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The impact of COVID-19 on local government stakeholders' perspectives on local food production

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THE IMPACT OF COVID-19 ON FOOD SYSTEMS

Inter-institutional Network for Food and Agricultural Sustainability

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Abstract

Local food production (LFP) can play an important role in ensuring access to food during supply chain disruptions. Because the drafting, adoption, and implementation of policies regulating LFP is under the purview of local governments in many U.S. states, researchers at University of Florida, Institute of Food and Agricultural Sciences Extension conducted a study to assess whether COVID-19 affected local government stakeholders' (LGS) (*N*=92) perspectives on LFP and the role that LFP can play in responding to public health emergencies. LGS who oversee the drafting, adoption, and implementation of LFP policies include staff responsible for code enforcement, sustainability initiatives, and planning, as well as elected and appointed leaders, such as mayors, city and county managers, and city and county commissioners. The survey assessed LGS' attitudes and knowledge about LFP. The survey also asked LGS about their perceptions and awareness of LFP in their communities, including their perceptions of the benefits of and barriers to LFP and the ways in which LFP producers were using the food they produced. Survey questions also focused specifically on COVID-19 and the role of LFP in public health emergencies. In particular, survey questions asked whether LGS perceived a change in their own attitudes, knowledge, and perspectives; whether there had been a change in the LFP activities in their communities following COVID-19; and what they thought the role of LFP was in responding to public health emergencies. Direct comparisons of

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LGS who responded to a 2019 survey (*N*=43) were assessed for statistically significant changes in overall attitudes, knowledge, or perceived benefits of LFP following COVID-19. This study found that LGS have generally positive attitudes and perceptions of benefits of LFP, including its role in public health emergencies, but have limited knowledge about LFP or awareness of barriers to its implementation. The results of this study indicate that LGS understand the potential benefits of LFP in public health emergencies but would benefit from information and training to support the development of policies and programs in their communities.

Keywords
COVID-19, Pandemic, Local Food Production, Local Government, Food Access, Food Policy, Urban Agriculture, Community Development, Public Health

Introduction

The impact of the 2019 novel coronavirus (COVID-19) has been referred to as a "wake-up call to the vulnerability of our food systems" (Gralak et al., 2020, p. e309). The food system has been identified as a weak point in pandemic preparedness (Osterholm, 2005), and previous research on the impacts of pandemics on food systems found that a pandemic that is severe enough to result in reductions in labor, supply chain disruptions, and changes in purchasing behavior can be expected to cause significant and widespread food shortages in the United States (Huff, Beyeler, Kelley, & McNitt, 2015).

As was widely documented, in the spring and summer of 2020, COVID-19 disrupted food supply chains leading to empty grocery store shelves and farmers terminating crops for which there was no available market (Campbell & McAvoy, 2020; N. Johnson, 2020; Kolodinsky, Sitaker, Chase, Smith, & Wang, 2020; Schrotenboer, 2020; Yaffe-Bellany & Corkery, 2020). Beyond disrupting food supply chains, layoffs and furloughs due to shutdowns led to newly food insecure individuals, which yielded a surge in demand at food banks (Friedersdorf, 2020). Reports stated that food insecurity doubled in the months following the onset of COVID-19 and that more than 50 million Americans—including 17 million children—were estimated to be food insecure due to the pandemic (Hake et al., 2020; Kenneally, 2020; Segers, 2020; Silva, 2020; Wegman, 2020). Specifically within Florida, foodbanks reported double the daily distribution of meals after the crisis started, and 2.7 million missing weekly meals in Florida as a result of employment disruption due to COVID-19 (Gallagher, 2020; Second Harvest Food Bank, n.d.). News coverage of these contrasting impacts —food with no markets and community members without access to food—provided an opportunity to increase awareness of food systems and the role they can play in communities' resilience during natural disasters and public health emergencies.

A report from the Food and Agriculture Organization (FAO) of the United Nations on COVID-19's disruptions of food systems and food accessibility asserted that local food production is a key measure to build more resilient local food systems (Fei et al., 2020). While there is no standard definition of local food production (LFP), the term is generally taken to refer to activities including home and community gardens, farming on vacant lots, and direct sales channels that farms use to sell their products in their local community, such as farmers markets and community supported agriculture (CSA) arrangements (Hodgson, Campbell, & Bailkey, 2011). The FAO's emphasis on LFP is supported by a substantial body of literature that has found that LFP has a number of benefits to communities that are particularly salient in the wake of COVID-19, such as increasing food access and food security in limited resource populations (Brown & Jameton, 2000; Meenar & Hoover, 2012; Neff, Palmer, McKenzie, & Lawrence, 2009; Smith & Harrington, 2014). Beyond commercial LFP, community gardens have been shown to have benefits that could be valuable in responding to a public health emergency, such as increasing access to fresh fruits and vegetables, building social capital, and providing opportunities for social engagement (Alaimo, Reischl, & Allen, 2010; Brown & Jameton, 2000; Gray, Guzman, Glowa, & Drevno, 2014; Hagley, Rice, & Flournoy, 2012; Holland, 2004; Mukherji & Morales, 2010; Okvat & Zautra, 2011).

