



Farm to School Literature Review

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List of Acronyms

CHIP	Community Health Improvement Partners
CSA	community supported agriculture
F2S	Farm to School
FFVP	Fresh Fruit and Vegetable Program
FINE	Farm to Institution New England
FNS	Food and Nutrition Service
GAP	Good Agricultural Practices certification
IFB	invitation for bids
NCES	National Center for Education Statistics
NSLP	National School Lunch Program
QED	quasi-experimental design
RCT	randomized controlled trial
RFP	request for proposal
SFA	school food authority
SN-OPS	School Nutrition Program Operations Study
SNMCS	School Nutrition and Meal Cost Study
SQF	Safe Quality Food certification
USDA	U.S. Department of Agriculture
USDA DoD Fresh	USDA Department of Defense Fresh Fruit and Vegetable Program

Executive Summary

The U.S. Department of Agriculture (USDA) supports a growing range of farm to school activities in which schools work with local or regional producers to serve locally produced foods in school cafeterias and to expose students to food and agricultural education experiences. Farm to school activities might include local and regional food procurement efforts; hands-on learning activities such as school gardening, farm visits, and culinary classes; or integration of food-related education into the regular curriculum.

The USDA Food and Nutrition Service (FNS) contracted with Abt Associates to design and conduct the *Farm to School Census and Comprehensive Review*, a three-year study to examine and describe the multiple facets of farm to school across the country. This study includes a review of published research on farm to school since the 2010 reauthorization of the Richard B. Russell National School Lunch Act; a review of the USDA Farm to School Grant Program; a set of interviews with food distributors to capture their experiences and perspectives; and the 2019 Farm to School Census of public, charter, and private school food authorities (SFAs) that participate in the National School Lunch Program (NSLP) in all States and territories.

In order to establish realistic goals with regard to increasing the availability of local foods in schools, USDA conducted the first nationwide Farm to School Census in 2013 with a second Census conducted in 2015 to measure progress. The 2019 Census continues to measure trends over time, and also includes new questions based on gaps in the literature identified in this review. The 2019 Census was administered to nearly 20,000 SFAs across the country to collect data on local food purchasing for school meals, school food gardens, other farm to school activities and policies, and evidence of the economic and nutritional impacts of farm to school activities. Findings from the 2019 Census will be available in 2021.

This document summarizes the results of the review of literature relating to farm to school activities published in English from 2010 to 2019. Publications selected for inclusion in the review addressed research questions under one (or more) of three study objectives for the *Farm to School Census and Comprehensive Review* listed below.

- **Objective 1:** Identify and describe the economic contribution of farm to school and procurement processes across various geographies;
- **Objective 2:** Assess the impacts of farm to school efforts on food growing, serving, and purchasing on schools, districts or SFAs; and
- **Objective 3:** Identify and describe how farm to school programs and activities have impacted changes in policy.

The publications reviewed were drawn from academic databases and other sources containing regional and national studies, studies drawing from key datasets, and federally and non-federally funded studies.

Summary of Literature

The review of research from 2010 through 2019 included 165 publications addressing relevant aspects of farm to school programs, and related activities and outcomes. In addition to 111 journal articles, this review covers 56 other documents including reports from non-profit organizations and governmental departments, book chapters, pamphlets, and magazine articles. The majority of these were descriptive

studies. More information about the design and methods used in the publications and the purpose of each can be found in Chapter 8, and specific information about each study can be found in Appendix D.

The review of the publications show that the way “local” is defined varies throughout the literature and can shift based on stakeholder perspectives, but most commonly references food grown within the State.^{21, 34, 41, 43, 68, 72, 79, 135, 156} The goal to increase the use of local foods in schools has been supported by new policies, legislation, and initiatives at the school district or State and national levels.^{112, 114, 125, 167}

These policies focus on diverse goals, ranging from the establishment of farm to school programs and task forces to the authorization of funding,^{7, 27, 29, 42, 82, 87, 135} incentives for local food procurement,^{55, 113, 114, 131} and school garden support.¹⁶ In particular, there are numerous policies that require State agencies to establish or support farm to school activities either through State agencies or budgets.^{55, 115} Funds from State or national sources are often supported by private sector grants and donations.^{44, 88, 135} Community organizations, parents, and parent-teacher groups also contribute resources to local farm to school initiatives.^{58, 64, 86, 136}

Data from the 2013 and 2015 Farm to School Censuses indicate that approximately two-fifths of all U.S. school districts participate in farm to school activities, but farm to school activities vary across States, size of SFA, urbanicity, poverty level, and school level.^{17, 51, 56, 73, 92, 135, 138, 157} The reviewed publications also document increases in the number of schools that incorporate school gardens^{123, 166} and salad bars,¹²³ but there is limited information available about how often school garden produce or other local products are incorporated into meals. More information is available about the educational opportunities that school gardens afford students, most commonly incorporating gardens into science curricula.^{82, 83, 106, 158} These activities can be bolstered by providing technical assistance to schools on such topics as how to set up gardens and how to train teachers on developing lesson plans that integrate farm to school topics into curricula.^{31, 58, 83, 91, 156, 158} Apart from the incorporation of school gardens and salad bars, the literature review highlighted a myriad of farm to school activities, ranging from taste tests^{18, 30, 43, 92, 152, 155} and interactions with farmers^{3, 8, 12, 20, 26, 31, 35, 37, 45, 82, 83, 92, 97, 108, 135, 138, 146, 149, 152, 155, 156, 161} to the promotion of local foods through newsletters, posters, and special events.^{33, 65, 74, 81, 97, 103, 148, 156}

Many schools also aim to purchase more locally sourced products. Most focused on fruits and vegetables, although local meat and dairy were also targets of increased procurement.^{34, 36, 142} Limited information was available about the preparation, planning and processes used by SFAs to incorporate local foods into meals, but includes purchasing additional equipment and additional personnel to prepare foods from scratch.^{33, 52, 161}

This review also included an examination of the relationship between farm to school activities and “plate waste.” Most studies were either anecdotal or lacked a rigorous study design. Further, they focused on overall waste, including packaging, paper products, and plastic cutlery. Mixed results suggest the need for additional rigorous research.^{16, 84, 89}

Although the results from the research were mixed, the publications reviewed suggest that farm to school activities may have positive effects on students including more willingness and acceptance of try fruits and vegetables,^{13, 14, 46, 63, 140} more consumption of healthy foods such as fruits and vegetables,^{89, 145, 152} decreased preference and consumption of unhealthy foods,^{15, 45, 63, 105, 113, 128} and increased nutritional knowledge^{13, 14, 46, 108, 113, 132}. No studies were identified that examined the specific aspects of the interventions that lead to these changes and whether the changes can be sustained.

The review also examined the procurement process of local foods, and common barriers included tight budgets,^{4, 20, 25, 26, 32, 34, 35, 41, 43, 55, 68, 71, 72, 74, 81, 87, 90, 92, 93, 96, 97, 118, 130, 135, 149, 154, 156, 160} food availability and

seasonality,^{3-5, 26, 32, 34, 36, 41, 43, 55, 68, 78, 87, 90, 96, 97, 115, 118, 120, 127, 130, 141, 142, 146, 149, 154, 156, 160} restrictions on which distributors can be used,^{4, 25, 26, 55, 69, 74, 90, 97, 118, 120, 130, 146} and capacity to prepare fresh foods.^{5, 20, 27, 32, 55, 74, 78, 95, 115, 120, 154, 156, 160} To help coordinate farm to school activities at all stages, schools and districts may hire additional staff.^{3, 37, 66, 104, 135} The literature review also highlights areas in which technical assistance might facilitate the local food procurement process for schools, including help in identifying vendors that can consistently supply large quantities of local food, navigating school food purchasing regulations, modifying facilities for on-site food preparation, and training of staff.^{3, 26, 28, 38, 72, 74, 93, 94, 98, 103, 143, 160, 161}

Schools and districts have increased spending on local foods^{18, 55, 97, 100, 118} and the literature suggests a positive trend over time in the amount of income that farmers receive from farm to school activities.⁵¹ Although the percentage of income that farmers receive from direct sales to schools or SFAs is low, there is some anecdotal evidence that they value making connections in the community.^{18, 41, 55, 76, 95} Indeed, data suggest that obtaining food directly from farmers and other producers is the second most common procurement method, behind working with distributors.^{130, 139} Whether school districts work directly with local farmers or distributors may be associated with the size of the school district, with larger districts sometimes finding it easier to request local products through their existing food distributors.⁴¹ The literature review also identified that farmers and distributors need technical assistance with several aspects of the procurement process.^{3, 28, 72, 74, 93, 143, 161}

Methodological Gaps in the Literature

In addition to summarizing the research from the publications reviewed, the study team also assessed which content areas could benefit from additional evaluations. The study team also examined the breadth of methodologies used in the research reviewed, highlighting instances where study objectives might be answered using alternative methods. The study team's review of the literature underscores the need for better quality research on farm to school implementations and impacts, including the use of longitudinal research designs, randomized control trials, or quasi-experimental designs.

The limited availability of literature on farm to school is sparse can be attributed to the lack of resources for program evaluation on the economic impacts of local foods. In particular, several areas would benefit from more rigorous impact evaluations: student attitudes about local foods; how nutrition and garden interventions affect fruit and vegetable consumption; local foods are incorporated into meals and effects on plate waste; best practices in local procurement processes; and how local food purchases affect the economy and the agricultural sector.

1. Introduction

A key piece of the 2010 reauthorization of the Richard B. Russell National School Lunch Act established that the U.S. Department of Agriculture (USDA) should create a Farm to School Program to distribute grant funding and provide training and technical assistance to improve access to local foods in schools as well as disseminate research and data on existing programs and opportunities for expansion. “Farm to school programs” include a wide range of activities that connect schools with local or regional producers in order to serve locally produced foods in school cafeterias and to expose students to food- and agricultural-related education experiences. “Farm to school” does not refer to a single program or prescribed program model – school food authorities (SFAs)ⁱ and schools can participate in various ways. Farm to school activities might include local and regional food procurement efforts (as defined by the school or SFA); hands-on, experiential learning activities such as school gardening, farm visits, and culinary classes; or integration of food-related education into the classroom curriculum.

Funding for farm to school efforts can come from a number of sources. One major source of funding is the USDA Farm to School Grant Program, which has distributed over \$25 million since 2013 to support activities in which schools work with local or regional producers in order to serve locally produced foods in school cafeterias and to expose students to food- and agricultural-education experiences. Other sources include State- and national-level initiatives, private sector grants, corporate partnerships, and donations. Farm to school programs may also be supported by general school funds or school food service funds. Finally, programs are often supported and encouraged by local communities. More details about funding sources can be found in Section 3.4.

About This Review

The USDA Food and Nutrition Services (FNS) contracted with Abt Associates to examine and describe the multiple facets of farm to school across the country. The *Farm to School Census and Comprehensive Review* includes a review of research on farm to school published since the 2010 reauthorization of the Richard B. Russell National School Lunch Act; a review of the USDA Farm to School Grant Program; a set of interviews with food distributors to capture their experiences and perspectives; and the 2019 Farm to School Census of public, charter, and private SFAs that participate in the National School Lunch Program in all 50 States and the District of Columbia, as well as American Samoa, Guam, Puerto Rico, and the U.S. Virgin Islands.

This document summarizes findings from the review of literature published between 2010 and 2019 on farm to school activitiesⁱⁱ and identifies gaps in that literature. Publications selected for inclusion in the review addressed the study’s research questions under one (or more) of three objectives listed below and were published in the United States in English. The full list of study research questions can be found in Appendix A.

- **Objective 1:** Identify and describe the economic contribution of farm to school and procurement processes across various geographies;

i SFAs are “the governing bodies responsible for school foodservice operations, but some of the responsibilities are fulfilled by districts, most notably determining eligibility for free/reduced-price meals, local wellness policies, and competitive food sales. Individual schools can also be responsible for the latter” (Vol 1., p. xiii).⁵⁶

ii The research supporting each finding is indicated by endnotes aligning to the References section.

- **Objective 2:** Assess the impacts of farm to school efforts on food growing, serving, and purchasing on schools, districts, or SFAs; and
- **Objective 3:** Identify and describe how farm to school programs and activities have resulted in changes in policy.

The study team ran keyword searches using relevant terms to identify publications related to the study research questions (see Appendix B for the full set of search terms, databases searched, and inclusion criteria), and then reviewed abstracts and full articles to confirm which were related. One hundred and sixty-five journal articles and research and technical reports were determined to be related to one or more study questions and were included in this review. For each publication, the study team summarized the research findings and methods. The literature review also identified gaps in research to inform recommendations for future studies and data collections.

Report Organization

The report begins by describing the process used to conduct the literature review (Chapter 2). Subsequent chapters review the findings from the literature related to each of the study objectives.

- **Chapter 3** describes how stakeholders define “local,” farm to school policies and networks, and the funding sources available for farm to school.
- **Chapter 4** examines farm to school activities and participation in those activities. Activities included school gardens, incorporation of farm to school in the curriculum, local product promotion in school meals, and incorporation of local foods in school meals. It also reviews study findings on the benefits to students of farm to school programming.
- **Chapter 5** describes local foods procurement activities and challenges.
- **Chapter 6** summarizes findings from the reviewed publications regarding economic implications of farm to school and how farm to school influences the agricultural sector and jobs.
- Finally, **Chapters 7 and 8** assess which topics could benefit from more rigorous impact evaluations and examine the data sources and methods used by the reviewed publications.

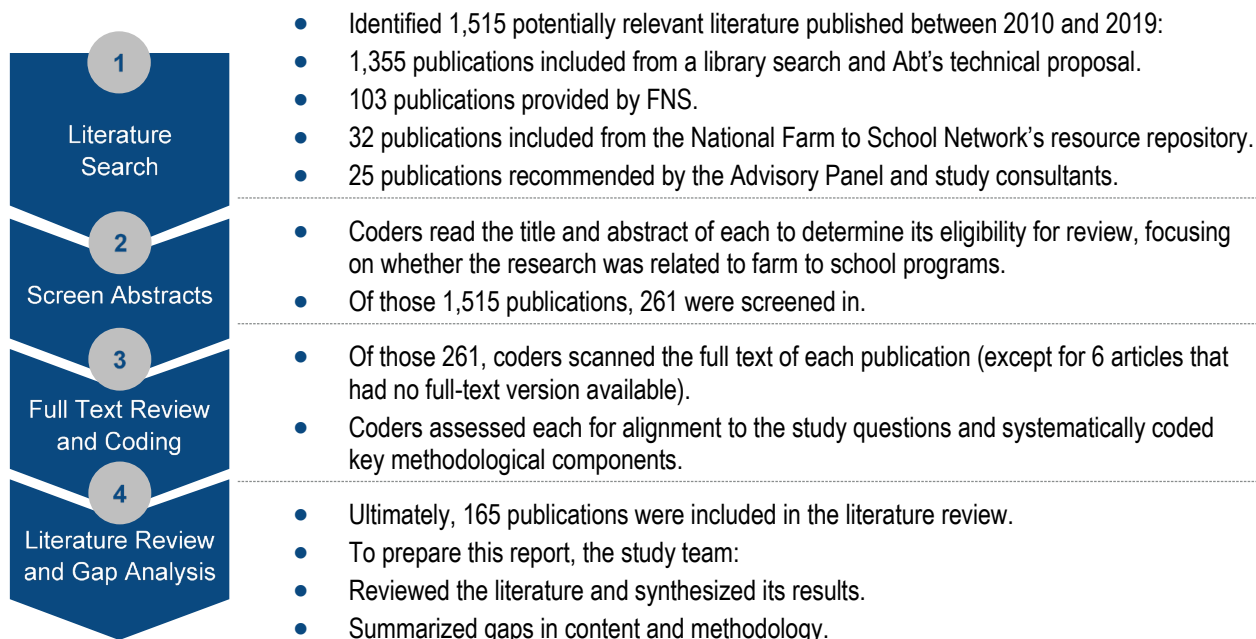
The main report is followed by several appendices – **Appendix A** includes the study research questions; **Appendix B** describes the literature search parameters; **Appendix C** includes the coding specifications; **Appendix D** includes a tables with the data sources and research designs for each of the reviewed publications; **Appendix E** includes a summary of the interviews conducted with food distributors; and **Appendix F** includes the interview protocol used for those interviews.

Sources for findings described in the report are cited using numbered endnotes aligned to the full set of studies cited in this review and catalogued alphabetically in the References section. Other information is indicated by footnotes using lowercase Roman numerals. Reference to *significant* findings indicate that the study reported statistically significant effects (typically $p \leq .10$).

2. Methodology

The goal of the literature search was to identify and review documents published between 2010 and 2019 that related to farm to school activities, programs, interventions, policy, and laws taking place in the United States. The study team conducted the literature review in four steps as shown in Exhibit 2-1.

Exhibit 2-1: Process Overview for Literature Review and Gap Analysis



Step 1: Literature Search

The study team conducted a library search based on search terms related to the study research questions across a number of databases (see Appendix B for the full set of search terms and databases searched). The initial library search focused on English-language literature published in January 2010 through February 2018 on research conducted in the United States. The publications excluded conference papers and posters, newspaper articles, editorials, theses or dissertations, books, book chapters, and book reviews.

In addition to the library search, FNS and members of the study advisory panel suggested additional publications not already identified in the search that were published through December 2019. The study team also leveraged the resource repository and search functions on the [National Farm to School Network website](#) to ensure that non-academic resources, particularly those from States and regions, were included. The National Farm to School Network website specifically was chosen for its large, searchable resource repository that includes sources beyond those available in academic databases. The study team searched the website for resources dated since January 2010 that focused on research and evaluation methods; data, statistics, and reports; and peer-reviewed studies that took place in preschool/early care and K-12 settings. Similar to the library search, resources identified were restricted to journal articles and research reports. Conference papers and posters, newspaper articles, editorials, theses or dissertations, books, book chapters, and book reviews in the repository were excluded. Additionally, to account for the broader array of resources available from the National Farm to School Network website relative to the library search

based on an academic database search, the study team excluded the repository's State farm to school program websites, toolkits, databases, webinars, and survey instruments.

This first step yielded a total of 1,515 publications.ⁱⁱⁱ

Step 2: Initial Abstract Screening

In step 2, the study team screened each of the 1,515 identified research publications. In addition to the initial inclusion criteria of English-language literature published between 2010 and 2019 on research conducted in the United States, to be eligible for this step, the research had to:

- Relate to farm to school programs, including activities, programs, policies, and laws.
- Focus on school settings, from early childhood through grade 12.
- Explicitly indicate that the programs, activities, or interventions of interest to the study were set within the framework of “farm to school.”
- Align with one or more of the objectives listed above.

This screening was facilitated by uploading the publications into the Abtrackr online portal, where they could be systematically assessed using information in their abstracts. Screening was performed by trained coders who read the publication's abstract to determine its eligibility. If there was no abstract to review, coders used the same guidelines to evaluate the publication by its title. If they were unsure but believed there might be a qualifying publication, coders marked it as relevant for inclusion.

Exhibit C-1 in Appendix C includes the specifications coders received in applying the study eligibility criteria. Research was ineligible when:

- It related to the study objectives but was not associated with farm to school, with one exception: following discussions with FNS, the Advisory Panel, and the study consultant, literature that had been identified in the Abt library search or recommended by FNS that related to school gardens was included even if it did not explicitly mention “farm to school” in the text.^{iv} However, these publications were expected to meet all other screening criteria.
- It described international interventions, privately funded programs with farm to school components, studies whose subjects were outside the eligible age range (e.g., adult behavioral outcomes), or studies completely unrelated to farm to school work or activities.^v
- It related to farm to school activities but did not address any of the study objectives.

Together, the use of these criteria ensured that publications that were screened in aligned with the study's research objectives and research questions. A total of 261 publications met the criteria and were screened in and further analyzed.

iii Relevant publications identified often included data or findings from prior to 2010.

iv Without the easing of this restriction, few publications would have been included in the literature review's section on school gardens, as it was uncommon for such studies to directly reference farm to school.

v “Farm to school” is sometimes abbreviated as “F2S” or “FTS.” Sometimes the literature search would identify studies in genetics, for example, where F2S has a different meaning (members of the F2 generation, or “F2s”). Such studies were ineligible.

Step 3: Full Text Review and Coding

Since it was not always clear whether a publication was directly relevant to a topic of interest, for each screened-in publication, coders re-assessed its eligibility for review by reading its full text. Coders applied the same eligibility criteria they had in step 2. Some publications deemed eligible in step 2 were reclassified as ineligible in step 3 upon examination of their full text. This final, full-text screening excluded 90 publications based on eligibility, plus six publications for which full text was unavailable at the time of screening, leaving 165 that were ultimately included in the literature review.

Coding Alignment to Study Objectives

Publications were also coded for alignment to each of the study's specific research questions in order to classify themes. Coders determined whether the focus or results of a publication helped answer one or more study research questions or sub-questions (see Appendix A). If the publication was eligible but did not directly align to any of the study questions, coders marked it as "other." Such publications often provided useful context.

Coding Methodological Components

For the 165 screened-in publications, coders identified and coded their methodological components, including their data sources, research design, metrics used to measure outcomes, types of participants, sampling approach, and data collection frequency. Coders also indicated whether a publication had provided its data collection instrument (e.g., survey, interview protocol). A summary of the findings is included in Chapter 8. The detailed guidance that coders received on how to code a publication's research methods and design is included in Exhibits C-2 through C-5 in Appendix C, and the coding for each publication is included in Appendix D.

For example, for data source (Exhibit C-2), coders could indicate that the publication relied on primary data, secondary data, or was a literature review. Coders also indicated whether the publication used data from either previous Farm to School Census. For research design (Exhibit C-3) coders indicated whether the publication relied on a randomized controlled trial (RCT), a quasi-experimental design (QED), a relational/correlational design, a descriptive design, or another study design (Section 8.2 provides more information about each types of study design). Coders also indicated if the publication included their data collection instruments and how frequently data collection occurred. For example, studies that include pretests and posttests were coded as two separate data collection events) (Exhibit C-4). Lastly, coders noted the metrics used to measure outcomes, the types of participants, and the sampling approach or how participants were selected for inclusion in the study (Exhibit C-5).

Step 4: Literature Review and Summary

Once all eligible publications were coded, the study team reviewed and summarized the content of the research, the research methods, and the methodological limitations. The team also assessed how well the research answered the research questions using methodologies appropriate to the question type. Gaps in content and methodology were noted. Many of the study's research questions are descriptive (e.g., asking for a count of school gardens); thus, it is appropriate for research mapped to those questions to be descriptive. However, numerous study research questions (e.g., asking about the effect or impact of farm to school policies on a range of outcomes) call for more methodological sophistication.

3. Farm to School Policy and Available Funding

This chapter first describes the variation in how “local food” is defined across the publications reviewed; it also discusses the overall trends and diverse policy goals that farm to school policies aim to address, including farm to school networks, taskforces, or advisory boards. Finally, it describes the reported sources of funding available for farm to school efforts.

