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Barriers to community garden success: Demonstrating framework for expert consensus to inform policy and practice

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ABSTRACT

Community gardens receive much attention for the benefits offered to participants and their communities. However, research has documented a variety of barriers and challenges that community gardeners and support organizations face in establishing and maintaining gardens. These issues may dilute service providers' impact, by reducing their attention to the more pressing factors that result in garden failure. Additionally, access to resources to mitigate these challenges and barriers differ from region to region. This demonstrates a significant need to identify the most pervasive barriers, challenges and obstacles in order to refine the focus of support programs and provide concentrated efforts to better position community gardens for success. The purpose of the study was to demonstrate the use of a framework to inform the development of policies and programs that stakeholders, including Extension, can adopt for overcoming the most frustrating impediments to success. It did so by using an underused but appropriately matched tool, the Delphi technique, which can easily be adopted by community garden stakeholders. Because the types of stakeholders are diverse and challenges are complex, the objectives were to determine whether consensus could be achieved and whether a core set of barriers exist. The group agreed upon four barriers, with the highest level of agreement centering on the challenge of time demand for community engagement.

1. Introduction

Community gardens receive much attention for the benefits offered to participants and their communities. Research often focuses on the positive physical and social benefits that community gardens provide to participants and neighborhoods. However, gardens face significant challenges to success and sustainability. In a survey of 445 organizations that support 8550 gardens in the United States and Canada, Drake and Lawson (2015a) found that from 2007 to 2012, 1615 gardens had been lost. Participants reported that lack of interest by gardeners, loss of land and funding were the reasons gardens ceased operating. The ability of community gardens and support organizations to mitigate garden loss is essential to sustained community and individual benefits. Additionally, mitigating these loses may be an important precursor for achieving continued support and resources from policymakers and funders.

Current research documents a variety of physical barriers and challenges that community gardeners and support organizations face in developing and sustaining gardens. One salient challenge is obtaining long-term land tenure that is supported by policy and planning (Drake and Lawson, 2014, 2015a; Lawson, 2004; Mikulec et al., 2013; Saldivar-Tanaka and Krasny, 2004; Wakefield et al., 2007). Community gardens located on vacant land are threatened by development (Drake and Lawson, 2014; Wakefield et al., 2007), which can create uncertainty among gardeners of the future of their gardens (Wakefield et al., 2007). In addition to not being able to acquire permanent land, the physical attributes of garden sites can also create obstacles, including soil contamination (Cohen and Reynolds, 2015; Wakefield et al., 2007), water access (Drake and Lawson, 2015b; Wakefield et al., 2007) and lack of available facilities, such as restrooms (Kingsley et al., 2009). Once gardens are built, resources, such as soil, compost, fertilizer, and seeds are in continual demand (Cohen and Reynolds, 2015; Drake and Lawson, 2015a; Gregory et al., 2016; Wakefield et al., 2007). Funding to support recurring costs for established gardens can be more difficult to obtain than for new gardens (Drake and Lawson, 2015a). Further, funding for support staff at individual garden sites and for supporting organizations, such as Extension (Cohen and Reynolds, 2015; Wakefield et al., 2007) can also challenge growth and sustainability.

Individual and community barriers and challenges also influence

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garden success and sustainability. For potential and current gardeners, the time commitment can be a challenge (Kingsley et al., 2009). Also lack of interest and participation (Drake and Lawson, 2015a), low visibility of the garden (Milliron et al., 2017), absence of technical skills (Cohen and Reynolds, 2015), and distance to a garden site (Kingsley et al., 2009), can be significant barriers though research is mixed on the final factor listed (Milliron et al., 2017). Gardeners also need assistance with strategies to reach out to the community at large and to increase support (Cohen and Reynolds, 2015; Drake and Lawson, 2015a,b). At the community level, research suggests resource disparities exist among low-income gardeners and communities of color. Low-income gardeners may have more difficulty contributing financial resources to a garden (Cohen and Reynolds, 2015; Wakefield et al., 2007). Further, communities of color may have unequal access to political leaders and groups, thus limiting the ability to secure public resources and funds (Cohen and Reynolds, 2015).

