Journal of Agricultural Education, 59(3), 229-242
https://doi.org/10.5032/jae.2018.03229

Information Needs and Information-seeking Behaviors of Urban Food Producers: Implications for Urban Extension Programs

Kumudu P. P. Kopiyawattage[1], Laura A. Warner,[2] & T. Grady Roberts[3]

Abstract

Extension is challenged with meeting the needs of a variety of stakeholders. As the country becomes more urban, Extension may need to adapt programming to reach new clients. Having an understanding about what, when, and how urban food producers gather information is important to address their needs. Information that is relevant, up-to-date, and meets clients' needs, enables their ability to adopt new ideas and innovative technologies, providing more opportunities for success. A mixed-method research design explored the information needs and information-seeking behavior of urban food producers in Columbus, Ohio. Urban food producers in this study most needed information to increase food production. Respondents preferred to receive information from the Internet and other electronic media over conventional information sources. This group of urban producers trusted information from university and Extension sources, but expressed mixed opinions about their personal experiences with OSU Extension.

Keywords: agricultural information, information-seeking behavior, urban Extension, food production

Introduction

The Urban Agriculture Committee of the Community Food Security Coalition (2002), defined urban food production as "the growing, processing, and distribution of food and other products through intensive plant cultivation and animal husbandry in and around cities" (p. 4). Urban food production has been identified as an important component of urban sustainability (Alberti, Marzluff, Shulenberger, Bradley, Ryan, & Zumbrunnen, 2003; van Veenhuizen & Danso, 2007). The demand and recognition for urban food production is increasing globally as a sustainable development strategy in cities (van Veenhuizen, 2006). When food is produced within a city, the cost of transportation, processing, and packaging is less, compared to food produced outside of a city (Mendes, 2006; Mougeot, 2006). Building community and social capital, self-sufficiency, and creating local resilience are other advantages of urban food production (Brown & Jameton, 2000).

Not only nationally, but also internationally, efforts have been taken to improve food production in urban areas as a sustainable urban development strategy (van Veenhuizen, 2006). Greening urban cities, utilizing organic waste, reducing pollution, minimizing heat, and improving air quality are some of the advantages of urban food production. It also helps to building community and social capital, which in turn creates self-sufficiency and social resilience (Brown & Jameton,

[1] Kumudu P. P. Kopiyawattage is a Senior Lecturer at the Department of Agricultural Systems,Rajarata University of Sri Lanka, Puliyankulama, Anuradhapura, Sri Lanka 50000 , kumudupdn@gmail.com
[2] Laura A. Warner is an Assistant Professor at the University of Florida, PO Box 112060, Gainesville, FL 32611-2060, lsanagorski@ufl.edu
[3] T. Grady Roberts is a Professor at the University of Florida, PO Box 112060, Gainesville, FL 32611-2060, groberts@ufl.edu

2000). For these reasons, the attention for urban vegetation and urban gardening has increased, as they contribute to improve the quality of urban life by offering opportunities for mental relaxation, social integration, and physical exercise (Lee & Maheshwaran, 2011).

This study addresses Research Priority Area 5 from the AAAE National Research Agenda, *Efficient and Effective Agricultural Education Programs* (Roberts, Harder, and Brashears, 2016). More specifically, it sought to answer question 6, "What methods, models, and programs are effective in communicating with diverse audiences?" (Roberts et al., 2016, p. 10).

Theoretical Framework

Information-seeking behavior is the "gap bridging process, where individuals make moves, influenced by information in time and space to reach desired outcomes" (Sturges & Chimseu, 1996, p. 136). In the Theory of Planned Behavior (TPB), Ajzen and Fishbein (1980) identified attitude, subjective norm, and perceived behavioral control as determinants of behavioral intention. As explored by Taylor and Todd (1995) in their Decomposed Theory of Planned Behavior (DTPB), an individual's belief towards their ability to perform a behavior (perceived behavioral control) is influenced by the availability of information about that behavior. When an individual is confident about the availability of resources towards performing the behavior he/she is strongly influenced to perform that behavior (Ajzen, 1991). Operationalized in the current study, when urban producers perceive that they possess information (availability of information; Taylor & Todd, 1995) that decreases the difficulty of producing food, they are more likely to engage in that behavior (Ajzen, 1991). If the urban producers believe there would be elements that prevent the availability of information, then they are less likely to perform the behavior.

