The Gap between Perception and Reality: Obstacles to Public School Use of Produce from Small Local Farms in the Southeastern United States

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Objective: Connecting farms to school foodservice operations is complex. Our purposes in this study were to: (1) identify and assess self-reported benefits and challenges to procurement and use of produce purchased directly from small farms in school foodservice operations, and (2) determine if opinions about procurement from small farms significantly differs between those with and without experience purchasing these products. **Methods:** An online survey was conducted with child nutrition directors from 3 southeastern states in the United States. Statistical tests assessed differences in opinions between those with and without experience purchasing with these products. **Results:** Directors without experience understood the benefits but significantly overestimated the difficulty in obtaining and using these products. Experience shaped director perceptions regarding perceived procurement challenges related to contract terms, ordering challenges, food safety practices, and ability of small farms to supply foodservice needs. **Conclusions:** Challenges exist in procuring produce from small farms (eg, lack of coordinated ordering, delivery, and communications processes, insufficient availability of products, and limited value-added processing). Sourcing products directly from these farms is not as onerous as perceived to be. Bridging the identified information gaps could increase participation in farm-to-school programs.

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In the United States (US), farm-to-school (FTS) programs aim to enrich the connection communities have with fresh, healthy food, and local food producers by changing food purchasing and educational practices in schools.[1] In the early 1990s schools introduced local foods in school meals by teaching students the origin of their food and planting edible gardens.[2] FTS programs more fully integrated these original components into 3 core elements -procurement of local foods, student education, and school gardens. FTS program evaluations have shown such programs can generate a range of student benefits including dietary practices,[3-5] increased student nutrition knowledge,[4,5-8] increased physical activity,[9] improved academic outcomes,[5] reduced screen time,[10] and participation in home meal preparation.[1] Benefits are also generated by the local community in the form of increased and diversified farmer income,[11,12] decreased food waste,[1] and increased community engagement in agricultural and environmental issues.[1]

Despite these benefits, FTS programs are far from universally adopted. In a national census of public school districts, private schools, and charter schools, less than half (42%; N = 5254) of responding school food authorities, representing 42,587

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schools, indicated they participate in FTS activities.[13] A key component and challenge is using locally grown food in school activities and, ideally, including them as part of school-prepared snacks or meals. Emphasis on using locally grown food, and particularly local food from small- or medium-sized farms is consistent with trends in consumer food demand. Locally grown foods often are believed to be higher quality, healthier, and safer than non-local foods;[14-18] moreover sustainably produced foods have a lower environmental impact,[19,20] and are favored by those wanting to support their local community.[21,22]

Farms that sell into FTS marketing channels are often classified as "small" by US Department of Agriculture (USDA) farm-size definitions.[23] Due to their small size, these farms are relatively flexible in production activities so have an advantage in producing highly differentiated products to serve niche markets, such as local schools.[24] Moreover, they are important stewards of crop genetic diversity,[25] offer an important source of rural employment and economic growth,[26] increased benefits in terms of labor income,[27] and can stimulate formation of social capital.[28] Whereas benefits are well established, it is still unclear why more schools are not participating in FTS programs.

Study Context and Objectives

Much funding supporting school participation in FTS programs prefers (or requires) that food be directly purchased from a farmer rather than through a wholesaler or distributor. To date, little evidence is available about the challenges and benefits of this procurement strategy, particularly as it relates to the US Southeast. This study, which is a component of a larger research initiative conducted in 2 phases, aimed to fill that knowledge gap. Findings from Phase I informed the development of the hypotheses tested during Phase II of the study, the basis of this paper.

During the initial qualitative research phase (Phase I), 8 focus group meetings were conducted with small- and medium-size produce farmers to explore barriers and challenges experienced in their efforts to market their produce directly to institutions, including schools. These focus groups were conducted throughout North Carolina (NC), South Carolina (SC), and Georgia (GA). This research phase culminated with a 2-day conference involving stakeholders throughout the farm-to-institution marketing channel including buyers for school, hospital, and long-term care foodservice operations.

From these meetings, practical marketing considerations (eg, payment terms, and processing, packaging and delivery requirements of institutional foodservice buyers [schools, hospitals, long-term care]) were identified as challenges to the efficient function of this procurement strategy. Food safety challenges, including related issues of obtaining (food) products liability insurance and food safety certifications, also were identified among top concerns. Perceptions about the benefits and challenges of this procurement strategy were different between those who had previous experience purchasing produce from small farms, compared to those who had no prior experience. This finding motivated the need to explore this issue further during the second phase of this study. Additional details about the Phase I study design and results are available.[29]

Our aim for Phase II was to quantify the benefits and challenges to procuring produce from small local farms in K-12 public schools. As such, the first objective of this study was to provide a comprehensive, quantitative assessment of the benefits and challenges of acquiring fruits and vegetables directly from small farms in public K-12 school foodservice operations. We hypothesized (Hypothesis 1) that respondents, regardless of experience with this procurement strategy, agree that purchasing produce from small farms offers several product quality, public relations, and revenue benefits. We further hypothesized (Hypothesis 2) that respondents, regardless of experience with this procurement strategy, agree that integrating small farms into their supplier networks creates challenges with procurement, food availability, and food safety.