Providing community garden support often requires interactions across scales as communities, non-governmental organizations and government agencies plan and implement community gardens (Drake and Lawson, 2015b). Challenges arise as the network of highly contextualized agencies and programs, which vary from town, municipality, county, and state, deliver garden support. Included in this garden support network are local county extension offices, which assist community gardeners in various technical and educational capacities through workshops, site visits, demonstration gardens, and plant clinics in addition to other services. The variety of issues faced by community gardens may mean that service providers (those that provide educational and technical assistance) are stretched thin and cannot devote attention to the central factors that result in garden loss. Additionally, access to resources to mitigate these challenges and barriers may differ from region to region. This demonstrates a significant need to identify the most pervasive barriers, challenges and obstacles in order to refine the focus of support programs and provide concentrated efforts to better position community gardens for success.

This aforementioned situation exists in the state of Florida, the focus of this study, where a complex network of stakeholder groups are providing garden support. Within this network there are state organizations that deliver educational and technical assistance to ensure the successful development and sustainability of these gardens including the Florida Department of Health (FDOH, 2018) and the University of Florida Institute of Food and Agricultural Sciences (UF-IFAS, 2018). These statewide organizations are uniquely positioned to provide meaningful support through their expansive footprint of local offices that foster a connection between the state organization and community members. These organizations and their collaborative partners have the potential to develop broad scale solutions to overcome the significant challenges that community gardens and gardeners face that will better position them for success.

Since overcoming the barriers and challenges to the success of community gardens takes a collaborative effort among garden stakeholders and support providers, developing agreement on common issues is essential. Developing group consensus has been shown to be a critical element to facilitating effective joint problem-solving across the includes multiple organizations across various contexts (Hesse et al., 2015; Innes, 1996; Innes and Booher, 1999; Koppenjan and Klijn, 2004; Pondy, 1967). In Florida, the barriers that impede the success have yet to be outlined in the literature, making this exercise especially salient among the study participants and the future of community gardens in the state. The purpose of this study was to apply a well-suited but underutilized tool, the Delphi technique, which all community garden stakeholders, including Extension, can easily adopt to move a group towards consensus. Given the diversity of challenges and stakeholders, the objective was to determine whether a core set of barriers exist for the successful development and sustainability of community gardens. Demonstrating consensus on core barriers and obstacles provides a critical first step for developing solutions that may provide mutual gain by mitigating common issues.

2. Collaboration, consensus-building and the Delphi technique

The success of community gardens at a large scale is predicated on successful collaboration of multiple stakeholder groups. Collaboration can be defined as the activity of working together towards a common goal that integrates numerous elements including communication, cooperation, and responsiveness (Hesse et al., 2015). Consensus building among stakeholders is frequently leveraged to explore complex situations and has been lauded as a more systematic and sophisticated communicative form of collaborative problem solving across sectors (Innes and Booher, 1999). Consensus building has emerged as a deliberation technique with the potential to bring about transformation by providing the opportunity to reformulate comprehensive planning in collaborative settings (Innes and Booher, 1999; Innes, 1996).

Building consensus is important in today's society because many of the problems that exist affect diverse groups of people with different interests (Burgess and Spangler, 2003). As problems accumulate and become more complex, the stakeholders and organizations that deal with the problems tend to rely on each other for assistance and become interdependent. Consensus-building processes allows a variety of people to have input in defining the problem and providing solutions, rather than leaving these decisions up to single organizations or experts (Burgess and Spangler, 2003). Utilizing this consensus building for joint-problem solving helps to mitigate potential conflict and the divergence of goals that is typically seen when decisions are made in isolation (Pondy, 1967).

To facilitate the development of salient solutions, the network of stakeholders must first develop consensus on the problem at hand. Malek (2013) explains that the goal of this initial assessment centers on gathering information from key stakeholders to identify common issues and barriers that need to be addressed (Malek, 2013). This process allows for joint problem solving efforts to effectively frame the issues and promotes the development of mutual gain solutions. (Burgess and Spangler, 2003; Innes and Booher, 1999; Malek, 2013).