The findings in this chapter are based on 26 journal articles and 26 other publications including technical and research reports on farm to school policies and funding at the national, State, and local levels. The majority (32) of these publications are descriptive studies, eight are relational/correlational studies, three are RCTs or QEDs, and 10 are other types of publications including literature reviews or meta-analyses.^{vi} More information about the types of research design and methods used in the publications and the purpose of each can be found in Chapter 8, and specifics on each study can be found in Appendix D.

3.1 Definitions of “Local”

Local foods are central when discussing farm to school activities, although what constitutes *local* may depend on stakeholder perspectives. In the Food, Conservation, and Energy Act of 2008 (the 2008 Farm Bill), the U.S. Congress states that “locally or regionally produced agricultural food product” means any agricultural food product that is raised, produced, and distributed in “(I) the locality or region in which the final product is marketed, so that the total distance that the product is transported is less than 400 miles from the origin of the product; [or] (II) the State in which the product is produced.”¹

However, there is **no universal definition of local** to be used by all schools, districts, or States. Rather, “each school district creates the definition of local that works for [its] particular needs and goals.”³⁰ Further, oftentimes, *local* is defined based on the product being sourced (e.g., an SFA might seek local apples in its requests but not oranges, given their limited domestic farmland).

Most commonly, the definition of *local* references food grown or produced within the State where the school or district resides.^{21, 34, 41, 43, 68, 72, 79, 135, 156} When the definition of *local* is constrained to a particular State, its definition may be set by the State legislature or another branch of State government.^{41, 52, 72, 79, 156} When SFAs define *local*, those definitions often involve a distance from the school or district, which might range from 25 to 400 miles and could cross State lines.^{34, 43, 100, 109, 118}

vi Note that some studies could have more than one type of design, and thus the counts by research design may not sum to the total in this section.

3.2 Trends in Farm to School Policy

Many States have legislation that supports or implements major initiatives for farm to school activities, and researchers have published State-by-State summaries of this legislation.^{112, 114, 125, 167}

Furthermore, States with farm to school legislation are more likely to have farm to school programs.^{80, 148}

According to the National Farm to School Network, between 2002 and 2018, 46 States, the District of Columbia, and the U.S. Virgin Islands had introduced a combined total of 453 bills and resolutions to establish, support, or expand farm to school efforts.^{114, vii} Almost all had passed farm to school legislation that related to local procurement, food and agriculture education or school gardens, with 146 bills enacted and 63 resolutions adopted. Between 2006 and 2008, the percentage of schools located in a State with a farm to school program-specific law, excluding laws related to local procurement, rose from 7 percent to 20 percent.¹⁴⁸ Further, between 2012 and 2014, 28 State and local farm to school policies were enacted across 18 States.^{55, 115} By 2014, there were more than 40 farm to school bills enacted in 22 States.¹⁵⁶ In 2017 alone, 46 pieces of legislation were introduced in 26 different States, and in 2018, 35 pieces of legislation had been introduced in 17 States.¹¹⁴

State legislation primarily focuses on **creating funding streams** for schools.^{20, 90, 112, 114, 158} Additionally, in Alaska, Colorado, the District of Columbia, and Hawaii, legislation provided **infrastructure** for successful development of farm to school activities by setting up programs, networks, task forces, advisory boards, or coordination offices.^{7, 27, 29, 42, 82, 87, 135}

Multiple States also have policies that require State agencies to **establish or support statewide farm to school activities** or provide money for farm to school, either through State agencies or directly through State budgets.^{112, 114, 125, 148} Other policies are related to a broader economic policy (Vermont), goal setting (Illinois), constructing kitchen facilities capable of providing fresh school meals and providing a financial match for schools that serve local foods (Michigan), processing or distribution infrastructure projects (Montana, Vermont), and income tax credit incentives (Rhode Island).^{55, 112, 114, 131}

District policies may also reflect State and national initiatives aimed at **getting more locally produced food** into schools. Schools must follow all federal, State, and local policies to procure food, and State and local rules may be more restrictive than federal regulations.³⁰ These initiatives range from encouraging the purchase of local foods by relaxing purchasing and bidding requirements, helping to establish programs to procure food, hiring specialists to help with the procurement process, and even establishing a database of distributors that could provide local foods to schools.^{43, 90, 100, 112, 114, 125}

State legislative actions focus on a diverse set of policy goals: ^{37, 55, 112, 114, 125, 131}

- Establishment of farm to school programs or pilot programs
- Inclusion of farm to school as part of broader wellness policies
- Creation of farm to school task forces
- Authorization of State funding or grant funding
- Creation of State farm to school directories to facilitate local procurement
- Incentives for schools to procure more local agricultural products, including increased school meal reimbursements
- Support for school gardens
- Support for farm to preschool
- Establishment of statewide programs promoting local food and agriculture to children
- Policies targeting underserved populations

vii Legislation in Guam, Puerto Rico, and the U.S. Virgin Islands had existed since the 1920s.

Furthermore, schools participating in the NSLP were required to have a local school wellness policy by the start of the 2006-2007 school year.² These policies include goals for **nutrition education** as well as nutrition guidelines. Farm to school efforts can be a part of these wellness policies. In fact, numerous states, including California, Florida, Hawaii, Montana, New Hampshire, New Jersey, New Mexico, Nevada, New York, North Carolina, Oklahoma, Tennessee, Texas, Washington, West Virginia, and the District of Columbia, have encouraged farm to school efforts as a part of a State- or territory-level broader wellness or food security policy.¹³¹ There are also a number of school district wellness policies that restrict soda, and have limits on the fat and sodium content of school meals served.²² The 2019 Farm to School Census includes data that will allow researchers to explore the extent that SFAs include local school wellness policies that support farm to school.

3.3 Farm to School Networks, Task Forces, and Advisory Boards

Farm to school networks, task forces, and advisory boards can **serve as important infrastructure** for successful support, development, and promotion of farm to school activities. The publications reviewed described statewide farm to school networks, task forces, and advisory boards in Alaska,¹³⁵ Colorado,²⁹ Georgia,¹⁶¹ Michigan,¹⁶² Oregon,^{66, 72} and Wisconsin,⁵ as well as localized networks in San Diego County, California,^{3, 43, 98} and Fayette County, Kentucky.¹⁵⁵ For example, State agencies in Georgia came together to create the Georgia Farm to School Alliance with the goal of having 20 percent of the food served in its schools be produced within the State by 2020.¹⁶¹ But even within these States and counties, it is not clear what proportion of schools and SFAs participate in farm to school networks.

Thus, there has been a gap in research on how States and local actors create institutions to support and promote farm to school activities. The 2019 Farm to School Census includes a question about participation in farm to school networks, task forces, and advisory boards and will provide the first nationwide SFA participation rate.

3.4 Funding Sources for Farm to School Efforts

In addition to the policies supporting farm to school efforts, this review also examined the funding available. Outside funding for farm to school efforts comes from a number of sources including State- and national-level legislative initiatives, private sector grants, and donations. **Federal sources** of funding include USDA Farm to School grants; USDA Team Nutrition Training grants; USDA People's Garden grants; the Let's Move initiative; the Food, Conservation, and Energy Act of 2008; and the Healthy Food Financing Initiative.^{44, 88, 135} Some **States have created funding streams** to encourage farm to school programs.^{37, 44, 64, 114}

Additional State efforts around farm to school:

- **California** initiated "A Garden in Every School" initiative, \$15 million in small grants to support school gardens,¹⁶⁶ and a platform to connect producers with schools that are interested in purchasing local food.⁴³
- **Mississippi** established cooperative extensions with the intention of collaborating with local farmers to make local foods more available for schools.⁹⁰
- **Texas** leveraged the USDA Department of Defense Fresh program to increase local foods in schools, and the Texas farm to school coordinator established full-time training and assistance programs through regional education service centers.¹¹²
- In **Michigan**, legislation encouraged State agencies to collaborate on farm to school efforts, which helped triple the farm to school participation in Michigan schools over a five-year period.⁹⁰
- **Alaska, Colorado, Hawaii, Georgia, Michigan, Oregon, and Wisconsin** all established task forces, coordinators, or grant programs to help facilitate farm to school. ^{5, 29, 66, 72, 135, 161, 162}

In addition to federal and State funding, farm to school programs may be supported directly by **general school funds or school food service funds** such as the nonprofit school food service account; local or private grants; and in-kind contributions. School districts may also receive financial support from corporate partnerships and donations and from other national private grants. **Private foundations and non-profit organizations** have also contributed to farm to school programs. In some cases, the foundations are local, such as the Decatur Education Foundation, which helps to raise money for farm to school efforts.⁶⁴ In other cases, the foundations are national. FoodCorps, a non-profit organization and an AmeriCorps grantee, helps to “connect students to food by promoting a healthier school food environment” and places funded service members at schools across the country.^{86, 136} Many of these service members play vital roles in hands-on learning such as school gardens and incorporating local foods into school meals. The 2019 Farm to School Census includes questions on funding sources for staffing farm to school activities, allowing for a more in-depth review of funding sources once the data become available.

Finally, programs are often supported and encouraged by **local communities**. Community organizations, parents, and parent-teacher groups have contributed to local farm to school initiatives. For example, one program in New York used parent-teacher funds to fund a garden educator.⁵⁸ In Decatur, Georgia, parents helped raise money to get new knives and a food processor for kitchen staff to process local produce.⁶⁴

According to the 2012 National Farm to School Preschool Survey, respondents identified individual donations (21 percent) as the primary source of outside funding, followed by private foundation grants (13 percent), State grants (10 percent), fundraisers (10 percent), federal grants (9 percent), corporate (6 percent) and private foundation (5 percent) donations, and local government grants (3 percent).⁷³

However, it is unclear whether grant funding and donations alone are enough to sustain a farm to school program, even as some grant programs address longer-term sustainability in the application process, including but not limited to the FNS Farm to School Grant Program. Some publications point out that due to their short-lived nature, grant funds cannot be relied on if a school or district wants to build a sustainable program, but that food hubs may help sustainability by increasing access to local foods in underserved areas.^{78, 138}

4. Farm to School Activities

This chapter first describes overall participation in farm to school activities at the school and district levels and variation across States and districts. Then it reviews the prevalence, support for, and use of school gardens. Next, it examines the extent to which farm to school activities have been incorporated in school curricula, how local foods are promoted to students, and other farm to school activities. Then it examines how farm to school efforts reportedly affect the procurement of and serving of foods in schools. Finally, it examines the benefits students may receive from farm to school programming.

The findings from this chapter are based on 72 journal articles and 29 other publications including research and technical reports on how schools, school food authorities, and school districts participate in farm to school. These publications are most likely to be descriptive studies (52), followed by relational/correlational studies (20), and other types of publications including literature reviews/meta analyses (21). Relatively few are QEDs (10) or RCTs (5).^{vii} More information about the types of research design and methods used in the publications and the purpose of each can be found in Chapter 8, and specifics on each study can be found in Appendix D.

4.1 Extent of Participation in Farm to School Activities

While farm to school is not a prescribed program, the Farm to School Census describes **a wide array of qualifying activities**, including local food procurement efforts and serving local foods in school meals; hands-on, experiential learning activities such as school gardening, farm visits, and culinary classes; or integration of food-related education into the classroom curriculum. SFA's can participate in various ways, and they may not always view certain activities, such as purchasing local foods, as a farm to school related activity. For example, the School Nutrition Program Operations Study (SN-OPS), a survey of a nationally representative sample of 1,391 SFAs during the 2011-2012 school year, found that only 20 percent of SFA directors reported participating in farm to school activities.⁹² However, 51 percent of the same SFA directors gave some preference to purchasing local foods, suggesting that the purchase of local foods is not always seen as a farm to school activity.

Participation in farm to school has grown at the national, State, and local levels.^{24, 26, 39, 88, 97, 148, 161} A total of 4,322 public school districts (39 percent) reported on the 2013 Farm to School Census that they participated in farm to school activities in the 2011-2012 school year,^{viii} purportedly a 430 percent increase in farm to school participation since 2006.⁹⁷ State- and local-level research corroborates such increases. For instance, a study focused on Michigan reported a greater than three-fold increase in the number of its school districts that purchased food from a local farmer between 2004 and 2009.²⁶ Similar trends have been reported in Georgia and San Diego County, California.^{39, 161}

For policymakers to understand how they may be able to influence participation in farm to school efforts, the study team examined the **factors associated with farm to school participation**. In addition to federal, State and local-level initiatives and funding, several factors can all be at play. Farm to school

vii Note that some studies could have more than one type of design, and thus the counts by research design may not sum to the total in this section.

viii The 2015 Farm to School Census, which was administered to all public school districts, private schools, and charter schools, reported that 5,254 (42 percent) participated in farm to school activities. See more at <https://farmtoschoolcensus.fns.usda.gov/about>.

activities can occur at every level from pre-K through high school, but descriptions of activities were found to vary across States, size of SFA, urbanicity, poverty level, and school level.^{17, 51, 56, 73, 92, 135, 138, 157}

- State:** The 2015 National Survey of Early Care and Education Providers reported that California, New York, and Wisconsin reported the largest number of farm to school activities in early care settings.¹⁵⁶ Other States that have reported high overall levels of participation in farm to school include Alaska (55 percent, 27,000 students), Maine (79 percent, 135,000 K-12 students), Massachusetts (68 percent, 422,000 K-12 students), New Hampshire (77 percent, 66,000 K-12 students), and Vermont (83 percent, 12,000 K-12 students).^{51, 135}
- SFA Size:** In SN-OPS, a nationally representative sample of SFAs during the 2011-2012 school year, indicated that participation varied by SFA size – 45 percent of 169 very large SFAs (25,000 or more students) participated in farm to school activities, 32 percent of 363 large SFAs (5,000-24,999 students), 25 percent of 531 medium-sized SFAs (1,000-4,999 students), and 14 percent of 328 small SFAs (fewer than 1,000 students).⁹² This was confirmed by an examination of the 2013 Farm to School Census data, which also found that larger schools and school districts were more likely to participate in farm to school efforts.¹⁷
- Urbanicity:** Using the National Center for Education Statistics (NCES) locale framework for urbanicity, SN-OPS found that the share of SFAs with farm to school activities was highest in suburban locations (31 percent), followed by 19 percent of rural SFAs, 17 percent of town SFAs, and 15 percent of city SFAs.⁹² However, a secondary analysis of the 2013 Farm to School Census provided somewhat different results, in which rural schools were less likely to participate in farm to school activities relative to urban schools.¹⁷ This difference may be due to the fact that SN-OPS relied on a sample of SFAs.
- Poverty Level:** Examining variation in activity by poverty level (approximated using the percentage of students receiving free/reduced-price lunch), 2011-2012 school year farm to school activities occurred in 29 percent of SFAs in low-poverty areas (less than 30 percent free/reduced-price lunch), in 21 percent of SFAs in medium-poverty areas (30-59 percent free/reduced-price lunch), and in 14 percent of SFAs in high-poverty areas.⁹² Similarly, in a 2018 study of early care settings, a lower proportion of sites with a majority of low-income children engaged in farm to school programming (50 percent) than did sites with fewer low-income children (58 percent).¹⁵⁷
- School Level:** The School Nutrition and Meal Cost Study (SNMCS), a nationally representative study of school meal programs during the 2014-2015 school year, showed slight variation between participation rates in farm to school between elementary and middle schools (17 percent each) and high school (20 percent).⁵⁶
- Local Food Environment:** According to a secondary analysis of 2013 Farm to School Census data, areas that already support local foods and have a dedicated infrastructure (e.g., farmer's markets, food hubs, a large proportion of farmers with direct-to-retail sales) were more likely to participate in farm to school programs.¹⁷

More data are needed to better understand the variation in activities across characteristics. The 2019 Farm to School Census data can be used to explore some of this variation.

4.2 Farm to School and Educational Experiences

Beyond local food procurement, farm to school policies and projects are often focused on incorporating farm to school activities into the curriculum. Curriculum integration was identified as a key factor of successful farm to school program implementation in a 2019 study of 194 practitioners and community residents in Ohio as well as a 2005 study of 592 teachers in California.⁹⁴

The literature also indicated that schools required physical, financial and technical assistance with setting up gardens, as well as a need for teacher training and support to develop and implement lesson plans integrating new farm to school topics into their curricula.^{31, 58, 83, 91, 156, 158}

In addition to schools, parents, and community members, Cooperative Extension Services (Extension)^{ix} can also play a role in farm to school educational activities, including assisting schools with gardens, farm-based field trips, and farmer visits to the classrooms.⁸

Examples of farm to school educational activities:

- School gardens
- Taste testing or serving locally produced foods in school meals
- In-class food and nutritional education, such as cooking demonstrations and “Top Chef” competitions.
- Interactions with farmers through either farm visits or having farmers themselves visit schools
- Training of school staff and faculty on how to present nutrition and food information to students.
- Special events such as Harvest of the Month, Farm to School Month, or Locavore Day that promoted local foods

4.2.1 Prevalence and Use of School Gardens

According to the 2015 Farm to School Census, there were more than 7,000 school gardens in 5,254 school districts across the country during the 2013-2014 school year.⁴³ The literature suggested there was a **positive trend in the number of schools that incorporated gardens**. For instance, two publications reported that the percentage of public elementary schools with school gardens increased from 10 to 12 percent in the 2006-2007 school year to 27 percent and 31 percent in the 2012-2013 and 2013-2014 school years, respectively.^{123, 166} Data from the 2014 School Health Policies and Practices Study indicated that 19 percent of all schools nationally had a school garden.¹⁶⁶ Studies in Alaska, California, Colorado, the District of Columbia, Georgia, Michigan, Minnesota, New York, and Oregon are in line with these trends.^{26, 39, 43, 59, 72, 74, 82, 83, 98, 106, 116, 121, 122, 135, 161}

Despite the prevalence of school gardens, State legislation or administrative regulations have rarely supported or addressed school gardens. One nationally representative study indicated that 84 percent of States did not have any statutes or administrative regulations in the 2013-2014 school year that addressed the presence of school gardens.¹⁶⁷ Further, 94 percent of States did not have any laws funding school gardens, and 92 percent did not specify that garden produce can be used in school meal programs. According to the National Farm to School Network, of the 51 school garden related bills introduced between 2015 and 2018, only 16 were enacted.¹¹⁴

A small number of publications identified **funding sources for school gardens**, which mainly relied on grants and donations. For example, by 2009, 40 percent of California public schools had received a grant through the “A Garden in Every School” initiative for instructional school gardens, although not all

ix Extension systems provides non-formal education and learning activities about subjects related to agriculture and home economics to both farmers and other community members typically housed as a part of land-grant colleges and universities. See more at: <https://nifa.usda.gov/extension>

schools had successfully set up their gardens.⁷⁰ In the District of Columbia, after the passage of the city's Healthy Schools Act of 2010, 48 percent of the public schools with fifth-graders (the focus of the study) had school gardens, of which 13 percent were funded by the Healthy Schools Act grants, which supported the implementation of school gardens among other health and wellness activities.¹³³ In Michigan, recipients of a 2011-2014 State grant used grant funds to start and maintain school gardens.¹⁰⁴ Research conducted in South Carolina that looked at the administration of school-based gardens as part of a pilot farm to school initiative from 2012 -2015 found that support came from grants and foundations, community and business donations, the school parent-teacher organizations, and school districts.¹⁵⁸ Finally, in Des Moines, Iowa, farm to school programming in the 2013-2014 school year relied mainly on FoodCorps service members and leveraged funds from small amounts that drew from public and private sources.¹³⁶

One study examined the **predictors and barriers to the success of school gardens** based on 429 surveys covering 38 States and Puerto Rico.⁶¹ Of those surveyed, 70 percent had an annual school garden budget of less than \$2,000. The study found that a higher operating budget, longer time in operation, and an in-ground garden (rather than in planters or a greenhouse) were significant predictors of success, whereas rural location and a lack of community interest were significant barriers to success, as was a lack of funding. The authors suggested that school garden programs may be more difficult to implement in rural areas because of a more limited school budget and access to resources, or in schools that lack community interest as many schools rely on volunteers to support the school. Race/ethnicity and socioeconomic status were not found to be related to success. A second study that surveyed 211 New York City schools similarly found that the operating budget was significantly related to the success of school gardens.⁶⁰ That study also indicated that while many schools that serve low-income populations are having success with gardens, there was an inverse relationship between free/reduced-price lunch status and success with gardens, indicating that it might be more challenging for urban schools serving a low-income population to achieve success with school gardens.

4.2.2 School Garden Integration into the Curriculum

Although school gardens offer a range of educational opportunities for all grade levels, SNMCS found that operating a school garden was **more common in elementary and middle schools** (9 and 6 percent, respectively) than high schools (4 percent).⁵⁶ **Science classes have incorporated school gardens into the curriculum more than any other subject**,^{82, 83, 106, 158} although gardens have been integrated into other subjects including, math, English language arts, social studies, and history.^{37, 82, 83, 158} For example, the FNS-funded [Team Nutrition](#) initiative developed evidence-based curricula that educators can use to integrate garden-based nutrition education lessons into subjects such as math, English language arts, and science.⁵⁶ Gardens are used to illustrate topics such as growth rates in math classes and lessons on photosynthesis and hydroponic farming in general science and biology classes.^{59, 134} Based on their own experiences using school gardens in the curriculum, teachers reported believing that incorporating school gardens into the curriculum to teach scientific methods is more effective than teaching the concepts in the classroom alone.³⁷

Gardens have been incorporated into curricula through creative use of **hands-on cooking and food activities** that meet curriculum standards,¹⁶¹ as well as through culinary demonstrations to teach students about harvesting, seasonality, and creating dishes with local foods.¹⁵² A 2019 systematic review of farm to school activities and outcomes included a finding from a rigorous RCT that indicated that a group of students that received a school garden and integrated science curriculum showed greater increases in

nutrition and plant science knowledge than a control group.¹²⁸ The study also found that schools with higher measures of intervention fidelity saw the highest increases in science scores.

Analysis of the 2012 National Farm to Preschool Survey data revealed that among preschoolers, edible school gardens were the third most common farm to school activity (after teaching children about locally grown food and serving meals or snacks with local foods).⁷³ The survey did not provide additional details about how the activity was integrated into the curriculum, perhaps because the survey also found that almost two-thirds of the 502 respondents did not use a published curriculum for their program. Two farm to school programs did provide additional detail about how they were implemented. *Watch Me Grow*, which was implemented in child care centers, featured monthly modules designed around specific crops including four activities (one per week) and a children's book.¹¹¹ Similarly, the *PLANT Gardens* garden-based preschool program offered lesson plans with hands-on activities focused on gardening and nutrition.¹⁵⁰

4.2.3 Promoting Local Foods

Local foods are promoted to students in a number of ways. According to SN-OPS, which focused on the 2011-2012 school year, the most common means of promoting local foods was through **taste testing**, followed by nutrition education and agriculture-related **lessons and curricula**, school or community gardens, farm tours, and parent and community education lessons.⁹² Numerous studies reported similar findings. Schools and school districts promoted local foods through frequent taste testing with students,^{18, 30, 43, 92, 152, 155} farm tours,^{35, 108, 149} classroom activities such as bringing farmers into the classroom,³⁵ cooking with local foods in consumer science classes,^{146, 152} and **marketing material highlighting local farmers**.¹⁰³ In a formative study examining how to increase farm to school programming in low-income high schools in Connecticut, students suggested that offering taste tests of local products was the best way to show that “it tastes and looks good.”⁶⁵ They also suggested posting bright posters highlighting the positive outcomes associated with eating local produce.