Echoing the findings from the FAO about the importance of LFP, consumer behavior changed in the wake of COVID-19 with an increasing interest in purchasing local food and via direct sales from producers (Kolodinsky et al., 2020; Worstell, 2020)—this increased interest was identified in both Google searches as well as actual increases in direct purchasing (Crampton, 2020; Kolodinsky et al., 2020; Schmidt, Goetz, Rocker, & Tian, 2020). CSAs, in particular, increased in consumer popularity after the onset of COVID-19 (Ricker & Kardas-Nelson, 2020; Schmidt, Tian, Goetz, Bartley, Moyer, & Rocker, 2020). The consumer interest in LFP and purchasing directly from local farms—as well as the producers adopting new ways of reaching customers (e.g., by online sales)—if sustained, has been identified as a building block for the innovation and transformation that can build food systems resilience (Worstell, 2020). I hypothesized that the confluence of these various impacts of COVID-19 and the responses to these impacts from producer to consumer increased awareness of and support for local food production and direct sales opportunities, which may translate into longer term change if it garners LGS support and policy adoption.

The FAO also issued a report specifically focused on the role of cities and local governments in responding to COVID-19's impacts on food access and community food systems. This report documented the results of quantitative and qualitative research on municipal responses to disruptions in food systems and the implications those responses had for food security and for long term food system resilience (Marocchino et al., 2020). One key point identified in the report was that areas with shorter supply chains and increased proximity to food production were more resilient (Marocchino et al., 2020). The FAO recommends that local governments support food distribution and purchasing from local producers (Marocchino et al., 2020). Key messages emerging from their analysis were that city and local governments serve as enablers in addressing the impacts of COVID-19 on food systems and that local governments "demonstrated enormous potential in identifying and connecting the food systems actors, facilitating collaboration and coordination and exploring innovative community-based solutions" (Marocchino et al., 2020, p. 14). One of their policy and action recommendations to build a more resilient food system was to promote local food production and improve short supply chains (Food and Agriculture Organization of the United Nations [FAO], 2020; Marocchino et al., 2020). Others have also identified food systems disruptions due to COVID-19 as an opportunity to reconceive the current arrangement of the food system and to adopt policies that will support a more resilient and equitable food system moving forward—notably by focusing on community food production, shorter supply chains, and having local government stakeholders (LGS) adopt food systems plans and policies that reflect their values, resources, and priorities (Béné, 2020; Farley & Scherr, 2020).

As is implicit in the recommendations to support LFP from the FAO and others, there are a number of frequently cited barriers to LFP. Most salient for the present study are restrictive policies that are under the purview of local governments, such as zoning regulations, codes of ordinances, and permitting requirements (Castillo et al., 2013; Horst, 2017). LFP can be bolstered by changes to zoning, land-use ordinances, and comprehensive plans (Angotti, 2015; Desjardins, Lubczysnki, & Xuereb, 2011; Hagley et al., 2012; Mukherji & Morales, 2010), which has led to food policy councils and advocacy groups taking that approach (Boden & Hoover, 2018; Gupta et al., 2018; Haines, 2018; Scherb, Palmer, Frattaroli, & Pollack, 2012). There are also a number of barriers to LFP that—though not rooted entirely in local policy—are barriers that local governments could address via the previously discussed "enabling" function identified by the FAO. These barriers include a lack of financial resources, lack of access to land and water, soil and water contamination, and lack of knowledge about agriculture (Daftary-Steel, Herrere, & Porter, 2015; Hagley et al., 2012; Wortman & Lovell, 2013)

Local government authority for self-governance, often referred to as "home rule," has a long-standing history in the United States dating back to 1875 (Sebree, 1989). The concept of home rule means that counties and municipalities have the ability to make their own laws and policies govern-

ing their own affairs without needing authorization from the state (Sebree, 1989; Su, 2017). In the U.S., 48 states have home rule provisions for at least some of their cities, and 37 states have home rule for their counties (Hanson, 1998). Because of home rule, policies regulating LFP—including the types of production and locations that are allowed—are under the purview of local governments in the majority of U.S. states. LGS who oversee the drafting, adoption, and implementation of LFP policies range from staff responsible for code enforcement, sustainability initiatives, and planning, as well as elected and appointed leaders, such as mayors, city and county managers, and city and county commissioners (Mukherji & Morales, 2010). These groups have diverse backgrounds—often with little or no prior knowledge or experience with issues related to food production—yielding potential gaps in knowledge or inaccurate perceptions about food production in communities or agriculture in general (Hendrickson & Porth, 2012). Understanding the knowledge, attitudes, and perceptions of these influential individuals is an important first step to develop informational materials and programs to foster the development of LFP in communities (Hendrickson & Porth, 2012).

Advocacy groups play an important role in the development of local food systems and key stakeholders—including members of these advocacy groups as well as producers, industry groups, and Cooperative Extension—can provide information, resources, and support to communities' LFP efforts (Hendrickson & Porth, 2012). General knowledge about LFP activities, advocacy groups, and food systems stakeholders serve as a foundation for LGS' to make informed decisions about LFP policies and regulations in their communities. Technical information about different production systems, best management practices, and potential public nuisance or food safety considerations are of particular importance for LGS staff who are responsible for drafting policies and ordinances to support LFP (Hendrickson & Porth, 2012). These policies and ordinances require definitions of types of operations, specification of types and intensities of activities that are allowed in different zoning classifications, and a number of other technical details which may simply be beyond the knowledge of the LGS' responsible for drafting the policies (Hendrickson & Porth, 2012).