Although consensus building is seen an important technique for collaborative problem solving, the persistence of organizational silos and fragmentation along with value diversity makes achieving consensus about the nature of problems more difficult (Koppenjan and Klijn, 2004). This makes finding an effective process for achieving consensus paramount. The Delphi technique is a widely used and accepted method for achieving convergence of opinion concerning real-world knowledge solicited from experts within certain topic areas (Hsu and Sandford, 2007). It is a research-based approach used to solicit, collate, and direct responses to achieve consensus among a group of experts and has been cited as an effective means from structuring a group communication process so that the process is effective in allowing a group of individuals to address a complex situation (Delp et al., 1977; Linstone and Turoff, 2002; Warner, 2015). The Delphi technique can be used to achieve the following objectives:

1. *To determine or develop a range of possible program alternatives;*
2. *To explore or expose underlying assumptions or information leading to different judgments;*
3. *To seek out information which may generate a consensus on the part of the respondent group;*
4. *To correlate informed judgments on a topic spanning a wide range of disciplines, and;*
5. *To educate the respondent group as to the diverse and interrelated aspects of the topic* (Delbecq et al., 1975, p. 11).

The Delphi technique has been cited as a well-suited method for consensus building that uses a series of questionnaires to collect data from a panel of selected subjects (Dalkey and Helmer, 1963; Dalkey, 1969; Hsu and Sandford, 2007; Lindeman, 1981; Linstone and Turoff,

1975; Martino, 1983; Young and Jamieson, 2001). Delphi, in distinction to other data collection and analysis techniques, employs a multiple iteration feedback process designed to develop a consensus of opinion around a specific topic. The feedback process allows and encourages the selected Delphi participants to reassess their initial judgments about the information provided in previous iterations (Hsu and Sandford, 2007). Additional characteristics associated with the Delphi technique include the ability to provide anonymity to respondents, a controlled feedback process, and the suitability of a variety of statistical analysis techniques to interpret the data (Dalkey, 1972; Ludlow, 1975). These characteristics are designed to offset the shortcomings of conventional means of amalgamating opinions obtained from a group, including the influence of dominant individuals, noise, and group pressure for conformity (Dalkey, 1972; Hsu and Sandford, 2007).

Subject anonymity is one of the primary benefits of this technique because it can reduce the effects of dominant individuals which often is a concern when using group-based processes used to collect and synthesize information (Dalkey, 1972; Hsu and Sandford, 2007). Moreover, the issue of confidentiality is facilitated by the geographic diffusion of the subjects as well as the use of electronic communication to solicit and exchange information. As a result, certain downsides associated with group dynamics such coercion to conform or adopt a certain viewpoint can be mitigated (Adams, 2001; Helmer and Rescher, 1959; Hsu and Sandford, 2007).

Another important feature of the Delphi technique is the controlled feedback process. This process consists of a well organized summary of the prior iteration distributed to the subjects that allows each participant an opportunity to reevaluate their perspective, generate additional insights and more thoroughly clarify the information developed by previous iterations (Hsu and Sandford, 2007). Through the administration of multiple iterations, subjects are expected to become more problem-solving oriented, to offer insightful opinions and to minimize the effects of noise. Dalkey (1972) defines noise as the communication which occurs in a group process which alters the data and focuses on special interests rather than problem solving. The information developed from this kind of communication generally consists of bias not related to the purposes of the study (Hsu and Sandford, 2007).

Finally, the ability to use statistical analysis techniques is a practice which further reduces the potential of group pressure for conformity (Dalkey, 1972). More specifically, statistical analysis can ensure that opinions generated by each subject of a Delphi study are well represented in the final iteration (Dalkey, 1972). The intention is that each subject would have no pressure to conform to another participant's responses that "may originate from obedience to social norms, customs, organizational culture, or standing within a profession (Hsu and Sandford, 2007, p. 2). Statistical analysis allow for objective analysis and summarization of the collected data.

