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Exploring Models of Local Food Procurement in Farm to Early Care and Education Programs

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Farm to Early Care and Education (Farm to ECE) initiatives generate similar benefits as Farm to School programs. However, there is a lack of research about local food procurement in Farm to ECE programs. We provide a descriptive evaluation of how 12 child care centers that participated in a Farm to ECE program procured local food. We found that centers purchased low volumes at the beginning of the program, creating challenges for establishing viable relationships with local food suppliers. Centers employed strategies such as building relationships with distributors and retailers, picking up local food, and aggregating demand with other centers and families to create successful programs.

Keywords: Farm to early care, farm to school, child care, local food procurement, collaborative learning

Introduction

Farm to Early Care and Education (Farm to ECE) initiatives are designed to connect child care providers (including family child care homes and public, private, and state-funded centers) with sources of local food to integrate into meals and snacks while simultaneously providing education around food production and preparation (Hoffman et al., 2017). Educational program components often include experiential learning such as gardening and sampling recipes of local food products. In these ways, Farm to ECE mirrors Farm to School programs.

While Farm to School programs originated in the mid-1990s, Farm to ECE programs became more widely adopted in the 2010s. Thus, less research is available about Farm to ECE programs. While multiple studies document the benefits of Farm to ECE programming for children's health and education (Carroll et al., 2011; Farfan-Ramirez et al., 2011; Hoffman et al., 2012, 2017; Izumi et al., 2015; Meinen et al., 2012; Sharma et al., 2015; Williams et al., 2014), less is known about their local food procurement practices (Harper & Matts, 2017; Rutz et al., 2018). Farm to

ECE programs differ in important ways from K-12 Farm to School programs in this regard. One critical difference is that Farm to ECE programs tend to purchase smaller quantities of food because of smaller serving sizes and lower student enrollment. Lower volume requirements can benefit Farm to ECE sites by giving them more flexibility to purchase from smaller food retailers such as supermarkets and farmers' markets (Hoffman et al., 2017; Otten et al., 2017). But, this smaller volume of purchases can also be a barrier. The relatively small value of purchases makes it more difficult for farmers and other potential suppliers to justify delivery expenses, making child care centers less appealing buyers (Hoffman et al., 2017; Otten et al., 2017).

Relatively little information is available concerning Farm to ECE procurement practices. Research is needed to better understand the approaches currently being used by Farm to ECE programs to procure local food, the benefits and challenges of these strategies, and what factors lead to successful local food supplier-ECE relationships. This study provides a descriptive program evaluation examining local food procurement practices used by centers in a Farm to ECE program in North Carolina (NC). This analysis evaluates interview and local food purchase information collected from 12 privately-owned child care centers participating in a Farm to ECE program. We identify challenges faced by child care centers in sourcing local food and the strategies centers have used to overcome procurement barriers. Finally, we provide suggestions to help those working to support Farm to ECE programs to enhance the efficiency and effectiveness of local food procurement by child care centers. The findings of this study will be of practical use to child care center managers who would like to start or more fully engage with Farm to ECE programs, and individuals and organizations who wish to support these efforts.

Background

Farm to School programs have grown in popularity in the thirty years since their inception. According to the most recent U.S. Department of Agriculture (USDA) Food and Nutrition Service Farm to School Census, these programs reached approximately 23.6 million students in 42% of U.S. school districts in 2015. Among respondent school districts who participated in Farm to School activities, 77% reported serving local food¹ in their cafeteria (USDA Food and Nutrition Service, 2015). Fewer data are available concerning the extent of Farm to ECE implementation (Hoffman et al., 2017; Stephens & Oberholtzer, 2018). Findings from the USDA's Farm to School Census indicated that of the 18,104 school districts that responded to the survey, 32% (5,793) organized Farm to School activities with preschool-age children in 2013-2014 (USDA Food and Nutrition Service, 2015). In the most recent National Farm to

¹ The term "local" has no universally accepted definition. USDA has adopted the definition of "local" included in the 2008 Farm Bill, specifically as food grown within the same state, or within 400 miles (Food, Conservation, and Energy Act of 2008, Pub. L. 110-246, 122 Stat. 1929). Individual organizations that participate in federal programs using fresh farm products can adopt their own definition of local so long as it does not exceed the 400-mile radius. It is common for studies on this topic to allow participants to share their own definition, as was done in the 2015 USDA Farm to School Census and the 2018 National Farm to Early Care and Education Survey (Shedd et al., 2018; USDA Food and Nutrition Service, 2015).

School Network survey (conducted with 2,030 Farm to ECE sites in 2018), 49% of sites ($n = 996$) indicated they were involved with some type of Farm to ECE activity (Shedd et al., 2018).