The literature provided some examples of schools and/or districts promoting local foods during **special events**. For instance, Maryland celebrated a Homegrown School Lunch Week each year, during which the students were served local produce, there were hands-on learning exercises like farmer visits, and food education was integrated into the classroom.¹²⁰ Certain school districts in California participated in a Harvest of the Month program or in California Thursdays, where local products were emphasized.^{43, 120} Finally, some schools in Vermont promoted a “locavore day” about once a month where 90 percent of the lunch is local.^{35, 149}

Much of the literature reviewed referenced the specific work of **school food service staff in promoting local foods**. Their efforts included promoting local foods through school newsletters,⁷⁵ posters or signage in the cafeteria,^{75, 82, 83, 89, 122, 146} on the menu,^{30, 35, 51, 75, 87, 161} and as “cool food” by creating relationships with farmers.⁷⁵ School food service staff also directly discussed and educated students about the benefits and importance of eating local foods.^{135, 146} For example, one school food service professional reported that she was initially pressured to make local food purchases, but after seeing that students seemed to prefer the locally purchased items, she bought more varieties of locally available vegetables, which resulted in some students trying and liking new foods.⁷⁵ Results from a statewide survey of school food service leaders in Minnesota reported the use of cafeteria food coaches (adults or students in the cafeteria encouraging students to eat healthy/local foods) as a way of promoting local foods.⁷⁴

Strategies for promoting local foods in child care or preschool settings included promoting gardens at child care facilities; participating in community-supported agriculture, mobile farmer's markets, or field gleaning; and buying and selling surplus crops.^{125, 156}

While many of the publications reviewed described the various ways to promote local foods, they rarely examined the **extent to which the promotions were successful**. Rather, success was often measured as completion of the promotional event or campaign, or documented for the entirety of the farm to school program which consisted of several components. However, a 2019 systematic review of farm to school related activities indicated that two RCTs were able to isolate the effects of promotions.¹²⁸ One study found that when students received daily promotional messages about legumes over the school intercom, they were two-and-half times more likely to select legumes at lunch compared to the control school. In the other study, which implemented the Smarter Lunchrooms intervention that is designed to improve child eating behavior, vegetable selection and consumption also increased, although fruit consumption did not. Further, in a small, descriptive study conducted in an urban high school with 30 students, researchers tested the effects of promoting sweet potatoes through taste tests.¹⁸ When sweet potatoes were first offered at lunch, no students selected sweet potatoes and only chose the option of carrots. After a taste test, some students did opt to take sweet potatoes with their lunch, and by the next week, carrots and sweet potatoes were being selected equally during lunch meals.

4.3 Local Foods in School Meals

This section describes various aspects of the incorporation of local foods or salad bars in schools, including increased interest from schools, the preparation process, the inclusion of foods from school gardens, salad bars, scratch cooking, and plate waste.

4.3.1 Increased Interest in Local Foods

In recent years, more schools have expressed interest in purchasing locally sourced products. Surveys of key stakeholders in Maryland indicated that schools that already served local foods were interested in procuring local foods or in increasing local food procurement.¹²⁰ The School Nutrition Program Operations Study of 1,393 schools reported on the percentage that specifically requested locally grown food.⁹² During the 2011-2012 school year, 49 percent *never requested food be sourced locally*, 43 percent did *some* of the time, and only 8 percent did *most* of the time. Constraining schools to only those participating in farm to school programming, requests for locally grown food were much more frequent—of the 366 schools participating in farm to school, only 11 percent *never* requested food be sourced locally, 70 percent did *some* of the time, and 19 percent did *most* of the time.

Historically, the **most commonly sourced food** for schools, by volume, were fruits and vegetables.^{20, 21, 37, 130} Two studies found the most popular items among students included apples and tomatoes, but other produce—including carrots, potatoes, cucumbers, summer squash, winter squash, beets, cantaloupe, peppers, and sweet corn—were also considered favorites.^{51, 162} While recent procurement efforts continued to focus on fruits and vegetables, meat and dairy were also targets of increased procurement.^{34, 36, 142} In line with these findings, as part of the *Farm to School Census and Comprehensive Review*, the study team interviewed 21 food distributors – 15 reported that their school customers requested produce, including apples, zucchini/squash, lettuce, carrots, stone fruits, and tomatoes; three provided dairy products such as milk or yogurt; and three provided seafood, poultry, or meat (see Appendix E). But a focus on seafood, poultry, or meat depended on a variety of factors. For example, research examining factors influencing

purchases of local seafood products identified three factors as the strongest influences: 1) distance from seafood ports, 2) outreach and promotional efforts, and 3) geographic region of the SFA.¹¹⁹

As farm to school programs mature, the most commonly sourced local food might change. For example, schools and distributors may make more contacts in the local farming community, and they may also be able to purchase more non-produce items such as grains, dairy products, and seafood. In the 2015-2016 school year, two-thirds of local purchases by San Diego County school districts, which had a relatively mature farm to school program, were for non-produce items.⁴³

The research reviewed did not clearly state how **school meal offerings** have changed with the implementation of farm to school activities, although there were reports of schools increasing offerings of fruits and vegetables.¹² Furthermore, SNMCS found that the mean Healthy Eating Index (HEI-2010)^x for student breakfasts was higher in schools that participated in farm to school than in similar schools that did not participate (73 percent versus 70 percent), and the difference was statistically significant.⁶²

Increasing local food purchases was found to have been a **goal in some State or local policies**. For example, the San Diego Unified School District aimed to invest 15 percent of its annual fresh fruit and vegetable budget in local foods.³⁰ The Davis Joint Unified School District had set a goal to increase the amount of food from local farms used in school meals and snacks to 60 percent of the district's total produce by 2010.⁵² As of July 2010, school records indicated the district was close to meeting this goal, with 49 percent of produce purchases coming from local farms. The Vermont Farm to School Network had set a goal of having 75 percent of Vermont schools purchasing 50 percent of their food from socially conscious, sustainable, regional food systems by 2025.¹³⁹ As of 2014, however, only 6 percent of Vermont schools were meeting this goal. In 2010, the Michigan Good Food Charter established the goal of sourcing 20 percent of food purchased for the State's schools from Michigan growers, producers, and processors by 2020.¹⁶²

Interestingly, broader food trends are also indirectly helping to get more local foods into schools. With the movement by restaurants to serve more local foods to their customers, distributors generally are sourcing a larger percentage of their foods from local farms.¹⁴⁶ In many cases, distributors for restaurants and schools overlap, and schools can indirectly gain more access to local foods.

4.3.1 Preparation of Local Foods in Schools and Scratch Cooking

Although numerous publications address the activities used by SFAs and schools to incorporate local foods into student activities, only a handful discuss the preparation, planning, and processes used by SFAs to incorporate local foods into meals.^{33, 52, 161} Only one publication, focusing on the Davis Joint Unified School District in California, used district expenditure data to understand how local products were being integrated into school meals.⁵² This report highlighted two aspects: the purchase of **additional equipment** that could be used in salad bars and to cook meals from scratch, and the **addition of**

x The Healthy Eating Index (HEI) is a measure of diet quality used to assess how well a set of foods aligns with the Dietary Guidelines for Americans. Nine components included in the HEI-2010 are adequacy components, which focus on meeting food group and nutrient needs without exceeding calorie requirements....The three other components, referred to as moderation components, measure dietary components that individuals are encouraged to limit....The total HEI-2010 score provides an overall measure of the nutritional quality of school meals." A higher score reflects "better conformance with the Dietary Guidelines for Americans and higher nutritional quality."⁶²

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As farm to school programs mature, the most commonly sourced local food might change. For example, schools and distributors may make more contacts in the local farming community, and they may also be able to purchase more non-produce items such as grains, dairy products, and seafood. In the 2015-2016 school year, two-thirds of local purchases by San Diego County school districts, which had a relatively mature farm to school program, were for non-produce items.⁴³

The research reviewed did not clearly state how **school meal offerings** have changed with the implementation of farm to school activities, although there were reports of schools increasing offerings of fruits and vegetables.¹² Furthermore, SNMCS found that the mean Healthy Eating Index (HEI-2010)^{xi} for student breakfasts was higher in schools that participated in farm to school than in similar schools that did not participate (73 percent versus 70 percent), and the difference was statistically significant.⁶²

Increasing local food purchases was found to have been a **goal in some State or local policies**. For example, the San Diego Unified School District aimed to invest 15 percent of its annual fresh fruit and vegetable budget in local foods.³⁰ The Davis Joint Unified School District had set a goal to increase the amount of food from local farms used in school meals and snacks to 60 percent of the district's total produce by 2010.⁵² As of July 2010, school records indicated the district was close to meeting this goal, with 49 percent of produce purchases coming from local farms. The Vermont Farm to School Network had set a goal of having 75 percent of Vermont schools purchasing 50 percent of their food from socially conscious, sustainable, regional food systems by 2025.¹³⁹ As of 2014, however, only 6 percent of Vermont schools were meeting this goal. In 2010, the Michigan Good Food Charter established the goal of sourcing 20 percent of food purchased for the State's schools from Michigan growers, producers, and processors by 2020.¹⁶²

Interestingly, broader food trends are also indirectly helping to get more local foods into schools. With the movement by restaurants to serve more local foods to their customers, distributors generally are sourcing a larger percentage of their foods from local farms.¹⁴⁶ In many cases, distributors for restaurants and schools overlap, and schools can indirectly gain more access to local foods.

4.3.2 Preparation of Local Foods in Schools and Scratch Cooking

Although numerous publications address the activities used by SFAs and schools to incorporate local foods into student activities, only a handful discuss the preparation, planning, and processes used by SFAs to incorporate local foods into meals.^{33, 52, 161} Only one publication, focusing on the Davis Joint Unified School District in California, used district expenditure data to understand how local products were being integrated into school meals.⁵² This report highlighted two aspects: the purchase of **additional equipment** that could be used in salad bars and to cook meals from scratch, and the **addition of**

xi The Healthy Eating Index (HEI) is a measure of diet quality used to assess how well a set of foods aligns with the Dietary Guidelines for Americans. Nine components included in the HEI-2010 are adequacy components, which focus on meeting food group and nutrient needs without exceeding calorie requirements....The three other components, referred to as moderation components, measure dietary components that individuals are encouraged to limit....The total HEI-2010 score provides an overall measure of the nutritional quality of school meals." A higher score reflects "better conformance with the Dietary Guidelines for Americans and higher nutritional quality."⁶²

personnel to oversee the salad/hot bars or prepare the salad/hot bar items or other items cooked from scratch. That district also worked with an outside vendor to **redesign menus** to include more seasonal produce and healthy items. These redesigned menus were part of a larger campaign that included the design of a new brochure and logo to communicate changes to school lunches, highlighting days with salad bars. The campaign also included photos of seasonal produce and prepared entrees by season included in new menus, which food service staff could use to describe the new meals. Apart from this study, information addressing the preparation, planning, and processes used by SFAs to incorporate local foods into meals was anecdotal, including qualitative research with school nutrition directors in Georgia.¹⁶¹ The interviewees highlighted the weekly inclusion of local items into school menus, facilitated by menus often being planned at the district level.

Relatedly, relatively few publications reviewed addressed scratch cooking,^{xii} mainly reporting on **perceived increases in scratch cooking** over time. In one study, 184 school food service leaders surveyed in Minnesota school districts reported a 43 percent increase in scratch or modified scratch cooking in 2011 compared to prior years, but they were not asked whether this increase resulted from farm to school efforts.⁷⁴ But because those school districts engaged in farm to school starting in 2003, it was not possible to directly attribute any reported increases to farm to school.

As part of the *Farm to School Census and Comprehensive Review*, the study team summarized aggregate findings from progress and final reports submitted by USDA Farm to School grantees that received awards in 2013 through 2017. Grantees found that SFAs reported that the absence of adequate kitchen infrastructure greatly affected schools' ability to incorporate fresh, local foods into meals and to cook more items from scratch in cafeterias. Kitchens often **lacked adequate equipment** for safe storage of foods or the tools and equipment to prepare them. For example, SFA grantees reported inadequate storage space, utensils, or cooking supplies needed to process more fresh foods; a lack of sinks big enough to wash all produce; and inadequate refrigerator or freezer space to keep food from perishing.

Additional, more accurate information about the causal relationship between farm to school efforts and SFA outcomes should be collected using a different methodology, relying less on self-reported information. Information about how additional research might further address scratch cooking is presented in Chapter 7.

4.3.3 Inclusion of Produce from School Gardens

A limited number of publications reviewed quantified how often produce from school gardens is incorporated into school meals. The 2014 School Health Policies and Practices Study found that 6 percent of schools grew food in the school garden that was used by school nutrition services.¹⁶⁷ In Minnesota, 21 percent of the 184 food service leaders surveyed reported that food grown in school gardens was used by the cafeteria.⁷⁴ In South Carolina, school-based gardens were part of a pilot farm to school program and educators received school garden training in which 11 percent of the 37 educators surveyed stated their school donated the garden-grown foods to school nutrition services.¹⁵⁸ The use of produce grown in school gardens in school meals was **more likely in States with laws related to school gardens** (15 percent) than in States without such laws (4 percent).¹⁶⁷

xii Scratch cooking refers to preparing food using basic, raw, and fresh ingredients rather than buying processed or pre-packaged foods.

Much of the information on whether produce grown in school gardens is used in school food service operations was anecdotal. For example, in Hawaii, all school garden produce was incorporated into school lunches as part of a pilot program at one school.⁹⁹ In Vermont, several schools purposely plant school gardens to use the produce in lunches.¹³⁷ In Pennsylvania, the school garden produce was donated to the school cafeteria.³⁰ In Denver, a Garden to Cafeteria program allowed students to harvest produce that would be offered in the schools' salad bars,¹¹⁶ and school gardens run collaboratively by local partners sold the produce grown to Denver Public Schools food service departments.³⁰

There were no available data on the share of school meals that include produce from school gardens, but interviews from a 2014-2016 farm to school evaluation in Georgia indicated reasons why this was not a common occurrence. They pointed out that school gardens typically **did not grow enough food** to meet the supply needs of a cafeteria, and that some school nutrition programs were concerned about potential **food safety risks**.¹⁶¹

There were a number of **initiatives that encouraged integrating produce** from school gardens in schools outside of meals. For example, in the South Carolina school garden pilot and educator training program, 65 percent of educators surveyed reported that their school harvested and ate the garden produce during garden instruction, 57 percent reported they used the garden produce in tasting programs, and 35 percent reported it was incorporated into the curriculum beyond the garden.¹⁵⁸ FoodCorps service members assisted with serving garden produce to students at school districts around the country, including in Des Moines, Iowa, and in Georgia.^{136, 161} In the District of Columbia, schoolwide taste tests incorporated items grown in school gardens as part of a Harvest of the Month program.^{82, 121} Similarly, in New York City, one school reported integrating garden produce through tastings in the lunchroom and classrooms.⁵⁹ In one publication about garden-based education in San Francisco, students integrated garden-grown produce into ethnically diverse meals prepared in class at least four times during the 13-week intervention.¹³²

Information about how additional research might further address inclusion of school garden produce in school meals is presented in Chapter 7. The 2019 Farm to School Census includes a question on how schools use the harvest from school gardens, so more information will be available on this topic when the data are available.

4.3.4 Salad Bars

Data from the 2015 Farm to School Census for the 2013-2014 school year estimated that there were **more than 17,000 salad bars** in schools nationally.⁴³ Similar to school gardens, the number of schools with salad bars has increased since 2010 overall. One nationally representative study found that while just 17 percent of public elementary schools had salad bars in the 2006-2007 school year, that number had increased to 30 percent by the 2012-2013 school year.¹²³ Other research using nationally representative data gathered by the Bridging the Gap research program determined that about 36 percent of elementary school children had access to salads, although it was unclear whether the salads were from salad bars.¹⁶⁵

The percentage of **salad bars using local produce** was difficult to determine, but two studies described such efforts. The San Diego County schools promoted Harvest of the Month fruits and vegetables at its school's salad bars. The program reaches over 5,000 students.³⁹ Also, in a Wisconsin study of fruit and vegetable intake at nine elementary schools, 79 percent of the meals quantified came from schools with a salad bar, some of which included produce from school gardens.¹⁴

4.3.5 Plate Waste

Most of the publications reviewed referred to decreases in the amount of “plate waste” associated with farm to school efforts, particularly for fruit and vegetables.^{75, 84, 108, 113, 144} However, it should be noted that most publications did not distinguish between actual food waste versus general waste, which includes packaging, paper products, and plastic cutlery.

Few publications reviewed looked at changes in plate waste as a result of farm to school efforts, and most were either anecdotal or lacked a rigorous study design. For example, one study reported anecdotal reports of decreases in student waste of locally grown produce from farm to school activities,⁷⁵ while another case study of three school districts in New England that conducted farm to school activities found that one of the school districts reported a 77 percent reduction in waste after the implementation of farm to school activities.¹⁴⁴

The study team also reviewed three more rigorous plate waste studies on the relationship between farm to school and plate waste. These objectively examined student plate waste through observation rather than self-report.^{16, 84, 89} One of these studies had positive findings and two had mixed findings. One QED study conducted plate waste observation to examine the impact of farm to school procurement activities in Florida and found an **increase in the amount of foods selected and consumed**, rather than just selected and not consumed, after the implementation of the farm to school program.⁸⁹ The SNMCS, which included observations of school meals in 170 schools that participated in the NSLP, measured plate waste using calories. The study found that participation in a farm to school program was significantly associated with **lower levels of plate waste overall** (4 percentage points) and for dairy (7 percentage points).⁸⁴ However, operating a school garden was associated with a significantly higher percentage of plate waste (5 percentage points). A third rigorous, observational plate waste study also found mixed evidence on the relationship between farm to school and plate waste. The study conducted plate waste observations using digital photography before and after implementation of the 2010 Richard B. Russell National School Lunch Act in several Wisconsin elementary schools participating in farm to school activities.¹⁶ It found that **locally sourced items were wasted more** than conventionally sourced items; fresh fruit was wasted more than canned and other processed fruit; and salad bar items had higher waste than main menu items. However, schools with **more mature farm to school initiatives had less waste** than immature ones, and fresh/raw vegetables were wasted less than cooked vegetables.

Given that findings on the relationship of plate waste to farm to school activities varied and that few studies used objective data, to what extent plate waste changed as a result of farm to school efforts is not clear. Information about how additional research might further address plate waste is presented in Chapter 7.

4.4 Student Satisfaction and Benefits from Farm to School Activities

The publications reviewed suggest that students liked having local foods and that farm to school activities may have positive effects on students including more willingness to try fruits and vegetables, more consumption of healthy foods such as fruits and vegetables, decreased preference and consumption of unhealthy foods, increased nutritional knowledge, and decreased occurrence of being overweight.

In interviews about their farm to school programs, school food service staff in the upper Midwest and in the Northeast stated the **students liked the local foods**. Further probing found it was due to the **quality of the foods**, the influence of school staff, and the relationship the schools made with the farmers.⁷⁵ From interviews with school food service staff in Decatur, Georgia, where a program was introduced to showcase

local produce, it was reported that nearly all students (93 percent) tried a featured salad; and of those students, 81 percent indicated that they would take the salad again.⁶⁴ Surveys of school nutrition personnel, also in Georgia, highlighted that students' excitement and enthusiasm were the key factors that encouraged the school to participate in the Farm to School Program.¹⁶¹ In a formative study to create a farm to school program in a low-income community in Connecticut, students reported that the primary benefit was its "freshness."⁶⁵ Information about how additional research might further address student attitudes about local foods is presented in Chapter 7.

The impact on **fruit and vegetable consumption** as a result of farm to school programs or school gardens had mixed findings.^{9, 14-16, 45, 46, 63, 74, 89, 105, 108, 111, 113, 115, 128, 132, 151, 152, 159} Results also varied for fruit consumption and vegetable consumption and depended on several factors including the specific intervention. Two studies had positive findings for farm to school activities on fruit and vegetable consumption. In one descriptive, pre-post evaluation of a program in Michigan that encouraged healthy eating habits and included farm to school activities for sixth-graders, 45 percent of students who had eaten less than the recommended number of servings increased their consumption of fruits and vegetables.¹⁵² A second study, that used a more rigorous QED design, examined Florida elementary school lunches after a farm to school intervention was implemented that included more local products in school lunches.⁸⁹ The study found that there were relatively small (0.1 or less additional servings per lunch on average) but significant effects on the average number of servings of fruits and vegetables relative to control schools. Those effects represented a 37 percent increase over the average vegetable and 11 percent of the average fruit consumption before the farm to school program began. However, a 2019 systematic review that examined findings from thirteen RCTs, the most rigorous type of impact studies, of farm to school related activities (including nutrition education) had inconsistent findings.¹²⁸ While the study findings were primarily positive and included healthier snack selection, one multicomponent intervention had inconsistent findings for selection and consumption of fruit and vegetables; and two multicomponent interventions did not find any significant changes in vegetable consumption or dietary intake. Similarly, in a 2017 systematic review of 14 publications examining school gardens, one RCT and three QEDs found that participating in various gardening interventions was associated with significantly greater fruit and vegetable consumption, though the increase ranged from less than a serving a week to 15 extra servings per week.¹⁴⁵ Finally, one RCT had mixed findings depending on the reporter, child's gender, or fruit versus vegetable consumption, and two RCTs found no significant changes in consumption.

In some instances, students were also **more likely to consume less unhealthy foods** or foods other than fruit and vegetables.^{15, 45, 63, 105, 113, 128} One RCT in the 2019 systematic review of farm to school related activities saw a 15 percent decrease in the consumption of unhealthy foods.¹²⁸ A relational study that used photographs to analyze school lunch trays in Wisconsin found that intake of fruit and vegetables displaced calories from other foods.¹⁵ The study also found that an additional year of having a farm to school program was correlated with a decrease of about 200 calories of foods other than fruit and vegetables. Similarly, a descriptive study of a Midwestern Head Start program that compared once-weekly farm to school lunches to other lunches found that the farm to school lunches were significantly lower in the percentage of calories from fat (2.8 percent lower), servings of refined grains (0.5 servings less), sodium (73 mg less), and total sugars (2.5 grams less).⁶³ While the farm to school lunches did not have more fruit and vegetable servings, they did have more protein, more dietary fiber, and higher levels of essential minerals and nutrients such as Vitamin A and Calcium.