Anecdotal evidence from cooperative extension personnel, staff of local agriculturally-focused non-government organizations, and buyers participating in Phase I of this study, revealed a notable divergence between the benefits and challenges reported by those who did and who did not have experience in purchasing produce directly from small farms. Therefore, the second research objective aimed to distinguish between benefits and

challenges that are real (those reported by experienced buyers), and those that are perceived but not real (those reported by buyers with no experience). We hypothesized that those with experience report more benefits (Hypothesis 3) and fewer challenges (Hypothesis 4) to purchasing from small farms compared to those with no experience doing so.

This study contributes to the literature in several substantive ways. First, we fill a void in the literature regarding benefits and challenges of FTS programs in the US Southeast. Second, this study introduces important ways that the experience in purchasing produce directly from small farms can shape the perspective of school buyers regarding these suppliers. Perceptions (or misperceptions) about the benefits and challenges of purchasing these farm products may impact the willingness of a school nutrition director, therefore a school district, to participate in FTS programs. As such, these study findings may be able to inform the efforts of non-government associations, farmers' associations, and others to educate school nutrition directors about the real (experienced) benefits and challenges of participating in FTS programs.

LITERATURE REVIEW

FTS programs – enabling policies and implementation realities.

Federal legislative support for FTS programs has increased over the past 2 decades. Most directly relevant to FTS programs is the Healthy, Hunger-Free Kids Act (HHFKA), which mandated the US Department of Agriculture (USDA) to update nutrition standards for the National School Lunch Program and the School Breakfast Program.[30] These regulations required schools to offer more fruit, vegetables, and whole grains as well as limit sodium, calories, and unhealthy fat in every reimbursable school meal by 2012.

The increased demand for fruits and vegetables in the nearly 100,000 schools that participate in the Child Nutrition Program was viewed as an additional opportunity to connect local farms to local schools. To date, the HHFKA has allocated $5 million annually to the FTS grant program. Funding requests have, however, greatly exceeded (5-fold) this amount. To address this and other program deficiencies, proposals to amend the Richard B. Russell National School Lunch Act were introduced (although not passed) through the Farm to School Act of 2015 [S. 569, H.R. 1061, 114th Cong. (2015)] and Farm to School Act of 2017 [H.R. 3687, 115th Cong. (2017)]. In addition to increasing school funding to purchase products from farms, these bills also extended the scope of the grant program to early care and education sites, after-school programs, summer foodservice program sites, and improved access among tribal schools to farm-fresh and traditional foods.

Several studies examined the effect of FTS programs on the consumption of healthful foods and obesity prevention.[31-33] Since implementation of the HHFKA, there has not been a systematic analysis of FTS program effects. Early evidence suggests there is concern about the financial impacts of this policy's requirements, anticipated challenges with menu planning, and student acceptance of foods that fit the new HHFKA guidelines.[34] This latter concern has been greatly reduced due to a proclamation issued by the US Secretary of Agriculture to offer schools flexibility in menu planning by relaxing sodium, whole grains, and flavored milk regulations.[35]

Further complicating matters is the lack of consistent definitions to characterize farm suppliers. For example, no formal definition exists of what qualifies as "local" leaving each buyer to decide what geographic boundary to use.[36,37] Moreover, consumers often perceive that "locally grown" foods are predominantly obtained from small farms (defined by the USDA as farms with annual gross sales less than $350,000) rather than simply local, and potentially large, farms.[23,38] Whereas schools can purchase farm products directly from a local (small) farm or indirectly via a wholesaler or distributor, both alternatives can pose managerial and logistical challenges to standard procurement practices.

Participation in FTS programs.