I hypothesized that LGS' attitudes toward LFP serve as a general foundation for their willingness to focus their limited time and resources towards supporting or developing LFP in their communities. These attitudes may be influenced by their general understanding of agriculture, LFP, or the above-described benefits. In some communities, attitudes may be influenced by the perceptions of the divide between rural and urban communities, perceived differences in the needs of more urbanized communities, and perceptions of the impact LFP has on traditional farming communities (Sharp, Jackson-Smith, & Smith, 2011). Information on public perceptions of LFP or evidence-based research on the impacts of LFP may influence LGS' attitudes towards the priority and usefulness of the benefits of LFP in their communities (Rahe, Van Dis, & Gwin, 2018).

The foregoing highlights the importance of the perspectives of LGS on the development of LFP in communities. As mentioned previously, of the many parts of daily life that were upended by the COVID-19 pandemic, food systems issues were at front and center of attention in communities. Because local governments were responsible for many aspects of the pandemic response, including, for example, emergency food programs and maintaining school lunch distribution for Title I schools, I hypothesized that COVID-19 may have caused LGS to reckon with issues of community food systems, food access, and LFP for the first time.

The motivation for this study was the fact that LGS are unlikely to be familiar with research literature on food systems and LFP, but the mass-media reporting about the profound impact of the COVID-19 pandemic on the food system, including reports about the doubling of food insecurity (Segers, 2020) and food shortages at grocery stores (Schrotenboer, 2020), could have been a "consciousness raising" event leading to greater knowledge about or appreciation of the importance of LFP. I hypothesized that this event could have provided an opportunity for LGS to increase their knowledge about LFP in their communities or it could have spurred them to want to learn more about LFP. I also hypothesized that this experience

could have affected their attitudes, leading them either to think more favorably about the potential benefits of LFP—due to the increased need for food in their community or because access to produce from local farms filled a need during the pandemic—or it could have led them to think more negatively, if the benefits they expected did not materialize following the pandemic. This event also could have provided the opportunity to think about the role LFP could play in their communities' response to a public health emergency. Given the overall importance of LGS to the support and facilitation of LFP in communities as emphasized by the FAO report (Marocchino et al., 2020), coupled with the possibility of COVID-19 serving as a "cue to action," I was interested in assessing the perceptions of LGS following COVID-19.

Methods

In summer 2020, University of Florida, Institute of Food and Agricultural Sciences (UF/IFAS) Extension conducted a study to assess whether COVID-19's impact on food systems affected the perspectives of LGS (*N*=92) on LFP. The survey assessed their perceptions of changes in LFP activities in their communities and the role that LFP plays in responding to public health emergencies, such as pandemics or natural disasters. The survey also assessed LGS' judgment of the usefulness of different types of information or training topics to support LFP in their communities.

The population for this study was identified as a part of a previous research study conducted in the fall of 2019 by the UF/IFAS Center for Public Issues Education. In 2019, researchers at the Center for Public Issues Education accessed public databases of city and county governments in Florida to develop a contact list of LGS, including city and county commissioners, city and county managers, city and county clerks, mayors, city and county planners, zoning administrators, parks and recreation directors, strategic initiative managers, and environment and sustainability directors (*N*=2,623). The 2019 study was formative research to serve as the basis to begin developing a program for UF/IFAS Extension to support local food production and urban agriculture efforts in Florida. The research team used a census approach of soliciting responses for all identified individuals rather than sampling from the population because this is a relatively new topic and audience for UF/IFAS Extension, and the research team wanted to hear from as many respondents as possible. For both the 2019 and 2020 surveys, members of the study population were sent an email containing information about the upcoming study, which was followed by an email with a link to the survey on Qualtrics, an online data collection platform. Individuals who did not complete the survey following the initial invitation received a follow-up email reminder each week for three weeks, after which the study was closed. The fall 2019 survey collected usable responses from 221 respondents. The LGS population identified for the 2019 study was used as the population for the 2020 COVID-19 study.

The survey response rate was lower than desired. One reason for the low response rate was that the large population for the study and limitations of time and financial resources prevented the research team from being able to implement procedures that have been found to increase response rate, such as providing incentives for participation, using multiple methods of contacting the study population (e.g., preceding the email request with a postcard in the mail), or using mixed mode data collection by mailing copies of the survey to those who do not complete it following the email distribution (Dillman, 2014). Further, based on email responses from members of the study population, other potential reasons for the low response rate were that UF/IFAS Extension was not familiar to members of the study population, and, hence, they were unwilling to respond. In addition, some members of the study population replied that they are not allowed to click links in unsolicited emails at their government email address. Because of the low response rate, non-response bias was assessed by comparing early to late respondents (Johnson & Shoulders, 2017; Lindner, Murphy, & Briers, 2001; Miller & Smith, 1983). Early respondents (those who responded to the survey within the first week, *n*=29) were compared with late respondents (those who did not reply until they received a reminder email *n*=60) on the dependent variables of interest in this study—knowledge, attitude, and perceived

benefits— using two-tailed independent *t*-tests at the .05 alpha level. There were no significant differences between the early and late respondents on knowledge [early M=3.23, SD=.81; late M=3.22, SD=1.10; $t(89)$=.05; p=.96]; attitudes [early M=4.48, SD=.49; late M=4.46, SD=.63; $t(86)$=.18; p=.85]; or perceived benefit of LFP [early M=4.05, SD=.66; late M=4.01, SD=.61; $t(84)$=.25; p=.80]. However, it should be noted that sample sizes per group were smaller than the recommended, which may increase risk of Type II error. Therefore, the results of this study should not be generalized beyond the sample.