The publications reviewed also found that exposing students to farm to school activities was associated with **more knowledge of their food** and its nutritional quality,^{13, 14, 46, 108, 113, 132} willingness to try and acceptance of eating vegetables,^{13, 14, 46, 63, 140} and students bringing this information home to their families.^{63, 113, 169} For example, in a QED study conducted with third graders in southern Illinois assessing a farm to school nutrition curriculum, students had significantly increased their knowledge of fiber, vitamins, and minerals as well as increased vegetable consumption.¹⁰⁸ In a descriptive evaluation of a farm to school program for preschoolers, parent focus groups indicated that the program led to about one additional type of fruit and one additional type of vegetable being available in the home.⁶³ In a three-year descriptive evaluation of farm to school programming in Wisconsin, researchers found that elementary (grades 3-5) students were more willing to try fruits and vegetables after the farm to school activities.¹⁴ Finally, an RCT of school gardens implemented in four States in different regions found a significant increase in the availability of vegetables prepared without added fat at home, but only found an increase in home fruit availability for sites that implemented the intervention with a high level of fidelity.¹⁶⁹

Student outcomes of farm to school studies were typically limited to changes in students' attitudes and behaviors or nutrition consumption at school. Additionally, some studies hypothesized that if farm to school efforts influence students' diets and food intake, then these efforts could have an important effect on student health and wellness.^{11, 40, 113, 115, 140} For instance, the 2019 systematic review of farm to school related activities referenced earlier reported that one multicomponent intervention led to a decreased occurrence of students being overweight.¹²⁸ The intervention included an integrated curriculum, promotions, and school nutrition policies and found that students were 35 percent less likely to be overweight after two years. However, there was **no significant change in obesity prevalence**; and two other RCTs found no significant changes in student's BMI as a result of food coaches or nutritional promotions.

Similarly, other studies examined whether farm to school efforts could influence students' cognitive development, and in turn, their academic achievement.^{9, 54, 85, 113, 128, 153} The National Farm to School Network's review of the benefits of farm to school cited four studies that **enhanced overall academic achievement** including grades and test scores as a result of farm to school programs.¹¹³ Four studies reviewed, including a rigorous RCT in a systematic review¹²⁸ and two QEDs,^{85, 153} explored the impact of school gardening activities on science achievement tests for elementary students. All three found that science achievement was significantly higher after participating in the garden curriculum compared to control students. The other publication, a literature review of school gardens, found that of four interventions that measured academic outcomes, two showed improvements in science achievement and one showed improvements in math scores.⁹ However, there were no significant difference in the studies that included a control group.

While several publications address student benefits of farm to school, the studies often had mixed findings, or generally failed to look at long-term outcomes. Information about how additional research might further address fruit and vegetable consumption and other student benefits of farm to school is presented in Chapter 7.

5. Local Food Procurement Practices and Challenges

The chapter begins with a brief review of the increased interest in local foods as well as the level of school spending on local foods; then it provides an overview of procurement practices, including the quantity and types of food sourced and the mechanisms by which the procurement process works. Finally, it discusses challenges in procuring local foods and additional technical assistance needs.

The findings in this chapter are based on 45 journal articles, and 33 other publications including technical and research reports on local food purchasing for schools. The majority (54) of these publications are descriptive studies, 14 are relational/correlational studies, three are QEDs or RCTs, and 14 are other documents including literature reviews.^{xii} More information about the types of research design and methods used in the publications and the purpose of each can be found in Chapter 8, and specifics on each study can be found in Appendix D.

5.1 School Spending on Local Foods

The most commonly cited statistic for the amount of money schools spend on local foods draws from the Farm to School Census data. In the 2013-2014 school year, **schools nationwide spent nearly \$790 million on local foods.**^{xiii} This number accounted for about 11 percent of the total food expenditures of schools that responded to the 2015 Farm to School Census^{24, 118} and represented a 105 percent increase over the \$385 million that schools reportedly spent nationwide during the 2011-2012 school year.^{18, 55, 97, 100, 118}

Multiple publications reported the percentage of overall spending on local foods by schools and districts.^{34, 100, 142} However, obtaining such figures presents some challenges. For schools and districts to report that percentage, they **must know from their distributors** which foods supplied to them were sourced locally and how much of what they paid the distributor represented local foods. If a distributor was unable to provide those details, it may not be feasible for a school to say where its food came from or how much the local portion cost.¹⁰

Generally, surveys of local school systems showed **a positive trend in the amount of money schools spent on local foods.** A 2011 survey of 184 Minnesota schools found their farm to school purchases totaled approximately \$1.3 million, roughly double the amount that Minnesota schools were estimated to have spent in 2010.⁷⁴ In California, the Davis Joint Unified School District increased local food purchases from \$24,000 (27 percent of total produce purchases) during the 2008-2009 school year to \$42,000 (49 percent of total produce purchases) during the 2009-2010 school year,⁵² while in Arkansas, Fayetteville Public Schools increased the amount of dollars spent on local foods by over 800 percent in two years from about \$9,000 in 2012 to \$75,000 in 2014³⁰. Schools in San Diego County steadily increased spending on local products, from \$3.1 million in the 2013-2014 school year to \$6.9 million in the next school year to \$17.7 million in the 2015-2016 school year.⁴³ This amount accounted for 25 percent of their total food budget and more than 50 percent of their total produce purchased.

Similarly, three school districts in Yolo County, California, part of greater Sacramento, increased the amount they spent on purchases directly from farmers between the 2014-2015 and 2015-2016 school

xii Note that some studies could have more than one type of design, and thus the counts by research design may not sum to the total in this section.

xiii See <https://farmtoschoolcensus.fns.usda.gov/>

years.⁵³ The increases ranged from \$1,740 to \$4,185. In Michigan, the percentage of school food service directors who purchased food directly from local farmers increased from 11 percent to 42 percent between 2004 to 2009.²⁶ Further, spending in Michigan on local foods almost doubled between 2011 and 2013 within a State-funded farm to school grant program.¹⁰⁴

In addition to examining spending by K-12 schools, a national survey of 1,496 examined **spending of early care and education providers**. Nearly 63 percent reported that they purchased local foods for meals, snacks, or classrooms.¹⁵⁶ On average, each provider spent almost \$19,000 locally during the year, accounting for 28 percent of its overall food budget.

This review found limited information that addressed the frequency with which SFAs asked distributors for the volume and price of locally sourced products. However, the 2019 Farm to School Census includes questions to determine whether SFAs ask distributors for reports that include the volume and/or price of locally sourced products, and if so, how often.

5.2 Procurement of Local Foods from Farmers, Producers, and Distributors

According to a summary of 2013 Farm to School Census data of the districts that served locally produced food in the 2011-2012 school year, 53 percent obtained food **directly from farmers and other producers**,¹³⁰ the second most common procurement method behind using **a distributor** (77 percent).¹³⁰ ¹³⁹ The 2013 Farm to School Census data also indicated that 25 percent of districts had sourced food from producer co-ops, 11 percent from farmer's markets, and 5 percent from community-supported agriculture (CSA).^{xiv} ¹³⁰ The publications reviewed provided several examples of school districts that sourced directly with farmers or producers. For example, a survey of 184 districts in Minnesota found that 75 percent sourced directly from local farms or producers.⁷⁴ Another district in Hawaii sourced 42 percent of its food from local farmers, whereas a district in Pennsylvania credits its long-standing relationship with local farmers for its ability to serve local foods.^{87, 146} There were also numerous examples where a subset (11 to 35 percent) of schools were able to work directly with local farmers.^{41, 75, 86, 162}

Studies differed as to whether the number of distributors affected the amount of local foods purchased by schools. Typically, **supply chains were already in place** for schools, particularly those that were constrained by tight budgets.^{92, 100, 142} Because the majority of food served in schools was not locally produced or sourced, developing new sources for purchasing local products can be burdensome.^{69, 139, 146} One study found that schools that procured more than half of their supply from one vendor were significantly less likely to buy directly from a farmer. This was because those schools that primarily relied on one wholesaler often had warehouses designed for large delivery trucks and thus were less likely to accept deliveries from individual farmers.⁴¹ However, there were examples of schools and school districts that sought out new suppliers that could provide local foods, **asked their current distributors to prioritize local foods** when they were available, or sought bids from new distributors that could provide local products.^{52, 93, 100, 142} Furthermore, based on the study team's interviews with distributors, nine of 13 distributors who responded to the question stated that providing local foods gave their company a **competitive advantage** (see Appendix E). Two produce distributors specified that selling local to schools provided a particular advantage against larger, broadline competitors.^{xv} Another two stated that although

xiv CSAs typically consists of consumers purchasing a share from the local farm before each growing seasons and regularly receiving part of the farms seasonal production in return.

xv "Broadline" refers to distributors that provide a wide variety of products to customers.

they believed providing locally sourced foods gave them a competitive advantage, there were still obstacles for schools to buy local, as **school funding did not always cover the cost** of local products.

In some cases, multiple schools/SFAs purchased from the same set of distributors, in which case it was not always feasible to request specialized local foods. For instance, one of the distributors the study team interviewed reported that almost all of the school districts in its State participated in one procurement bid. In San Diego County, about 80 percent of the schools sourced their produce from the same three distributors.³⁹ The Hawaii Department of Education's School Food Services Branch was centralized to help procure food for schools; however, the Kohala Center, a Hawaiian independent community-based group, proposed decentralizing this authority to help more schools purchase locally produced products.⁸⁷

5.3 Factors That Affect SFAs' Supply Chains

Typically, before an SFA can recruit or use distributors for their ability to “buy local,” an SFA must first consider its constraints. For example, SFAs generally operate under **intense budget pressure**, necessitating distributor prices to be a primary consideration.^{10, 77} Under federal and sometimes State regulations, for purchases above the small purchase threshold, SFAs are obligated to solicit their food procurement needs to multiple vendors and are typically required to select the vendor that can provide the products they need at the best value.^{10, 30, 77} In some instances, SFAs had preferences for local foods and purchased them, as long as they did not cost more than competitors' foods. However, even in those instances, there was still a limit to how much more an SFA could spend on local foods compared to non-local competitors' foods.²⁰ Some SFAs also could only apply geographic preference for unprocessed, locally grown or locally raised agricultural product.¹⁰

SFAs also consider **effort** when sourcing from multiple smaller vendors. For example, over 80 percent of SFA respondents in Pennsylvania reported in a 2007 year statewide survey that they were more likely to order local foods when they come from a single source; some reported hesitancy to hire smaller distributors due to the increased workload involved, as it required additional coordination. However, this issue was only indicated in a single study reviewed.¹⁴⁶

SFAs also need to consider their **ability to prepare the items they purchase**. Many schools do not have the facilities or equipment required to process whole foods on-site. As a result, in many cases, distributors have to provide pre-cut or pre-processed foods, which smaller, local distributors might not have the capacity to do.³⁶ Working within these constraints, SFAs might opt to request more local foods from their current distributors. There were some examples of schools or districts requesting more local foods from distributors already under contract, such as Detroit Public Schools and San Diego County school districts.^{3, 142} Schools also might solicit for local products, but they needed to ensure that there were enough potential vendors to fulfill the competition requirement of solicitations and could not do so in a way that impedes “full and open competition.”¹⁰

Finally, a major determining factor in SFAs' supply chains was the **size of the school district**. Smaller SFAs may find it easier to purchase local foods directly from farmers, whereas larger SFAs might find it easier to request local products through their existing food distributors.^{10, 81} There were numerous examples of schools and SFAs both using their existing suppliers and sourcing from new suppliers for local foods. For example, large school districts, such as those in Yolo and San Diego County (California), as well as Detroit Public Schools (Michigan) and Decatur County Schools (Georgia), typically worked with their current suppliers to source local products.^{30, 53, 64, 72, 90, 100, 142, 164} Conversely, numerous smaller school districts in Maryland and Oregon, as well as early care and education facilities nationwide, established new supply chains to directly source local products.^{10, 30, 156}

The **structure of these supply chains** was important – some research showed that structure was correlated with SFA spending on food such that traditional distributors might be the most efficient suppliers of local foods to schools, whereas procurement from producers and non-traditional suppliers was associated with higher transaction costs.²³ In Massachusetts, the School Nutrition Law allowed school districts to purchase fruits and vegetables from local farms without going through the normal bidding process, as long as “reasonable business practices are followed” and each contract was less than \$25,000.^{20, 101} Some groups also help to facilitate the conversation among schools, distributors, and farmers by holding conferences where all three entities can connect.⁴³ Events such as these could help facilitate local foods getting to schools by either route, depending on the connections made.

5.4 Challenges to Procuring Local Foods

Numerous studies referred to challenges with procuring local foods. One commonly cited challenge was related to the **lack of available local food** at a sufficient quantity of the desired food items, often due to seasonality.^{3-5, 26, 32, 34, 36, 41, 43, 55, 68, 78, 87, 90, 96, 97, 115, 118, 120, 127, 130, 141, 142, 146, 149, 154, 156, 160}

Similarly, some districts indicated that foods might not be available due to their inability to find suppliers for local foods or issues with the quality of the product that was available.^{4, 25, 26, 55, 69, 74, 90, 97, 118, 120, 130, 146}

Barriers to purchasing local foods:

- Lack of available food.
- Inability to find local suppliers.
- Cost of local foods.
- Procurement process (e.g., food safety liability issues).
- Lack of available food preparation area, time, storage space.

A second challenge was the **higher direct cost of local foods** when compared to the conventional supply chain.^{4, 20, 25, 26, 32, 34, 35, 41, 43, 55, 68, 71, 72, 74, 81, 87, 90, 92, 93, 96, 97, 118, 130, 135, 149, 154, 156, 160} Studies conflicted on the cost of local versus non-local products. Often, cost was reported as the largest barrier facing schools that wished to start offering local products.^{20, 90, 130} However, some studies indicated either that local products were sometimes cheaper or that schools did not pay a premium for local products—the result of a number of factors including the schools’ proximity to farms, shortening of supply chains, the amount of packaging, growing seasons, and the specific products purchased such as perishable foods that farmers otherwise would be unable to sell.^{20, 62, 75, 87, 109}

A third challenge was the **procurement process** itself, including food safety liability issues (e.g., serving or selling tainted foods), finding time to schedule deliveries, and general lack of knowledge of how to contract with and coordinate delivery from multiple smaller suppliers.^{3, 4, 7, 19, 25, 26, 29, 32, 43, 55, 71, 87, 90, 109, 118, 125, 141, 142, 146, 168}

The reviewed publications also documented similar challenges for producers and distributors. For example, a 2019 study in Florida based on interviews with producers identified the three largest barriers for producers as **distribution challenges, limited produce, and food safety requirements**.¹²⁹ Producers indicated that selling produce to schools was less profitable than to other organizations, with some small-scale farmers citing their inability to provide a reliable supply to meet school needs. The higher food safety standards of those schools prevented some of the producers from supplying their products to schools at all. Some noted that participating in co-ops helped to defray the costs by sharing responsibilities across farmers.

Similarly, in interviews with the study team, 12 of 21 distributors commented that their own **concerns about food safety requirements** and requirements for audits (including Good Agricultural Practices

(GAP) and Safe Quality Food (SQF) audits)^{xvi} were a major barrier to creating new supply chains with local producers. Distributors explained that many local producers run small operations, and can view food safety certification requirements as too cumbersome and costly. To address this challenge, a few distributors reported using “blanket,” or GroupGAP, certifications, which cover a number of producers under the same umbrella. Seven distributors also thought that some farms might find it challenging to produce the volume at competitive prices that distributors need for the relationship to be profitable.

Finally, other well-documented barriers that often prevented schools from purchasing local foods were unrelated to the procurement process. Rather, they included the lack of available time and space to prepare and store local foods.^{5, 20, 27, 32, 55, 74, 78, 95, 115, 120, 154, 156, 160}

5.5 Procurement Technical Assistance Needs

Data collection from food service personnel, farmers, and distributors indicate gaps in technical assistance to schools as well as to local farmers and distributors. The needs of schools for technical assistance in procurement included the following: identifying vendors that could supply safe, high-quality food consistently and in large quantities; navigating the various national, State, and local regulations surrounding school food purchasing; understanding complications with billing and payment for individual farmers versus the typical billing process for distributors; dealing with logistics of accepting deliveries from numerous new vendors; modifying facilities for on-site food preparation; and hiring or training staff to help prepare and serve foods.^{3, 28, 72, 74, 93, 143, 161}

Based on surveys and interviews with farmers and food service directors, farmers and distributors also required assistance with nearly every one of these **aspects of procurement**.^{51, 98, 120, 138} Primarily, this included how to find schools that wanted to purchase their food, what foods they should be growing, and in what quantities.^{38, 98, 103} For example, mismatched agricultural and academic calendars and school food budget constraints were cited by food distributors as significant barriers to local food procurement in schools. Barriers could be addressed by working with regionally based food distributors to connect schools with local agriculture, and increasing reimbursements for school meals.^{66, 77} Farmers and distributors also needed help understanding and conforming to the regulatory environment, including food **quality and safety, and insurance requirements**.^{26, 38, 94, 98, 103, 160} Interviews with distributors indicated that for some smaller farms, delivery could be a logistical hurdle. If farmers’ budgets were already strained, delivering food to schools could not only be logistically but also financially burdensome.¹⁰

Several **best practices** were identified in the research that might help ease the management of the procurement process. One was to **first determine the food needs** and then decide on the type of supplier that would best fit those needs.^{30, 72, 81, 142} Although foods need to be sourced through a competitive process, such a decision-making process could help an SFA determine whether small local farms or a larger aggregator or distributor would be a better source for the desired foods. Other practices included being **flexible with certain delivery and quality requirements**, building organizational relationships with producers, providing professional development for food prep and purchasing staff, and possibly sourcing help from outside organizations to guide local purchasing decisions.^{30, 37, 41, 71, 143, 161}

xvi GAP is a voluntary USDA food safety audit and certification program to verify that fruits and vegetables are produced, packed, handled, and stored as safely as possible. SQF is a food safety and quality management program that audits and certifies food service providers against Global Food Safety Initiative standards.

6. Economic Implications of Farm to School

This chapter first examines the effect of farm to school on school spending, including funding for local foods and other farm to school activities; the second describes how farm to school programs affected farmers and agricultural production; and the third provides some insight on how farm to school activities affected job creation. Details about how research might further address the effect of local food purchases on the economy and agricultural sector are presented in Chapter 7.

The findings in this chapter are based on nine journal articles, and nine other publications including research and technical reports about three types of economic effects of farm to school. Almost all of these (17) are descriptive studies, one is a relational/correlational study, and one does not have an applicable research design.^{xvii} More information about the types of research design and methods used in the publications and the purpose of each can be found in Chapter 8, and specifics on each study can be found in Appendix D.

6.1 Effects of Farm to School on the Local Economy

Though the direct impact of farm to school activities on farmers may not seem high, there were wide-ranging effects on the economy as a whole. Two descriptive studies led by Community Health Improvement Partners (CHIP) about farm to school in San Diego County, California showed every dollar spent on local produce by schools generates from \$1.30 to \$2.60 in local economic activity.^{38, 39} Other researchers attempted to model the effect that local purchases have on the local economy by providing multipliers for categories such as jobs created, sales, labor income, and value added. In nearly every instance, the purchases of local products by schools **added value to the local economy** in each of these categories.^{6, 38}

6.1.1 Farm to School and the Agricultural Sector

Although the percentage of income derived from farm to school sales was low,⁷⁶ there was some anecdotal evidence that **farmers changed their behavior** to accommodate their range of clients and appreciated making connections within the community. Benefits of these connections included diversified markets, increased off-season sales, and a market for surplus and/or less desirable foods.^{18, 41, 55, 76, 95}

A survey of 223 New England farmers found that those selling directly to institutions including schools **increased their median acreage** in production by three acres, whereas acreage in production stayed the same for other respondents.⁵¹ The farmers also reported that 13 percent of their gross sales went to these institutions. Though this survey included institutions other than schools, farmers reported that 49 percent of their institutional sales went to K-12 schools. The farmers also reported **producing specific crops** for their farm to institution sales, including carrots, squash, lettuce, potatoes, blueberries, turnips, parsnips, beans, jams, and pickles.

Figures for the **percentage of a farmer's income derived from farm to school sales** varied but were generally in the low single digits. In a survey of only seven farmers, the amount of their income derived from farm to school sales ranged from less than 1 percent to 4 percent.⁷⁶ Though the percentage was small, this money stayed in the local economy. Another study reported that according to the USDA, more than 80 cents of every dollar spent on local food sales go to the farmer, compared to only 17 cents in a

xvii Note that some studies could have more than one type of design, and thus the counts by research design may not sum to the total in this section.

more traditional food supply chain.³⁹ Statistics tracking the volume of local sales attributable to farm to school efforts were rare, but those that existed indicated a positive trend over time in the amount of income that farmers received from farm to school activities. In Massachusetts, gross sales per farm increased from \$31,474 in 2010 to \$134,895 in 2014.⁵¹

6.2 Farm to School and Job Creation

The total **number of full- or part-time school positions** related directly to farm to school was unclear. The decision to hire staff for farm to school efforts can be made by the individual school, a district, or the State, among other arrangements. Some staff, both full-time and part-time, were hired directly by the school, or with funds allocated by parent-teacher associations.^{58, 139} In other cases, grants helped schools hire farm to school staff.¹³⁹ Elsewhere, bills have been passed by State legislatures in Alaska, New Mexico, and Oregon with the intent of helping to hire full-time and part-time staff to coordinate farm to school activities.^{37, 66, 135}

The **responsibilities of the staff hired for farm to school efforts** varied. Some were hired to work in school gardens, others to oversee kitchens and develop new school menus, or to coordinate in-school training and education.^{33, 58, 70} The responsibilities and challenges of sourcing locally produced food were sometimes novel to schools used to traditional procurement practices, necessitating hiring staff to communicate with farmers as well as to coordinate other aspects of the food procurement process at the school and district level.^{3, 37, 66, 104, 135} For example, the New Mexico legislature in 2015 introduced a bill for additional funding for local procurement that included a full-time position in a State agency.³⁷ In Alaska, the legislature created a new State-level program coordinator position.¹³⁵ Currently, the number of staff hired for farm to school efforts, the sources of funding for the staff, and the types of roles they play all vary by site.

7. Topics That Could Benefit from Additional Research

The publications reviewed underscore the need for better quality research on farm to school program implementation and impacts,^{80, 124} as many cited limitations such as lack of longitudinal research design (studies are typically cross-sectional or retrospective), narrow geographic and market scope, and reliance on self-reports of dietary behaviors.^{11, 97, 148, 151} Limitations of the available literature on farm to school can be attributed to the dearth of resources for program evaluation and the economic impacts of local foods.^{31, 97, 117, 159}

The study team assessed whether the study research questions (see Appendix A) could be answered by the literature available, and accordingly identified topics that could benefit from additional research. This chapter summarizes several areas that would particularly benefit from more rigorous impact evaluations: (1) student attitudes about local foods; (2) how nutrition and garden interventions affect fruit and vegetable consumption; (3) how local foods are incorporated into meals and effects on plate waste; (4) best practices in local procurement processes; and (5) how local food purchases affect the economy and the agricultural sector. The chapter concludes with other areas of interest that either are addressed in the 2019 Farm to School Census or could be addressed using Farm to School Census data. See Section 8.2 for information about the types of research designs that could be used in evaluations and the purpose of each.

7.1 Student Attitudes about Local Foods

Numerous existing studies provided descriptive evidence on student attitudes about local foods, but descriptive studies cannot definitively show that farm to school programs caused student attitudes and behaviors to change. The nature of documenting student attitudes lends itself to lower-cost interventions that manipulate the scope and intensity of students' interactions with local food, school gardens, and other activities associated with farm to school efforts to assess behaviors and attitudes about food.

