clients' needs because there is not enough need for it in my county.	4,1	1.49	11	0.04
There are urban agriculture programs in my county.	2,4	2.55	26	0.03
There are no urban agriculture programs in my county.	4,1	2.70	11	0.04
Urban farmers in my county generally sell their products to local restaurants.	4,1	3.61	11	0.02

Conclusions, Implications, and Recommendations

This study contributes to the literature by continuing the work of other scholars (Oberholtzer et al., 2014; Reynolds, 2011) in bridging urban agriculture with Extension programs, specifically in predominantly rural states, where urban agriculture is not yet as developed as more metropolitan areas of the country. The results of this study provided key insights about Arkansas CEAs' perceptions and awareness of urban farming in their counties. Arkansas is a predominately-rural state; however, there is increased interest in sustainable agriculture and locally grown foods, there will likely be an increase in the demand for urban agricultural resources from Extension.

Respondents indicated the following perceptions of urban agriculture, relating to the first objective of the study. The results supported definitions from the literature about urban agriculture, as well as the definition developed in a previous study focused on urban agriculture in Arkansas—“small-scale, fewer than 10 acres, diversified, and sustainable farming within city limits that engages with the market, the community, or both” (Dobbins et al., 2020). Respondents indicated there were small-scale, diversified farms in their counties; however, when asked to describe the concentration of urban agriculture in their counties, most indicated a low concentration. When the term “urban agriculture” was introduced, respondents reported a lower concentration than when the term was not present. This could be attributed to the rurality of many of the counties in which respondents worked. Of the urban farms identified by respondents, most were described as using medium-to-low levels of sustainable practices. This contradicts previous studies about urban agriculture in Arkansas that indicate a high use of sustainable practices among urban farmers in the Northwest and Central regions of Arkansas (Dobbins et al., 2020). Future research should capture rural county agents' perceptions of sustainable or alternative farming methods in use in their counties. The majority of urban farmers in Arkansas utilized sustainable growing practices, though the participating agents in this study did not reflect that finding (Dobbins et al., 2020). Capturing this data would be a way to bridge the gap between sustainable growers and Extension in a predominately rural and conventional agricultural state.

The second objective, determining respondents' self-reported knowledge of urban farming in their counties, resulted in various findings. Few respondents reported frequently assisting urban agricultural clients, though most respondents believed that Extension was a valuable resource for urban farmers. Overall, respondents agreed that Extension should provide more urban agriculture resources. Thus, despite challenges with allocating resources to urban agricultural programming, Arkansas CEAs

considered these activities relevant to Extension's mission, supporting findings from similar studies (Surls et al., 2014). Data describing the preferred program types by respondents (face-to-face communication and on-site farm demonstrations) align with previous findings from a needs assessment conducted as part of the overall project that urban farmers preferred these modes of programming as well. This triangulation should provide baseline data for future programming to connect Extension with urban farming populations. Professional development opportunities for agents related to urban agriculture should implement respondents' preferred program types to capitalize on the existing interest for increased training in this area.

Respondents demonstrated a lack of understanding the scope of urban and diversified agriculture in their counties, as well as of the needs of clientele who work in the urban agricultural sector. Despite a self-reported lack of knowledge about urban agriculture, respondents demonstrated an understanding of potential markets for urban farmers in the state. In the Northwest and Central regions of Arkansas, two of the top three markets for urban agricultural products included farmers' markets and on-farm/direct-to-consumer sales (Dobbins et al., submitted). This relates to the Builder, Weaver, and Warrior Work theory (Stevenson et al., 2007) and corroborates Clark et al.'s (2017) finding that agents view the marketplace as a mechanism for local food system change. Respondents identified increased access to healthy food most frequently as a benefit of urban agriculture in their counties. This supports Rogus and Dimitri's (2015) concept that urban agriculture can enhance community food security, which includes access to healthy food. Opportunities for increasing the benefits of urban agriculture in communities can help enhance collaboration and communication between farmers, community members, and agents in the area.