3. Methods

3.1. Applications and applicability of the Delphi technique

This statewide study used the Delphi technique to identify the most important barriers, challenges and obstacles to starting and sustaining a successful community garden program in Florida. The Delphi process has been used in various fields of study such as program planning, needs assessment, policy determination, and resource utilization to develop a full range of alternatives, explore or expose underlying assumptions, as well as correlate judgments on a topic spanning a wide range of disciplines (Warner, 2015). Warner (2015) and Linstone and Turoff (2002) provide a long list of applications, including:

- Establishing programmatic objectives
- Planning for budget modifications
- Identifying essential professional competencies within a specific context
- Supporting various elements of curriculum development
- Collecting historical data
- Exploring perceptions related to potential policy changes
- Understanding personal motivations and values
- Investigating urban and regional planning possibilities
- Gauging the barriers and motivators that may impede adoption of practices or program success
- Engaging stakeholders in evaluation of educational and technical assistance programs
- Exploring potential future options to determine what is likely to happen, what may change, and what effects can be anticipated

The Delphi technique was appropriate for this study because it provides a structured process for integrating multiple perspectives of a large group of experts to identify commonly perceived barriers to community gardens. Additionally, it assists in the assurance that the feedback collected is representative of the opinions of the participants allowing for a true picture of the most pervasive barriers across stakeholder groups.

3.2. Expert panel

The first key task in a Delphi study is to develop an expert panel of individuals composed of any arrangement of stakeholders, subject experts, and facilitators (Linstone and Turoff, 2002). The population for this study consisted of key community garden experts that held various roles in community garden programs across the state of Florida, United States. An advisory committee purposefully selected the group of experts in alignment with best practice for the Delphi technique (Stufflebeam et al., 2012). The advisory committee included representatives from the state agencies, non-profits, institutions of higher education, and various school systems and they were asked to create a list of potential study panel members. The advisory committee selected individuals that had a breadth of experience, expertise through different roles in community garden programs and types of organizations, geographic diversity and varied perspectives (Stufflebeam et al., 2012).

The advisory committee provided a total of 75 nominees. The principal investigator initially contacted all potential participants from this list via email providing an overview of the study, soliciting their participation and requesting a follow-up telephone call. In some instances the effort of initial email solicitation required multiple email contacts to schedule the subsequent phone call. The follow-up call provided additional details on the study and outlined the expectations of the participants. A total of 53 individuals agreed to participate and they were provided with a copy of the initial survey in advance to provide time for a thoughtful response. We secured Institutional Review Board approval (IRB201602143) and informed consent was obtained from all individual participants included in the study consistent with the protocol.

3.3. Data collection and analysis

The Delphi process transpires over a number of rounds of surveys that evoke expert panelists' opinions about the topic at hand (Geist, 2010; Warner, 2015). This study used a series of three iterations using online surveys. Surveys were validated using an expert panel of program evaluators, agricultural and horticultural educators, and state school garden coordinators not included in the study. The expert panel reviewed the instruments to ensure that the questions effectively measured the paradigm of interest, were appropriately worded to enhance respondent comprehension and were structured to collect the intended responses. Following the integration of the panel recommendations, the principal investigator pre-tested the instruments with a small audience similar to the potential participants to ensure the aforementioned design modifications were effective.

Delphi surveys are designed in relationship to the imminent

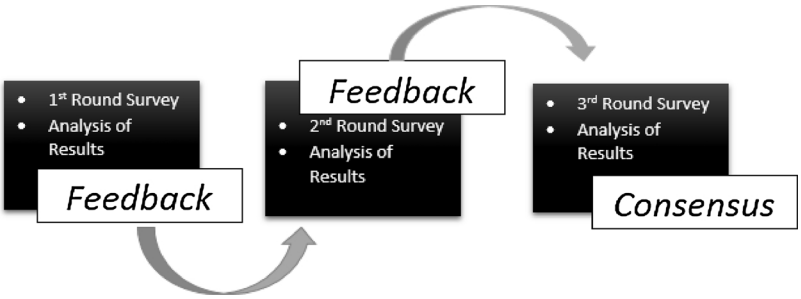

Fig. 1. Delphi Technique Conceptual Map.

problem and evolve based on group input. This means that the Delphi technique is an iterative process, with each round based upon the results of the round before it (Fig. 1).