Future research might consider cluster RCT designs, where particular classrooms within a school are randomly assigned to participate in a school garden and other classrooms are not. The resulting differences in attitudes expressed by the students could then be attributed to the policies themselves. Likewise, students could be randomly assigned to school meals with and without certain menu items, or to information sessions or not on the benefits of eating locally. There are also a number of approaches using QEDs that could tackle this question. For example, if researchers knew when a school garden was established at schools across the district, they could measure how the number of years a student experienced school gardening activities influenced attitudes and behaviors. Section 8.2 provides more information about these as well as other types of study designs.

7.2 Farm to School Effects on Fruit and Vegetable Consumption

Multiple studies have been conducted on this topic, and most have found small but positive outcomes resulting from nutrition education and gardening interventions; however, several impact studies have not found changes in fruit and vegetable consumption. Furthermore, there were limited data available regarding long-term changes in fruit and vegetable consumption. Therefore, there is no way to determine whether changes in fruit and vegetable consumption are sustained over time.

Future research that included QEDs or RCTs and use longitudinal data to examine the impacts of nutrition education or gardening interventions relative to a control group and assessments of fruit and vegetable consumption over time are needed to better understand this important topic.

Further, one study found that increased availability of fruit at home occurred only with high levels of implementation fidelity.¹⁶⁹ Studies examining the specific mediating processes that lead to higher fruit and vegetable consumption may help to understand the mixed findings. Research can examine what characteristics of a school garden or nutrition intervention increase the availability of fruit and vegetables at home and make their consumption most likely. For example, do children learn to like fruit and vegetables through the school garden and then encourage their parents to stock them at home; or do they encourage their parents to garden at home, which increases their access to fruit and vegetables; or do children learn about nutrition and become convinced of its importance?

7.3 How Local Foods are Incorporated into Meals and Effects on Plate Waste

The study team examined what preparation, planning, and processes are used by SFAs to incorporate local foods into meals. Generally, the data were lacking, likely due to the nuances and individual needs of each SFA. One way to increase the evidence base is to improve the data collected about these practices. However, given the rich, nuanced data required to answer this question, the study team recommends conducting interviews with key food service stakeholders to learn more about how local foods are incorporated into meals.

To lay the groundwork for this, the 2019 Farm to School Census includes a question about how schools use the harvest from their school gardens, including whether the produce is included in school meals or served in classrooms as part of educational activities. The 2019 Census also includes “increased scratch cooking (e.g., use of less process foods)” as a response option when asking about perceived benefits of participation in the farm to school program. Whether scratch cooking increased as a result of farm to school efforts is also well suited to a QED approach, but would first necessitate defining the type of “scratch cooking.” Then an additional question could be added to future Census instruments, asking about the percentage of meals cooked from scratch across all SFAs. Once these data are collected, the percentage of scratch cooking could be compared between SFAs that are and are not implementing farm to school activities. If these data are collected over time, additional rigor could be added to the research design by comparing percentages within and between SFAs over time (difference-in-differences design).

Questions regarding perspectives on plate waste are included in the Census; however, to address this topic rigorously, the study team recommends an evaluation that does not rely on self-reports. For example, a well-designed QED could compare plate waste using objective metrics (e.g., examining plates of students’ food after eating) in schools or SFAs with and without farm to school activities. Research could also examine the causal relationship between farm to school efforts and plate waste, above and beyond examining the correlation between plate waste and participation in farm to school activities. Furthermore, it is important to separate food waste from overall waste or packaging/transport waste.

7.4 Best Practices in Local Procurement

Aspects of the local procurement process that are particularly complex, as well as best practices to alleviate these burdens, were addressed by numerous studies.^{xviii} Still, this research area would be well suited to randomized interventions. One potential intervention would be to test different best practices,

xviii Note that while procurement processes are the same for both local and non-local items, this review focused on the procurement of local items. FNS recently conducted a study about procurement at the SFA level that is expected to be available in 2020.

perhaps by providing staff at certain schools or SFAs various types of technical assistance. This would be a relatively straightforward way to understand which types of best practices can alleviate which burdensome aspects of procurement. A random assignment of technical assistance would allow researchers to be able to identify the impacts of the best practices themselves. There are also potential ways to study this question without undertaking a costly intervention. One way would be to identify different policies that pertain to the procurement process across districts or States, or even food industries. In particular, obtaining this type of nuanced information lends itself to qualitative interviewing.

The reviewed publications did address how the variety of school foods purchased has shifted with farm to school implementation, but since the studies were primarily descriptive studies, they could not assess whether changes were caused by farm to school efforts. A rigorous study for this question could use a QED to assess differences in food purchases and meal offerings between SFAs implementing farm to school activities and those not implementing them.

Furthermore, only one study was able to address the extent to which the volume of local sales by SFAs claimed by producers and distributors shifted with farm to school efforts.⁵¹ It is surprising this area would have a significant gap, given it is central to understanding the effectiveness of farm to school policies. The 2019 Farm to School Census, as well as earlier Farm to School Censuses, provide a comprehensive catalog of farm to school purchases of local foods across States and SFAs, which will allow researchers to examine trends over time.

7.5 How Local Food Purchases Affect the Economy and the Agricultural Sector

The effect of local purchases on the local economy and on local agriculture production are both topics that should be evaluated within a causal framework, but cannot be definitively answered using the reviewed research given the lack of impact studies in this area.

There are a few potential ways to study these questions, using extant data, as well as by designing an RCT or strong QED. Perhaps the most straightforward solution is a QED using information collected from the Farm to School Census about local purchases. Local economic conditions and agricultural production in these areas could be compared to those in other, similar areas where there was little or no spending on local food. To obtain even more nuanced information, these analyses could be conducted by the type of local food purchased (e.g., dairy products versus produce). There are a variety of possible designs, from comparing SFAs within the same State to using more advanced techniques such as propensity score matching to compare areas based on a range of characteristics. Additionally, should information about local purchases become available, with sufficient variation in local food purchase volumes within specific regions, impacts could be identified both on within-SFA changes over time and on between-SFA comparisons described above, resulting in a stronger design (e.g., difference-in-differences). Other information necessary to conduct these analyses could come from other extant data, such as county-level information from the USDA Census of Agriculture or other detailed statistics from the Decennial Census and American Community Survey. These questions could also be examined through an RCT, where funding for local purchases could be randomly assigned to certain SFAs or to certain food products.

7.6 Other Topics Addressed by the Farm to School Census

In addition to the topics listed above that could benefit from additional impact evaluations, the topics below could also benefit from additional research. Each of these either could use secondary analysis of Farm to School Census data or has a specific related question in the 2019 Farm to School Census.

- **How States and local actors create institutions to promote farm to school activities** – The 2019 Farm to School Census includes a question about participation in farm to school networks, task forces, and advisory boards and it will provide the first nationwide SFA participation rate.
- **Whether school meals include produce from school gardens** – The 2019 Farm to School Census includes a question on how schools use the harvest from the school gardens.
- **Whether distributors are recruited or used by SFAs for their ability to “buy local”** – The 2019 Farm to School Census includes questions to determine whether SFAs ask distributors for reports that include the volume and/or price of locally sourced products, and if so, how often.
- **Whether school wellness plans incorporate farm to school** – The 2019 Farm to School Census includes a question on policies in place at the SFA including wellness policies that support farm to school. Further research could also address how and what types of farm to school policies are incorporated into school wellness plans.
- **How schools fund farm to school activities** – The 2019 Farm to School Census will explore how schools fund staff members who lead farm to school activities. Further research could include case studies or budget document reviews that explore the intricacies of supplemental funding and to what extent the sources of funding differ from activity to activity.
- **How certain characteristics affect the types of farm to school activities** – Secondary analysis of Farm to School Census data could explore how characteristics such as school size, share of students who receive free/reduced-price meals, federal reimbursements per student, district expenditures per student, food cost per student, cafeteria sales per student, county poverty rate, county population, urbanicity, and race/ethnicity affect which type of farm to school activities that schools and districts choose to participate in.

8. Data Sources and Methods Used in the Research

The previous chapters summarize the findings of research identified in the literature that address three objectives of the *Farm to School Census and Comprehensive Review* as well as topics that could benefit from additional research. This chapter describes the types of data sources, research designs and analytic methods, participant populations, and metrics used in the reviewed publications. Details about individual studies can be found in Appendix D.

8.1 Data Sources

To better understand the basis of the findings summarized in previous chapters, coders documented the data source(s) for each of the publications reviewed (Exhibit 8-1). **Primary data sources** included surveys or interviews/focus groups conducted by the researchers. **Secondary data sources** included extant administrative records from schools, local governments, or other institutions, as well as results from publicly available survey datasets. Other research performed literature searches and/or conducted meta-analyses. Data source categories shown in the exhibit were not mutually exclusive and researchers could have used multiple types of data.

Among the research included in the literature review, more than half of the publications drew from **primary data** (56 percent), a quarter drew from **secondary data** (23 percent), and one-fifth of reviewed studies drew from the **Farm to School Census** data (20 percent). More specifically, about one-third reported on results from **interviews and/or focus groups** (31 percent), and one-fifth of studies conducted **observations** in the field and/or developed **case studies** (22 percent). One-fourth of reviewed studies included **literature reviews or meta-analyses** (24 percent) however, about half of these cases also included other types of analyses.

Only 6 percent of studies used **document reviews**; among those few, the types of documents reviewed varied considerably. One publication reviewed purchasing patterns from the invoices of distributors and growers;⁵³ another reviewed history of farm to school legislation in Oregon.⁶⁶ Yet another study supplemented key stakeholder interviews with a review of documents from leading food service companies.⁵⁵

Exhibit 8-1: Data Sources in Publications Reviewed

Source	Number of Publications (Percent of total)
Primary data	90 (56%)
Secondary data	38 (23%)
Farm to School Census data	33 (20%)
Interviews or focus groups	51 (31%)
Observations or case studies	35 (22%)
Literature review or meta-analysis	39 (24%)
Document review	10 (6%)
Other	15 (9%)

Note: N = 162 publications. Percentages do not sum to 100 as study types are not mutually exclusive and researchers could have used multiple data sources. Excludes three studies that did not have an applicable data source.

The reviewed publications also included **relational and correlational designs** (18 percent of studies), which are less rigorous than a QED as they do not control as strongly for confounding differences. These types of designs include pre-post designs and cross-sectional comparisons with few controls. Other studies used relational analyses that estimated the relationship between one variable and another without using a comparison group. Still others relied on correlational methods that simply measured the

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association between two variables. For example, one study used the 2015 Farm to School Census to analyze the association between local agricultural production and farm to school expenditures.¹¹⁸

The majority of studies (66 percent) used a **descriptive design**, particularly when answering questions about economic contribution or procurement processes. The types of studies using this design type included numerous small-scale surveys. For example, one study presented results of a survey of 72 farmers in Mississippi to understand the barriers they faced in producing food for schools.¹⁴¹

Six percent of studies used designs **other** than those mentioned above, ranging from analysis of media and documents to qualitative coding of interviews. Some of the more novel approaches were the analysis of photographs of cafeteria trays to study student food choice patterns^{14, 15, 86, 107} and video recordings of children explaining their concerns about farm to school efforts.⁶⁹

Exhibit 8-2: Research Design in Publications Reviewed

Design	Number of Publications (Percent of total)
Randomized control trials (RCT)	6 (4%)
Quasi-experimental design (QED)	13 (9%)
Relational and/or correlational design	26 (18%)
Descriptive design	94 (66%)
Other	9 (6%)

Note: N = 143 publications. Percentages do not sum to 100 as researchers could have used multiple design types. Excludes 22 studies that did not have an applicable research design. Meta-analyses or literature reviews might have included studies with any of these research designs, including RCTs, but were not classified here.

8.3 Participant Populations and Sample Sizes

To better understand how the findings summarized in previous chapters could be generalized, coders documented the kinds of participants in the research. The study team used the results to categorize the type of data that quantitative research used, and excluded research that only reviewed literature or used qualitative data. The large percentage of quantitative research reporting their sampling mechanisms (i.e., indicating they had selected a sample within a population) suggests that most of the reviewed publications did not capture the full population of schools, teachers, or students.

Exhibit 8-3 shows the distribution by participant type for 110 quantitative studies that described their research populations. Nine **main types of participants** appeared in the reviewed publications: students, teachers, school administrators (including food service directors), other school-level data (e.g. school meal observations or number of schools), district and State administrators, parents, farmers, management companies (i.e., food distributors and food vendors), and nutrition service staff. A small group of studies (12 percent) used another type of participant. The most common type of data included either student-level data or data from nutrition service staff. There was also a considerable number of studies with district- and State-level data from administrators (11 percent). Underrepresented populations included teachers and parents.

Exhibit 8-3: Participant Type

Type	Number of publications (Percent of total)
Students	28 (25%)
Teachers	6 (5%)
School administrators (including food service directors)	23 (21%)
District/State administrators	14 (13%)
Other school data	17 (15%)
Parents	5 (5%)
Farmers	21 (19%)
Management companies	19 (17%)
Nutrition service staff	27 (25%)
Other	14 (13%)

Note: Includes 110 quantitative studies that described their populations. Percentages do not sum to 100 as studies could have had multiple types of participants.

The **number of participants** by type varied (Exhibit 8-4). Research that looked at student-level data had the largest mean number. Conversely, the smallest mean number of participants was research that looked at teacher-level data. This disparity in the number of participants was largely related to the methodological approach of the research. Studies that included interviews and relied on qualitative data collection had fewer participants than studies that used large-scale administrative datasets.

Exhibit 8-4: Mean Sample Size for Participant Type

Type	Overall Mean
Students	2,791
Teachers	19
School administrators (including food service directors)	173
District/State administrators	37
Other school data	533
Parents	1,423
Farmers	57
Management companies	27
Nutrition service staff	137

Note: Includes 110 quantitative studies that described their populations.

8.4 Measurement Metrics

An important aspect to consider across the study's objectives is what metrics or definitions the reviewed research used to measure results. Measurement metrics differed substantially. They included such metrics as experiences and practices, student behavior and attitudes, implementation processes, school district purchasing patterns, product demand, various measures of actual food purchases, as well as interactions and linkages between school communities and producers.

Research that focused on **economic contributions of farm to school and procurement processes** tended to focus on two main types of information.

- The first was the **experiences and practices** of various actors in the procurement and distribution process. This research often came in the form of surveys administered to various stakeholders. For example, a study in one county in Nebraska surveyed food service directors, producers, and distributors to learn about the feasibility and interest in implementing farm to school programs.¹²⁷ Another study used in-depth in-person interviews with various supply-chain actors to learn about their perceptions about organizational practices.⁷¹
- The second type of information was **financial and other quantitative data** on sales, acreage, and capital investments. For example, these metrics included school district purchasing patterns,⁵³ product demand,⁷² and various measures of actual food purchases.³³

Research addressing **the impacts of farm to school on student and other school-based outcomes** used a more varied set of metrics.

- Much of this research analyzed information on **behaviors and attitudes towards specific foods of students**, measured either through interviews and observation or through surveys. In general, these studies tended to ask children about their behaviors and attitudes. For example, student surveys asked about nutrition knowledge, fruit and vegetable consumption behavior, and awareness of farms/farmers.¹⁰⁸
- Many studies also used responses to survey questions about the process of implementing farm to school programs and gardens at the school level of **food service directors and other school administrators**. For example, one study collected online surveys of school nutrition directors and educators and conducted interviews with school nutrition directors and other key food service personnel.¹⁶¹
- A third common type of metric included **participation counts** of schools and children; for example, counts of students served and participating in a particular culinary arts curriculum.¹⁰² The Minneapolis Public Schools Culinary and Nutrition Services reported the number of Minneapolis schools with a school garden and salad bar.¹⁰⁶

Other metrics included used school nurse perceptions of their role in promoting fruit and vegetable consumption¹¹⁰ and interactions and linkages between school communities and producers.¹⁴⁶

9. Conclusions

The literature review documents increases by school districts in the amount of money spent on local foods in recent years and their plans to purchase more foods. Furthermore, the 2013 and 2015 Farm to School Censuses indicate that approximately two-fifths of all U.S. school districts participate in farm to school efforts. Still, the definition of “local” varies. The literature identifies increases in State and local legislation to support farm to school efforts. These focus on various goals, ranging from the establishment of farm to school programs and task forces to the authorization of funding and incentives for local food procurement. Several policies require State agencies to establish or support farm to school activities. Funds from State or national sources are often supplemented by grants and donations.

Limited information is available about how often school garden produce or local foods are incorporated into meals, including whether scratch cooking increased as a result of farm to school efforts. More information is available about the educational opportunities, especially incorporating gardens into science curricula. Although the research is mixed, studies suggest that students exposed to farm to school programming are more likely to consume fruits and vegetables, are also more accepting of eating vegetables, and are more knowledgeable about the nutritional quality of their food. The reviewed publications also examines the relationship between farm to school activities and “plate waste,” finding mixed results.

The goal to increase more local foods is reported to be limited by such barriers as tight budgets, food availability, restrictions on which distributors can be used, and capacity to prepare fresh foods. Technical assistance might support the local food procurement process for schools. The increase in farm to school efforts may be associated with a slight increase in the amount of income that farmers receive from these activities and new connections with the community, but the literature indicated that farmers and distributors need technical assistance with several aspects of the procurement process.

The reviewed studies use a wide range of methods, and provide useful information, but methodological limitations exist. In particular, few studies use analytic methods that could report on impacts of specific policies or interventions; and among these, there is variation in the level of methodological rigor. The majority of reviewed studies use descriptive or correlational approaches; though informative, these types of methods cannot be used to report on causal impacts. Additional impact studies are needed to better understand the following topics: student attitudes about local foods; how nutrition and garden interventions affect fruit and vegetable consumption; local foods are incorporated into meals and effects on plate waste; best practices in local procurement processes; and how local food purchases affect the economy and the agricultural sector.

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Appendix A: Study Research Questions

This appendix includes the research questions for the three objectives that were a focus of this literature review.

Objective 1: Identify and describe the economic contribution of farm to school and procurement processes across various geographies

- a. How do schools and SFAs define local, or is there no set definition? Which entity defines it for farm to school purposes? How does this vary across SFA size, State, and region?
- b. How much money do SFAs spend on local food?
 - i. Quantify, if possible, how local purchases affect the local economy, if at all.
 - ii. Quantify, where possible, the demand from farm to school practices on local agriculture production (e.g., acreage planted, labor, revenues, crop selection).
- c. How many full- and part-time positions are dedicated to farm to school efforts, if any (State, SFA, school level)? Are the positions funded by a grant (e.g., Farm to School Grant)? Are the funds allocated by the State, SFA, school district, or school (e.g., staffing or line items for farm to school activities)? On what do those positions concentrate (e.g., gardens, local products, nutrition education)?
- d. In what ways does the number of producers and/or distributors used to source local items for NSLP impact overall procurement? Is there a concerted effort to procure local food? If so, at what level is this policy—national, State, SFA, school? Is it related to a broader initiative (e.g., Good Food Purchasing Policy or a statewide purchasing target)?
- e. What goals do SFAs have regarding local purchasing, and have goals been reached?
- f. Are distributors recruited or used by SFAs for their ability to “buy local”? Is this codified in procurement contract language?
- g. Do different SFAs procure from the same distributors? Do SFAs ask distributors for reports that include the volume and/or price of locally sourced products; and if so, how often do they do so?
- h. What are the most common foods purchased locally, by region, in weight, volume, and by cost? How do their costs compare to similar non-local commercially purchased items? How often do SFAs use the geographic preference option to request local items?
- i. What aspects of the local procurement process do SFAs find particularly complex or burdensome, and what aspects are easily accomplished? Have SFAs identified best practices to manage or simplify their local procurement process?
- j. Do SFAs have to establish new supply chains to purchase local items; and if so, what is that process? Do SFAs use forward contracts or other standard contracting vehicles, or do they predominately use micropurchases for local foods?
- k. To what extent has the volume of local sales by SFAs claimed by producers and distributors shifted with farm to school efforts?
- l. To what extent do SFAs have direct relationships with local farmers and producers?

Objective 2: Assess the impacts of farm to school efforts on food growing, serving, and purchasing on schools, districts or SFAs

- a. What is the number of active school (food) gardens in each SFA and state? How are those gardens supported (i.e., grants, fundraising, directly funded by state government)?
- b. How often is garden produce integrated into the school operations (e.g., salad bars, sampling in the cafeteria)?
 - i. What share of school meals include produce from school gardens? What share of school gardens sell or donate their harvest to SFAs for school meals?
 - ii. How have gardens been integrated into the curriculum at various grade levels (e.g., nutrition education, cooking classes, and agricultural coursework)?
- c. How many SFAs and schools have salad bars? What percent of those salad bars using local foods?
- d. Is “local” promoted to students? If yes, how is “local” promoted?
- e. How many schools, students, and staff participate in farm to school nationwide and at what levels (e.g., pre-K, elementary, middle, high school)? Does every student at each school participate in the same capacity, or is it limited to certain groups (i.e., certain grades, classes, garden club)?
- f. What are students’ thoughts, attitudes, and behaviors related to farm to school and school meals that include local foods (satisfaction, before-and-after meal participation rates, produce consumption, willingness to try new things)?
- g. In addition to school gardens, what types of farm to school activities are practiced at the state and SFA levels? Is there state-level policy that incorporates and affects farm to school?
 - i. What is the variance in activities across grade levels, regions, SFA size, urbanicity, and based on the number of students who receive free/reduced-price lunch?
- h. Has school food purchasing changed since farm to school implementation at the SFA level (e.g., in terms of variety, type, locality)? If yes, how has it changed? In what ways have the meal offerings changed? What are the most commonly purchased and most popular (among students) farm to school products, and how are they different from those that are not considered part of the program?
- i. Has the amount of “plate waste” changed as farm to school efforts are implemented at the school or SFA level? If yes, has it increased or decreased?
- j. Have farm to school efforts led to more “scratch cooking” at the SFA level? What preparation, planning, and processes are used by SFAs to incorporate local foods into meals?

Objective 3: Identify and describe how farm to school programs and activities have impacted changes in policy

- a. What are the farm to school trends over time? Where are the gaps in technical assistance and funding for farm to school (i.e., to determine current and future farm to school needs)?
- b. What policies have been instituted since 2010 regarding local food at the state and SFA levels? How many schools or SFAs have included farm to school in the wellness plan or district/school-level policy?
- c. What types of strategies or system changes have been implemented by state agencies (e.g., Department of Education, Agriculture, and Environment) in an effort to roll out farm to school? To what extent have those changes directly impacted farm to school efforts? Are farm to school efforts directly allocated in the state budget?
- d. What percent of schools, SFAs, and states have a farm to school network, task force, or advisory board that promotes or assists with implementing farm to school?
- e. What other funding sources are SFAs using to assist in the cost of its farm to school program (e.g., Team Nutrition Training Grants, FoodCorps, State Health Department funds)? Are Farm to School Grants able to provide the requisite assistance?

Appendix B: Literature Search Parameters

This appendix includes information about the bibliometric databases searched for relevant publications as well as search terms used to identify relevant literature. The databases are listed below and the search terms are included in Exhibit B-1.