Limited research has examined information needs of this unique sub-set of agricultural producers. Information needs of urban producers are context specific and depend on several factors (Byamugisha, Ikoja-Odongo, & Nasinyama, 2010). Those factors include value urban farmers attach to different information sources, characteristics of farmers such as level of education, income, gender, and homogeneity or heterogeneity of the farm (Byamugisha, et al., 2010). Urban producers use various sources of information. Identifying these different sources of information used is important for information dissemination (Duram & Larson, 2001). The Internet, government information sources, university sources, Extension agents, non-profit organizations, and exhibitions are some of the information sources used by urban food producers (Angello, Msuya, & Matovelo, 2016; Harms, Presley, Hettiarachchi, & Thien, 2013). Out of those sources, online sources are mostly preferred by urban producers compared to other sources (Surls, Feenstra, Golden, Galt, Hardesty, Napawan, & Wilen, 2014). Therefore, promoting collaborations among different information sources, using more online sources to supplement existing information dissemination approaches, and providing information in different languages is important in urban areas (Angello et al., 2016; Harms et al., 2013; Surls et al., 2014).

Previous research has also examined the communication preferences of other Extension audiences. Warner, Stubbs, Murphrey, and Huynh (2016) conducted a national Delphi study to determine the competencies needed by Extension personnel to use social marketing. They identified eight competency areas: "(a) Personal attributes; (b) Knowledge and understanding; (c) Research and analysis; (d) Communication; (e) Leadership; (f) Professionalism and ethics; (g) Program-planning, implementation, and evaluation; and (h) System thinking" (p. 14). Within these eight categories areas were competencies like "build collaborative relationships based on trust and authenticity" (p. 24), "identify and locate stakeholders" (p. 25), and "synthesize primary and secondary data to understand target audience's perceived barriers, benefits, and motivators to a given change" (p. 24). In a study of agricultural opinion leaders, Lamm, Rumble, Carter, and Lamm

(2016) found this audience preferred receiving information from web pages and meetings. Twitter, conference calls, and other sources were less preferred. Social media has also been examined within the context of Extension. Bowen, Stephens, Childers, Avery, and Stripling (2013) found social media usage was prevalent in both rural and urban 4-H programs. Rumble, Lamm, Martin, and Warner (2017) examined how to frame messages with homeowners to increase water conservation behaviors. They discovered this audience responded to the social implications of the message.

Having an understanding about what, when, and how urban producers gather information is important for Extension to be able to address their needs. When urban producers receive information that is relevant, up-to-date and meets their needs, they have greater ability to adopt new ideas and innovative technologies, providing more opportunities for success (Mchombu & Cadbury, 2006). By understanding the information needs and information-seeking behavior of urban agriculture producers, we can map how urban producers' knowledge is constructed and how they are influenced by different sources of information.

Purpose and Objectives

The purpose of this study was to describe how the information needs and information-seeking behavior of urban food producers influence their perceived behavioral control towards urban farming. The specific objectives that guided the study were to:

1. Identify the most needed information of urban food producers.
2. Identify the frequency of usage and trust in information sources.
3. Explore participants' satisfaction with the OSU Extension.

Methods

This study used a mixed method research approach to develop a more detailed description of a phenomenon of individuals involved in it. The methodology of the study included a semi-structured interview and a questionnaire. This research was conducted as a part of a larger research study.

Instrumentation

A questionnaire was developed to collect quantitative data. A hybrid of several instruments that measured information-seeking behavior, trust, and satisfaction were used, based on the work of Mugwisi, Ocholla, and Mostert (2014), who developed a questionnaire on information needs of agricultural researchers and Extension workers in Zimbabwe. The UF/IFAS Extension Customer Satisfaction Survey (Israel, 1997) was used to capture the interaction and satisfaction with the CES. The first section of the questionnaire required respondents to indicate the type of information they needed to improve their production and to be successful urban producers. In the second section the respondents were given 20 sources of information and were asked to indicate the frequency of use (1 = *never use*, 2 = *less than once a month*, 3 = *about 1-2 times a month*, 4 = *once a week*, 5 = *several times/week*). In the same section, respondents were asked to rank the level of trust they associate with the quality of each information source on a scale of five (1 = *very poorly trust*, 2 = *poorly trust*, 3 = *moderately trust*, 4 = *highly trust*, 5 = *very highly trust)*.