The researcher-developed questionnaire that was used as the instrument for the 2019 study was used as the basis for the for the COVID-19 follow-up survey. The original impetus for the 2019 study was that UF/IFAS Extension had begun receiving questions from LGS about how to support LFP and how to draft policies to foster urban agriculture. To begin to systematically develop information and resources to support LGS' efforts related to urban agriculture and LFP more generally, UF/IFAS Extension and the Center for Public Issues Education developed a survey to solicit information that could guide the development of materials and programs that would be most beneficial to LGS. The survey was developed by reviewing literature discussing the benefits of and barriers to implementing LFP in communities, as well as reviewing previous studies that had been conducted regarding Extension and LFP (Diekmann et al., 2016; Hendrickson & Porth, 2012). Questions regarding attitudes, perceived knowledge, LFP activities in the community, perceived usefulness of training topics, and preferred methods of receiving information were added to help UF/IFAS Extension learn what types of information could be developed in order to support LFP in Florida and ways that LGS are interested in receiving that information. The survey instrument was assessed for face and content validity by an expert panel consisting of a section chair of the Florida Chapter of the American Planning Association, senior planners in Alachua County and the City of Gainesville, the Pasco County Extension Director, and a policy specialist at the National Sustainable Agriculture Coalition. The research team also conducted a cognitive test of the survey instrument with two members of the target audience in order to assess whether the questions on the survey instrument were clear, used accessible terminology, and were interpreted as the research team intended.

It is common practice for social science research to include groups of questions, referred to as "scales," to measure subjective variables such as attitudes or perceptions to increase the likelihood of valid measurement. The scales are tested for internal consistency to ensure that the group of questions are measuring the same concept (Robinson, Shaver, & Wrightsman, 1991). For this study, the internal consistency reliability of the scales was calculated using Cronbach's alpha, and the standard consistency score for a scale to be considered reliable is .7 or higher (Nunnally, 1978). Questions that were not of interest to assessing the effects of COVID-19 were removed from the 2019 survey instrument, and questions specifically related to how COVID-19 had affected LFP activities in communities and LGS' perspectives were added to the survey instrument. In particular, LGS were asked whether their attitudes and perceptions about LFP have changed since COVID-19. They were also asked whether there were changes in the amount of LFP in their communities or what LFP products were being used for following COVID-19. A group of questions asked LGS about their perceptions of the role of LFP in their community during a public health emergency.

Because there is no standard definition of "local food" or "local food production," the survey provided the following operational definition:

> The production, processing, distribution, and sale of food within urban and suburban areas for noncommercial/hobby, commercial, educational, or nonprofit purposes. Examples of these activities include: food producing gardens (community, backyard, institutional, market, or rooftop); edible landscaping; bee, poultry, and animal keeping; farmers markets or mobile produce trucks; urban or market farms; and innovative food-production methods, such as hydroponics, aquaponics, and aquaculture.

While farmers markets are a market channel, rather than a type of food production, a variety of organizations include farmers markets in their definitions in order to capture the relationships of farms on the periphery of communities that grow and market their products primarily for sales in those communities (Hodgson et al., 2011; Martinez et al., 2010).

Subjective knowledge was assessed with four items using a 5-point Likert-type scale (1=strongly disagree; 5=strongly agree). A mean score for all four items in this scale was computed for each individual to represent their overall subjective knowledge. The internal consistency reliability for this four-question knowledge scale was α=.85. Attitudes toward LFP were assessed using a 5-point semantic differential between nine sets of bipolar descriptors (e.g., undesirable/desirable; harmful/beneficial). A mean score for the nine items in this scale was computed for each respondent to represent their overall attitudes towards LFP. The internal reliability for the nine-question scale was α=.92. The benefits of LFP were assessed with 12 items using a 5-point Likert-type scale (1=strongly disagree; 5=strongly agree). A mean score was calculated for each respondent to represent their overall perception of benefits. The internal reliability for this twelve-question scale was α=.92.

Respondents were asked to indicate which of 13 LFP activities were occurring in their communities and were also asked seven questions about what the local food producers in their communities were using their products for, which was measured on a 5-point scale (1=not at all; 5=to a great extent). LGS were asked about the usefulness of seven training and informational topics related to LFP using a 5-point scale (1=not at all useful; 5=extremely useful). Respondents were asked to report the change in their attitudes towards LFP, perceived benefits of LFP, and amount of LFP activities in their communities following COVID-19. They were also asked about the perceived change in what producers were using their products for following COVID-19 and their perception of the role LFP plays in responding to public health emergencies.

Descriptive statistics were calculated on personal and professional characteristics for all respondents (*N*=92). For LGS who responded to both the 2019 and 2020 surveys (*N*=43), paired *t*-tests were used to assess whether there were statistically significant changes in attitudes, knowledge, perceived benefits, and informational needs of LGS' who responded to both surveys. Data were analyzed using the SPSS software package.