Databases Searched

- Academic Search Complete
- AgEcon
- EconLit
- Education Research Complete
- ERIC
- JSTOR
- National Agricultural Library
- National Library of Education
- PsycInfo
- PubMed
- Science Direct 4 Block
- Web of Science
- National Farm to School Network Resources: <http://www.farmtoschool.org/resources>

Exhibit B-1: Search Terms

Block A	"Farm to preschool" OR "farm-to-preschool" OR "farm to school" OR "farm-to-school" OR "farm to institution" OR "farm-to-institution" OR "F2S" OR "F2I" OR "FTS"
AND	
Block B	"alternative food network" OR agricultur* OR "breakfast in the classroom" OR "child and adult care food program" OR "child obesity" OR "community supported agriculture" OR "food hub" OR "food knowledge" OR "food literacy" OR "food self sufficiency" OR "food service program" OR "fresh fruit and vegetable program" OR "fresh prod*" OR "green groc*" OR "green prod*" OR "local econ*" OR "local farm*" OR "local ranch*" OR "locally grown" OR "national school lunch program" OR "organic food" OR "plate waste" OR "food self-sufficiency" OR "national school breakfast and lunch program" OR BIC OR cafeteria OR chef OR cook* OR CSA OR diet OR distributor* OR edible OR family-owned OR FVP OR fishermen OR food* OR foodcorps OR foodservice OR fruit* OR garden* OR green OR harvest OR locavore OR market OR meal* OR milk OR NLP OR NSBLP OR NSLP OR nutrition* OR orchard OR grow*
AND	
Block C	adolescent OR "direct* marketing" OR "health* attitudes" OR "health* knowledge" OR "health* practice" OR "high school" OR "middle school" OR child* OR city OR classroom OR crop OR district OR diversi* OR econom* OR ecotrust OR education OR elementary* OR environment* OR evidence OR formal OR fund* OR geograph* OR grant* OR group OR grow* OR health* OR impact* OR implement* OR informal OR intervention* OR local* OR method* OR mid-sized OR natural OR network OR offer* OR order
AND	
Block D	"advisory board" OR advocate OR alliance OR assessment OR bid* OR board OR amount OR "evaluation framework" OR "head start*" OR "institutional board" OR "intermediate market" OR "local vs. national percentage" OR "repeat* exposure" OR "repeated* exposure" OR activit* OR budget OR bureau OR coach OR competi* OR consumption OR contract* OR cost OR cost-savings OR council OR county OR criter* OR curriculum OR deliv* OR demo OR department* OR document*

Appendix C: Coding Specifications

This appendix includes the detailed specifications provided to staff in coding the abstracts (Exhibit C-1) as well as the full text articles for data source (Exhibit C-2), research design (Exhibit C-3), availability of data collection instruments and data collection frequency (Exhibit C-4), and outcome metrics and sample selection (Exhibit C-5).

Exhibit C-1: Instructions and Criteria for Abstract Decisions

Objective	Look for Answers to the Following Questions	Look for the Following Keywords	
Objective 1: Identify and describe the economic contribution of farm to school and procurement processes across various geographies	• How is “local” defined? • How much money do SFAs spend on local food? • What is the relationship between producers/ distributors and food procurement? • How are distributors recruited? What must distributors report about locally sourced products? Are they contractually obligated to buy local? • What about local procurement do SFAs find burdensome/easily accomplished? • Do SFAs have best practices to manage their local procurement process? • Do SFAs establish new supply chains to buy local? What contracts do they use to buy local? • How has F2S impacted demand of local agriculture? • What are the most common foods purchased locally?	• local • local procurement process • producer • distributor • supply • source • economic impact	• volume • price • supply chain • contract • local economy • agriculture • cost
Objective 2: Assess the impacts of farm to school efforts on food growing, serving, and purchasing on schools, districts or SFAs	• Have gardens, salad bars, and other F2S activities been integrated into schools? • Is “local” promoted to students? • How many schools, students, and staff participate in F2S nationally? • Has F2S affected: • Students’ attitudes and behaviors? • School food purchasing or school meals? • Plate waste? • Scratch cooking? • What are the most popular F2S products among students?	• garden • salad bar • school • student • school meals, school lunch, school food • consumption • child obesity • fruits • vegetables • diet	• health knowledge • health attitudes • health practice • National School Lunch Program • well-being • waste • cafeteria • agriculture • curriculum
Objective 3: Identify and describe how	• What are F2S trends? • Are there gaps in F2S technical assistance/funding?	• trend • policy • technical assistance	• funding • grants • partnership

Objective	Look for Answers to the Following Questions	Look for the Following Keywords	
farm to school programs and activities have impacted changes in policy	• What policies have been instituted since 2010 regarding local food? • What strategies have State agencies implemented to roll out F2S? • How many schools include F2S as policy? • How many schools/states have a F2S network, task force, or advisory board? • What other funding sources are used to supplement F2S?	• task force • network • local food	• board • working group • wellness plan

Exhibit C-2: Guidance on Coding Data Source

“What methods does this publication use (select all that apply)?”		
Response Option	Definition	Example
Primary data collection	Collection of original data for a specific purpose for that study.	Researchers developed and administered surveys to students in schools.
Secondary data collection	Administrative or other existing (“extant”) data already collected by an agency or another researcher for another purpose.	Researchers used data from the 2015 Farm to School Census.
Document review	Systematic review and analysis of existing documents.	Researchers reviewed the text of an SFA’s farm to school project goals.
Interview, focus group	A question/answer or discussion between subject and interviewer. Interviews can be structured, semi-structured, or unstructured. Focus groups are similar to interviews, but take place as a moderated group discussion.	Researchers interviewed farmers and school principals one-on-one, in person. Researchers gathered groups with 10 teachers at once in intervention schools to discuss how they work farm to school topics into their instruction.
Observation	Observation by a researcher in the field.	Researchers sat in on sessions of a school’s gardening class throughout the academic year, taking notes on teacher and student behaviors and attitudes.
Case study	In-depth and detailed analysis of one unit, such as a person, group, event, or organization.	Researchers focus on the experience of one farmer participating in the farm to school program.
Literature review	Review of related published research in a particular topic area.	Researchers summarize 15 research articles describing research on farm to school supply chains.
Meta-analysis	Use of statistical methods to combine/assess results from a set of distinct, existing research.	Researchers combine and report on the results of 10 research articles examining the impact of farm to school on student fruit and vegetable consumption.
Other, specify	N/A	Researchers measure plate waste using photographs taken in the field of students’ lunch plates.

Exhibit C-3: Guidance on Coding Research Design

“What type of design does this publication use (select all that apply)?”		
Response Option	Definition	Example
Randomized Controlled Trial (RCT)	Bottom Line: Look for the words “random”^a A study in which units are assigned randomly to different groups, usually a treatment and control group, although there can be multiple treatment groups (e.g., students assigned to receive intervention for 5 days, 15 days, or 25 days).	Researchers randomly assign 50 students to an after-school gardening club and 50 students to a sports club.
Quasi-Experimental Design (QED) or Relational/Correlational^b	Bottom Line: If statistics are employed but the study is not an RCT, it likely falls in this category. A study in which there is a comparison group, but units are not randomly assigned. Studies may perform analyses such as regression, ANOVA, ANCOVA or t-tests. Studies may also discuss differences in means for outcomes across two groups. Studies to include in this category may also correlate two variables without explicitly making a comparison. For example, a study may report the correlation between a school's participation in a F2S program with the school's amount of food waste.	Researchers compare students who volunteered to visit a local farm on weekends to those who didn't. In this case, there is a treatment and comparison group, but they were not formed at random but rather by self-selection. Researchers examine the fruit and vegetable intake of one group of students before and after participating in an intervention (one group, pre-post-test). Researchers measure the relationship between the demographics of a school district and its probability of participating in a farm to school program.
Descriptive	Bottom Line: Numbers, but no statistical models. Do not measure the effect of a variable, just describe it. Analyses may include a graph of trends over time, or a table of means, sums, percentages, or counts.	Researchers provide the number of schools and students participating in farm to school programs in Massachusetts.
Other, specify	N/A	
Not applicable	Select this option if the study is, for example, a literature review that did not conduct any analyses.	

^a This guidance was given because coders varied in their methodological backgrounds. The word *random* could also appear in research that used random selection but not random assignment. Following initial coding, a different member of the study team with a quantitative background re-reviewed the publications coded as RCTs to ensure that they were correctly categorized.

^b Recall that QEDs and relational/correlational research was initially coded as one category, again to accommodate that coders varied in their methodological backgrounds. Following initial coding, a different member of the study team with a quantitative background re-reviewed these publications and placed QEDs into their own category.

Exhibit C-4: Guidance on Coding Data Collection

“Does the study include their data collection instruments in the study (e.g., in the appendix)?”		
Response Option	Definition	Example
Yes	Select this option if the study includes the surveys they administered, interview protocols, or other measurement instruments. Don't select this option if authors only provide one or two examples of survey questions in the text of their study.	Researchers include their study survey in the study appendix.
No	Select this option if the study does not include any instruments.	Researchers mention they administered a study, and may mention the scales included in that study, but do not include the full instrument in the study.
Not applicable	Select this option if the study is, for example, a literature review that did not conduct any analyses.	
“How frequently did the study collect data included in analyses?”		
Please provide a numeric response	For example, if the study was a pre and post test of students' attitudes towards vegetables, you'd write 2. If the study examined Farm to School Census data from 2005, 2006, and 2007, you'd write 3. If not applicable, leave blank.	

Exhibit C-5: Guidance on Coding Outcomes Metrics and Sample Selection

“What metrics are used to measure outcomes (e.g., study health knowledge; height/weight; pictures of students' plates)?”	
You do not need to list every outcome the study examined. We just want a general sense of how the main outcomes were measured. If not applicable, leave blank.	
“Does the publication include information about how study participants were selected for inclusion in the study (e.g., random sample of students)?”	
Yes	Select “Yes” if the study says anything like, “All food distributors in Michigan were included in the survey,” or “A random sample of students in Vermont participating in farm to school programs were administered a survey.”
No	Select “No” if there were no study participants (e.g., the study examines farm to school laws between 2015 and 2016) or the study includes participants but doesn't specify how they were selected for inclusion in the study.

Appendix D: Data Sources and Research Designs, by Publication

This appendix includes information about the data sources, research design, availability of data collection instruments, availability of information about participant recruitment, and frequency of data collections for each publication cited in this review. Legislative documents are not included in this table.

Publication	Data Source											Research Design						Instrument(s) Included	Info about Participant Recruitment	Frequency of Data Collection
	Primary Data	Secondary Data (Administrative)	Farm to School Census Data	Document Review	Interview/Focus Group	Observation	Case Study	Literature Review	Meta-Analysis	Other	N/A	RCT	QED	Relational/Correlational	Descriptive	Other	N/A			
³ Arnett (2013)	•														•				•	1
⁴ Askelson et al. (2015)	•				•										•				•	1
⁵ Bateman, Engel, & Meinen (2014)	•				•										•				•	1
⁶ Becot et al. (2017)		•	•					•							•					
⁷ Belansky et al. (2010)	•				•							•							•	3
⁸ Benson (2014)	•														•				•	1
⁹ Berezowitz, Bontrager Yoder, & Schoeller (2015)*								•									•			
¹⁰ Berkenkamp (2014)					•					•					•					2
¹¹ Berlin et al. (2010)		•						•									•			
¹² Berlin et al. (2013)*								•									•			
¹³ Bevan, Vitale, & Wengreen (2012)	•														•				•	1
¹⁴ Bontrager Yoder et al. (2014)	•					•				•				•					•	2
¹⁵ Bontrager Yoder & Schoeller (2014)	•									•			•						•	1

Publication	Data Source											Research Design						Instrument(s) Included	Info about Participant Recruitment	Frequency of Data Collection
	Primary Data	Secondary Data (Administrative)	Farm to School Census Data	Document Review	Interview/Focus Group	Observation	Case Study	Literature Review	Meta-Analysis	Other	N/A	RCT	QED	Relational/Correlational	Descriptive	Other	N/A			
¹⁶ Bontrager Yoder, Foecke & Schoeller (2015)										•				•					•	
¹⁷ Botkins and Roe (2018)		•	•												•					1
¹⁸ Bristow et al. (2017)	•		•											•	•				•	1
¹⁹ Buckley et al. (2013)					•										•				•	1
²⁰ Carbone et al. (2016)			•		•	•								•					•	4
²¹ Carpio, Zapata, & Boonsaeng (2010)		•													•					
²² Centers for Disease Control and Prevention; Bridging the Gap Research Program (2014)		•		•				•							•					1
²³ Christensen, Jablonski & O'Hara (2017)		•	•							•				•	•					
²⁴ Christensen et al. (2017)	•	•					•							•	•			•	•	1
²⁵ Cirignano et. al (2012)	•														•					1
²⁶ Colasanti, Matts & Hamm (2012)	•	•												•					•	2
²⁷ Colorado Farm to School Task Force (2013)						•				•					•					
²⁸ Colorado Farm to School Task Force (2015)	•		•		•	•									•			•		
²⁹ Colorado Farm to School Task Force (2017)	•		•		•	•									•			•		
³⁰ Conell et al. (2015)			•	•		•	•								•					
³¹ Conner et al. (2011)								•	•								•			

Publication	Data Source											Research Design						Instrument(s) Included	Info about Participant Recruitment	Frequency of Data Collection
	Primary Data	Secondary Data (Administrative)	Farm to School Census Data	Document Review	Interview/Focus Group	Observation	Case Study	Literature Review	Meta-Analysis	Other	N/A	RCT	QED	Relational/Correlational	Descriptive	Other	N/A			
³² Conner et al. (2012)	•													•					•	1
³³ Conner, Estrin, & Becot (2014)		•													•					1
³⁴ Conner et al. (2010)		•			•										•				•	1
³⁵ Conner et al. (2014)					•			•								•			•	
³⁶ Conner et al. (2016)					•										•				•	1
³⁷ Crawford-Garrett (2015)	•		•		•			•							•				•	1
³⁸ Cureton (2015)	•														•				•	1
³⁹ Cureton (2016)	•		•												•				•	1
⁴⁰ Davis et al. (2011)	•											•							•	2
⁴¹ Dimitri, Hanson & Oberholtzer (2012)	•				•										•				•	1
⁴² District of Columbia Office of the State Superintendent of Education (2014)	•	•													•					
⁴³ Durairaj & Cureton (2017)	•		•												•				•	1
⁴⁴ Ellsworth, Ernst, & Snelling (2015)	•													•				•	•	2
⁴⁵ Evans et al. (2012)	•				•								•						•	1
⁴⁶ Evans et al. (2016)	•		•									•							•	1

Publication	Data Source											Research Design						Instrument(s) Included	Info about Participant Recruitment	Frequency of Data Collection
	Primary Data	Secondary Data (Administrative)	Farm to School Census Data	Document Review	Interview/Focus Group	Observation	Case Study	Literature Review	Meta-Analysis	Other	N/A	RCT	QED	Relational/Correlational	Descriptive	Other	N/A			
⁴⁷ Farm to Institution New England (FINE) (2016b) - Massachusetts	•		•		•										•					1
⁴⁸ Farm to Institution New England (FINE) (2016a) - Maine	•		•		•										•					1
⁴⁹ Farm to Institution New England (FINE) (2016d) – Vermont	•		•		•										•					1
⁵⁰ Farm to Institution New England (FINE) (2016c) – New Hampshire		•	•												•					
⁵¹ Farm to Institution New England (FINE) (2017)	•		•												•				•	1
⁵³ Feenstra et al. (2017)		•	•	•											•					
⁵² Feenstra & Ohmart (2010)	•	•			•										•					1
⁵⁴ Figlio & Winicki (2005)		•		•										•						
⁵⁵ Fitch & Santo (2016)				•	•			•							•					
School Nutrition and Meal Cost Study (2019) ⁵⁶ Vol. 1. Foresstal et al. ⁶² Vol. 2. Gearan et al. ⁸⁴ Vol. 4. Fox et al.	•	•				•										•			•	
⁵⁷ Gardner Burt (2016)								•									•			
⁵⁸ Gardner Burt, Koch, & Contento (2017b)	•				•										•				•	2
⁵⁹ Gardner Burt, Koch, & Contento (2017a)	•														•					1

Publication	Data Source											Research Design						Instrument(s) Included	Info about Participant Recruitment	Frequency of Data Collection
	Primary Data	Secondary Data (Administrative)	Farm to School Census Data	Document Review	Interview/Focus Group	Observation	Case Study	Literature Review	Meta-Analysis	Other	N/A	RCT	QED	Relational/Correlational	Descriptive	Other	N/A			
⁶⁰ Gardner Burt, Burgermaster, & Jacquez (2018)	•													•						1
⁶¹ Gardner Burt et al. (2019)	•													•						1
⁶³ Gibson et al. (2014)	•				•	•									•				•	2
⁶⁴ Godfrey (2010)					•											•				
⁶⁵ Greer et al. (2018)					•									•	•			•		1
⁶⁶ Griffin (2013)				•						•						•				
⁶⁷ Gunter & Thilmany (2012)		•	•													•				
⁶⁸ Ha-Ngoc (2016)	•	•												•					•	1
⁶⁹ Harper et al. (2017)	•									•					•					
⁷⁰ Hazzard et al. (2011)					•										•				•	1
⁷¹ Heiss et al. (2015)					•										•				•	1
⁷² Henderson et al. (2011)		•			•			•							•	•				
⁷³ Hoffman et al. (2017)			•					•							•					
⁷⁴ Institute for Agriculture and Trade Policy with the Minnesota School Nutrition Association (2012)	•														•			•	•	1
⁷⁵ Izumi, Alaimo, & Hamm (2010)	•				•											•			•	1
⁷⁶ Izumi, Wright, & Hamm (2010a)	•				•			•							•				•	2

Publication	Data Source											Research Design						Instrument(s) Included	Info about Participant Recruitment	Frequency of Data Collection
	Primary Data	Secondary Data (Administrative)	Farm to School Census Data	Document Review	Interview/Focus Group	Observation	Case Study	Literature Review	Meta-Analysis	Other	N/A	RCT	QED	Relational/Correlational	Descriptive	Other	N/A			
⁷⁷ Izumi, Wright, & Hamm (2010b)							•	•									•			
⁷⁸ Janssen (2014)							•								•					1
⁷⁹ Jones et al. (2015)	•				•	•							•						•	
⁸⁰ Joshi et al. (2014)				•				•		•						•				
⁸¹ Kane et al. (2011)	•				•		•								•				•	1
⁸² Kang (2015)	•	•			•	•									•			•		
⁸³ Kang (2016)	•	•								•					•					
⁸⁵ Klemmer, Waliczek, & Zajicek (2005)	•												•						•	1
⁸⁶ Koch et al. (2017)	•	•				•				•			•					•	•	1-2*
⁸⁷ Kohala Center (2015)	•				•		•								•					1
⁸⁸ Kraak , Story & Wartella (2012)								•	•											
⁸⁹ Kropp et al. (2017)	•												•				•		•	2
⁹⁰ Landry et al. (2015)	•							•						•	•					1
⁹¹ Langellotto & Gupta (2012)									•								•		•	
⁹² Laurie et al. (2014)	•														•			•		2
⁹³ Lawrence & Liquori (2012)							•										•			
⁹⁴ Lee et al. (2019)	•				•										•					1

Publication	Data Source											Research Design						Instrument(s) Included	Info about Participant Recruitment	Frequency of Data Collection
	Primary Data	Secondary Data (Administrative)	Farm to School Census Data	Document Review	Interview/Focus Group	Observation	Case Study	Literature Review	Meta-Analysis	Other	N/A	RCT	QED	Relational/Correlational	Descriptive	Other	N/A			
⁹⁵ Lehnerd et al. (2018)	•														•					
⁹⁶ Leyda (2011)				•											•					
⁹⁷ Low et al. (2015)		•													•					
⁹⁸ Magarik (2014)	•														•				•	1
⁹⁹ Malama Kaua'i (2016)						•	•								•					
¹⁰⁰ Marshall et al. (2012)		•			•										•					3
¹⁰¹ Massachusetts Department of Public Health (2012)											•						•			
¹⁰² Mattfeldt-Beman, Jenkins & Kline (2012)							•								•				•	
¹⁰³ Matts et al. (2015)	•		•					•						•	•				•	1
¹⁰⁴ Matts, Harper, & Smalley (2016)	•														•					
¹⁰⁵ Meinen et al. (2012)	•											•							•	2
¹⁰⁶ Minneapolis Public Schools Culinary and Nutrition Services; Youth Farm (2015)	•														•					1
¹⁰⁷ Moreno-Black & Stockard (2018)										•				•					•	2
¹⁰⁸ Moss et al. (2013)	•													•					•	2
¹⁰⁹ Motta & Sharma (2016)	•				•			•							•				•	1
¹¹⁰ Muckian, Snethen, & Buseh (2017)	•				•										•				•	1

Publication	Data Source											Research Design						Instrument(s) Included	Info about Participant Recruitment	Frequency of Data Collection
	Primary Data	Secondary Data (Administrative)	Farm to School Census Data	Document Review	Interview/Focus Group	Observation	Case Study	Literature Review	Meta-Analysis	Other	N/A	RCT	QED	Relational/Correlational	Descriptive	Other	N/A			
¹¹¹ Namenek Brouwer & Benjamin Neelon (2013)	•											•								2
¹¹³ National Farm to School Network (2017a)*		•	•					•							•					
¹¹² National Farm to School Network (2017b)			•	•			•	•									•			
¹¹⁴ National Farm to School Network (2019)										•					•					
¹¹⁵ Neff, Merrigan, & Wallinga (2015)*			•					•									•			
¹¹⁶ Nowak et al. (2012)						•									•					
¹¹⁷ O'Hara & Pirog (2013)								•									•			
¹¹⁸ O'Hara & Benson (2017)		•	•					•						•					•	1
¹¹⁹ O'Hara and McClenachan (2019)		•	•											•						1
¹²⁰ Oberholtzer et al. (2012)	•				•									•	•				•	1
¹²¹ Office of the State Superintendent of Education (2012)										•					•					
¹²² Office of the State Superintendent of Education (2013)	•	•													•					
¹²³ Ohri-Vachaspati et al. (2016)		•											•						•	7
¹²⁴ Osowski & Nettles (2013)	•				•										•				•	2
¹²⁵ Owen, Rosch, & Smith (2011)*								•									•			
¹²⁶ Palakshappa et al. (2016)	•	•											•						•	1
¹²⁷ Pinard et al. (2013)	•														•				•	2