Factors motivating participation in FTS programs are complex and include interest in improving student meal quality, increasing student interest in food systems and agriculture, linking food to student learning, and/or supporting the viability of the local agricultural sector.[39] The challenges of local food procurement by school foodservice operations (SFOs) mirror those identified in broader farm-to-institution supply chain studies.[29,40] A lack

Table 1
Key Demographic, Health, and Food Access Characteristics of the Study Region

Characteristic	Georgia (GA)		North Carolina (NC)		South Carolina (SC)		Data Year(s) Source
	%	State Rank	%	State Rank	%	State Rank	
Students eligible for free or reduced-price lunch	62.1	4th	54.0	14th	57.4	12th	2013-2014; NCES, 2016
Adolescents consuming fresh fruit less than one time per day[a]	43.1	16th	42.0	17th	50.8	2nd (tie)	2015 (NC, SC), 2013 (GA); CDC, 2013
Adolescent obesity	12.7	26th	16.4	7th	16.3	8th	2015 (NC, SC), 2013 (GA); CDC, 2015
Adolescent overweight	17.1	7th (tie)	15.9	15th	18.2	1st (Highest)	2015 (NC, SC), 2013 (GA); CDC, 2015
Prevalence of household-level food insecurity and very low food security	14.0	20th	15.1	10th	13.0	22nd	Avg. 2014-2016; Coleman-Jensen et al, 2017

Note.
[a] Among reporting states. Data for GA is not available for 2015; 2015 rank is estimated using GA outcomes from 2013.

of physical infrastructure (eg, storage and processing facilities), insufficient staff time and expertise to wash and prepare fresh fruits and vegetables, insufficient financial resources, seasonality of local produce availability, ease of ordering from mainline suppliers and, in the case of schools, procurement practice regulations, are among the supply chain barriers commonly identified by nutrition directors and farmers.[41] In addition, other studies identified food safety and liability,[29,42] and (lack of) external support (ie, assistance from NGOs or advocacy groups) as also affecting local farm sales to schools.[43] Importantly, qualitative research examining small farm produce marketing in the US Southeast suggests perceptions concerning procurement challenges may overstate the difficulty in purchasing from small farms.[29]

Characteristics of both schools and local farm production can facilitate and constrain FTS participation; unsurprisingly, areas with fewer challenges to implementing FTS activities have higher FTS program adoption.[44] Purchasing produce directly from small farms often requires additional time and financial resources than does purchasing from mainline suppliers. Moreover, there is evidence that schools with a higher percentage of free lunch-eligible students are less likely to use local foods.[45] In addition to the higher per unit costs of using locally sourced products, other costs include higher search costs to identify suppliers, steps to verify adequate food safety protocols, and time to negotiate and monitor new supplier agreements.[46]

METHODS

SFOs in 3 southeastern states – NC, SC, and GA – were the focus of this study. Children in these states live in households with relatively low *per capita* incomes, and thus, have a high rate of eligibility for free or reduced-price school meals, have poor health outcomes and food access, and lower levels of fresh fruit and vegetable consumption compared to other states (Table 1). To understand the experiences of schools directly purchasing fruits and vegetables from small farms, the perspectives of both schools that are, and that are not, purchasing these farm products are considered in this analysis. The discussion herein focuses on quantifying and assessing the benefits and challenges of public K-12 schools purchasing from public K-12 schools.

Participants

In the study region, with the exception of a few large urban school districts, the district child nutrition directors or school foodservice buyers (hereafter directors) are responsible for food purchasing decisions. As such, our target population was the 442 district-level child nutrition directors in GA (N = 239), NC (N = 117), and SC (N = 86). The names and contact information of the directors were obtained from publicly available online databases, in South Carolina, this information came directly from the Child Nutrition Program.

Instrument Development and Dissemination

Our hypotheses and Phase I focus groups results,[29] as well as surveys measuring FTS procurement,[47-49] guided the survey design. Items were divided across 6 sections: (1) current purchasing practices; (2) experience purchasing directly from small farms; (3) benefits and challenges of purchasing from small farms; (4) the SFO in-house traceability system; (5) traceability implementation and costs; and (6) a section "about you and your firm," which captured demographic characteristics about the respondent, characteristics of the SFO they work in, and the respondent role in the operation. As the study objectives address issues concerning produce procurement from small local farms, results from sections 1, 2, 3, and 6 are the focus of this paper.

Recommendations by Dillman et al[50] guided individual item construction and general survey organization. Closed-ended items were used to measure respondent experience and SFO practices and rating items (ie, Likert scales) to assess extent of respondent agreement concerning the benefits and challenges of using products from small farms. Open-ended items were also included to allow respondents to offer additional insights as well as to gather general comments and feedback. For context, at the beginning of the survey, respondents were provided information about what are small- and medium-scale farms and their prevalence in the study region. The survey included 33 items.

Benefits of sourcing directly from small farms were explored across dimensions of product characteristics, public relations, and revenue impacts. Potential challenges were similarly measured across dimensions of procurement, food availability, and food safety. These 3 dimensions were identified directly from Phase I findings and other literature.[29,47-49] In instances where a district was not currently purchasing directly from a farm, respondents were asked to report their perceptions of the benefits and challenges of procurement from this source. A list of items that examined benefits and challenges of purchasing produce from small farms are in Tables 4 and 5. The extent of respondent agreement that each item was a benefit or challenge was evaluated on a 5-point Likert scale, which provided options of Disagree, Somewhat Agree, Neither Agree nor Disagree, Somewhat Agree, and Agree. An option of "I do not know" was also offered to prevent introducing response bias through forcing a respondent choice.