Results

Roughly half of the respondents were elected officials (47%) and just over a third indicated that some aspect of LFP was included as part of their job duties (36%). For the length of time in their current position, 46% had been in their role for 1–5 years, with 41% having been in their role for six years or longer. More than half of respondents (57%) had served in a government role for more than 10 years. Over half of respondents (54%) indicated that the political views of the community in which they served were conservative or very conservative (see Table 1).

Just over 30% of respondents identified as Republican and either conservative or very conservative. The same percentage of respondents (32%) identified as Democrat and moderate. A large proportion of respondents preferred not to answer questions about their political affiliation or beliefs (27% and 18%, respectively). A large proportion of respondents were age 50 or older (76%) (see Table 2). Respondents indicated moderate self-reported knowledge, rating their knowledge of LFP activities in their community and their familiarity with LFP activities the highest, and rating their ability to identify key stakeholders in LFP in their community the lowest. The mean index score for this scale was 3.22 (*SD* 1.03) on a 5-point scale, putting it just above the midpoint, which indicates that these LGS had limited self-perceived knowledge (see Table 3).

LGS' overall attitudes toward LFP were positive, with a mean index score of 4.47 on a 5-point scale (*SD* .59). LGS also rated highly the benefits of LFP, with enhancing local economies, increasing food access, and generating new market opportunities for farmers rated the highest of the benefits of LFP, and increasing savings for local government agencies rated lowest. The mean index score

Table 1. Professional Characteristics of Respondents

	After COVID-19 (*N*=92)		Both Before and After COVID-19 (*N*=43)	
Variable	***Number***	**%**	***Number***	**%**
Job Position [a]				
County commissioner	7	8.0	4	9.3
City commissioner	20	22.7	5	11.6
County manager	2	2.3	1	2.3
City manager	13	14.8	5	11.6
City clerk	11	12.5	7	16.3
Mayor	13	14.8	10	23.3
City council	1	1.1	0	0
County planner	5	5.7	4	9.3
City planner	6	6.8	3	7.0
Environmental and sustainability director	1	1.1	0	0
Other	9	10.2	4	9.3
Involved with LFP as part of job duties [b]				
Yes	31	35.6	15	34.9
No	56	64.4	28	65.1
Time Served in Current Position [c]				
Less than 1 year	11	12.6	9	22.5
1 to 5 years	40	46.0	18	45.0
6 to 10 years	19	21.8	4	10.0
More than 10 years	17	19.5	9	22.5
Time Served in Government Position [d]				
Less than 1 year	2	2.3	0	0
1 to 5 years	25	28.4	10	25.6
6 to 10 years	11	12.5	9	23.1
More than 10 years	50	56.8	20	51.3
Political Beliefs/Values of Community [e]				
Very conservative	13	14.6	5	12.8
Conservative	35	39.3	16	41.0
Moderate	21	23.6	16	41.0
Liberal	6	6.7	2	5.1
Very liberal	2	2.2	0	0

[a] Responses missing from 4 in After COVID-19
[b] Responses missing from 5 in After COVID-19
[c] Responses missing from 5 in After COVID-19 and 3 in Both Before and After COVID-19
[d] Responses missing from 4 in After COVID-19 and 4 in Both Before and After COVID-19
[e] Responses missing from 3 in After COVID-19 and 4 in Both Before and After COVID-19

for the benefits of LFP scale was 4.04 (*SD* .63) (see Tables 4 and 5).

The LFP activity identified most frequently as occurring in communities was farmers markets (75%), with urban farms occurring the least frequently (16%). LGS indicated that the primary uses of LFP products were personal consumption and supporting community food access. All the training topics were rated as very useful by the respondents, with effective models that other communities have used to enhance LFP, food safety measures related to LFP, and evidence-based research on the im-

Table 2. Personal Characteristics of Respondents

	After COVID-19 (*N*=92)		Both Before and After COVID-19 (*N*=43)	
Variable	Number	%	Number	%
Political Affiliation [a]				
Republican	30	34.1	18	46.2
Democrat	28	31.8	10	25.6
Independent	4	4.5	1	2.6
Non affiliated	2	2.3	0	0
Prefer not to answer	24	27.3	10	25.6
Personal Political Beliefs/Values [b]				
Very conservative	13	14.8	5	12.8
Conservative	17	19.3	13	33.3
Moderate	28	31.8	12	30.8
Liberal	8	9.1	2	5.1
Very liberal	6	6.8	2	5.1
Prefer not to answer	16	18.2	5	12.8
Age Category [c]				
20–29	1	1.2	0	0
30–39	8	9.3	3	7.0
40–49	12	14.0	6	14.0
50–59	17	19.8	9	20.9
60–69	37	43.0	20	46.5
70–79	11	12.8	5	11.6
Sex [d]				
Female	38	42.7	15	35.7
Male	46	51.7	25	59.5
Prefer not to answer	5	5.6	2	4.8

[a] Responses missing from 4 in After COVID-19 and 4 in Both Before and After COVID-19
[b] Responses missing from 4 in After COVID-19 and 4 in Both Before and After COVID-19
[c] Responses missing from 6 in After COVID-19
[d] Responses missing from 3 in After COVID-19 and 1 in Both Before and After COVID-19

pacts of LFP being rated the highest (see Tables 6–8).