Studies show similarities in the overall benefits of Farm to School and Farm to ECE programs related to children's food preferences and health outcomes, providers' motivations for participation, and farmers' motivations and profitability. Studies of both programs find that the exposure to fresh produce provided by these programs contributes to children's greater willingness to try, like, and consume more fruits and vegetables, which corresponds to health benefits (Birch et al., 1987; Carroll et al., 2011; Evans et al., 2012; Farfan-Ramirez et al., 2011; Hermann et al., 2006; Hoffman et al., 2012, 2017; Hollar et al., 2010; Izumi et al., 2015; Koch et al., 2017; Kropp et al., 2018; Langelotto & Gupta, 2012; Lineberger & Zajicek, 2000; Meinen et al., 2012; Sharma et al., 2015; Williams et al., 2014). One study of an urban Head Start² program found that meals served as part of a farm to preschool effort were more nutritious than those usually served (Gibson et al., 2014; Stephens & Oberholtzer, 2018). In addition, qualitative research suggests that Farm to ECE providers value beneficial outcomes for both children and local farmers (Rutz et al., 2018). These findings are consistent with the National Farm to School Network's 2018 survey, which indicated that Farm to ECE providers ranked "teaching children where food comes from," "providing experiential learning opportunities," and "supporting local farmers" among key motivations for participating in these programs (95.5%, 95.1%, 89.7%, respectively; Shedd et al., 2018). These findings are also consistent with results concerning food service professionals' motivations for participation in Farm to School programs (Izumi, Alaimo, et al., 2010). Finally, findings of the scant research exploring farmer participation in Farm to ECE programs (Rutz et al., 2018) echo those of farmers' experiences in Farm to School programs. Specifically, because child care centers offer a small and minimally profitable market, farmers are primarily motivated to participate in Farm to ECE programs due to their social values (Becot et al., 2017; Conner et al., 2012; Izumi, Wright, et al., 2010; Thornburg, 2014).

While there are some similarities in food procurement strategies used by ECE sites and K-12 school systems, critical differences between them point to the need for additional research in this area (Rutz et al., 2018). Primary among these are lower volume requirements for local food at ECE sites due to lower enrollment and smaller portion sizes. For example, the vegetable serving sizes for meals for children five years and under in the Child and Adult Care Food Program (CACFP)³ are so small that they are measured in either $\frac{1}{4}$ or $\frac{1}{8}$ cup, while for snacks, they can

² Head Start programs are federally funded, public preschools that serve children from low-income families. Operated out of the U.S. Department of Health and Human Services, they are administered at the state level. For more information, see <https://www.acf.hhs.gov/ohs/about/history-of-head-start>.

³ The Child and Adult Care Food Program (CACFP) is a federally funded program administered through the USDA Food and Nutrition Service. It provides reimbursements for meals and snacks for qualifying children and adults in child care centers, day care homes, adult day care centers, afterschool care programs, and children residing in emergency shelters. Similar to the National School Lunch Program that provides reimbursements and guidelines for K-12 school districts, CACFP includes a set of guidelines for nutrition standards, as well as procurement regulations. For more information, see <https://www.fns.usda.gov/cacfp/child-and-adult-care-food-program>.

increase to $\frac{1}{2}$ cup (USDA Food and Nutrition Service, n.d.). By comparison, the daily serving sizes for lunches in the National School Lunch Program are $\frac{3}{4}$ cup of vegetables for K-8, and one cup for grades 9-12 (USDA Food and Nutrition Service, 2019). In terms of enrollment, more than 50% of K-12 districts have more than 1,000 children enrolled, while the child care centers in our study had an average of 60 students (Aritomi & Coopersmith, 2009). Most ECE programs also lack a coordinated, centralized food procurement system that is typical of many K-12 programs. Therefore, ECE programs generally purchase significantly smaller volumes of food and contribute to challenges potential suppliers face in offering delivery services.

The smaller volume requirements of ECE programs may offer increased supplier flexibility. Through the National School Lunch Program (for K-12 schools) and CACFP (for child care centers), public K-12 schools and private and public child care centers can participate in federal nutrition programs that reimburse the cost of providing meals to qualifying students (Harper & Matts, 2017).⁴ Due to the small volume of their purchases, ECE sites generally fall far below the lowest purchasing threshold, which allows them the flexibility to purchase products from vendors without soliciting bids. On the other hand, school systems often consolidate purchasing for an entire district, increasing the amount they spend and forcing them to request bids to find the lowest cost vendor. As a result, it is not unusual for ECE providers to purchase food at supermarkets or big box stores (Hoffman et al., 2017; Otten et al., 2017). If they wish to use local foods, it is relatively easy to purchase them from farmers' markets and farm stands while still receiving CACFP reimbursements.

Despite these differences, ECE and K-12 schools face many of the same barriers in using local foods, such as lacking appropriate storage and processing capacity to prepare fresh foods (Otten et al., 2017). In addition, the seasonality in farm product availability relative to the time of year when schools are in session is also a challenge (Otten et al., 2017; Shedd et al., 2018). Notably, however, this is less of a challenge for Farm to ECE than K-12 programs, which, with the exception of Head Start programs, may operate year-round and can thus purchase locally-sourced products whenever they are in season (Hoffman et al., 2017). Both Farm to School and Farm to ECE also often report challenges due to policies and regulations regarding local food procurement. In the case of Farm to ECE programs, compliance with the CACFP is perceived as a procurement barrier that makes these sites hesitant to purchase locally-sourced food (Otten et al., 2017; Shedd et al., 2018).

⁴ These programs require that single purchases above \$250,000 go through a competitive bid process, with buyers selecting the lowest-cost bid. For single purchases less than \$10,000, an ECE or school can simply find a vendor and purchase the product. For single purchases between \$10,000 and \$250,000, facilities are permitted to use an informal method to solicit and compare vendor prices. The USDA increased the federal micro-purchase limit from \$3,500 to \$10,000, and the simplified acquisition threshold from \$150,000 to \$250,000, effective as of October 30, 2019. For more information, see <https://www.fns.usda.gov/cn/federal-micro-purchase-and-simplified-acquisition-thresholds>.