To improve the reliability and clarity of the survey, the instrument was pre-tested using the approach Dillman et al describe.[50] This approach involves collecting specific feedback on survey items, survey organization, and respondent level of interest and engagement with the survey. The instrument was pretested with 5 directors and minor revisions made based on this feedback.

Upon recommendation of the pre-testers and staff working at South Carolina's Child Nutrition Program, the survey was administered electronically. A study description and link to the online survey was emailed to the full population of child nutrition directors in the study area. The survey was hosted on SurveyMonkey® and was active for 7 weeks. Following Dillman et al,[50] 3 reminders were sent 2, 4, and 6 weeks after the initial email invitation. Paper copies were made available to those who preferred this format. Consent was obtained from all study participants, and no incentives to participate were provided.

Data Analysis

This cross-sectional analysis considers a school district to be the unit of analysis. Likert-scale response data on respondent experience in procuring produce from small farms were assigned numeric values where 1 = Disagree and 5 = Agree. Instances where respondents indicated "I don't know" were few (typically 2.8%-4.8% of responses) and are not included in the descriptive statistics or other aspects of this analysis.

Respondent characteristics are summarized using descriptive statistics for the whole sample as well as

Table 2
Characteristics of School Districts and Respondent School Foodservice Operations by State

Characteristics of School Districts[a]					
Characteristic	**Measure**	**Georgia**	**North Carolina**	**South Carolina**	**Total[b]**
Number of public schools per district	Average	12.4	20.8	12.9	
	Min - Max	1-137	1-183	1-91	
Student enrollment per district (2016)	Average	9,311	12,990	9,239	
	Min - Max	155 - 174,821	586 - 163,364	662 - 76,973	
Total number of school district foodservice buyers		239	117	86	442
Completed responses		28	34	23	105
Response rate		11.7%	29.1%	26.7%	25.5%[c]

Characteristics of Respondents											
	Measure	**GA Total**	**Purchase from small farms (%)**		**NC Total**	**Purchase from small farms (%)**		**SC Total**	**Purchase from small farms (%)**		**Total[b]**
			Yes	**No**		**Yes**	**No**		**Yes**	**No**	
	Responses	100	21.4	78.6	100	20.6	79.4	100	21.7	78.2	
Food budget (in millions)	Average	$3.37	3.81	1.52	$3.14	$3.14	3.22	$3.05	$2.48	3.22	$3.19
	Min - Max	$0.2 - $23.0	$0.2 - $23.0	$0.3 - $4.0	$0.3 - $23.0	$0.3 - $23.0	$0.4 - $6.5	$0.3 - $12.0	$0.7 - $7.0	$0.3 - $12.0	$0.2 - $23.0
Meals offered											
Breakfast	% of respondent SFOs	100.0	100.0	100.0	100.0	100.0	100.0	91.3	100.0	88.9	97.7
Morning snack		3.6	0.0	4.5	11.8	14.3	11.1	8.7	20.0	5.6	9.1
Lunch		100.0	100.0	100.0	100.0	100.0	100.0	100	100.0	100.0	100
Afternoon snack		75.0	83.3	72.7	90.6	85.7	66.7	87.0	100.0	83.3	76.1
Dinner		3.6	16.7	0.0	0.0	0.0	0.0	13.0	20.0	11.1	4.5
Importance that produce from small farms is "locally grown"[d]											
Important or very important	Respondent rating (%)	10.7	0.0	13.6	14.7	0.0	18.5	0.0	0.0	0.0	11.4
Moderately important		46.4	16.7	54.5	41.2	57.1	37.0	26.1	20.0	27.8	38.1
Little or not important		42.9	83.3	31.8	44.1	42.9	44.4	73.9	80.0	72.2	49.5
Have not thought about it		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
Mann-Whitney U (p-value)			7.5 (.000)***			85.0 (.671)			45.0 (.971)		

Note.
[a] Information reflects traditional school districts excluding charter school districts. Characteristics of school districts reflect the whole population of schools in each state (rather than just respondent schools) and were obtained from the Georgia Department of Education, the North Carolina Department of Public Instruction, and South Carolina Department of Education, respectively.
[b] Total includes 20 respondents who did not identify their state.
[c] Overall, 31 invitations to participate were returned as undeliverable. The total response rate is based on the number of successfully invited participants (N = 411).
[d] Ratings were made on a 5-point Likert scale where 5 = Very Important, 4 = Important, 3 = Moderately Important, 2 = Of Little Importance, 1 = Not Important.
***** denotes statistical significance at the .01 levels.**