For the third objective, relating to respondents' identified barriers to participating in urban agricultural programs, a majority of respondents perceived themselves as slightly knowledgeable about urban farming; however, just under half of respondents indicated they were confident in their ability to advise and assist urban agricultural clients' needs. Future research should investigate this discrepancy to discover why agents report little knowledge of urban agriculture but higher confidence in assisting urban farmers. There is potential for increased collaboration between Extension and urban farmers, though this collaboration will vary based on region. While respondents disagreed slightly with the difficulty of assisting urban farmers, half agreed that there was not enough need for urban agricultural assistance in their county. More than half of the respondents were from counties with populations 50,000 or below – this may be an indicator of how the rurality of a state affects urban farming growth. Urban farming in a predominately-rural state is not expected to be a major phenomenon, but future research in the state could expand upon this instrument to gauge the use of alternative or sustainable farming practices, which may capture a wider audience than a survey aimed at urban agriculture. Professional development opportunities for both urban and non-urban agents may be more effective if focused on local and sustainable food systems, rather than specifically urban farming, due to the differences observed between urban and non-urban agents' perspectives on urban farming. As urban farmers frequently operate within local and sustainable food systems (Reynolds, 2011), broadening the focus of training and professional development beyond urban agriculture specifically should benefit both urban and non-urban local food producers in the state as well as increase Extension's impact within the sector. This is further corroborated by Dobbins et al.'s (2020) findings that most urban farmers in Arkansas identify as local and sustainable producers rather than as urban farmers.

The key findings revealed that agents in less populous regions of Arkansas have differing perceptions and awareness of urban farming as it relates to barriers, markets, programs, resources, and clients. These differences occurred mostly between regions with significantly different population levels. The items in which differences between responses occurred included the concentration of urban farming in their county, the level to which urban farms in their county participated in sustainable practices, the difficulty of assisting urban farming clients, the presence of urban farming programming in their county, and where urban farmers in their counties sell their products. These results indicate that

programming for urban farming in Arkansas will be regionally-specific and dependent on the needs of small-scale, diversified farmers in the region.

Several limitations exist for this study. Perceptions of urban agriculture are difficult to capture in rural areas where respondents do not associate their production methods with the term “urban”, which may have biased the results of this study. Future research should examine local food that uses sustainable (i.e. organic-type, non-conventional production agriculture) methods to better capture these alternative farming networks in a rural state. Additionally, the response rate of 57% potentially did not capture the various perceptions of agents in the state holistically. This also supports the need for future research on local food rather than specifically urban agriculture, which may have limited the response rate.

For Extension to build successful collaborative relationships through its unique set of resources, local food systems should be continually legitimized as an important issue (Dunning et al., 2012). The Arkansas Extension system has made steps toward this through the work of Philyaw Perez and McCullough (2017), who hosted regional local-foods meetups with key stakeholders of Arkansas’s local food system; however, with urban farming being a relatively new phenomenon in rural states like Arkansas, more research into this sector is needed. Implications for practice include understanding the perceptions and awareness of agricultural agents regarding urban and local sustainable agriculture. This is a growing aspect of the agricultural sector, often populated in Arkansas by people with non-traditional agricultural backgrounds (Dobbins et al., 2020), who may or may not understand the full array of services and resources available to them through Extension. To better market programs to this population and to strengthen the impact of Extension research to local communities, understanding the baseline data of perceptions, awareness, and barriers of CEAs is critical for future programming in local and sustainable agriculture. By better understanding how Extension agents perceive urban agriculture in a rural state, Extension professionals can determine to what extent their programming impacts local communities, specifically related to local food production. This directly supports the National Research Priority 6: Vibrant, Resilient Communities (Graham et al., 2016).

Recommendations for practice are based on the study’s objectives and Builder, Weaver, Warrior Work theory (Stevenson et al., 2007) to provide a framework for urban agricultural programming in Arkansas that can serve as a model for other states with similar demographics and farming practices. As Stevenson et al. (2007) posited, Extension personnel often work as both builders and weavers within and between conventional and alternative food systems. While this study did not directly ask respondents to identify what types of training and programming they would prefer to disseminate to those in their counties who are small-scale, diversified farmers, future research could corroborate Stevenson’s (2007) findings to determine whether Extension agents prefer to conduct economic and market-centric programming. This is especially relevant for the developing local food system in Arkansas, as evidenced in the needs assessment of urban producers in the state completed as part of the overall project, in which producers indicated a desire for increased market-related information for local food systems (Dobbins et al., submitted). Extension personnel are uniquely qualified to aid urban farmers focusing on scale and business planning, production practice, marketing, and distribution (Oberholtzer et al., 2014), and agents often view the marketplace as an environment for change within food systems (Clark et al., 2017). However, Arkansas Extension’s local food program currently lacks resources for beginning local producers to help them navigate these new markets. Thus, increased quantitative investigations into the specific program areas needed for the region could provide evidence-based data about program development for local food systems and their related economies and markets. Additionally, as Clark et al. (2017) explained, the weaver work bridges the political and economic arm of alternative food network development and is necessary for long-term change strategies and building collaborative initiatives between Extension, individuals, and other organizations within food systems. This work is critical for future development, prosperity, and community engagement within the agricultural sectors of each state.

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