Research on Farm to ECE indicates a need to better understand the strategies that child care centers use to take advantage of opportunities and overcome perceived barriers to using local food. In their review of farm to preschool research from 1994-2015, Hoffman et al. (2017) reported that the majority of research on this topic has focused on children's educational activities about local food and the food system. Among their conclusions, they note, "[g]iven that a primary purpose of the farm to preschool movement is to connect local food producers with early care and education settings, additional research focused on interventions that include partnerships with local food producers is warranted" (Hoffman et al., 2017, p. 458). The 2018 National Farm to School Network Survey (Shedd et al., 2018) identified procurement, specifically the "reliability of local food supply" (26.9%), "finding suppliers/farmers to provide local food" (26.7%), and "knowing how to order local items" (24.4%) among the top five challenges facing Farm to ECE providers. Shedd et al. (2018) suggested that technical assistance providers can assist ECE providers to "navigate processes for procuring and ordering local foods" (p. 29). To help address these challenges and respond to the call to assist ECE programs with logistics of local food procurement, we need to improve our understanding of approaches that can contribute to successful local food relationships between ECE programs and vendors.

Study Context

This study evaluates a Farm to ECE program funded by the W.K. Kellogg Foundation and led by the Center for Environmental Farming Systems (CEFS)⁵ in North Carolina in 2016-2017. As part of this program, CEFS and multiple statewide partners used a Breakthrough Collaborative Series strategy to provide ECE sites with technical assistance while fostering a community of practice that promoted joint learning and sharing (American Diabetes Association, 2004). Organizers initiated the project with invitations to county-based Smart Start Partnership for Children⁶ organizations to apply for participation in the Farm to ECE program. Applicant organizations were required to partner with a child care center that had previously participated in a program focused on capacity building around nutrition and physical activity (Smart Start, n.d.) and to develop multi-stakeholder teams to support the center in Farm to ECE efforts. Invitations were sent to 11 Smart Start Partnerships for Children representing 18 counties to apply to participate in the statewide Farm to ECE program. Teams from nine counties, including 13 child care centers⁷ and 75 participants, were selected to participate in three day-long learning sessions between April and October of 2017. During these sessions, teams received technical assistance

⁵ The Center for Environmental Farming Systems (CEFS) is a partnership among NC State University, NC A&T State University, and the NC Department of Agriculture and Consumer Services. CEFS develops and promotes just and equitable food and farming systems that conserve natural resources, strengthen communities, improve health outcomes, and provide economic opportunities in North Carolina and beyond. For more information, please visit <https://cefs.ncsu.edu/>.

⁶ Smart Start Partnership for Children is a public/private partnership that works at the state level as well as through county offices to provide technical assistance to child care centers in order to improve the quality of early childhood education. See <https://www.smartstart.org/> for more details.

⁷ Twelve of the 13 center directors who participated in the program were interviewed as part of the evaluation described here; despite multiple attempts, we were unable to contact the remaining center director.

from state partners and shared and learned from other participants. The technical assistance was provided by a state team that provided general information about Farm to ECE, including local food procurement strategies. For example, county teams were informed about different procurement options and provided information about issues such as food safety and CACFP local food purchasing guidelines. The content of this technical assistance was derived from previous research and the team's experiences implementing Farm to ECE programs in urban areas (Rutz et al., 2018). However, recognizing that local food options often vary by region and between urban and rural areas, centers were encouraged to connect with local partners to determine how to best implement procurement strategies. Importantly, centers were encouraged to determine a definition of "local" that most resonated with the agricultural context of their county and the expectations of the communities and families they served.

CEFS also worked with the University of North Carolina's Go NAPSACC⁸ team to create a module in their child care environmental assessment framework regarding local food procurement. Go NAPSACC defines local food as food grown in child care gardens, within the state, or in a neighboring state if a center is near the state border. The Farm to ECE Go NAPSACC best practices module helped teams set goals for local food procurement, including increasing the variety of local food products they procured, increasing the number of times these foods were offered as part of meals or snacks, and communicating about local food procurement to parents and their community. Finally, funding in the form of a \$600 "mini-grant" was offered to each center to support their Farm to ECE programming. Four centers reported using some of this funding to subsidize their local food purchases.

Methods

Our team conducted an evaluation of the local food procurement practices of 12 child care centers involved in the NC Farm to ECE program. None of the child care centers in this project were affiliated with public school systems, Head Start programs, or centers based in family homes; rather, all were independently owned and operated facilities. Twelve among the 13 participating centers (92.3%) opted to be included in this study. Table 1 summarizes the key characteristics of the 12 centers participating in this evaluation. These centers are categorized based on their size: small centers are defined as those which serve less than 40 children, medium-sized centers serve 41-80 children, and large centers serve more than 80 children. This research was conducted under North Carolina State University's IRB # 11820.

⁸ Go NAPSACC is a designated evidence-based program by the Center for Excellence in Training and Research Translation that was developed by researchers at the University of North Carolina. It describes a set of best-practices to improve the quality of early childhood education, including self-assessment tools, action planning guides, and educational resources. This program is used by child care centers and technical assistance providers nationally, and a Farm to ECE best practices module was created to guide and promote Farm to ECE activities as part of this project. For more information see: <https://gonapsacc.org/>.