Individual interviews with commercial urban producers were conducted to collect qualitative data. A researcher-developed interview guide was designed based on the conceptual framework used for the study. The interview guide development process included several important steps such as literature review, feedback from a panel of experts, and approval from the institutional

review board of the University of Florida The questionnaire included open-ended questions about the information needs and information-seeking behavior of urban food producers. According to the developed qualitative interview guide, first, the respondents were asked about their most needed information to continue urban food production. Then the respondents were asked about their perception towards different information sources they receive information from. Finally, the respondents were asked their opinion about the services offered by OSU Extension.

To ascertain that the developed instruments measured the intended constructs, steps were taken to overcome threats to validity, reliability, and sources of error. To overcome threats to internal validity, items adapted from established instruments were kept unchanged and data were collected within a limited period. Threats to statistical validity which is caused due to errors in statistical interpretations and wrong data analysis (Ary, Jacobs, Sorensen, & Walker, 2014) were overcome by getting feedback from a panel of experts who had expertise in urban Extension, agricultural education and communication, and survey design and research. By using established instruments, threats to construct validity were addressed. A pilot test was conducted before the actual data collection to establish reliability. Needed changes were done to the instrument based on the results of the pilot study.

Establishing trustworthiness is important in qualitative studies. Lincoln and Guba (1985) used the term trustworthiness to talk about the validity of qualitative research. Triangulation and member checking were used to establish credibility. Multiple data sources such as researcher notes and audio transcriptions were used to establish credibility of the collected data. After the data were transcribed, they were sent to the respondents to review for accuracy. According to the feedback from the respondents, needed changes were done to the transcriptions to ensure the accuracy of the transcribed data. Transferability was established through thick description and confirmability was established through an audit trail. Transferability measures as it relates to thick description, the participants of this study were chosen based on having urban farming experiences in Columbus. Throughout this study the researcher maintained a journal to take notes of each visit to individual producers. Audio records of each interview were listened multiple times for understanding. Transcriptions of the interviews were checked with the audio to ensure accuracy. All the reflective processes, notes, and data analysis used in this study were documented.

Population and Sample

The target population for this study was commercial urban food producers in the city of Columbus, which was purposively selected for this study because it is recognized as a national leader in urban Extension and has branded Extension in the city as OSU Extension (National Urban Extension Leaders, n.d). OSU Extension has a presence in each county, linking communities to teaching, researching, and outreaching resources of the university. The sample was identified using the urban Extension specialist (a key informant) with extensive experience in urban agriculture in the city (Ary et al., 2014). Fifteen commercial urban producers were initially identified and snowball sampling was used to identify additional commercial producers. Of the original nominated producers, eight agreed to participate. These eight nominated an additional seven producers. In total, 15 commercial urban food producers participated in the study. Producers were given a code based on the order in which their data was collected (R1, R2, R3, etc.).

Out of those 15, 10 producers were female and 5 producers were male. Respondents have lived in urban areas an average of 15 years. Most respondents (54%) indicated the highest level of education completed was a 4-year college degree followed by 15%, 16%, and 15% of respondents who had completed some college education, a graduate or professional degree, and high school or GED respectively. About 70% of respondents stated that their gross annual income was below

$10,000. Fifteen percent of respondents stated their income was between $10,000 to $19,000. The income category between $20,000- $39,000 and $40,000 - $59,000 was 8% each. Respondents' average years of experience as urban farmers was 6 years.

Data Collection and Analysis

Data collection was conducted in January of 2017. The lead researcher visited each respondent personally to collect data. Interviews were conducted on the farm premises of the respondents. The purpose of the research was explained and informed consent was obtained. Casual conversations were made with respondents to build rapport as suggested by Creswell (2013). The researcher spent an average of 2-3 hours with each respondent interviewing, observing, touring their farms, and shadowing the respondents' farm operations. Each respondent took approximately 20-30 minutes to complete the questionnaire. Interviews lasted an average of ten minutes with each respondent beyond the questionnaire. All the interviews were voice recorded with the permission of the respondents. Researcher notes were also taken.

The conceptual framework developed by the researcher was used as the guide for data analysis. The constructs developed in the conceptual model were considered as the base for thematic areas identified through data analysis. The data were transcribed first by the researcher. In order to understand the data deeply, transcriptions were read several times (Ary et al., 2014). To identify categories, line-by-line open coding was used as suggested by Strauss and Corbin (1990). After the initial analysis, those identified categories and respondents' quotes related to each category were recorded on a spread sheet. Descriptive statistics were used to summarize quantitative data.