Table 3
Types of Produce Suppliers used by School Foodservice Operations

Type of Supplier	Percent of buyers who purchase produce from each type of supplier	Amount of produce purchased from each type of supplier [a]	
		Average (%)	Min.- Max (%)
Produce wholesaler or broker	73.33	60.75	9 - 100%
Mainline foodservice distributor	43.81	29.16	8 - 100%
Directly from growers or farmers	21.90	2.09	1 - 50%
Other distributors	15.24	5.28	2 - 100%
Cooperatives	11.43	2.72	2 - 100%
Specialty distributor	0.00	0.00	0%

Note.
Most respondents reported procuring produce from one (44.8%) or 2 (44.8%) types of suppliers. The remaining respondents (10.4%) purchased produce from 3 types of suppliers.
[a] Calculated based on (only) those who sourced through a given type of supplier.

state subsamples. SFO supplier networks are evaluated using data about where SFOs obtain produce and amount (%) purchased from each type of supplier (eg, farm, wholesaler, specialty distributor). From these data, descriptive information regarding the percentage of buyers (among total respondents) who source produce from a given type of supplier is estimated. Respondent perceptions of the benefits and challenges of sourcing produce from small farms are summarized using the median and interquartile ranges for all respondents and sub-groups of respondents comprised of those who have, and have not, previously purchased produce directly from small farms. Mann-Whitney U tests for independent samples were used to assess whether these subsample groups have an identical distribution of scores for each attribute. Corrections for ties and continuity are included in these estimates.

Respondents who purchased food directly from a small farm in the last 2 years are classified as having prior experience. Due to additional procurement steps, as is assumed that a buyer would be aware if a small farm was incorporated into their supplier network; as such, the 4 respondents who indicated they were unsure if they had recently purchased from small farms were classified as having no prior experience. Overall, 24.8% (N = 26) of respondents had, and 75.2% (N = 79) had not previously included small farms in their supplier network.

RESULTS

A total of 442 study invitations were distributed; of these, 31 were returned as undeliverable. Among the 411 potential respondents, 115 potential respondents started and 105 completed the full survey yielding an overall response rate of 25.5%. Whereas a higher response rate would have been ideal, lower response rates are commonly reported in studies.[51] Moreover, several studies have found a weak or nonexistent relationship between low response rates and low survey accuracy.[51-53] As Table 2 shows, response rate varied by state; this was anticipated as study investigators had established relationships with SFOs in NC and SC. Respondents reported annual average food budgets of $3.19 million, ranging between $200,000 and $23.0 million.

Although this range of annual school district budgets is substantial (Table 2), it is representative of school districts in this region; school districts in the study area vary considerably both in the number of schools in each district and in each school's enrollment. In addition, student and staff purchases from SFOs also varies considerably and is related, in part to school food quality, school food policies, extent and type of food alternatives (eg, fast food restaurants, convenience stores) located near the school, and extent to which students qualify for free- or reduced-price food programs. Schools also differ in meals served each day; in addition to lunch, increasingly, schools are offering

Table 4
Perceived Benefits of Purchasing Directly from Small Farms

	All	SFOs that do not purchase from small farms	SFOs that do purchase from small farms	Test of Difference in Means
	Median with Interquartile ranges (ICR)			Mann-Whitney U (p)
Products				
Produce from small farms is fresher	5.0 (4.0 - 5.0)	4.0 (4.0 - 5.0)	5.0 (4.0 - 5.0)	783.5 (.086)*
Produce from small farms meets needed product specifications (eg, size, consistency)	4.0 (3.0 - 4.0)	3.0 (3.0 - 4.0)	4.0 (3.0 - 4.0)	641.0 (.072)*
Public relations				
Our customers appreciate our response to their requests for food grown on small farms	4.0 (4.0 - 5.0)	4.0 (4.0 - 5.0)	4.0 (4.0 - 5.0)	847.5 (.646)
Purchasing directly from small farms benefits the economy	5.0 (4.0 - 5.0)	5.0 (4.0 - 5.0)	5.0 (4.0 - 5.0)	900.0 (.442)
Purchasing directly from small farms is good for our institution's public image	5.0 (4.0 - 5.0)	5.0 (4.0 - 5.0)	5.0 (4.0 - 5.0)	944.5 (.622)
Purchasing directly from small farms contributes to rural community growth	5.0 (4.0 - 5.0)	5.0 (4.0 - 5.0)	5.0 (4.0 - 5.0)	879.0 (.330)
Revenue				
We can charge higher prices because we purchase from small farms	1.0 (1.0 - 3.0)	1.0 (1.0 - 3.0)	1.0 (1.0 - 3.0)	851.0 (.432)