Publication	Data Source											Research Design						Instrument(s) Included	Info about Participant Recruitment	Frequency of Data Collection
	Primary Data	Secondary Data (Administrative)	Farm to School Census Data	Document Review	Interview/Focus Group	Observation	Case Study	Literature Review	Meta-Analysis	Other	N/A	RCT	QED	Relational/Correlational	Descriptive	Other	N/A			
¹²⁸ Prescott et al. (2019)*								•									•			
¹²⁹ Qu, Fischer, & Rumble (2019)	•				•										•				•	1
¹³⁰ Ralston & Benson (2015)	•		•												•					1
¹³¹ Ralston et al. (2017)		•	•					•						•						1
¹³² Ratcliffe et al. (2011)	•												•							2
¹³³ Ray, Fisher & Fisher-Maltese (2016)											•						•			
¹³⁴ Richardson (2011)											•						•			
¹³⁵ Robb (2012)			•		•					•					•			•	•	
¹³⁶ Robinson & Lewis (2014)	•						•								•					
¹³⁷ Roche & Kolodinsky (2011)					•										•				•	1
¹³⁸ Roche, Conner, & Kolodinsky (2015)									•								•	•	•	2
¹³⁹ Roche et al. (2016)		•	•												•					
¹⁴⁰ Roche et al. (2017)	•												•							2
¹⁴¹ Rosenberg et al. (2014)	•														•				•	1
¹⁴² Rosenthal & Berkenkamp (2015)		•			•		•								•					
¹⁴³ Rushing (2014)					•	•		•								•		•	•	1
¹⁴⁴ Sacheck et al. (2012)							•								•				•	

Publication	Data Source											Research Design						Instrument(s) Included	Info about Participant Recruitment	Frequency of Data Collection
	Primary Data	Secondary Data (Administrative)	Farm to School Census Data	Document Review	Interview/Focus Group	Observation	Case Study	Literature Review	Meta-Analysis	Other	N/A	RCT	QED	Relational/Correlational	Descriptive	Other	N/A			
¹⁴⁵ Savoie-Roskos, Wengreen & Durward (2017)								•									•			
¹⁴⁶ Schafft, Hinrichs, & Bloom (2010)	•			•	•	•	•								•				•	1
¹⁴⁷ Scherr et al. (2013)	•						•	•							•					1
¹⁴⁸ Schneider et al. (2012)	•							•					•						•	
¹⁴⁹ Sevoian & Connor (2012)					•										•					
¹⁵⁰ Sharma et al. (2015)	•				•		•							•						1
¹⁵¹ Sitaker et al. (2014)								•									•			
¹⁵² Smith, C. et al. (2012)	•					•									•					2
¹⁵³ Smith, L. & Mostenbocker (2005)	•												•						•	2
¹⁵⁴ Smith, S. et al. (2013)	•													•					•	1
¹⁵⁵ Srinivasan (2012)							•										•			
¹⁵⁶ Stephens & Oberholtzer (2016)	•		•		•										•					1
¹⁵⁷ Stephens & Oberholtzer (2020, available online 2018)	•													•					•	1
¹⁵⁸ Taylor, C. et al. (2017)	•														•				•	1
¹⁵⁹ Taylor, J. C. & Johnson (2013)								•									•		•	
¹⁶⁰ Thompson, J.J., Brawner, & Kaila (2017)					•		•								•				•	
¹⁶¹ Thompson, J.J. & Narciso (2017)	•	•	•		•										•			•	•	1

Publication	Data Source											Research Design						Instrument(s) Included	Info about Participant Recruitment	Frequency of Data Collection
	Primary Data	Secondary Data (Administrative)	Farm to School Census Data	Document Review	Interview/Focus Group	Observation	Case Study	Literature Review	Meta-Analysis	Other	N/A	RCT	QED	Relational/Correlational	Descriptive	Other	N/A			
¹⁶² Thompson, M. & Matts (2015)	•													•					•	4+
¹⁶³ Thompson, O.M. et al. (2014)	•				•										•				•	1
¹⁶⁴ Thornburg (2014)	•				•		•								•				•	1
¹⁶⁵ Turner & Chaloupka (2012)		•													•				•	2
¹⁶⁶ Turner et al. (2016)	•	•	•											•	•				•	2
¹⁶⁷ Turner et al. (2017)	•	•												•						1
¹⁶⁸ Vo & Holcomb (2011)*		•						•	•				•						•	1
¹⁶⁹ Wells et al. (2018)	•											•							•	2

* Publication includes several studies whose research design, data source, and other information have not been coded.

Appendix E: Distributor Interview Summary

The United States Department of Agriculture (USDA) Food and Nutrition Service (FNS) contracted with Abt Associates (Abt) for a comprehensive research project that includes a literature review, a review of the Farm to School Grant Program, and the 2019 Farm to School Census. As a part of this larger project, the study team interviewed school food distributors to capture their experiences and perspectives in order to inform the larger study.

The study team designed the distributor interviews to be exploratory in nature to determine whether a larger, national survey of food distributors would be worthwhile. Though the small sample size (21 distributors) is not representative of the full population, these interviews indicate the breadth and depth of the information that distributors have access to and are willing to share. Additionally, these interviews provide useful context about distributors' experiences with farm to school efforts and effects on their company's marketing, business, and operations.

Report Organization

Between April and June 2019, the study team conducted interviews with 21 distributors about the following topics:

- Characteristics of food distribution companies
- Distributors' and/or their customers' definitions of "local"
- Types of local food requests and contracts with school customers
- The process for establishing supply chains and the most frequently requested foods
- How local food distribution has changed over time, and the effects of farm to school efforts
- Reports distributors provide to school customers
- Additional recommendations and challenges that still need to be addressed.

This summary is organized according to these topics following the discussion of the study team's recruitment and interview methods.

Key Interview Findings

- **Definitions of "local" vary.** Distributors define "local" in a variety of ways, but most use a 250- to 400-mile radius or State/regional boundaries.
- **Informal communications are common.** Schools mostly communicate their requests for local foods through telephone or email.
- **There are barriers to providing local food.** The seasonality of local foods, cost, and food safety concerns can be barriers to providing the local foods that schools request. Also, whole produce can be challenging for school staff to prepare.
- **Companies that provide local food may have a competitive advantage.** Most distributors agreed that their company's ability to provide local foods likely gives them a competitive advantage.
- **The local market is growing.** Most distributors reported that the number of local producers they work with and their company's local sales to schools have increased over the past 10 years.

Recruitment and Interview Methods

Recruitment Methods

Interviews were conducted with a convenience sample of 21 school food distributors. The study team arrived at this sample by reaching out to 32 distributors across the country from a list compiled by FNS staff, and for whom we were able to find contact information. The target sample size was 20 interviews. In spring 2019, the team contacted each of the distributors on the list to request their participation via telephone and email. After several attempts were made to contact each distributor, the study team recruited additional distributors beyond the initial list in order to reach the target number of participants.^{xx} Ultimately, representatives from a variety of 21 small, medium, and large companies agreed to be interviewed. These respondents included 17 from the original list plus four from the additional distributors contacted. Respondents were told that individual distributors would not be identified and data would only be presented in aggregate or broken down by region, size, or distributor type. The study team completed interviews with respondents from in a variety of positions, including President, Vice President of Food, Owner, Registered Dietician, Buyer, Sales Coordinator, and Farm to School Lead. At least one respondent from each FNS Region participated in the interviews (Exhibit E-1).

Exhibit E-1. Representatives interviewed from each FNS Region

FNS Region	States and Territories	Number of Distributors Interviewed in Region ^a
Mid-Atlantic	Delaware, District of Columbia, Maryland, New Jersey, Pennsylvania, Puerto Rico, Virginia, West Virginia, U.S. Virgin Islands	2
Midwest	Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin	4
Mountain Plains	Colorado, Kansas, Iowa, Missouri, Montana, Nebraska, North Dakota, South Dakota, Utah, Wyoming	3
Northeast	Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, Vermont	1
Southeast	Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee	2
Southwest	Arkansas, Louisiana, New Mexico, Oklahoma, Texas	1
West	Alaska, Arizona, California, Hawaii, Idaho, Nevada, Oregon, Washington, American Samoa, Commonwealth of the Northern Mariana Islands, Guam	8

Note: In fiscal year 2020, the FNS Regions were reorganized. The updated States and Territories in each region can be found at: <https://www.fns.usda.gov/fns-regional-offices>.

^a While some distributors interviewed represented national organizations, the region reflects the location of the representative who was interviewed.

Interview and Analysis Methods

The study team developed an interview protocol to cover all the topics of interest to FNS. This protocol was pilot tested with three distributors and refined ahead of recruitment (see Appendix F for the final

xx While distributors were often difficult to reach, most agreed to participate when we were able to reach them by telephone.

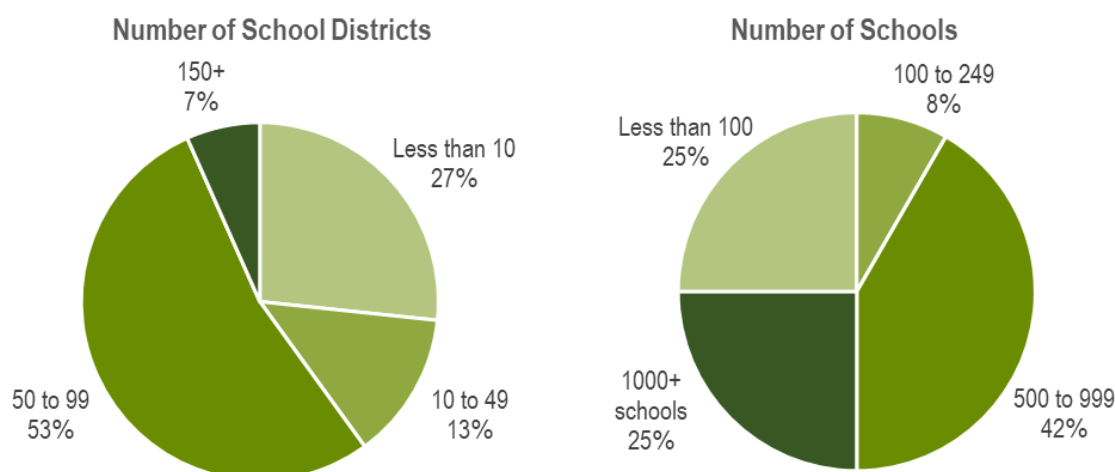
protocol). The protocol provided structure to the interviews; however, the team occasionally had to modify or omit questions to facilitate productive conversations and accommodate respondent needs. For example, questions may have been omitted in cases where distributors had limited time to participate in the interviews. Additionally, given the range of job roles of the respondents, some were not able to answer all questions, and some distributors did not share sales information, which they may have considered confidential. As a result, not all interviews touched on every question. The interviews were recorded and transcribed, and the transcriptions were reviewed for accuracy by the study team.

All interview transcripts were de-identified and coded in NVivo 12, a qualitative data analysis software program. The study team developed a preliminary set of codes that aligned to each interview question. NVivo's automatic coding feature was used for the initial coding of the interview transcripts by question. This coding was reviewed and revised for accuracy and an inductive coding process was then used, in which new codes were created and refined as themes emerged. The coders were in regular communication with the interviewers to discuss findings and themes.

Characteristics of Interviewed Distributors

The distributors interviewed varied in many ways, including in their company's size, their customers, and the reach of their distribution network. Among the 15 distributors who were able to identify the number of school districts their company worked with, they reported working with between two and 250 school districts, with an average of 58 districts and a median of 50 districts.^{xxi} Twelve distributors were able to provide the number of individual schools they work with, which ranged from 59 to 1,750 schools, with an average of 626 schools and a median of 525 schools (Exhibit E-2).

Exhibit E-2. Distributors varied in their number of customers, but most worked with at least 50 school districts and 500 or more schools



Note: Number of distributors reporting: school districts $n = 15$; schools $n = 12$. No distributors reported working with 100–149 school districts or 250–499 schools. Interview question: "Please estimate the total number of school districts with whom you work. Within these districts, about how many schools does this represent?"

xxi As a part of the interview protocol, the study team instructed interviewees to use the terms *school district* and *school food authority (SFA)* interchangeably, based on their preferences and familiarity. The terms used in this report generally reflect the language used by the respondents.

Fifteen of the 20 distributors were able to estimate their mix of urban, suburban, and rural customers;^{xxii} of those, nine reported working with customers in all three settings (Exhibit E-3). Of these 15 distributors, 13 distributors reported working with urban school districts, 11 with suburban school districts, and 13 with rural school districts.

Exhibit E-3. Distributors worked with schools in urban, suburban, and rural areas

FNS Region	Distributor ^a	% of Urban Schools	% of Suburban Schools	% of Rural Schools
Mid-Atlantic	MA-SM-PR-1	52%	0%	48%
Mountain Plains	MP-MD-PR-1	0%	75%	25%
	MP-MD-PR-2	25%	0%	75%
	MP-MD-PR-3	90%	5%	5%
Midwest	MW-LG-BL-1	22%	0%	78%
	MW-SM-PR-1	25%	25%	50%
	MW-XX-BL-1	33%	33%	33%
Southeast	SE-MD-PR-1	30%	30%	40%
Southwest	SW-MD-PR-1	40%	40%	20%
Western	W-MD-PR-1	65%	20%	15%
	W-SM-PR-1	100%	0%	0%
	W-SM-PR-2	40%	20%	40%
	W-SM-PR-3	30%	20%	50%
	W-SM-PR-4	33%	33%	33%
	W-SM-PR-5	0%	100%	0%

Note: n = 15; six distributors were unable to describe how their customers fit into these groups. Interview question: "For these schools, do you have an estimate of how many of these are urban, suburban and rural?"

^a The distributor identifiers reflect organizational characteristics. The first two letters in the identifier reflects the FNS Region where they are based. The second set of letters reflects the relative size of the distributor in terms of their total yearly sales (SM is \$50 million or less, MD is between \$50 million and \$150 million, LG is \$300 million or more, and XX is not reported). The third set of letters in the identifier represents the type of company (BL is broadline and PR is produce).

Fifteen distributors identified the States where their school district customers were located. Seven reported supplying to customers in only one State, three in two States, two in five States, two in six States, and one in 49 States.

xxii Generally, distributors were uncertain about the mix of urban, suburban, and rural customers, and several distributors who responded to this question indicated that they were guessing.

Distributors source local inventory from a wide range of producers, including farmers, ranchers, and fishers (Exhibit E-4). Some also reported sourcing from producer cooperatives, which were typically owned by groups of farmers who share responsibilities and split profits. Distributor interviewees estimated the number of producers they work with for local school food distribution. Of the 17 distributors able to describe which suppliers were local, 16 reported working with farmers to source local foods, potentially in addition to other suppliers, and 13 of these reported working exclusively with farmers.

Exhibit E-4. Distributors primarily worked with farmers only, with one distributor working with fishers only, to source local food



Note: n = 17. Interview question: “How many are local individual producers, farmers, ranchers or fishers? How many are local producer cooperatives, including farmer, rancher, or fisher cooperatives?”

The number of farmers providing products to distributors ranged from five to 118 per distributor, with an average of 50 farmers. Exhibit E-5 shows the number and type of producers each of the 17 distributors used to source products. Two distributors sourced inventory directly from fishers—one was a seafood distributor with approximately 100 fishers providing products to its inventory; the other sourced from a single fisher, in addition to farmers, ranchers, and cooperatives. Two distributors sourced inventory from ranchers—one reported working with two ranchers and the other reported working with 15 ranchers, although both supplemented their inventory with items from other producers.

Exhibit E-5. Distributors generally sourced products from a large number of producers

Number of Producers	Number of Distributors Working with Each Producer Type			
	Farmers	Ranchers	Fishers	Producer Cooperative
1 to 25	6	2	1	2
26 to 50	3	0	0	0
51 to 75	2	0	0	0
76 to 100	4	0	1	0
100+	1	0	0	0

Note: n = 17. Interview question: “How many are local individual producers, farmers, ranchers or fishers? How many are local producer cooperatives, including farmer, rancher, or fisher cooperatives?”

The study team also asked distributors whether they sourced their foods from cooperatives or food hubs. Of the eight distributors who discussed their work with producer cooperatives, four reported working with a producer cooperative or broker, which allows groups of farmers, ranchers, or fishers to work under one Good Agricultural Practices (GAP) certification, likely via GroupGAP.^{xxiii} Three distributors reported they do not work with producer cooperatives. Only one distributor reported selling food to cooperatives, rather than vice versa.

Food hubs manage aggregation, distribution, and marketing services for multiple farmers and ranchers that may lack the resources needed to access them individually.^{xxiv} Of the seven distributors who responded to the question about whether their company sources from food hubs, one reported that it sells to food hubs, and another reported that the company they worked for was a food hub. The others noted that they did not work with food hubs.

In order to estimate the size of the distributors, respondents were asked to share their company's total sales for the year and the percentage that came from school and local sales. Sixteen reported on their sales, which ranged from \$250,000 to \$1 billion. Six of these distributors had less than \$50 million in sales, seven had between \$50 million and \$150 million, and three had more than \$300 million in sales.

Most distributors (17 out of 21) were able to provide the percentage of their company's total sales for the year that reflected its business with school districts.^{xxv} The majority of distributors (11) reported less than 20 percent of their total sales were to school districts, five distributors reported that between 20 percent and 40 percent of sales were to school districts, and one distributor reported that 80 percent of sales were to school districts.

Fewer distributors (14) were able to provide information about the percentage of their company's school sales that represents local foods. Five reported less than 10 percent of their school sales were local, six reported between 15 percent and 50 percent of school sales were local, and three reported all school sales were local.

xxiii GAP is a USDA audit program through which producers can demonstrate their compliance with food safety requirements to purchasers and retailers. More information about GroupGap can be found at: <https://www.ams.usda.gov/sites/default/files/media/Fact%20Sheet%20-%20GroupGAP%20for%20Growers.pdf>

xxiv More information on food hubs can be found at: <https://www.ams.usda.gov/local-food-directories/foodhubs>

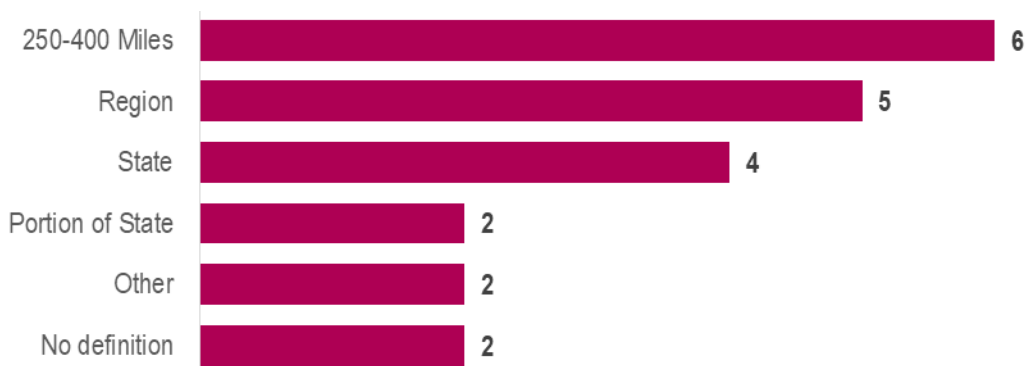
xxv The sample specifically sought out distributors that worked with schools and school districts.

Definitions of “Local”

As FNS has no formally codified definition of “local” for foods, distributors were asked about how they defined “local,” particularly when working with school districts. Throughout the interviews, distributors used their own individual definition of “local” when the term was discussed. Of the 21 respondents, two did not provide a definition of “local.” A distributor located in the Southeast region reported that it did not specifically supply local foods to schools, and therefore had no definition, and a distributor in the Northeast reported that it was not feasible to have a consistent definition of “local” for all foods.

Six distributors from four regions referred to a 250- to 400-mile radius (either around the company or their school customers) to define “local” (Exhibit E-6). Five distributors from four regions applied a regional definition, usually encompassing a few bordering States. Four defined “local” as within their State’s boundaries. Two of the distributors located in the Western region employed tighter boundaries, including only neighboring counties within their State.

Exhibit E-6. Most distributors defined “local” using a 250- to 400-mile radius or State/regional boundaries



Note: $N = 21$. Interview question: “In terms of boundaries, how is “local” defined for procuring and marketing local food products and producers?”

In some cases, distributors may shift their definition of local based on individual district preferences. For example, one distributor indicated that the company’s school customers prefer to use State boundaries, which the company accommodates. Another distributor shifted the definition based on the individual needs of the company’s customers (i.e., various school customers working with this distributor requested to receive products ranging from a radius around their school (50, 100, 200, or 400 miles) or from within State boundaries).

All but one of the 21 distributors confirmed their company provides local food to schools in some capacity. Distributors reported that school districts request local foods through various types of contracts and solicitations, as described in the next section. One distributor reported it does not provide local foods to schools because almost all of the school districts in its State participate in one procurement bid, with no efforts to specifically procure locally sourced foods for the participating districts. Given the statewide bid, schools did not communicate directly with the distributor, and therefore did not have the opportunity to convey preferences for local.

Requests for Local Foods and Contracts with School Customers

Frequency of Requests

Eighteen distributors described the frequency and types of requests for local items their company received from school districts. The frequency of requests varied from weekly to yearly. Eight distributors reported that requests for local food were received at least biweekly, and one distributor reported getting monthly requests. Four distributors noted a seasonal shift, relating that many school food directors request local foods more frequently in the early fall and spring when a greater variety is available. One distributor reported getting requests only once a year as part of the bids. Three distributors reported they did not usually receive requests for local foods, as geographic preferences were not specified in the procurement language.

"It's usually just when school comes back in session in the fall...is about that time of year...and it's one of those things where it's just a back and forth communication between them and our customer service representatives. I would say the planning is a growing trend, but currently the majority of it is just a seasonality ordering."

Types of Solicitations

The individuals interviewed from the sampled distributors found it difficult to distinguish between formal and informal procurement.^{xxvi} They generally focused on sales rather than purchasing and were recruited to participate in these interviews because of their relationships with SFAs. Their accounting/purchasing colleagues may have been better positioned to answer questions regarding solicitations. Many respondents spoke about informal purchasing of local foods (e.g., using weekly emails or telephone calls with SFA clients).

Distributors reported that they used a mix of formal contracts and informal communications with schools; however, informal communications were common when talking about local foods with schools. Ten distributors reported using informal procurement, like micro-purchases. Seven distributors said their main solicitation types are Request for Proposals (RFPs) or Invitation for Bids (IFBs). Six distributors used a fixed-price contract in their work with schools. The distributors did not refer to any other types of contracts, such as cost-plus or forward contracts.

Thirteen distributors reported they receive requests for local items through telephone calls, emails, or conversations with the company's sales representatives. Two distributors reported that requests for local food came through formal procurement channels, such as a specification in a RFP.

USDA Fresh Fruit and Vegetable Programs

Six distributors reported that schools they worked with participated in other school meals programs.^{xxvii} Three distributors indicated that the Fresh Fruit and Vegetable Program (FFVP) helped schools purchase additional fresh produce and allowed them to offer new types of produce for students to try; two

xxvi For more information about procuring foods for FNS Child Nutrition programs, including the differences between formal and informal procurement, see https://fns-prod.azureedge.net/sites/default/files/f2s/F2S_Procuring_Local_Foods_Child_Nutrition_Prog_Guide.pdf.

xxvii Distributors were not always clear whether they were referring to the USDA Fresh Fruit and Vegetable Program, which provides free fresh fruits and vegetables to children at eligible elementary schools, or the USDA Department of Defense Fresh Fruit and Vegetable Program, which allows schools to use their entitlement dollars to buy fresh produce.

distributors said that schools often purchased directly through the USDA Department of Defense Fresh Fruit and Vegetable Program (USDA DoD Fresh); and one distributor indicated that they provided a discount to schools on their produce because they were competing against a distributor who was the USDA DoD Fresh contract holder and could offer produce at a lower price to schools.