Results

Preferred Information

The most needed information for urban farming selected by respondents were related to increasing production (R3, R4, R7, R8, R9, R11, R13, R15). Respondents also needed information about pest and disease control (R2, R4, R9, R15), information on available resources (R7, R8, R11), marketing and business management (R5, R3, R12, R10), and grant and other funding opportunities (R1, R3, R5, R7).

Frequency of Use of Information Sources

The respondents use a variety of information sources (see Table 1). Out of the thirteen sources of information given, the Internet is the most frequently used source of information by respondents followed by friends and co-workers, and family and close relatives. Events at research centers, newspapers, commercial trade shows, neighbors, and local garden stores were the least frequently used sources of information.

Table 1

Frequency of Use of Information Sources

	Never Use %	Use 1-2 times per year %	Use 3-4 times per year %	Use about monthly %	Use about weekly %
Internet	0	0	7	20	72
Friends or co-workers	0	0	7	27	40
Family members or close relatives	27	13	13	20	20
University web sites	7	20	20	27	20
Company web sites	14	27	7	34	14
Food production magazines	14	34	34	0	14
Television programs	60	14	7	0	14
Neighbors	20	20	47	0	7
Local garden store	27	27	20	7	7
Articles in the local newspaper	47	20	20	0	7
Consultations with university specialists	14	27	40	7	7
Commercial Trade Shows	34	47	14	0	0
Events at Research Centers	40	47	7	0	0

Internet. Time to access, availability, and cost of access has made the Internet the most convenient source of information for respondents (R1, R3, R5, R6, R8, R9, R11, R12, R13, R15). The Internet is a very powerful method based on the fact that the respondents are able to gain access to this source in the convenience of their home, instead of going elsewhere. As stated by R12, the Internet is the "cheapest and most effective source of information. So why not use it?"

Respondents used social media applications on the Internet to share information and to communicate with other producers. Facebook was the mostly used Internet application by the respondents. Almost all the respondents were members of different Facebook groups which are relevant to urban farming. These Facebook groups related to farming have members from around the world. Members of these farming-related social media groups represented a wide variety of agricultural professionals such as researchers, food producers, Extension officers, authors etc. Therefore, Facebook has become a very trustworthy, convenient, and inexpensive way to share, learn, research, disseminate and to consult for information. Most of the respondents were accustomed to posting on Facebook groups before reaching out to other sources, whenever they have a problem that needed to be solved on the farm. R3 stated that the Facebook groups gave her the opportunity to "communicate with other urban producers who are steps above her in scale and in the market." For R12, the biggest advantage of using Facebook groups was the opportunity it

provided to interact with 'the people' in the urban agriculture sector who have contributed a lot in terms of research and publications.

> Thankfully, there's groups on Facebook that I'm in where it's –in my opinion the best farmers in the whole country if not the whole world. It's all these people that wrote these books in there and they'll talk to you like you're a normal person. They're just awesome humble people. (R12)

Other than Facebook, some respondents also used YouTube (R15, R 10, R3, R 6), online blogs maintained by other urban producers (R1, R3, R6, R7), and online publications by different institutions (R4, R10).

Friends and co-workers. Urban producers were their own sources of information. Almost all the producers interviewed for this study stated that they consult their friends and co-workers for information. R1 stated that her first source of information was her friends who she meets in the farmers' market. Whenever she has a problem she is used to reaching out to those friends because "they have a little bit more experience dealing with problems, they got a little more crop variety and a little more land. And they've been in production for a longer." According to R3, she felt very comfortable talking to her friends whenever she had a problem that needed to be solved on the farm.

Trustworthiness of Information Sources

Table 2 presents the findings of the trustworthiness of different sources of information. Most respondents trusted university resources over other resources because the university experts were more knowledgeable and have research backgrounds. Respondents used resources from different universities.

> Other resources that I found recently that I really like as well is that Michigan State Extension office has a handful of programs that really do a good job focusing on the small-scale farmers in particular. (R5)

Other than that, respondents also stated that they trust on-farm tours and demonstrations (R5, R7, R8, R10) because they get to see and feel the actual situation in those farms. Some respondents mentioned that they do not have time for farm visits, even though they prefer to go (R12, R 3, R1).