Note.
*** denotes statistical significance at the .10 level.**
Results aggregate observations from NC, SC, GA.
Ratings were made on a 5-point Likert scale where 5 = Agree, 4 = Somewhat Agree, 3 = Neither Agree nor Disagree, 2 = Somewhat Disagree, 1 = Disagree.

breakfast, morning and/or afternoon snacks, and occasionally evening meals. A notable number of schools, including 55% of respondents in the School Nutrition Association's 2015 national survey, now participate in summer feeding programs designed to ensure low-income children have access to meals even when school is not in session.[54] These additional meal services directly increase the overall SFO budget.

The lower portion of Table 2 presents characteristics of respondents who have and have no experience purchasing food from small local farms. Within each state, approximately 20% of respondents indicated they purchase food from small farms. Districts purchasing these foods tended to be larger and reported they are more likely to offer afternoon snacks and dinner. Results concerning the importance of purchasing locally grown food are similar across the 3 states with approximately 11% of respondents indicating it is important or very important, and 38% indicating it is moderately important. Responses did not differ between those with or without previous experience in NC and SC, but did statistically differ between these groups in GA. Among respondents with experience, statistical tests indicated it was less important to source products from small farms.

The types of organizations who are SFO suppliers and percent of produce SFOs purchased from each source are summarized in Table 3. Produce whole-

Table 5
Perceived Challenges of Purchasing Directly from Small Farms

	All	SFOs that do not purchase from small farms	SFOs that do purchase from small farms	Test of Difference in Means
	Median with Interquartile ranges (ICR)			Mann-Whitney U (p)
Procurement				
I am unable to buy from small farms due to contractual obligations with current distributor	3.0 (1.0 - 4.0)	4.0 (2.0 - 5.0)	3.0 (1.0 - 3.0)	569.0 (.002)***
Small farm food prices are not competitive with other bidders	3.0 (3.0 - 4.0)	3.0 (3.0 - 4.0)	3.0 (2.0 - 4.0)	706.0 (.067)*
Placing orders with and/or billing from small farms is too complicated.	3.0 (3.0 - 4.0)	4.0 (3.0 - 4.0)	3.0 (2.0 - 3.0)	423.50 (.000)***
Delivery options from small farms are too limited	4.0 (3.0 - 5.0)	4.0 (3.0 - 5.0)	3.0 (2.0 – 4.0)	702.0 (.034)**
Small farms do not offer varieties of produce our SFO uses	4.0 (3.0 - 5.0)	4.0 (3.0 - 5.0)	4.0 (3.0 - 4.0)	652.0 (.022)**
Produce from small farms is too variable in its specifications (1.00) e.g. size, consistency)	4.0 (3.0 - 4.0)	4.0 (3.0 - 4.0)	3.0 (3.0 - 4.0)	721.5 (.054)*
Small farms do not offer precut, prepackaged or other value added processing options	4.0 (3.0 - 5.0)	4.0 (3.0 - 5.0)	3.0 (3.0 - 4.0)	780.0 (.138)
Small farms are not able to supply adequate quantities or volumes of produce	4.0 (3.0 - 5.0)	4.0 (4.0 - 5.0)	3.5 (3.0 - 4.0)	632.0 (.003)***
Food availability				
There are not enough small farms in my area sell to SFOs	4.0 (3.0 - 5.0)	4.0 (3.0 - 5.0)	4.0 (3.0 - 4.75)	839.5 (.271)
There is a lack of wholesalers or brokers in my area supply produce from small farms	4.0 (3.0 - 5.0)	4.0 (3.0 - 5.0)	3.0 (3.0 – 4.0)	746.0 (.113)
Food safety				
Small farms do not use adequate farm food safety practices	3.0 (2.5 - 4.0)	3.0 (3.0 - 4.0)	3.0 (2.0 - 4.0)	738.5 (.121)
Small farms do not adequately document their food safety practices	3.0 (3.0 - 4.0)	3.0 (3.0 – 5.0)	3.0 (2.0 – 4.0)	627.0 (.024)**

Note.
***, **, and *** asterisks denote statistical significance at the .10, .05, and .01 levels, respectively.**
Ratings were made on a 5-point Likert scale where 5 = Agree, 4 = Somewhat Agree, 3 = Neither Agree nor Disagree, 2 = Somewhat Disagree, 1 = Disagree.

salers/brokers and general foodservice distributors were the most commonly reported suppliers and were used by 73.3% and 43.8% of buyers, respectively. Whereas nearly half (44.8%) reported purchasing all produce from a single type of supplier (ie, foodservice distributor, produce wholesaler, or broker), most reported regularly purchasing produce from 2 (44.8%) or 3 (10.4%) firms.