The first round of the Delphi technique is commonly referred to as the generative round. Panelists are encouraged to explore the topic through a prompt that describes the question or issue (Geist, 2010; Linstone and Turoff, 2002). They provide open-ended responses based on the survey item(s). The researcher analyzes the input and translates it into a survey for the following round. Our study used two open-ended items to develop a comprehensive list of barriers, challenges and obstacles based on the panel experience with community garden programs. The questions for the round 1 survey are included in Table 1.

Since the data collected during the first round will be qualitative, open-ended responses, those responses that are considered to have the same meaning are combined into a single response (Warner, 2015). Frequently, the researcher will create categories of data to facilitate data management and simplify the process for panelists to respond to in subsequent rounds (Warner, 2015). Although there are several options for analyzing the qualitative data, a common method used for the Delphi technique is the constant comparative method (Glaser and Strauss, 1967). This method for analysis involves multiple steps. Initially, the data are evaluated line by line and coded with temporary names, then recoded until categories become distinct (Glaser and Strauss, 1967; Warner, 2015). Next, each category is examined to create significant relationships with other categories and subcategories. To conclude, the researcher may use framework or criteria to develop final themes or core categories to describe the data (Glaser and Strauss, 1967; Warner, 2015).

The researchers for this study used the same three-step process of analysis to categorize the items for the development of the second round survey. First, the data was assessed line by line and coded with temporary names, then recoded, until categories of barriers, or themes, became well-defined. Individual items were combined when they had the same meaning. Then the individual categories were examined to create meaningful relationships with other categories and subcategories. The result of this process was a single list of barriers, challenges and obstacles that were not grouped by overarching theme (i.e resources) but rather by impediment category (i.e. issues of funding). Group coding was used throughout this process; three researchers coded together to develop the initial themes which were then presented to an external member for review and feedback. Conflicts and perspectives of divergent codes were addressed through group discussion. The researchers held formal meetings to discuss their perspectives and formalize coding decisions made by unanimous agreement.

Table 1
Round One Survey Questions.

Question #	Question Text
1	Please list all of the barriers/challenges/obstacles for starting a community gardens program.
2	Please list all of the barriers/challenges/obstacles for sustaining of a community gardens program.

The data collected after the generative round are frequently quantitative and frequently consist of the level of agreement with items that emerged from the first round. The subsequent rounds are quantitative in nature and employ a Likert scale placed next to the individual responses collected in the generative round (Warner, 2015). The Likert scale may range from five to seven points and ask for panelists to choose their level of agreement with each item.

The surveys for rounds 2 and 3 of this study were also validated and pre-tested using the same process outlined above. Likert scales are often used and may be labeled from “strongly disagree” to “strongly agree (Warner, 2015).” The data collected from these rounds are analyzed based on a definition of consensus developed by the researcher prior to initiating the process (Warner, 2015). While Delphi studies exhibit relative variance, a common definition of consensus is where two-thirds of group members indicate that they agree or strongly agree with an item (Conner et al., 2013; Harder et al., 2010; Shinn et al., 2009).

Our second survey asked respondents to rate each item on the list of barriers, challenges and obstacles, identified in round one on a seven-point Likert-type scale (1 = Strongly Agree, 2 = Agree, 3 = Somewhat Agree, 4 = Neither Agree nor Disagree, 5 = Somewhat Disagree, 6 = Disagree, 7 = Strongly Disagree). The respondents were asked to frame their level of agreement on the importance of each item as a threat to successful development and sustainability of a community garden program. Prior to conducting the study, the researchers adopted the criteria of consensus by using two-thirds of group members identifying strongly agree or agree. This criteria was then used to select the items for inclusion in the third survey (Boyd, 2003; Conner et al., 2013; Harder et al., 2010; Shinn et al., 2009).