Table 1. Center and Produce Procurement Characteristics of Participating Child Care Centers

Child Care Center	County [Redacted]	Center Size ^a	Center Setting ^b	Primary Source of Produce	Source(s) of Local Produce
CCC1	County 1	Medium	Rural	Caterer	Distributor, Donation, Farmers' Market
CCC2	County 2	Small	Rural	Retailer	N/A
CCC3	County 3	Medium	Urban	Retailer; Caterer	Farmers' Market, Donation
CCC4	County 4	Large	Rural	Distributor; Retailer	N/A
CCC5	County 5	Large	Urban	Retailer	Produce Aggregator
CCC6	County 6	Small	Regional City/Suburban	Retailer	Food Hub, Farmers' Market
CCC7	County 7	Small	Rural	Retailer; Distributor	Pop-up Market
CCC8	County 7	Large	Rural	Retailer; Distributor	Pop-up Market
CCC9	County 7	Medium	Rural	Distributor; Retailer	Pop-up Market
CCC10	County 8	Medium	Rural	Retailer	CSA
CCC11	County 8	Medium	Rural	Retailer; Distributor	CSA
CCC12	County 9	Medium	Rural	Retailer	Donations, Pop-up Market

Notes.

^a Size categories: Small = 1-40 children; Medium = 41-80 children; Large = 81-120 children

^b Based on the NC Rural Center's classification, which uses 2014 US Census Population estimates to calculate average population density by county; Rural = 250 people per square mile (or less); Regional City and Suburban = between 250 and 750 people per square mile; Urban = more than 750 people per square mile (NC Rural Center, n.d.).

Data Collection and Analysis

Two complementary approaches were used to track and evaluate local food procurement by child care centers. First, centers used a tracking log to record local food purchases. Date, source of product, what product was purchased, and volume and cost were recorded. Logs were collected, and data were entered and compiled every month from May to September 2017. Individual sites, however, only recorded transaction data during this period when they were purchasing local foods. On average, centers collected consecutive transaction data for 2.03 months, given the start-up time and procurement challenges. Second, in spring 2018, we conducted semi-structured

interviews with center directors to capture their experiences procuring local food and perceptions of the approaches used and to identify strategies to address any procurement challenges. The recorded interviews lasted one hour on average and were later transcribed verbatim.

A codebook was developed cooperatively by the researchers to facilitate analysis of the transcribed interviews. We began with *a priori* coding, in which researchers used previous research, work experience in this setting, particular questions asked during the interview, and existing literature on the topic to deductively develop a set of themes related to the research study (Gibbs, 2007). The *a priori* code list served as a sensitizing framework that allowed researchers to then use open coding in a process of inductive code development, wherein the sensitizing concepts “help the researcher to be receptive to and explicit about acknowledged but subtle concepts” (Silver & Lewins, 2014, p. 615). Four co-authors participated in the code development process by creating a codebook that consisted of *a priori* codes and codes that were developed upon review of all transcripts. This coding team used the draft codebook to code one transcript, then met to compare their coding, review the proposed codes, and make revisions and clarifications. One co-author then used this final codebook to code the transcripts, guided by Saldaña’s (2013) coding manual and using NVivo 11, qualitative data analysis software.

The coder used evaluation coding (Saldaña, 2013) to focus on particular topics relevant to the Farm to ECE program. Evaluation codes “assign judgments about the merit, worth, or significance of programs or policy” and are appropriate to use for this evaluation study since they reflect the type of questions that participants were asked (Saldaña, 2013, p. 119). For example, a code about any previous programming implemented at the centers was developed based on the question, “Were you already participating in some Farm to ECE activities before you started the Farm to ECE project, i.e., purchasing local foods, gardening, educational activities?” Another code, “challenges and barriers,” described the obstacles child care providers faced in implementing local food procurement. The co-author responsible for coding met regularly with the co-authors at bi-weekly meetings to review any questions or modifications to the codebook that arose during the coding process to mitigate bias.

Once coding was complete, the coder performed a thematic analysis through a retrieval process to examine all of the text from multiple transcripts grouped under one code (Gibbs, 2007). The analysis looked for patterns in the retrieved text and looked for relationships between these patterns and characteristics of the respondents (e.g., size of the child care center, distribution method; Gibbs, 2007). The coder then summarized these themes and patterns under different categories, including definitions of local food, various distribution methods, and unanticipated themes, such as the role of donations by farmers. This summary included participant perceptions for each category and example quotes that were organized by center size. The co-authors used this coding summary to analyze the findings in the context of their experiences with Farm to ECE programming and the extant literature, resulting in the subsequent report of findings, discussion, and practice-based recommendations.

Results

We collected baseline data from nine centers enrolled in the program (three centers joined the program after baseline data had been collected). These data indicated that six centers had previously purchased some food locally, primarily from farm stands and farmers' markets. By the end of the program, ten of the 12 centers reported sourcing local food from multiple venues, including market middlemen such as broadline distributors, retailers, and food hubs, and directly from farmers through farmers' markets, Community Supported Agriculture⁹ (CSA), and pop-up markets held at child care centers.

Defining "Local" Food

For the purposes of the NC Farm to ECE project, teams were encouraged to define local food in a way that reflected the agricultural context in their county and the values and expectations of center staff and families. These definitions may include geographic administrative boundaries (e.g., by county or state) and opting to preferentially source products from certain types of farmers (e.g., those of a particular gender or racial or ethnic background). During interviews with child care center directors, interviewees were asked how their child care center defined local food. Child care centers frequently defined local food as those sourced within a radius of 50 to 100 miles or a product coming from somewhere in North Carolina. For example, Child Care Center (CCC6) responded that for them, "[i]t's locally within our community or locally across North Carolina, is what we're looking at." While most centers focused on this community and state-wide definition of local food, four centers (CCC1, CCC2, CCC5, and CCC8) considered "local" within a regionally defined area. For example, CCC1, a medium-sized center, stated that "[w]e decided to define local as North Carolina, and South Carolina, Virginia, and Tennessee, and Georgia ... just to make sure that we could get a good variety as far through the season as we could." These responses are similar to findings in the National Farm to School Network's 2018 Survey, where ECE respondents defined "local" as within the same city/county (35.3%), within a 50-mile radius (25.3%), or within the state (19.2%). Fewer respondents (2.7%) in that survey defined "local" as produced in a multi-state region (Shedd et al., 2018).