Whereas a notable proportion of respondents (21.9%) reported they bought at least some produce directly from farms, these purchases reflected only a small percentage (2.1%) of total spending

on fruits and/or vegetables. This suggests that even school districts who source some produce from local farms still face procurement constraints or other challenges (eg, seasonality of supply, volume challenges) limiting direct purchases from small local farms. Berries, leafy greens, tomatoes, squashes and gourds, and tubers and other root vegetables were the items most frequently purchased directly from small local farms.

Benefits of Produce Procurement from Small Farms

Most buyers (49.5%; Table 2) reported it was at least moderately important that produce purchased by their organization was sourced from a small local farm. Results concerning benefits of using small farm produce are in Table 4. Overall, respondents agreed that purchasing directly from small local farms offered public relations benefits in that it contributed to rural community growth, offered a good public image, and benefited the local economy. It also was agreed that produce sourced from small farms was perceived to be fresher.

With 2 exceptions, there was no difference in the benefits reported between those with and without experience; those with no experience generally recognized the benefits of doing so. Notably, however, those with experience reported a significantly higher level of agreement that produce from small farms is fresher ($p = .086$) and able to meet their product specifications ($p = .072$) than those with no experience. This suggests those with no experience underestimate the quality and ability of these products to meet their needs.

Challenges of Produce Procurement from Small Farms

Buyer perception of procurement challenges may affect both ability and willingness to incorporate small farms into their supplier network. Respondent ratings of several dimensions of procurement, accessibility, and food safety challenges are presented in Table 5. Median respondent ratings are between "Somewhat Agree" (rated 4 on the 5-point Likert scale) and "Neither Agree nor Disagree" (rated 3) for each item. Overall, the difficulty of accessing small farm products either directly, or through wholesalers or brokers, was the most significant challenge. Among the explored dimensions of procurement, the perception that small farms are not able to supply an adequate quantity of produce (median = 4.0; Interquartile Range (ICR) 3.0-5.0), that delivery options are too limited (median = 4.0; ICR: 3.0-5.0), and that small farms do not offer the variety of produce their SFO requires (median = 4.0; ICR: 3.0-5.0), were among noted challenges.

Importantly, statistically significant differences in the extent procuring produce from small farms was perceived to be a challenge was found between buyers with and without experience doing so. As Table 5 reports, for nearly all considered procurement considerations (7 of 8), and one food safety consideration, those with experience reported each item to be significantly less of a challenge than those with no experience procuring products from small farms. In particular, differences in perceptions regarding how limiting current procurement contracts are to sourcing small farm products, how complicated it is to order products from small farms, and the ability of small farms to supply the volume requirements of SFOs are perceived to be more substantial challenges by those with no experience compared to those with experience.

DISCUSSION

Through objective one we sought to identify and assess the benefits and challenges of SFOs purchasing produce directly from small farms. Findings indicate SFO buyers in GA, SC, and NC at least somewhat agree that this procurement strategy offers public relations and product quality/product specification benefits. These results provide support for Hypothesis 1, postulating directors would agree that purchasing produce from small farms would offer benefits, such as improved product quality, and public relations.

The use and the efficiency of this procurement strategy remain hampered by product availability and current procurement practices. Directors reported they at least somewhat agree they are challenged by several concerns related to the procurement and availability of produce from small farms. Food safety was not identified as a particular concern. Overall, there is some evidence to support Hypothesis 2, which posited buyers would agree that integrating small farms into their supplier networks creates challenges with procurement, food availability, and food safety.

The difference between the perceptions of those with and without experience purchasing from small farms is examined through our second research objective. Those with no experience generally understood the benefits, as such there is insufficient evidence to support Hypothesis 3. Those with no experience, however, appear to overestimate the difficulty of purchasing from small farms compared to those with experience. The no experience group also had statistically different perceptions regarding how limiting current procurement contracts are to sourcing small farm products, the complexity of the ordering process, the ability of small farms to supply foodservice needs, and the extent to which small farms implement and document their food safety practices. These results are consistent with Hypothesis 4.

Taken together, our findings provide strong evidence that those with no experience purchasing foods from small farms overestimate the challenges of this procurement strategy and underestimate the extent to which products from small farms can meet the needs of their SFO. Given this, financial and market coordination support offered through some federal and state programs, such as programs funded through HHFKA, may incentivize additional SFOs to explore this procurement strategy and help them to gain a more accurate understanding of the benefits and challenges of purchasing from small farms. Moreover, training regarding the implementation of FTS initiatives should include information not just about the benefits but also about possible challenges and suggestions to overcoming these challenges.