The third and final survey asked the respondents to identify their level of agreement on the same Likert-type scale with the shortened list of barriers, challenges and obstacles resulting from round 2. Consensus among the panel of experts was achieved in the third phase of the study on all of items on the shortened list. Three rounds for achieving consensus aligns with Cyphert and Gant (1971), Brooks (1979), Ludwig (1994, 1997), and Custer et al. (1999) who assert that three iterations are sufficient to collect the needed information and to reach a consensus in most cases (Table 2).

3.4. Respondent demographics

In each round of the survey, respondents provided information regarding the organization type that they represent, the role(s) they hold with the garden or garden program, the geographic region where their work takes place and the number of years of experience they have working with community gardens. To delineate geographic area, we utilized the state of Florida’s Extension districts. Overall, the participants in this study had an average of approximately 10 years (10.58) of experience working with community garden programs. Table 3 provides a breakdown of the respondent demographic information per round.

Table 2
Breakdown of participant demographics per round.

	Round 1 (n = 43) n (%)	Round 2 (n = 41) n (%)	Round 3 (n = 45) n (%)
Organization			
University	21 (48.8)	15 (36.6)	16 (35.6)
State Agency	0 (0.0)	1 (2.4)	1 (2.2)
Non-profit	9 (20.9)	9 (22.0)	11 (24.4)
Elementary School	2 (4.7)	3 (7.3)	4 (8.9)
Middle School	3 (7.0)	3 (7.3)	2 (4.4)
School Board/District	2 (4.6)	2 (4.9)	2 (4.4)
Other	6 (14.0)	8 (19.5)	9 (20.0)
Roles[a]			
Administrator	8	16	18
Educator	27	25	28
Professional Development	12	6	4
Garden Team Member	14	8	10
Volunteer	3	8	9
Other	9	8	11
Geographic Area[a]			
Northwest	3	4	5
Northeast	2	2	3
Central	3	3	4
South Central	23	26	26
South	4	2	5
Statewide	3	3	2

[a] Note. Both geographic region and roles were multiple response items, so each respondent may have provided multiple responses based on their work. Percentages were not provided for that reason.

4. Results

4.1. Delphi results by round

4.1.1. Round 1

The response rate for this round was 77% (n = 41). Twenty-eight types of barriers, challenges and obstacles came from the first round of analysis. Table 3 provides a breakdown of these items organized by overarching theme.

4.1.2. Round 2

Forty-one of the 53 panel members responded in round two for a 77% response rate. In this round, respondents were asked to rate their level of agreement with the 28 barriers, challenges and obstacles identified in round one on a seven point Likert-type scale. Results of this round of responses are displayed in Table 4.

As noted in Table 5, the panel demonstrated consensus on only four items that they considered to be important to address for the successful development and sustainability of community garden programs. Twenty-four items fell below the two-thirds agreement threshold. Those 24 items were eliminated from further study.

The items that the panel demonstrated consensus on centered on lack of available and committed volunteers, challenges in dedicating the amount of time necessary for community engagement, issues of site selection and access, and inadequate community support. While a lack of municipal support and difficulties navigating local regulations in addition to challenges associated with garden maintenance were eliminated from further analysis, they should remain a consideration as they have been cited in other research. Respondents disagreed that inaccessible and limited technical support, theft and vandalism, conversion and encroachment pressures, and interpersonal conflict in the garden were significant issues that should be addressed to ensure the success of community garden programs.

Table 3
Breakdown of response categories by theme.