Local Food Purchases

Food purchase logs were used to gain more precise estimates of the volume and other characteristics of local food purchases by Farm to ECE sites. Among the 12 sites included in this evaluation, ten successfully procured local food for use at their sites. While the number of

⁹ Community Supported Agriculture (CSA) are purchasing arrangements where customers purchase a share from a farmer before the season begins, and then receive a box of food throughout the season, often once a week. This arrangement helps farmers have funding in the beginning of the season, when their costs are highest, and also helps to share risk with consumers, who have pre-paid and therefore will only receive what the farm produces. For example, if farmers lose a crop due to weather or pests, customers share in that loss. Many different versions of CSAs have emerged, including produce distribution companies that aggregate from multiple farms and allow customers to choose what they receive in their boxes (Woods et al., 2017).

participating sites is relatively small, these data offer some initial and novel insights into these purchases. Collectively the successful ten sites spent a total of \$2,261 on 1,582 pounds of local food during the period that they collected transaction data. This volume includes 66.4 lbs. of donations from parents, farmers, and teachers and produce grown in home and child care center gardens. As there was no cost to obtaining these donations, their value is not monetized or included in the spending totals. The average spending across centers during the time they purchased locally-produced foods was \$226.10 and ranged from \$64.30 to \$384.31. In addition, participating sites made 124 unique local food purchases (average \$23/purchase), the majority of which were made at a farmers' market or local farm. These results corroborate interview findings, indicating that many centers chose to start small and purchase low volumes of local foods for snacks and taste tests rather than integrating local food into meals right away. In examining what specific products were purchased or donated to a center, squash (323.3 lbs), melons (172.7 lbs), cucumber (171.7 lbs), peaches (165.6 lbs), and berries (135.9 lbs) were the most commonly obtained. It is worth noting that this list of products is shaped by the type of agricultural production common in the area of study.

The two centers that did not report any local food purchases are served by the same Smart Start Partnership for Children and participated on the same county team. As part of the technical assistance for the program, our team attempted to connect these centers (CCC2 and CCC4) with a food hub¹⁰ that also runs a processing facility that chops and bags local collards and cabbage. However, since this food hub does not provide delivery services, the centers opted not to use this option. Instead of providing produce for meals and snacks, this non-profit food hub engaged in educational activities related to local food with these two centers, including providing taste tests.

Table 2 summarizes the average and ranges of spending and volume of local food procurement by center and by child. This table summarizes that the three small, six medium, and two large centers served 33, 64, and 107 children, respectively. It is not possible to estimate local food spending on a per meal basis as the available food is spread across several meals and snacks. However, some interesting observations emerge in considering the monthly local food purchases and procurement (purchases plus donations) on a per-child basis. Among the sites included in this study, it was the smaller ones that, on average, both spent the most (\$3.64) and procured more (3.31 lbs) per child. Relative to small centers, medium and large sites spent less per child and sourced less food per child. Interestingly, the price paid for locally produced also varied consistently with center size; smaller centers reported spending the least amount per unit for purchased food (\$1.00/lb) compared with medium (\$1.62) or large (\$2.20) centers.

¹⁰ Food hubs are defined by the USDA as a “centrally located facility with a business management structure facilitating the aggregation, storage, processing, distribution, and/or marketing of locally/regionally produced food products” (Barham, 2010).

Table 2. Local Food Purchases between May and September 2017 by Center Size

Center Size	Number of Children	Value of local food purchases per center (\$)			Amount of local food purchased (lbs)		Donations			Cost per Pound of Purchased Food (\$/lb)	Monthly	
		Total	Spending Per child	Transaction Value	Total Site Purchases	Per child	Centers Receiving Donations n (%)	Weight (lbs)	Donations as a % of Total Local Food Used by Center ^c		Spending on Local Foods (\$/child)	Local Food per Child (lbs/child) ^d
Small (n = 3 ^a)	32.7 [22,40]	\$246.56 [\$182.00, \$311.12]	\$6.60 [\$4.55, \$8.64]	\$16.72 [\$2.40, \$58.00]	247.6 [245.3, 250.0]	6.5 [6.8, 6.3]	0 (0.0)	n.a.	n.a.	\$1.00 [\$0.73, \$1.27]	\$3.64 [\$1.51, \$5.76]	3.31 [2.01-4.54]
Medium (n = 6)	64.0 [47,80]	\$220.95 [\$64.30, \$384.31]	\$3.37 [\$1.15, \$4.80]	\$25.35 [\$11.91, \$36.38]	136.8 [50.6, 221.6]	2.07 [0.90, 2.94]	2 (33.3)	33.2 [53.0, 13.4]	20.9 [20.9, 20.9]	\$1.62 [\$1.27, \$2.00]	\$2.08 [\$0.57, \$4.23]	1.33 [0.46-2.48]
Large (n = 3 ^b)	107.3 [98,120]	\$221.40 [\$162.90, \$279.89]	\$1.95 [\$1.57, \$2.33]	\$35.39 [\$14.81, \$55.98]	99.5 [79.0, 120.0]	0.88 [0.76, 1.00]	0 (0.0)	n.a.	n.a.	\$2.20 [\$2.06, \$2.33]	\$1.56 [\$1.55, \$1.57]	0.71 [0.67-0.76]

Notes. Unless otherwise noted, values reflect each measure's average [min, max] values.