Table 2

Trustworthiness of Information Sources

	Very poorly trust %	Poorly trust %	Moderately trust %	Highly trust %	Very highly trust %
University web sites	0	7	34	14	40
Consultations with university specialists	0	0	47	7	40
Demonstration gardens	7	0	20	27	40
Friends or co-workers	0	0	78	47	34
Local garden store	7	7	40	20	20
Events at Research Centers	7	0	34	20	20
Family members or close relatives	14	0	34	20	14
Commercial Trade Shows	0	20	27	14	14
Company web sites	7	0	27	47	14
Food production magazines	7	14	34	20	14
Internet	0	0	47	20	14
Neighbors	7	67	7	7	7
Television programs	14	14	40	7	0
Articles in the local newspaper	14	0	54	20	0

Cooperative Extension Service

Interaction. When the respondents were asked about their interaction with the CES, about 74% of the respondents stated that they have used CES and about 14% of the respondents stated that they have never used CES. Respondents who have never used Extension were asked about reasons they did not use Extension and they stated that they were unaware of its existence in the city. About 7% of the respondents use CES monthly or weekly while about 40% and 27% of the respondents use CES 1-2 times per year and 3-4 times per year respectively.

Satisfaction. Only 13% of the respondents indicated they were highly satisfied with the overall services offered by the CES. About 27% of the respondents were satisfied with the overall services offered by the CES. About 7% of the respondents were highly dissatisfied with the overall services offered by the CES. About 20%, and 14% of the respondents were dissatisfied, and neither satisfied nor dissatisfied about the overall services by the CES respectively.

As mentioned in the previously, Extension is not the most preferred source of information by the respondents however, they trust Extension resources, because the information is coming

from university research and university professionals. Their satisfaction about overall Extension service depends on several factors such as mode of delivery, time to access, and availability of information. Some respondents mentioned that the Extension services are useful for basic information only. (R15, R4).

Perceptions. OSU Extension has initiated an urban producer networking group which facilitates social gatherings for urban producers, to meet up and network with others. The respondents appreciated this because it gives them an opportunity to network with other producers in the city.

> Another thing is urban farmers' network. Out of this Extension business, he and other people get together and started get togethers that we could meet each other and socialize. It is wonderful. We had our first meeting a couple of weeks ago and it was a wonderful time. There were about 20 producers. It was fun and exciting. So, it is not just learning through Extension but also the social outlet. (R2)

Some respondents (R1, R3, R5, R6) also have had some negative experiences with Extension personnel which had made them reluctant to reach out to Extension in the future. R1 expressed that he could not receive the information he needed and Extension did not help him to reach out to other people who would had information for him. Moreover, R3 mentioned her disappointment towards a specific Extension agent for not disseminating new information he got from conferences and other related events he attended. Responsiveness of Extension towards respondents' issues and information needs were also criticized by several respondents (R1, R3, R5, R6). R3 stated, that she received "vague responses to specific questions" she has asked from Extension.

> I have needed quick information before and I have reached out to my Extension agent. And I have been told by him that he had no information for me. And even if I follow up they say they don't have information. That is not the only example that the same thing had happened. (R1)

Another respondent said,

> I have definitely gotten a few vague responses from him to specific questions I have asked. I've had other people who've gotten just like "no I can't help you" and I just feel like there should be more responsiveness to the fact that people are - you're saying you want to be here for us so how do we work together to do that. (R 3)

During the interviews, several respondents complained that most of the Extension materials they receive are irrelevant to agriculture. (R1, R5, R12, R7).

> I would say the e-newsletter I get which is the main thing that comes from Extension that I've seen from our office. It is actually pretty off putting because it does not include anything about agriculture. (R1)

Respondents also stated their preference towards the information delivery modes used by Extension. Webinars are not preferred by respondents because they are difficult to get through and easy to avoid (R1, R5, R10). R5 said that the fixed slides used in webinars have not been very "attention getting and attention keeping" for her. Respondents preferred to receive information through e-mails (R2, R3, R4, R8, R9, R11, R14, R15), other electronic media such as Facebook

posts (R1, R12, R5, R9), and searchable data bases (R11, R13). R13 said that he preferred online materials more because he does not have to "drive half an hour to go sit somewhere to receive information." R4 stated that he preferred "searchable interfaces" so that he could "learn what they need rather than being overwhelmed with too much information."

Respondents also expressed their opinion on in-person training organized by OSU Extension. The respondents preferred to receive Extension information as on-farm demonstrations and in-person training because it is the best way to have a captive audience and to learn from a more experienced group through interactive activities.

Conclusions, Recommendations, and Implications

Urban food producers in this study most needed information to increase food production. Respondents preferred to receive information from the Internet and other electronic media over conventional information sources. This group of urban producers trusted information from university and Extension sources, but expressed mixed opinions about their personal experiences with OSU Extension.