Theme	Barriers, Challenges and Obstacles
Resources	• Lack of appropriate resources (i.e. soil, fertilizer, tools and equipment) with available storage • Attaining grant funds requires a 501c3 • Elevated water costs • Lack of available and committed volunteers • Issues of funding (lack of funding available, initial startup costs, budget limitations)
Support	• Inadequate community support • Lack of municipal support and difficulties navigating local regulations (i.e. zoning, ordinances and permitting) • Inaccessible and limited technical support
Planning/Management	• Challenges associated with garden maintenance • Challenges to developing the garden's organizational structure (policies and procedures, fee structure, garden management plan, etc.) • Inability to effectively implement garden rules and regulations and monitor compliance • Garden leaders don't know how and where to start (i.e. landscape design plan) • Lack of connection and consistency among gardens • Lack of ongoing, internal leadership • Lack of technical gardening knowledge that leads to frustration and dropout • Challenges with scheduling and coordination (logistics) • The garden becomes too big to manage
Interpersonal Issues	• Lack of cultural sensitivities among local community members • Interpersonal conflict in the garden • Inadequate cooperation among gardeners
Liability	• Issues related to attaining liability insurance and having new gardeners sign a waiver of liability • Public safety and issues of liability
Community Engagement	• Challenges in dedicating the amount of time necessary for community engagement • Challenges to understand the needs of the community • Challenges in providing educational and social activities in the garden
Environmental Factors	• Theft and vandalism • Significant conversion and encroachment pressures from development • Issues in site selection and gaining access to appropriate land (location, landowner permission, water access, free of contaminants, bathroom facilities and storage)

Table 4
Delphi Study Round Two Results for Level of Agreement with Each Item.

Barrier, Challenge or Obstacle	Strongly Agree/Agree (%)
●Lack of available and committed volunteers	76.9
●Challenges with time demands for community engagement	69.2
●Issues of site selection and gaining access to appropriate land (location, ● landowner permission, water access, free of contaminants, bathroom ● facilities and storage)	66.7
●Inadequate community support	66.7
●Lack of municipal support and difficulties navigating local regulations (i.e. zoning, ordinances and permitting)[a]	64.1
●Challenges associated with garden maintenance[a]	64.1
●Lack of ongoing, internal leadership[a]	61.5
●Lack of appropriate resources (i.e. soil, fertilizer, tools and equipment) with available storage[a]	56.4
●Lack of technical gardening knowledge that leads to frustration and dropout[a]	53.8
●Lack of connection and consistency among gardens[a]	53.8
●Public safety and issues of liability[a]	53.8
●Issues of funding (lack of funding available, initial startup costs, budget limitations)[a]	51.3
●Challenges to developing the garden's organizational structure (policies and procedures, fee structure, garden management plan, etc.)[a]	51.3
●Inability to effectively implement garden rules and regulations and monitor compliance[a]	51.3
●Challenges to understanding the needs of the community[a]	50
●Gardens leaders don't know how and where to start (i.e. landscape design plan)[a]	48.7
●Challenges with scheduling and coordination (logistics)[a]	46.2
●Issues related to attaining liability insurance and having new gardeners sign a waiver of liability[a]	41
●Inadequate cooperation among gardeners[a]	38.5
●Challenges in providing educational and social activities in the garden[a]	38.5
●Lack of cultural sensitivities among local community members[a]	33.3
●Attaining grant funds requires a 501c3[a]	30.8
●Elevated water costs[a]	28.9
●The garden becomes too big to manage[a]	25.6
●Interpersonal conflict in the garden[a]	23.1
●Significant conversion and encroachment pressures from development[a]	23.1
●Theft and vandalism[a]	17.9
●Inaccessible and limited technical support[a]	15.8

[a] Note. Consensus was defined as two-thirds (66.6%) agree or strongly agree.

Table 5
Delphi Study Round Three Results for Level of Agreement with Program Outcomes.

Barrier, Challenge or Obstacle	Strongly Agree/ Agree (%)
●Challenges with dedicating the amount of time necessary for community engagement	88.60%
●Lack of available and committed volunteers	86.40%
●Issues in site selection and gaining access to appropriate land (location, landowner permission, water access, free of contaminants, bathroom facilities and storage)	79.50%
●Inadequate community support	72.70%

4.1.3. Round 3

In round three, respondents were provided the shortened list of four items that fell within the definition of consensus based on the responses from round two. Panel members were asked to go through the same exercise as in round two in an attempt to capture any potential changes in perception based on the shortened list. Forty-five of the 53 panel members responded in this round for an 85% response rate. Table 5 contains summary data for this round. The panel maintained consensus on all items. The highest level of agreement centered on the challenge to dedicating the amount of time necessary for community engagement.