^a CCC2 had no local purchasing and is thus not included in purchase calculations.

^b CCC4 had no local purchasing and is thus not included in purchase calculations.

^c Average and range calculated among only those sites which received donated produce.

^d Includes both purchased and donated food.

Strategies to Facilitate Local Food Procurement

Evaluation of the interview data revealed three primary strategies used by centers to address local food procurement challenges: (1) building relationships with distributors and retailers, (2) picking up local food purchases, and (3) aggregating orders with other centers and families. These general strategies and variations observed in implementation are described below.

Building Relationships with Distributors and Retailers

At the beginning of the project, the state-level technical assistance team observed that centers were primarily interested in sourcing local food directly from farmers. However, our team encouraged centers to consider purchasing local food through broadline distributors¹¹ or standard food retailers (primarily grocery stores) as easier procurement options, especially if they had previously purchased from these suppliers. All of the centers in the program used retailers and distributors as their primary source of produce. Many reported they appreciated the convenience and affordability of food purchased through these channels, including that retailers are open many hours almost every day. Distributors and retailers were also believed to be a useful alternative for centers in North Carolina since other projects run by CEFS¹² have worked directly with distributors and retailers for several years to increase the amount of local food they sell.

The three center directors who purchased local food through distributors and retailers as part of this program reported that finding information about local food through distributors and retailers was challenging and time-consuming. By way of example, after CCC3's director reported seeing a commercial touting a warehouse store's locally sourced food options, she engaged with the manager to inquire about purchasing local products. He was unable to provide this information and directed her to call a 1-800 number. The center director was frustrated that "[t]hey couldn't give me a list of [local] items. ... Knowing that they purchase local was wonderful, but I couldn't purchase from them because I never knew exactly which items were which." Similarly, CCC9's director talked to a manager at a different Big Box Store and "found out that nothing they carry is local." This experience is indicative of the limits of the procurement opportunities through standard retailers. Further, these experiences were unexpected by many center directors. As CCC9's director stated: "We have dairy farms close by, and our milk is not even from this state. It's not local. We have chicken farms up the street, but our chicken is not local. That's hard to wrap your head around."

¹¹ Broadline distributors are large-scale food companies that deliver high volumes of food (and sometimes other products, as well) to institutions and businesses. They are an integral part the mainstream food system, and are extremely convenient and efficient for their clients. They include companies like Sysco and U.S. Foods, as well as smaller scale regional distribution companies.

¹² The NC Growing Together project was a USDA-funded CEFS project that ran from 2013-2018. The overarching goal was to achieve greater food security by enhancing the economic viability of small and mid-scale farms and fishing operations and their communities through strengthening supply chains with mainstream markets. For more information, see: <https://cefs.ncsu.edu/food-system-initiatives/nc-growing-together/>

CCC9's director struggled to schedule a meeting with a produce manager from a grocery store to discuss local food procurement options; however, she had more success setting up a meeting with the distributor from whom she had a purchasing relationship. "[We had a] lady that works with fresh produce and things like that for [this major national distributor] come and meet with us. We met with her for about an hour and talked. ... That was another step that we took is trying to see, 'Okay. We already deal with [this major national distributor]. Let's see if they carry some local stuff.'" As this quote indicates, even for those center directors who had existing relationships with broadline distributors, time and effort were needed to understand the variety and availability of the local food products they could offer. This center was ultimately able to purchase local food successfully from distributors and retailers.

Staff Pick-Up Local Food Purchases

Several center directors noted the challenge in transporting local food from its source to the child care center. In a majority of cases, this was addressed by the center director picking up the food rather than relying on the supplier to deliver it. For example, one center purchased from a food hub that has a social mission to work with underserved farmers and buyers. This hub offers delivery but charges a fee for it. Since this center only needed food for snacks (their meals were purchased from a caterer), the delivery fee was cost-prohibitive. Instead, this center director opted to pick up the center's order herself: "I live in [Town 2], so I would stop by the Food Hub and pick up the food as opposed to them delivering it to us here in [Town 1]. I can go get it because it's right there. ... Usually, the delivery costs, unless it's gonna be free, it's gonna be ... more expensive for us" (CCC6).

In these instances, given the director's direct involvement in purchasing and picking up the local food, the location and hours of operation of these outlets were key factors that affected directors' assessments of the difficulty of local purchasing. For example, CCC5's director picked up produce from a local business that purchased from several different farms (referred to as a produce aggregator in Table 1). "Because it is kind of a distributor, it's open every day ... I could just pop back down there if I needed extra" (CCC5). Similarly, more than half of the centers (7) indicated that farmers' markets were their main source of local food. Four of these centers reported purchasing from a particular farmer each visit. In these cases, the director often communicated with the farmer in advance, either to find out what items they would have available or to actually place an order. As CCC3 said, "It got to the point where I could give them the list of things that I needed in the following week, and they would gather up enough of it so that I could purchase without going here and there to purchase them."

Some ECE centers combined picking up food at the farmers' market with a field trip to expose students to new foods and farming. In doing so, center directors provided enriching experiences for children at the same time as they did their purchasing for the week, thus overcoming the challenge that many markets are only open during school hours. In the case of one center

(CCC6), farmers' market field trips were timed at the end of the day, requiring families to pick children up at the market. This increased parent engagement and awareness of local food and the possibility that they would purchase food at the market.