Turning now to questions specifically related to COVID-19 or public health emergencies, over 50% of respondents indicated that their overall attitude towards LFP was more positive or much more positive than before COVID-19. Almost two-thirds of respondents judged LFP as some what or much more beneficial following COVID-19. The majority of respondents indicated that the *amount* of LFP in the communities was about the same as before the pandemic (see Table 9).

Regarding changes in how producers were using their products following COVID-19, the majority of responses in each category indicated that the uses were about the same. The uses of LFP products that had the largest proportion of respondents indicate had increased more or much more were producing food for personal consumption (45%) and supporting community food access (36%) (see Table 10). Finally, respondents were asked about their perception of the role of LFP in public health emergencies. The respondents showed moderate support for the various roles that LFP could play in public health emergencies, rating increasing the availability of healthy food the highest (M 3.85 SD .91) (see Table 11).

Looking specifically at respondents for whom before and after COVID-19 data were available, there were no statistically significant differences in any of the index scores for the knowledge,

Table 3. Self-Perceived Knowledge of Local Food Production Topics (*n*=91)

Item	*M*	*SD*
I am aware of the current local food production activities in my city/county.	3.32	1.22
I am familiar with the activities included under the umbrella of local food production.	3.30	1.23
I am aware of advocacy groups for local food production in my community.	3.19	1.26
I can identify key stakeholders in local food production in my city/county.	3.10	1.25
Knowledge Index Score	*3.22*	*1.03*

Note. Responses collected using 5-point scale (1=strongly disagree; 5=strongly agree).

Table 4. Attitudes Toward Local Food Production

Item	*M*	*SD*
Unimportant–Important (*n*=88)	4.65	0.61
Bad for rural communities–Good for rural communities (*n*=89)	4.64	0.70
Useless–Useful (*n*=90)	4.59	0.66
Bad for urban communities–Good for urban communities (*n*=90)	4.54	0.72
Undesirable–Desirable (*n*=88)	4.53	0.79
Bad for traditional farmers–Good for traditional farmers (*n*=89)	4.52	0.80
Harmful–Beneficial (*n*=90)	4.50	0.69
Overall bad–Overall good (*n*=91)	4.19	0.94
Not a priority–A high priority (*n*=90)	4.13	0.96
*Attitudes Index Score (*n=*91)*	*4.47*	*0.59*

Note. Responses collected using 5-Point Semantic Differential Scale with 1 for negative terms and 5 for positive terms.

Table 5. Perceived Benefits of Local Food Production

Benefit Outcome	*M*	*SD*
Enhance local economies (*n*=91)	4.33	0.82
Increase food access and security (*n*=91)	4.29	0.78
Generate new market opportunities for farmers (*n*=91)	4.22	0.80
Improve general health and well-being of community members (*n*=90)	4.19	0.78
Foster community engagement (*n*=91)	4.15	0.83
Generate social capital in communities (*n*=88)	4.15	0.82
Provide opportunities for youth development programs (*n*=91)	4.15	0.82
Opportunities for educational experiences for community members (*n*=91)	4.15	0.73
Increase community members' consumption of fruits and vegetables (*n*=91)	4.12	0.87
Enhance the aesthetic appeal of neighborhoods (*n*=91)	3.63	0.99
Increase savings for county/city agencies (*n*=90)	3.60	0.96
Increase property values (*n*=91)	3.49	0.97
Benefits Index Score	*4.04*	*0.63*

Note: Responses collected using 5-point scale (1=strongly disagree; 5=strongly agree).

attitudes, or benefits scale mean scores; however, the mean score for attitudes approached significance (p=.06). While there were no significant differences in the mean index scores, there were significant differences in specific items, including a decrease in the rating of generating social capital in communities as a benefit of LFP. There were statistically significant increases in attitude scores on LFP being a high priority, and good for urban communities, rural communities, and traditional farmers. The only item in the knowledge scale with a statistically significant increase was the ability to identify key stakeholders in LFP in the community (see Tables 12–14). There was a statistically significant change

Table 6. Current LFP Activities in Respondents' Communities (*n*=87)

	Number	%
Farmers markets	65	74.7
Beekeeping	56	64.4
Farm stands	55	63.2
Backyard chickens or goats	48	55.2
Community gardens	45	51.7
Mobile farm stands	38	43.7
School gardens	36	41.4
Community supported agriculture (CSA)	33	37.9
Aquaculture, hydroponics, and/or aquaponics	28	32.2
Farming on vacant lots	24	27.6
Front-yard gardening	22	25.3
Market gardens	20	23.0
Urban farms	14	16.1

Table 7. How Local Food Producers in Respondents' Communities are Using Their Products

Uses	*M*	*SD*
Personal consumption only (*n*=89)	3.49	0.99
To support community food access (*n*=88)	3.36	0.97
Purely as a hobby (*n*=89)	3.19	1.02
Making a living (*n*=89)	3.18	1.22
Supplementing household income (*n*=89)	3.13	1.00
To connect with members of their community (*n*=89)	3.11	0.87
Neighborhood beautification/revitalization (*n*=89)	2.58	0.98

Note. Responses collected using 5-point scale (1=Not at all; 5=To a great extent).