Urban farming is a very information-intensive activity. As stated by the respondents themselves, most of them were first-generation urban farmers. Therefore, they do not have parental sources who can pass down basic knowledge about agriculture, which makes them highly dependent on other information sources. The respondents use a variety of information sources to gain agriculture related knowledge. Those information sources are selected mainly by choice. Diekmann, Bennaton, Schweiger, and Smith (2017) in a study conducted with urban producers in California reported similar findings, which highlighted the need for reliable online information sources for urban farmers. Respondents also prefer and trust close ties such as friends and co-workers from which to receive information. According to Granovetter (1973), new information flows more through weak ties than through strong ties because connections in the close network circle of an individual tend to move similar to that individual. Therefore, weak ties play an important role in allowing an individual to access new information. But, the findings of this study contradict with Diekmann and Batte (2009), who concluded that San Francisco farmers prefer print and other traditional information sources over interpersonal and electronic media. But the authors had not considered rural-urban differences in their study. If the researchers had considered rural and urban farmers separately, the findings would have been more powerful in interpreting the preference of producers. The same study stated that those who prefer the Internet and other online sources tend to be educated and younger than other producers. This aligns with the findings of this study because most of the respondents were highly educated and were young in age. Llewellyn (2007) stated that information needs to be relevant, meaningful, and delivered in a way that is desired by producers.

These results highlight a need for change in Extension program delivery modes in urban areas. Extension needs to focus more on electronic and other visual media to disseminate information to urban producers. As suggested by Mastel (2014), adopting new technologies will help Extension to expand its audience. Extension is best suited to help beginning farmers because more advanced farmers who need specialized assistance are better able to pay for consultants. But, if OSU Extension is planning to address the needs of all farmers, the respondents' perception of the fact that Extension is useful only for basic information could be overcome by designing and delivering programs to segmented audiences such as beginning farmers, established farmers, commercial farmers, community gardeners etc.

Visibility of Extension is a matter of concern in urban areas. Since Extension originated in the rural areas, targeting rural population, some urban respondents are still not aware of the services they can get from Extension, while some of them are completely unaware of the existence of Extension. Several research studies have stated that awareness, participation, and use of Extension resources is low among urban populations. (Jacob, Willtis, & Crider, 1991).

The respondents' trust towards Extension and university resources is high, but they are concerned about the time, mode of delivery, and availability of Extension information. Some respondents believe that Extension is useful only up to a certain point and thereafter Extension cannot help with farming. Some respondents who are aware of Extension programs believe they could not benefit from Extension programs. This poses a challenge for Extension. It is recommended to conduct awareness programs among urban producers about the services available through Extension. Farmers' markets could be a great avenue to spread the word about Extension, for those producers who are unaware of its existence. Since the respondents highly depend on co-workers and friends, producers who attend Extension programs could be advised to make other producers aware of Extension programs and resources available through Extension. Key leaders within the urban farming communities could be used to serve as opinion leaders to develop trust and to inform other producers of Extension services.

Other than quality, mode of delivery, relevance, and other factors that are related to information sources, it was also realized that personal characteristics of the information disseminator also plays an important role. Several producers interviewed for this study have had negative experiences with Extension professionals. Those unpleasant experiences had made them dislike and become demotivated towards seeking out help from Extension. Raison (2010) and Reynolds (2011) suggested that the Extension agents taking on the traditional role of being an educator need to be combined with the role of a facilitator to effectively serve urban communities. Lelekacs, Bloom, Jayaratne, Leach, Wymore, and Mitchell. (2016) added more to it by suggesting "to provide educators with knowledge about food systems research, as well as tools, and guidance about working across disciplinary lines, facilitating community engagement, and addressing social dimensions of local food systems" (p. 2).

Today, available information and information sources are very diverse. Therefore, the need for quality information that is delivered on time, in the proper format is important to meet the needs of urban producers. Extension professionals are required to have a better understanding urban producers' information-seeking behavior. Future research on digital and online information delivery strategies and expected competencies from urban Extension professionals will assist Extension to design and deliver effective Extension programs to the urban clientele they serve. Additionally, this study should be replicated in other urban centers around the country to see if similar findings emerge.