While the strategy of picking up food, rather than having it delivered, worked for many center directors, it was not feasible for all sites. CCC12's director explained, "There is not [a market open] here until after we're closed. It's not really easy for me to get to ... except for the farmers' market on the weekend." In addition, several center directors cited challenges in identifying and purchasing from markets and farmers due to living in rural areas without many local food outlets or arranging for food pick-up outside of work hours. As the director described above explained of her efforts to pick up produce at the food hub: "[i]t's like if I want to have a variety or if I want to have something specific on my menu, then I know I need to go find it ... I don't think about the time process or the gas process to go get it" (CCC6).

Aggregating Orders

A strategy of aggregating orders was used by centers to increase the volume of their direct purchases from farmers and to facilitate product delivery. Teams in two counties worked with farmers to aggregate orders across centers and to create opportunities on the premises of the child care sites for additional sales, referred to as pop-up markets in Table 1. In these cases, three centers ordered from a farmer who delivered produce to one site where the other two centers could pick up their orders. On delivery days, the farmer would also set up a pop-up farm stand during the time when families would come pick up their children (3 pm-6 pm). The benefit of this model was to both aggregate demand from the centers, thus increasing volume to justify delivery and expanding the potential customer base to include child care center families and staff. Center directors noted the potential for this model to support farmers. As CCC9's director stated, "I think [it] helped [the farmers] decide to want to work with us ... because it wasn't like they were going to lose out on time and money. They're still getting three orders a week."

As another option, child care centers purchased local foods through CSA shares. Two centers in this study used a CSA model of local food procurement that, in some instances, also helped farmers reach additional individual customers. For these two centers, purchasing a CSA share was effective because they only needed enough produce for taste tests or snacks or because the farmer was flexible in adapting the CSA box to meet the centers' needs. For example, CCC1, a medium-sized center, said that the farmer she purchased from was willing to adapt the model to address this challenge, allowing her to "get whatever she had, whether it was a box full of tomatoes or potatoes, or whatever she had that was good." For the other center that employed this model, CCC10, this approach required additional engagement with families and staff since the farm they were working with required five subscriptions to be willing to deliver CSA boxes to a new site. This required that the center find four families and staff members willing to purchase a CSA share to get the box for the center delivered. The director herself got a box and

said that she was pleased with this option: “I got a box personally for my family. ... I’d definitely say it’s cheaper than a grocery store.” In this case, the CSA model was cost-effective for this center; the quantities met their needs, and there was a clear benefit to the farmer.

While purchasing produce through CSA shares worked for some centers, others did not feel this approach would meet their needs. When asked if they’d tried using the CSA model, one director stated that “more than likely [a CSA] would not be sufficient enough for us to be able to do what we need to do for this many children” (CCC6).

Discussion and Practice Recommendations

Results and implications of this evaluation offer several valuable and actionable insights for those engaged with Farm to ECE programs. In terms of the local food purchase log data, spending and the volume of local food obtained by our sites are much lower than those reported in the National Farm to School Network’s 2018 survey, where centers reported spending an average of \$4,490 on local food over the course of a year (Shedd et al., 2018). However, it is important to consider that our results reflect only an average of a few months (2.03) of purchases in the first year of a nascent program. Importantly, the National Survey reports that milk was the most frequently served local product, with 21.7% of the centers reporting serving it daily (Shedd et al., 2018), which would increase their expenditures and volume of local food purchased. In comparison, none of the centers in our study reported purchasing local milk.¹³

For the qualitative aspect of this study, we determined five key findings that directly relate to practice-oriented recommendations. First, at the outset of this program, the state-level team suggested that distributors and retailers would be the easiest local food procurement options for centers. Due to the difficulty in identifying which food is local, these sources took more of the center directors’ time and effort than anticipated. Although this additional effort was a challenge for centers, the effort could generate long-term benefits. As centers signal their interest in purchasing locally sourced foods, mainstream food retailers may respond by increasing the amount and variety of the local products they stock. It is recommended that technical assistance providers offer Farm to ECE providers an accurate assessment of the investment that relationship-building with distributors and retailers may require.

Secondly, it was found that there is an information gap in center directors’ understanding of what products are grown locally and why these items may not be available in local stores. This was illustrated by the center director, who noticed that items grown in her county were not sold at the local Big Box Store, such as dairy and poultry. One practice recommendation that emerges is the potential benefit of offering center directors information about agri-food production and marketing systems prior to initiating a Farm to ECE program. Doing so will help directors understand the supply chains that serve distributors and retailers and the implications of the

¹³ Interestingly, one center did purchase local ground beef on an occasional basis (CCC6).

seasonality of supply on local food availability, which, in turn, would help them more effectively craft their Farm to ECE programs and menu-planning.

Third, our results indicate that the success of local food procurement often relied on the willingness of center directors or technical assistance providers to use personal time to pick up produce in order to facilitate relationships and avoid delivery costs. Future programs should take note of this trend since a model that relies on a passionate individual rather than embedding local food procurement within an organization's processes is less likely to be sustained in the long run.

Fourth, several of the child care centers in this study reported that they received donations of fresh produce from local farmers. It was reported that these donations were altruistically made in an effort to support Farm to ECE program efforts. Assuming this donated produce is not at the very end of its shelf-life, such donations come at a cost to the farmer. Given this, it is recommended that during Farm to ECE training, program directors be informed about the financial challenges often faced by farms, particularly by the smaller-scale operations that are more likely to partner with a child care center. An expectation on the part of centers that products will be given to them free of charge could undermine the long-term goal of developing sustainable and mutually beneficial Farm to ECE programs.