Table 8. Usefulness of Informational and Training Topics

Topic	*M*	*SD*
Effective models other communities have used to enhance local food production (*n*=88)	4.09	0.92
Food safety measures related to local food production (*n*=88)	4.06	0.89
Evidence-based research on the impacts of local food production (*n*=88)	3.97	0.90
Environmental best management practices associated with local food production activities (*n*=88)	3.93	0.98
How to identify stakeholders for developing local food production activities (*n*=87)	3.91	0.96
Research data pertaining to public perceptions of local food production (*n*=88)	3.90	0.94
Definitions and terminology associated with local food production (*n*=88)	3.61	0.98

Note. Responses collected using 5-point scale (1=Not at all useful; 5=Extremely useful).

Table 9. Perceived Change in Attitudes, Benefits, and Activities Following COVID-19

Variable	Number	%
Overall attitude towards LFP now as compared with before COVID-19		
Much more negative	0	0
Somewhat more negative	4	4.5
About the same	40	44.9
Somewhat more positive	20	22.5
Much more positive	25	28.1
Judgement of the benefits of LFP as compared with before COVID-19		
Much less beneficial	0	0
Somewhat less beneficial	1	1.1
About the same	37	40.7
Somewhat more beneficial	27	29.7
Much more beneficial	26	28.6
Amount of LFP in your community as compared with before COVID-19		
Much less	3	3.3
Somewhat less	7	7.8
About the same	58	64.4
Somewhat more	17	18.9
Much more	5	5.6

in the perceived usefulness of every informational topic, with each item being rated as more useful, aside from definitions and terminology associated with LFP, which were rated less useful (see Table 15).

Discussion

Over half of respondents reported positive changes in their attitudes towards LFP and their judgement of its benefits. However, respondents indicated that the amount of LFP in their community is about the same as before COVID-19, and they rated the role that LFP can play during public health emergencies as having only moderate benefits for their communities. Taken together, these overall responses indicate that the COVID-19 pandemic and its ongoing effects can be used as an opportunity for food systems advocates and educators to communicate about the ways in which LFP can mitigate negative disruptions in the food supply chain and foster community resilience in communities. It is worth noting that this study was conducted in the summer of 2020, so some changes in LFP that were underway may not have had time to be developed and become operational.

The low ratings of knowledge for identifying key stakeholders in LFP or awareness of advocacy groups for LFP in communities highlights a key opportunity for individuals working in food systems to provide LGS with information about individuals and groups in their communities to support LFP. In addition, the rating of all the informational and training topics as useful or extremely useful provides guidance for Extension or other groups that can provide evidence-

Table 10. Perceived Change in How Local Food Producers in Respondents' Community Were Using Their Products Following COVID-19

	Percentage of Responses				
Uses	Much less	Less	About the same	More	Much more
Personal consumption only (*n*=87)	1.1	2.3	51.7	36.8	8.0
Supplementing household income (*n*=87)	2.3	10.3	62.1	17.2	8.0
Making a living (*n*=86)	2.3	10.5	73.3	11.6	2.3
Neighborhood beautification/revitalization (*n*=86)	2.3	10.5	80.2	7.0	0
Connect with members of their community (*n*=86)	2.3	7.0	62.8	24.4	3.5
To support community food access (*n*=86)	0	5.8	58.1	29.1	7.0
Purely as a hobby (*n*=87)	3.4	5.7	60.9	25.3	4.6

Table 11. Role of Local Food Production in Public Health Emergencies (*n*=87)

Roles	*M*	*SD*
Increase availability of healthy food in the community	3.85	0.91
Foster community resilience	3.68	0.92
Increase community members' ability to support themselves	3.66	0.90
Mitigate negative impacts of disruption in food supply	3.64	0.93
Provide opportunities for social/community cohesion	3.60	0.91
Mitigate food insecurity in limited resource populations	3.55	0.94

Note. Responses collected using 5-point scale (1=strongly disagree; 5=strongly agree).

Table 12. Knowledge about Local Food Production Before and After COVID-19 (*n*=42)

	Pre		*Post*	
Item	*M*	*SD*	*M*	*SD*
I am aware of the current local food production activities in my city/county.	3.69	0.98	3.52	1.19
I am familiar with the activities included under the umbrella of local food production.	3.45	0.97	3.50	1.19
I can identify key stakeholders in local food production in my city/county.	**3.19***	1.22	**3.26***	1.25
I am aware of advocacy groups for local food production in my community.	2.80	1.21	3.20	1.23
Knowledge Index Score	3.22	0.74	3.38	0.99

* $p<.05$

Note. Responses collected using 5-point scale (1=strongly disagree; 5=strongly agree).

based information and trainings to assist LGS in supporting LFP in their communities.

Because of the extensive media coverage of food supply chain disruption and increased demand on food banks in their communities (Balch, 2020; Martin, 2020; Segers, 2020; Yaffe-Bellany & Corkery, 2020), it was hypothesized that there would be significant differences in LGS' attitudes toward, knowledge about, and perceived benefits of LFP. This research did not support that hypothesis. One possible explanation for this is that LGS are a unique population who may have been largely buffered personally from the negative effects of COVID-19 on the food supply chain. Many people in government positions were able to continue working, many from home, so their income and access to food were largely unchanged. Another possible explanation of this is that LGS rated their own knowledge of LFP as limited, so they may not have the knowledge about LFP or its benefits to have been able to see the actual or possible benefits that it could have in their community following the COVID-19 pandemic.