References

Alberti, M., Marzluff, J. M., Shulenberger, E., Bradley, G., Ryan, C., & Zumbrunnen, C. (2003). Integrating humans into ecology: Opportunities and challenges for studying urban ecosystems. *Bio Science, 53*(12), 1169-1179. doi:10.1641/0006-3568(2003)053[1169.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211. Retrieved from https://cas.hse.ru/data/816/479/1225/Oct%2019%20Cited%20%231%20Manage%20THE%20THEORY%20OF%20PLANNED%20BEHAVIOR.pdf

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior.* Englewood Cliffs, NJ: Prentice-Hall, Inc.

Angello, C., Msuya, J., & Matovelo, D. (2016). Assessing the information needs and information sources of urban and peri-urban livestock keepers in Kinondoni and Morogoro urban districts, Tanzania. *Library Philosophy and Practice*, *1*. Retrieved from http://digitalcommons.unl.edu/libphilprac/1363/

Ary, D., Jacobs, L. C., Sorensen, C., & Walker, D. A. (2014). *Introduction to research in education* (9th ed.). Belmont, CA: Wadsworth.

Bowen, R. D., Stephens, C. A., Childers, C. C., Avery, E. J., & Stripling, C. T. (2013). Diffusion of social media among county 4-H programs in Tennessee. *Journal of Agricultural Education, 54*(3), 84-99. doi: 10.5032/jae.2013.03084

Brown, K., & Jameton, A. (2000). Public health implications of urban agriculture. *Journal of Public Health Policy*, *21*(1), 20-39. Retrieved from https://www.jstor.org/stable/3343472

Byamugisha, H. M., Ikoja-Odongo, R., & Nasinyama, G. W. (2010). Information needs and use among urban farmers in Kampala city in Uganda. *Library and Information Research*, *34*, 18-32. Retrieved from http://www.lirgjournal.org.uk/lir/ojs/index.php/lir/article/view/235/487

Creswell, J. W. (2013). *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Diekmann, F., & Batte, M. T. (2009). Examining the information search strategies of Ohio farmers. *Journal of Extension*, *47*(6). Retrieved from http://www.joe.org/joe/2009december/a8.php

Diekmann, L., Bennaton, R., Schweiger, J. & Smith, C. (2017). Involving Extension in urban food systems: An example from California. *Journal of Human Sciences and Extension, 5*(2). Retrieved from https://www.jhseonline.com/current-issue-2

Duram, L. A., & Larson, L. K. (2001). Agricultural research and alternative farmers' information needs. *Journal of Applied Communication and Research, 53*(1). Retrieved from http://dx.doi.org/10.1080/00330124.2001.9628438

Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology*, *78*(6), 1360-1390. Retrieved from http://www.jstor.org/stable/2776392

Harms, A. M. R., Presley, D. R., Hettiarachchi, G. M., & Thein, S. J. (2013). Assessing the educational needs of urban gardeners and farmers on the subject of soil contamination. *Journal of Extension*, *51*(1). Retrieved from https://www.joe.org/joe/2013february/a10.php

Israel, G. D. (1997). *Florida Extension Service's customer satisfaction survey protocol*. Gainesville, FL: UF/IFAS. Retrieved from http://pdec.ifas.ufl.edu/satisfaction/CSS%20Protocol.pdf

Jacob, S. G., Willis, F. K., & Crider, D. M. (1991). *Citizen use of cooperative Extension in Pennsylvania: An analysis of statewide survey data*. University Park, PA: Penn State College of Agriculture.

Lamm, K. W., Rumble, J. N., Carter, H. S., & Lamm, A. J. (2016). Agricultural opinion leader communication channel preferences: An empirical analysis of Participants of agricultural and natural resource leadership development programs. *Journal of Agricultural Education, 57*(1), 91-105. doi: 10.5032/jae.2016.01091

Lee, A. C., & Maheshwaran, R. (2011). The health benefits of urban green spaces: A review of the evidence. *Journal of Public Health, 33*(2), 212-222. doi:10.1093/pubmed/fdq068

Lelekacs, J. M., Bloom, J. D., Jayaratne, K. S. U., Leach, B., Wymore, T., & Mitchell, C. (2016). Planning, delivering, and evaluating an Extension in-service training program for developing local food systems: Lessons learned. *Journal of Human Sciences and Extension, 4*(2),1-19. Retrieved from https://media.wix.com/ugd/c8fe6e_3633e1c2b3ed4f6c98c2e75d3c5d649b.pdf

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage.