Complicating matters is the management structure of SFOs; 12%-15% of K-12 schools have outsourced management of their foodservice operations.[55] As the benefits generated by FTS programs accrue primarily to participating students and farms, and given the additional inconvenience and costs of sourcing local farm products, contract foodservice companies have been reluctant to incorporate local foods into their menu planning due to the relative cost and inconvenience of sourcing these products. Contracts which at their onset specify requirements for local food procurement or offer other incentives to do so may be needed to encourage the use of local foods in SFOs managed by a contract foodservice company.

Food Safety Considerations

Results related to food safety are particularly noteworthy. Buyers with no experience reported a statistically lower confidence than those with experience that small farms use adequate food safety practices. This perception of increased food safety risk from small farm products is understandable. As smaller farms frequently have fewer staff dedicated to food safety training, practices, and documentation, it is often believed that small farms have less rigorous food safety standards. Due to the vulnerable health status of children (SFO clients) and potential liability due to cases of foodborne disease, SFOs are particularly sensitive to these risks. To be clear, there is no evidence that food purchased from a small and/or local farm presents a greater food safety risk than farms of any other size or proximity.[56] These misperceptions of small farm production practices are damaging and could be addressed through SFO buyer education.

Implementation of the Food Safety Modernization Act (FSMA) also could help address food safety concerns. Of relevance to FTS programs are the "Standards for the Growing, Harvesting, Packing, and Holding of Produce for Human Consumption" ("The Produce Rule"). FSMA has initially granted special treatment for small and very small farm businesses by permitting them a longer period to become compliant with FSMA requirements. Small farms (those with $250,001-$500,000 in average annual produce sales over the past 3 years) were granted one additional year, and very small farms (those with $25,001-$250,000 in produce sales over the same period), were permitted 2 additional years to become compliant. Micro-farms, which have less than an average of $25,000 in annual produce sales, are fully exempted from FSMA requirements. Of note is that produce from these farms still can be safely incorporated into school supplier networks. Buyers can require their suppliers, including micro-farms and small farms qualifying for modified requirements,[57] to comply with any food safety standard equal to or above the federally required minimum.[56] In addition, SFOs can require suppliers to obtain product liability insurance, which addresses risk of injury (including a foodborne disease) due to the consumption, handling, use, or condition of a food product. SFOs in the southeastern US commonly require their sup-

pliers carry $1 million to $3 million of this form of insurance coverage.[58]

IMPLICATIONS FOR HEALTH BEHAVIOR OR POLICY

In spite of strong public support, and assistance from state, county, and non-government organization programs, FTS programs have been adopted by less than half (42%) of US school districts. Logistic, administrative, and other constraints are factors reported to deter SFOs from implementing FTS programs and to be particularly problematic in instances where schools want to buy produce directly from small farms. Although some of these identified constraints appear to be well-founded, qualitative research examining small farm produce marketing suggests perceptions concerning procurement challenges is not fully accurate and may overstate difficulty in purchasing from small farms.[29] Factors that facilitate and constrain procurement of small farm produce, and the extent to which this was perceived differently by those with and with no experience of these products was explored in this study. These issues are both important and timely. Concerns about child nutrition and food safety, which is one of the factors examined as potential constraint to small farm procurement, the US Department of Health and Human Service *Healthy People 2020* and *Healthy People 2030* public health prevention priorities and actions.[59,60]

Our results indicate that child nutrition directors in our study area have strong interest in, and recognize the benefits of, sourcing produce from small local farms. Specific aspects of produce procurement were reported as true challenges by those with experience in sourcing these products from small farms. Results of this portion of our study are generally consistent with findings of related literature examining procurement in other US regions.

Although logistical bottlenecks can limit procurement of small farm produce, it is possible that misperceptions regarding the actual challenges of using produce from small farms may be unduly limiting their use in SFOs. Novel to this study was considering the benefits and challenges through the lens of those who do and do not have experience using these products. Our results find that those who have not previously sourced products from these farms understood the benefits but overestimated the difficulty of procuring produce from small farms. Our findings are most relevant to schools in NC, SC, and GA and other regions with a similar agricultural production environment.

Overall, these results point to an information gap among some southeastern child nutrition directors. The potential impact of (mis)perceptions is important and may deter SFOs from directly including small farms into SFO supplier networks. Educating buyers about the real challenges and reinforcing the benefits of this sourcing strategy are keys to countering this. Sharing information and best practices between directors with and with no experience purchasing these products may be helpful. As local food systems are characterized on a regional (or sub-regional) basis, information sharing among those within, rather than regions would be particularly valuable.

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Human Subjects Approval Statement

This study was reviewed and approved as exempt by the Clemson University Institutional Review Board.

Conflict of Interest Disclosure Statement

The authors declare that they have no competing interests.

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