It is important to note that LGS were reporting on their *perceptions* on their attitudes, knowledge, barriers, and the activities occurring in their communities, which may be influenced by their age, political views, or personal level of

Table 13. Attitudes Toward Local Food Production Before and After COVID-19 (*n*=40)

	Before		After	
Item	*M*	*SD*	*M*	*SD*
Unimportant–Important	4.53	0.72	4.70	0.46
Useless–Useful	4.54	0.75	4.68	0.52
Bad–Good for rural communities	**4.15***	1.01	**4.68***	0.57
Undesirable–Desirable	4.45	0.78	4.63	0.54
Bad–Good for urban communities	**4.33***	0.85	**4.62***	0.58
Harmful–Beneficial	4.54	0.71	4.56	0.59
Bad–Good for traditional farmers	**3.85***	1.01	**4.54***	0.71
Overall Bad–Good	4.44	0.83	4.16	0.97
Not a priority–A high priority	**3.78***	1.00	**4.15***	0.92
Attitudes Index Score	*4.29†*	*0.69*	*4.54†*	*0.40*

* $p<.05$; † $p=.055$

Note. Responses collected using 5-Point Semantic Differential Scale with 1 for negative terms and 5 for positive terms.

interest in LFP. Further, the initial impetus for the research study was to gain information that could be used to develop programs and materials to support local governments' efforts to adopt policies related to LFP, but it may be that LGS are not the best source for some of the information the research team was seeking. For example, the research team wanted to know what activities are currently

Table 14. Perceived Benefits of Local Food Production Before and After COVID-19 (*n*=43)

	Before		After	
Item	*M*	*SD*	*M*	*SD*
Enhances local economies	4.19	0.88	4.33	0.81
Increases food access and security	4.17	0.95	4.29	0.78
Provides opportunities for educational experiences for community members	4.21	0.89	4.21	0.71
Improves general health and well-being of community members	4.16	0.95	4.21	0.71
Provides opportunities for youth development programs	4.26	0.90	4.16	0.84
Increases community members' consumption of fruits and vegetables	4.17	0.96	4.12	0.86
Generates new market opportunities for farmers	4.05	1.09	4.12	0.79
Fosters community engagement	4.14	0.86	4.09	0.87
Generates social capital in communities	**4.15***	0.82	**4.07***	0.76
Enhances the aesthetic appeal of neighborhoods	3.74	0.95	3.74	0.98
Increases savings for county/city agencies	3.44	1.16	3.41	1.05
Increases property value	3.42	0.97	3.27	0.82
Benefits Index Score	*4.02*	*0.79*	*4.02*	*0.60*

* $p<.05$

Note. Responses collected using 5-point scale (1=strongly disagree; 5=strongly agree).

Table 15. Usefulness of Informational Needs Before and After COVID-19 (*n*=38)

	Before		After	
Item	*M*	*SD*	*M*	*SD*
Effective models other communities have used to enhance local food production	**3.82***	1.16	**4.03***	0.98
Evidence-based research on the impacts of local food production	**3.82***	1.01	**4.00***	0.90
Food safety measures related to local food production	**3.92***	0.92	**3.97***	1.01
How to identify stakeholders for developing local food production activities	**3.79***	1.04	**3.95***	1.06
Environmental best management practices associated with local food production activities	**3.95***	0.96	**3.89***	1.09
Research data pertaining to public perceptions of local food production	**3.66***	1.10	**3.89***	0.95
Definitions and terminology associated with local food production	**3.82***	1.01	**3.55***	0.98

* $p<.05$

Note. Responses collected using 5-point scale (1=Not at all useful; 5=Extremely useful).

occurring in communities and how LFP producers are using their products; in considering the results of this research, it is likely that those questions would be better asked of LFP producers or people working in food systems, rather than the people in government who are responsible for drafting and implementing policy. In addition, LGS may see their mandate as representing the wishes of their constituents, so research into the attitudes and perceptions of residents or of LFP producers may have actually been a better way to gain information that would help LGS to support LFP in their communities.

Conclusion

An unexpected effect of COVID-19 has been increased media and public attention on food systems. While much of this attention has been targeted at supply chain issues and food insecurity, it may also have increased awareness of LFP and its potential value for communities. Extension educators and food systems advocates can capitalize on this unique situation by providing evidence-based information on the benefits of LFP and examples of effective models that could be used to develop LFP programs in their communities—particularly as the pandemic has lasted long enough for LGS, producers, consumers, and businesses to seek measures to mitigate risk and uncertainty moving forward.

To that end, quantitative and qualitative research to document the benefits of LFP could be beneficial in creating educational materials specifically targeted to LGS. As mentioned previously, information from other perspectives would be particularly valuable because this population of LGS may have been spared many of the negative effects of COVID-19 on food systems. Additional research focusing on the perceptions, knowledge, attitudes, and informational needs of community members and local food producers would help to provide a more complete picture of how COVID-19 has affected perspectives on LFP and on the role LFP can play in communities during public health emergencies. While adopting policies to support LFP can be an important element of increasing food system resilience, there are additional, complementary opportunities for LGS to support food systems and food security. These opportunities include dedicating funds to create infrastructure to support local and regional food distribution, and serving the "enabling" role previously mentioned by serving as a convener for multistakeholder councils. While COVID-19 has increased attention to food systems, it is important that this attention move from an emergency response to long-term planning and food systems development.

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