Llewellyn, R. S. (2007). Information quality and effectiveness for more rapid adoption decisions by farmers. *Field Crops Research*, *104*(1-3), 148-156. Retrieved from http://www.sciencedirect.com/science/article/pii/S0378429007001220

Mastel, K. L. (2014). Extending our reach: surveying, analyzing, and planning outreach to Extension staff. *Journal of Agricultural and Food Information, 15*(4), 268-281. doi:10.1080/10496505.2014.960738

Mchombu, K., & Cadbury, N. (2006). Libraries, literacy and poverty reduction: A key to African development. *Library Philosophy and Practice, 1069,* 1-14. Retrieved from http://www.bookaid.org/resources/downloads/Libraries_Literacy_Poverty_Reduction.pdf

Mendes, W. (2006). Creating and implementing food policy in Vancouver, Canada. *Urban Agriculture Magazine, 16,* 51-54. Retrieved from http://www.ruaf.org/creating-and-implementing-food-policies-vancouver-canada

Mougeot, L. (2006). *Growing better cities: Urban agriculture for sustainable development*. Ottawa, Canada: International Development Research Centre

Mugwisi, T., Ocholla, D., & Mostert, J. (2014). An overview of the information needs of agricultural researchers and Extension workers in Zimbabwe. *South African Journal of Library and Information Science, 64*(1), 85-108. Retrieved from https://www.degruyter.com/downloadpdf/j/libr.2014.64.issue-1/libri-2014-0008/libri-2014-0008.xml

National Urban Extension Leaders. (n. d). *A national framework for urban Extension: A report from the national urban Extension leaders*. Retrieved from http://media.wix.com/ugd/c34867_668cd0780daf4ea18cb1daddad557c72.pdf

Raison, B. (2010). Educators or facilitators? Clarifying Extension's role in the emerging local food systems movement. *Journal of Extension, 48*(3). Retrieved from https://www.joe.org/joe/2010june/comm1.php

Reynolds, K. (2011). Expanding technical assistance for urban agriculture: Best practices for Extension services in California and beyond. *Journal of Agriculture, Food Systems, and Community Developmen*t, *1*(3), 197–216. doi:10.5304/jafscd.2011.013.013

Roberts, T. G., Harder, A., & Brashears, M. T. (Eds). (2016). *American Association for Agricultural Education national research agenda: 2016-2020.* Gainesville, FL: Department of Agricultural Education and Communication.

Rumble, J. N., Lamm, A. J., Martin, E. T., & Warner, L. A. (2017). Examining thought processes to understand the impact of water conservation messages on attitude. *Journal of Agricultural Education, 58*(3), 168-184. https://doi.org/10.5032/jae.2017.03168

Strauss, A. L., & Corbin, J. M. (1990). *Basics of qualitative research*. London, UK: Sage Publications.

Sturges, P., & Chimseu, G. (1996). The chain of information provision in the villages of Malawi: a rapid rural appraisal. *International Information and Library Review, 28*(2), 135-156. Retrieved from http://www.sciencedirect.com/science/article/pii/S1057231796900107

Surls, R., Feenstra, G., Golden, S., Galt, R., Hardesty, S., Napawan, C., & Wilen, C. (2014). Gearing up to support urban farming in California: Preliminary results of a needs assessment. *Renewable Agriculture and Food Systems, 30*(1), 1-10. doi:10.1017/S1742170514000052

Taylor, S., & Todd, P. (1995). Decomposition and crossover effects in the theory of planned behavior: A study of consumer adoption intention. *International Journal of Research in Marketing, 12*(2), 137-155. doi:10.1016/0167-8116(94)00019-K

Urban Agriculture Committee of the Community Food Security Coalition, (2002). *Urban agriculture and community food security in the United States: Farming from the city center to the urban fringe*. Retrieved from http://ocfoodaccess.org/wp-content/uploads/2013/08/Urban-Agriculture-Food-Security_CFSC-2002.pdf

van Veenhuizen, R. (Ed.). (2006). *Cities farming for the future: Urban agriculture for green and productive cities.* Silang, Philippines: International Institute of Rural Reconstruction and ETC Urban Agriculture.

van Veenhuizen, R., & Danso, G. (2007). *Profitability and sustainability of urban and peri-urban agriculture: Agricultural management, marketing, and finance occasional paper 19*. Rome, Italy: Food and Agriculture Organization of the United Nations.

Warner, L. A., Stubbs, E., Murphrey, T. P., & Huynh, P. (2016). Identification of the competencies needed to apply social marketing to Extension programming: Results of a Delphi study. *Journal of Agricultural Education, 57*(2), 14-32. doi: 10.5032/jae.2016.02014