Finally, results suggest that procurement models which aggregate demand across centers and the community of staff and families associated with a center offer benefits to child care centers and the farmers who supply them. The farmer benefits from a new market opportunity that is larger than working with individual centers since most of the centers in this study purchased small volumes. The child care center's community benefits from the opportunity to connect with and purchase produce from a local farmer, and the child care center benefits from the direct delivery of fresh produce and the opportunity to offer an additional service to its staff and families.

A procurement model that facilitates sales opportunities for local farms through a "pop-up" or farm stand at the child care center, or CSA box drop-off requires effort and flexibility on the part of both centers and participating farmers. We suggest conducting a survey with parents at the beginning of a Farm to ECE program to assess their interest in particular marketing alternatives. Since developing a child care center's community as a market takes time, we also recommend that Farm to ECE projects work with socially motivated farmers who are willing to be flexible and grow with the project.

Conclusions

At present, literature that addresses local food procurement challenges of child care sites that have implemented a Farm to ECE program is limited. Using a mixed-methods approach that collected and evaluated both qualitative (interview) and transaction-level purchase data, this paper lays out unique insights regarding logistical considerations, challenges, and strategies used by child care centers engaged in Farm to ECE programs in their procurement of local produce.

Overall, we find that most (10 of 12) of the child care centers participating in this program successfully incorporated locally sourced produce into their Farm to ECE programs. Many of the centers in our program chose to use these local foods for taste tests and snacks rather than incorporate them into regular meal planning. This approach is due to the preference of centers to “start small” in their use of local food products because of the time and effort it takes child care centers to identify and develop relationships with local food vendors, as well as the adjustment needed to shift to serving fresh produce in child care kitchens. In general, child care centers were surprised by the challenge in sourcing locally-produced food and were unaware of the nature and complexity of supply chains serving standard distributors and food retailers.

The sites included in this analysis used a variety of approaches to procure their local foods. These adopted approaches can be generally categorized as relying on building relationships with distributors and retailers, staff pick-up of local food purchases, or aggregating orders with other centers and families. These approaches vary considerably in the unit cost of the local foods, the amount and nature of effort required by the director to source these products, and the extent of engagement with the child care center’s community of family and staff. The sustainability of these approaches to sourcing products is discussed, and considerations and recommendations for implementing these sourcing strategies in other Farm to ECE programs are offered. These actionable insights include providing centers looking to establish Farm to ECE programs with information regarding local food procurement challenges through broadline distributors and retailers, providing Farm to ECE center directors with additional information about food production and supply chains, making center staff engaged with Farm to ECE programs aware of the possible ‘cost’ of food donations from small farmers, and encouraging the use of procurement strategies which are not reliant on a single individual for food pick-up but which, to the extent possible, incorporate other centers and members of their child care center’s community (staff, families).

Importantly, the themes and patterns observed here are consistent with other Farm to ECE research findings. Our evaluation of procurement models used by Farm to ECE programs indicates that no matter the procurement approach, centers and their partners need to be flexible and invest the time to build relationships. Due to the low volume and decentralized nature of the child care system, food delivery expense was a challenge for child care centers. In addition, these small volumes and distribution issues draw into question farmer profitability of serving these centers. Future studies should explore how selling to Farm to ECE programs can be made more profitable and appealing through other benefits for participating centers and farmers. This may include the benefit of enhancing a farmers’ reputation and brand recognition through Farm to ECE as community engagement.

Research on this topic continues. Researchers in North Carolina have explored the feasibility and impact of the centralized kitchen model to address Farm to ECE procurement challenges. Centralized kitchens source ingredients from local farmers, prepare meals, and deliver these

meals to child care centers, increasing the volume of local foods sales and ensuring delivery of local food products to child care centers. Preparing local foods through a centralized kitchen offers the additional benefit of removing the burden of food preparation from centers and allows a third party to ensure compliance with CACFP standards. It is likely that innovative approaches such as this, which connect local farmers to child care site programs through flexible and place- and resource-specific arrangements, will be needed to ensure the sustainability of many Farm to ECE programs.

Limitations

While the results of the local food purchase logs offer interesting new insights into the volume and value of food purchases, they must be interpreted with caution. The small sample size, combined with the variability both within and among centers assigned to each size group, means that these results may not be indicative of purchases by centers of these sizes. Further, it is worth noting that the cost of local food does vary by the type of supplier. Previous research with K-12 districts reported that purchases through broadline distributors have higher per-student costs than purchasing directly from a farm or a non-traditional distributor, such as a food hub (Christensen et al., 2017). However, as shown in Table 1, large centers in our study were not more likely to purchase through a distributor than small or medium centers. Another consideration is the mix and relative weights of the products used by sites. It is possible, for example, that a center may have purchased heavier items, such as sweet potatoes, thus increasing the number of pounds purchased and lowering their costs per pound. Finally, while these results indicate how much locally sourced food was available for students, it is not necessarily the case that students actually consumed this full amount. Due to waste during food preparation and plate waste, the consumed amounts will be smaller than the per-child weights available.

Overall for this study, the number of child care centers included is relatively small (12), and there is heterogeneity both within and across the size-groupings of child-care sites included in this study. While the data collected as part of this study cannot offer widely generalizable results, the descriptive findings reported here do offer a useful initial and insightful look at these procurement issues. In addition, the research approach adopted serves as a useful starting point for those who wish or need to evaluate Farm to ECE program supply chains in their own area. Future efforts to evaluate procurement by Farm to ECE programs would be well served to also collect information that would facilitate comparison of their study setting and outcomes with those of the USDA's Farm-to-School Census and other datasets.

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