5. Discussion and conclusion

Utilizing the Delphi technique proved to be a useful approach in gaining the input of a diverse panel of key experts in the identification of agreed upon impediments that were viewed as paramount to address for the success of community gardens. As the panel of experts represented the diversity of actors involved in community gardens across the state, it provided a comprehensive and holistic lens to the Delphi process by utilizing varied interests, expertise and perspectives. Additionally, since the Delphi technique was utilized, we believe that the feedback provided represented the true opinions of the participants void of coercion or manipulation. As a result, this study documents genuine needs that resonate across the state showing that there are pervasive issues related to community engagement and support, volunteer availability and management, and land access, that permeate the network of community garden stakeholders. These issues require the refined focus of support programs and organizations.

The results of this study align with barriers and challenges drawn from the literature that relate to the selection and access of long-term, quality land with appropriate facilities (Cohen and Reynolds, 2015; Drake and Lawson, 2014, 2015a; Lawson, 2004; Kingsley et al., 2009; Mikulec et al., 2013; Saldivar-Tanaka and Krasny, 2004; Wakefield et al., 2007), developing community engagement strategies to increase community support (Cohen and Reynolds, 2015; Drake and Lawson, 2015a,b) and a lack of interest and participation among volunteers (Drake and Lawson, 2015a). As these issues extend beyond Florida, there is the posibilty that strategies for serving community gardens in Florida can be developed or adapted more broadly to address these central issues to garden loss. Developing support programs that provide educational and technical assistance for effectively engaging the surrounding community, while also providing meaningful volunteer engagement, has the potential to mitigate some of the issues of garden loss. Additionally, promoting the development of local policies that alleviate issues of land ownership and facilitate increased access to compatible quality land will provide a larger footprint for possible community gardens.

This study also demonstrates how a network of key stakeholders with diverse perspectives that exist in the context of community gardens can move towards consensus on shared issues. We believe the Delphi technique represents a more appropriate process for this context than traditional consensus building. This study effectively integrated the perspectives of gardeners, university and extension professionals, teachers, non-profit representatives and for- profit service providers. We believe participant anonymity coupled with a structured communication process and statistical analysis mitigated conventional

issues associated with in-person, discussion based consensus building processes.

State organizations have the opportunity to leverage the Delphi technique and include a diversity of opinions, including that of the gardeners themselves, not only to identify shared issues but also salient solutions. As consensus was achieved, it provides support organizations with a clear picture of the main issues that need to be addressed as well as opportunities for aggregate impact. On a larger scale, service providers can now design programs to address the four key barriers to community garden success in Florida. They can work in collaboration with other organizations to develop solutions to address these common issues that impede on community garden success. It would be beneficial to develop tools and performance indicators to measure the extent to which each barrier can affect an individual garden. Such tools could also help establish benchmarks for success and determine whether progress has been made over time. While 24 of the initial barriers did not achieve consensus, the complete list of 28 may serve as a resource for understanding the breadth of challenges individual gardens may experience.

The Delphi technique demonstrates a process that can be adopted by stakeholders to develop consensus on the type of assistance needed by community gardens and to promote more cohesive support. The results of this study have the potential to inform a strategic framework for extension faculty and staff and other community garden key stakeholders to consistently support gardens across geographic regions. While it is important to take the results of this study into consideration when having discussions of policy and practice for community gardens, it should not be viewed as a panacea as local needs should also be integrated into decision-making.

In the review of literature associated with this study, it became evident that there is little research that exists that provides salient strategies for overcoming each of the barriers outlined in our study. The studies that identify potential strategies for community garden success provide broad recommendations such as recruiting outside of immediate social and garden networks (Glover et al., 2005), supporting learning across communities (Twiss et al., 2011) and supporting key social processes like a leadership council (Teig et al., 2009). These studies present anecdotal evidence of their effectiveness depicted by respondent quotes that are grounded in a specific case. This demonstrates an opportunity for future research to inform relevant strategies for overcoming community garden barriers based on a structured evaluation of their effectiveness. To provide recommendations, the evaluation study should be designed as a randomized control trial to control for external factors and all for causal assertions between the strategies and the measured outcomes.

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