Typically Requested Local Foods

Fifteen distributors reported their school customers requested produce, including apples, zucchini/squash, leafy green vegetables, carrots, stone fruits, and tomatoes. Three distributors provided seafood, poultry, or meat to schools, and three provided dairy products such as milk or yogurt.

Five distributors added that schools requested processed or pre-cut foods (e.g., cleaned and chopped lettuce). Four distributors reported processing food in-house, whereas two provided processed foods from external processors. Three distributors reported that the cost and labor required to process foods generally discouraged school districts from buying whole foods. Distributors also indicated that many school districts lack the equipment and/or staff to prepare unprocessed products, such as whole head lettuces.

Eight distributors reported they typically could provide the local foods that schools request. However, they did note a few challenges. For example, six distributors indicated that seasonality was a challenge, as not all items are available year-round. One distributor described ways the company tried to overcome this challenge by communicating with schools, including providing them with the projected availability of certain items.

Three distributors described specific planning processes they use to ensure they could provide local foods for schools, such as adding new sources and keeping produce in storage. Two distributors reported that food safety requirements could present a barrier, because sometimes the only farms that can provide the foods do not have the appropriate certifications. One distributor reported that cost (and what schools are willing or able to pay) can make it hard to provide local foods.

Distributors commented on which foods were easiest for them to source locally (Exhibit E-7). Three distributors reported that items with a longer shelf life (e.g., frozen or dried produce) were easier because they could keep a stock on hand to supply to schools when requested. Two distributors reported their school customers often requested foods that required only minimal processing (e.g., apples, pears).

Distributors also commented on which foods were challenging to source locally. The seasonality of local foods and low levels of production within the geographic region served were identified most frequently

Exhibit E-7. Distributors described the easiest and most challenging products to source locally

<i>Easiest to source locally</i>		
8		Apples
7		Leafy green vegetables
5		Cucumbers
5		Potatoes, Sweet potatoes
5		Stone fruits
4		Squash, Zucchini
4		Root vegetables
<i>Most challenging to source locally</i>		
5		Tomatoes
4		Leafy green vegetables
3		Stone fruits
3		Broccoli, Cauliflower

Note: n = 19. Numbers are the distinct distributors who identified the item as easy or challenging to source.

"Apple" and "Cherry" icons by Lyhn; "Spinach", "Potatoes", "Squash" and "Carrot" icons by Icons Producer; "Cucumber" by Tooora khan; "Tomato" and "Broccoli" by Rakhmat Setiawan, from the Noun Project.

(by six distributors each). They also perceived that food safety requirements reduced the number of producers that distributors could use, which sometimes made it difficult for distributors to supplement their stock when production levels were low.

Requests for local foods from schools prompted changes to company practices for some distributors. Of the ten distributors who reported shifts in company practices, six expanded their vendor network with additional local suppliers. However, eight distributors said their company practices had not changed; of these, five attributed this to their company already having a long-standing commitment to supplying local foods. Three distributors said their company did not shift their practices to provide local foods, despite some barriers, including the seasonal availability of local produce.

Top 3 Local Foods

Nineteen distributors reported their company's top local foods by volume and dollar sales (Exhibit E-8). When distributors reported their top local products by volume, apples led the list, followed by cucumbers and leafy green vegetables. When distributors discussed the top local products by dollar sales, apples were still first on the list, but tomatoes were second and cucumbers were third.

Distributors reported that generally, local items cost more, but product and seasonality may be factors that make local items at times, cost relatively the same.

Competitive Advantage of Local

Nine of the 13 distributors who responded to the question about whether local foods provided them with an advantage stated that providing local foods did in fact give their company a competitive advantage. Two distributors specified that selling local products to schools provided a particular advantage against larger, headline competitors. Another two distributors reported that although they

"I think we have the competitive advantage for districts that [are] interested in making it happen. And I think the challenge that I see is that between the bid process, between the capacity of some other distributors, it takes a bit of flexibility for a district to work with somebody like us."

believe providing locally sourced foods gave them a competitive advantage, there are still obstacles for schools to buy local, as school funding does not always cover the additional cost of local products.

Four distributors stated that providing local foods did not give their company a competitive advantage, either because their competitors were also providing local foods (three respondents) or because local foods did not play a significant role in school purchases (one respondent).

Exhibit E-8. Distributors reported that school districts most frequently purchase local apples

By volume		
13		Apples
5		Cucumbers
5		Leafy green vegetables
4		Squash/ Zucchini
4		Stone fruits
4		Watermelon
4		Tomatoes
By dollar sales		
12		Apples
5		Tomatoes
4		Cucumbers
4		Stone fruits
4		Leafy green vegetables

Note: n =19. Numbers indicate number of distinct distributors who identified item as one of their top local foods.

"Apple" and "Cherry" icons by Lyhn; "Spinach", and "Squash" icons by Icons Producer; "Cucumber" by Tooora khan; "Tomato" by Rakhmat Setiawan; "Watermelon" by Oksana Latysheva from the Noun Project.

Nineteen distributors reported that they marketed their company's ability to supply local foods to schools using a wide array of tools (Exhibit E-9). For example, some distributors sent emails to school district staff with lists of local foods available during each season or with information about local farms. Other distributors organized farm tours, field trips, or farmer visits to the school to educate students about local food. Students had the opportunity to taste local products during sampling sessions or local food weeks/months, when schools intentionally added local products to their menus.

A few distributors reported engaging with farmers to market locally sourced products, but four distributors reported that coordinating visits between schools and farmers was difficult because of the farmers' availability or the schools' ability to transport students to the farms.

Company Goals for Local Products

Distributors were asked whether their company set goals about the amount of local products it aimed to provide to school districts. Nine of the 10 distributors responding to the question reported that their company did not have these goals. The one distributor whose company has such a goal reported it was 20 to 25 percent of all products distributed to schools.

Distributors whose companies lacked specific goals explained their absence. Five reported that sourcing local foods was already a part of their company culture, so formal goals were unnecessary. Three distributors reported they chose not to set a goal because it was too challenging.

Supply Chain and Demand

New Supply Chains

Seventeen distributors described whether their company had processes for establishing new supply chains with local producers. Eleven reported that they developed new supply chains, and six reported that they continued with their pre-existing relationships when supplying local food.

Twelve distributors commented that their own concerns about food safety issues, as well as requirements for audits [including GAP and Safe Quality Food (SQF)^{xxviii} audits], were a major barrier to creating new supply chains with local producers. Distributors explained that many local producers run small

Exhibit E-9. Distributors use a wide array of marketing tools

	Farm information materials (6)
	Local product availability lists/calendars (6)
	Conferences/vendor shows (4)
	Samples/tastings (4)
	Farm tours (4)
	Local purchase weeks or harvest months (3)
	In school farmer visits (2)
	Staff training/demonstrations (1)

Note: Numbers indicate number of distinct distributors who described each marketing tool.

"Farms" Info and "Training" icons by Stock Image Folio, "Grocery List" by K, "Vendor" by Srinivas Agra, "Apple Bite" by DPLcons, "Farming" icon by ProSymbols, "Harvest" icon by Deemak Daksina, and "Farmer" icon by Grégory Montigny from the Noun Project.

xxviii SQF is a third-party food safety certification program that provides certifications to food service providers that meet regulatory requirements.

operations, and can view food safety certification requirements too cumbersome and costly. To address this challenge, a few distributors reported using “blanket,” or GroupGAP, certifications, which cover multiple producers under the same umbrella. One distributor reported that USDA helped connect the company with local producers who are interested in working together to meet food safety specifications.

In addition to the need to ensure food safety, seven distributors said some farms may find it challenging to produce the volume at competitive pricing that distributors need for the relationship to be profitable.

Four distributors reported established relationships and word of mouth were the main means of establishing new supply chains. For three distributors, current relationships with producers and customers helped them establish new supply chains. One distributor cited that the opportunities provided by USDA for networking at conferences and making connections were as important as finding and initiating conversations with local producers.

Two distributors reported working with other producers and wholesalers to find products to fill supply gaps when the local producers they typically worked with could not provide sufficient quantities.

Two companies have one or more dedicated recruiters whose job is to find new local producers to source from. One distributor held a training program to bring in new producers. One distributor reported that using food hubs would help the company provide more local foods because they could source products from multiple producers in a single location and construct a centralized place to store the produce.

Staffing

Ten distributors responded to the question about whether their company employed particular individuals to procure local foods. Four had a dedicated staff member or team who worked with vendors to supply local foods to schools. For the other six distributors, this responsibility was spread across staff members, who might also work with other types of customers and/or vendors.

Motivation to Provide Local Food

Twelve distributors discussed factors that would encourage their company to provide more local food to schools. Three reported already being motivated to do so, so no factors would motivate them to provide more than they already provide.

Six distributors said they believed customer demand would motivate their company to engage with additional local food businesses. One distributor suggested that if school customers could clearly indicate their desire to purchase local foods, distributors would be more likely to provide those products. Another distributor suggested that states should mandate a minimum percentage of a school district’s funding to be spent on local foods, so schools would be required to use more local products.

“Them asking for it. That’s all it takes. I mean, they’re going to get it if we have it and it fits their parameter, their spec, and their price. And we’ll give them credit for it, we’ll tally it, whether or not they use it. I assume they do, in their year-end totals. But it’s really the ones that are really fighting for it, or they ask for it.... We definitely see people go all in, and that’s wonderful.”

Adhering to a “within the State” definition of “local” was a barrier for one interviewee, who suggested that if definition were expanded to regional or radial, rather than within State boundaries, it might be easier for distributors to provide local food because they would not need to keep items sourced from neighboring States apart during warehousing. Another distributor reported that providing items sourced from local producers (often smaller operations) could be difficult, because it can be cost-prohibitive for

smaller producers to certify the food safety of their products, so the cost and liability burden may be passed to the distributor.

Local Food Production and Sales

Number of Local Producers

The study team asked distributor interviewees about growth in the number of local producers they worked with over the last 10 years^{xxix} (or since they started working at this company). Of the 19 distributors who responded, 14 reported an increase, four reported no change, and one reported a decrease. For one distributor, although the number of large producers the company worked with had not changed, the number of small-scale producers had grown.

Nine of 14 distributors identified increased demand as the main driver of change in the number of local producers distributors work with, as their company adjusted the number of suppliers it needed based on the requests it received. Several distributors pointed out that eating local foods has become trendy, with a big push nationwide to move toward the local, sustainable produce. In line with the increased demand, two distributors reported that more schools were reaching out, seeking local foods, and some were reaching out earlier. By working with multiple producers, distributors indicated that they were better able to meet that need. A couple of distributors noted that their local farm to school activities, and State support for those activities, was a big reason the demand had grown so much. Another distributor indicated that they do demonstrations for local schools on the preparation of different types of seafood, and this led to large increases in demand.

Two other distributors indicated that they had seen large increases in greenhouse and hydroponic grown local products, which led to new producers. In fact, two distributors pointed out that while the average age of farmers seems to be increasing, they were also working with more millennial farmers who were using new methods of farming. Finally, two distributors reported that their mission was to invest in regional growers, so they were building their networks.

Local Sales to School Districts

Fourteen distributors responded to a question about changes in local sales volumes over the past 10 years (or since they started working at this company). Eleven distributors said their local sales volume had increased, two said it remained the same, and one did not know.

Seven distributors that reported an increase in their company's volume of local sales to school districts speculated about the factors that influenced the increase. Three distributors said market trends and demand; two said USDA programs and funding, which encouraged school food programs to search for local food options; and one said planning and communications between farmers and distributors had improved, which bolstered local sales.

One of the two distributors who reported their company's volume of local sales to school districts had remained the same attributed this to the low availability of local foods, which forced it to replace local products with non-local substitutes. The other distributor said that although local sales to school districts

xxix In 2010, Section 18(g) of the Richard B. Russell National School Lunch Act was amended to create a Farm to School Program.

had remained about the same, the company's total volume was lower due to competition from other distributors servicing the area.

Farm to School Impacts

Fifteen distributors offered their perspective on how farm to school efforts have affected whether and how school districts purchase local food. Only two distributors said that farm to school efforts had no impact on purchasing trends. Five distributors said that farm to school efforts facilitate education for school nutrition staff, bringing greater awareness of and starting conversations about the local food movement.

Three distributors said buy-in from school nutrition staff is a critical factor in determining the success of farm to school efforts. For example, one distributor described how a school district invested in a new kitchen to allow it to prepare foods from scratch and accept a greater quantity of locally grown foods. Another three distributors said processing was a major barrier to local food purchasing, as fresh and whole (e.g., head lettuces, unpeeled carrots) items require additional work by school nutrition staff. Respondents indicated that kitchen workers may lack the requisite skills or equipment to process such items, so schools face higher costs when considering non-processed local food purchasing.

"There's an educational component here, as well. People don't have a good understanding of where their food comes from today...of what the food system looks like today. And we don't do a good job in our educational system of teaching that....I do think that as we're able to educate and share this information, that'll both help support the local community and just help people, potentially, know more about their food. And, hopefully help them eat healthier, as well. Or make healthier decisions."

Three distributors discussed the role of cost in motivating local food purchasing. Two distributors reported that State-level programs provide reimbursements for schools that use local (i.e., State-grown) items and USDA DoD Fresh encourages schools to direct entitlement dollars toward local food purchases. Another distributor said that schools wanted to work with food distributors that offer fixed prices for local products, thus avoiding price fluctuations due to scarcity or seasonality. Two distributors said they had been asked by schools to participate in more food demonstrations and events due to farm to school efforts. One of these distributors reported that school requests to serve local foods led to a bump in local sales for the company. These events were not worthwhile for the second distributor, however, because the increase in sales did not defray its costs of conducting the visits. Reports Provided to School Customers

Some distributors noted that schools often ask them to provide volume or price information regarding locally-sourced products purchased from the company, also known as "velocity reports." Eight distributors had received requests, and ten distributors reported they had not been approached by schools for these reports.

Fourteen distributors spoke about their ability to generate velocity reports or similar data; 11 distributors said they could provide this information. Some said they regularly provided reports to schools, even if not specifically requested. Three distributors said they could not provide these reports if asked, because they did not have systems in place to identify the origin of the products they supplied, as they did not separate products when warehousing.

Nine distributors described the specific types of reporting they provided for schools. Five said they provided something similar to a velocity report. One distributor provided certificates to schools that enumerate the pounds of local produce purchased, the local farm jobs supported, and the acres of

sustainable farmland used to source the products. Another distributor gave flyers to local schools to highlight the farms the purchases supported. Two distributors said it was particularly important for schools to receive this information for reporting to school district administrators and local stakeholders (e.g., school boards).

Nine distributors described their process for tracking local products. Six said they tracked local food velocity information, and five said they tracked products using unique codes that indicate whether the item was sourced locally.

Additional Recommendations and Challenges

At the end of each interview, the study team asked respondents a series of questions that invited their recommendations for farm to school efforts and asked them to reflect on the challenges they faced.

Recommendations

- **Motivate school districts.** Five distributors said the motivation of school nutrition staff, particularly directors, is a key factor affecting local food procurement. Specifically, they suggested that increased education about local food for school nutrition staff and ensuring clear communications between school districts and distributors would motivate school nutrition staff to purchase and prepare more local foods.
- **Increase flexibility.** Four distributors suggested that schools be more flexible with their menus and contracts, because the use of local foods relies on consumers' ability to accept what is available at a given time.
- **Improve planning.** Three respondents indicated that additional front-end planning would facilitate distributors being able to provide local products by allowing them to coordinate with producers, so appropriate volumes of products could be available.
- **Facilitate cooperation.** Three distributors cited coordination between producers and schools as a factor affecting their ability to provide local products to schools. In particular, they suggested cooperative structures between producers (e.g., food hubs) are integral to meeting the demand from schools, while minimizing costs. Additionally, one distributor suggested schools coordinate into a "buying consortium" that would set a single definition of "local" for their district/region.

"I think it is a little bit of that language piece of—can you write these contracts in a way that a local distributor, a local food hub, a local farm is actually positioned to be competitive without creating contract demands or expectations that would be impossible for a local supplier?"

Challenges

- **Lack of resources.** Two distributors cited a lack of resources available to schools, suggesting insufficient funding and gaps in educational materials about local food preparation.
- **Capacity of schools to prepare local foods.** Two distributors cited the high cost to schools in money and staff time with buying local foods. Local products are seen as more expensive than non-local alternatives, and they often are delivered fresh and whole (e.g., whole head lettuces, carrots, winter squashes), requiring additional resources for preparation (e.g., peeling, chopping).

- **Local food supply.** Four distributors cited difficulties in finding the volume of supply from local producers needed to meet demand. Three distributors stated that cited local producers cannot meet food safety requirements, which creates a barrier to creating new supply chains.
- **Competition from larger producers.** One distributor indicated that small-scale farms are being “squeezed out” because they cannot match the prices that larger producers can offer.

Conclusion

The distributors the team interviewed work with both producers and schools, giving them unique perspectives on the successes, challenges, and the future of providing local foods to schools.

Key Findings

Definitions of “local” vary. The distributors the team interviewed defined local in multiple ways, and these definitions could be flexible depending on customer needs. The majority of distributors that responded used either a 250- to 400-mile radius or their State/regional boundaries. There was no formalized definition of local across the organizations.

Informal procurement for local foods was common. Respondents indicated that SFAs communicated local food requests through telephone calls and emails. Requests specifically for local foods were not consistently included in the formal procurement process. Informal procurement, like micro-purchases, can allow distributors to provide available, local products quickly, but distributors cannot always meet demand when they receive last minute requests.

There are barriers to providing local food. Distributors identified a few barriers to providing local foods. They cited the seasonality of local foods as a challenge because schools may not be aware of availability (e.g., asking for strawberries in December), and distributors may not have the capacity to warehouse local products to extend their season. Food safety requirements and concerns make it difficult for distributors to find the supply they need to provide the local foods that schools request. Unprocessed foods can be challenging for school staff to use, as they may not have the capacity or skills to prepare (e.g., clean, slice, chop) the product. Distributors suggested increasing the training for school nutrition staff.

Companies that provide local food have a competitive advantage. Most distributors agreed that their company’s ability to provide local food gave them a competitive advantage. They reported that they distributed local-focused marketing materials to their customers. Despite the competitive advantage, the majority of these distributors do not have formal company goals for providing local foods to school customers.

The local market is growing. Most distributors stated that both the number of local producers they work with and their company’s local sales to schools have increased over the past 10 years. They attributed this change to demand forces and market trends.

Distributors are an important source of data. School food distributors offer an important perspective on farm to school practices. Distributors are uniquely placed to understand both supply and demand challenges of providing local foods to schools, as they work directly with both school customers and producers. The distributors contacted by the study team were generally willing to share their knowledge and experiences. Given the different structures and positions of distributor organizations, it is important to clearly communicate key topics of interest prior to the interview, so respondents can prepare information and consult with colleagues as needed.

Appendix F: 2019 Farm to School Distributor Interview Protocol

Before we begin, all information gathered from food distributors is for research purposes only and will be kept private to the full extent allowed by law. Findings will be made public, but responses will be grouped with those of other study participants, and no individual food distributors will be identified. Participation in this study will not affect any reimbursements, credits, or foods your company receives through USDA programs.

Permission to Record: In order to ensure that we accurately capture the points raised during this interview, we would like to digitally record this conversation. Please note that the interviews will remain private. Your identity and any information attributable to you will not be released to anyone outside of the research team and the recording of your interview will be deleted at the end of the study, after all data have been analyzed. May I start recording now?

☐ PERMISSION GRANTED → START RECORDING NOW

☐ PERMISSION DENIED → "That's okay, I can continue without recording."

Distributor Company Name	
Interview Date	
Time Start	
Time End	

1. I'd like to confirm your contact information to make sure what we have is accurate:

Distributor Company Name	
Name	
Title	
Phone	
Email	
Location Address	
Overall Job Duties	

The focus of this interview is on sales, and potential shifts in demand for local products to school districts. For this interview, when I say "school districts" I mean districts, schools, or School Food Authorities (SFAs). I understand you may also do business with other companies and institutions. For this interview, please focus only on your relationship with school districts unless otherwise specified.

Definition of Local

Distributors and school districts may define the word “local” when referring to “local foods” in different ways. We are interested in how your company applies the word “local” when it comes to the foods you provide to school districts. We will then refer to your definition of “local” throughout the remainder of this interview.

2. In terms of boundaries, how is “local” defined for procuring and marketing local food products and producers? [PROBES: In terms of radius around your location, how do you define “local”? Is there another way your company defines “local”?] Do you define “local” differently for different products (or Districts)?

[**PROBE**: examples include: same city or county; produced within a 50 mile radius of your warehouse, a specific school district, or jurisdiction; within a 100 mile radius; within a 200 mile radius; produced within the State; produced within a Region]

[**PROBE IF R ANSWERS “REGION”**: How do you define Region? Do you code products by State or ZIP?]

[**PROBE**: How did your company arrive at this definition of “local”? [IF NECESSARY: Does your company have one definition, have one definition for “school districts,” or does it vary by client?]

Thank you! For the remainder of this interview, when I say “local foods” I’m referring to the definition you just provided. [READ ANSWER IN QUESTION 2 ABOVE]

3. Do you provide local foods to school districts? [IF NECESSARY: by local we mean any way you, your company and/or your school district clients define local as described earlier.]

☐ YES → SKIP TO Q4 (AFTER THE BOX BELOW)

☐ NO → CONTINUE TO Q3a BELOW

QUESTIONS FOR DISTRIBUTORS WHO DO NOT PROVIDE LOCAL FOODS:

3a. Do you get requests from school districts for local foods? If so, do school districts define local preferences? How do they make those requests? What kinds of items are requested?

3b. Please describe the reasons why you have not provided local foods to school districts.
PROBE: Have you included local producers in your supply chain?

THANK YOU AND END INTERVIEW.

Requests for Local Foods & Contracts

4. How frequently do you get specific requests for local foods from school districts?

4a. How are these requests for local foods communicated by school districts? [**PROBES:** Is this done formally, through an RFP (Request for Proposals) or IFB (Invitation for Bids) or through market basket purchases? Or, are these requests more informal? Are these requests codified in the school district's procurement document language?]

4b. What types of requests (Note to interviewer, this question focuses on whether the request is codified in the procurement language if answered in 4a.) related to local foods do you receive?

We are interested in what happens when your company receives a request from a school district for local foods. For the next questions, please think about how your company has responded to requests for local foods, or how you would respond to requests for local foods.

5. What local foods are typically requested by school districts? [**PROBES:** Fruits, vegetables, meat, seafood, grains, etc.? whole or processed product? (RQ Obj1 h) [Note to interviewer: If R says "none," proceed to Q. 5e.]

5a. How have you been able to meet these requests?

5b. Which products (have been easiest/would be easiest) to source locally? Why?

5c. Which products (have been most challenging/would be most challenging) to source locally? For those that are most challenging, what are the biggest challenges?

5d. Have requests for local foods from school districts led to changes in overall company practices? **IF YES**, what kinds of changes have these requests prompted? [Note to interviewer: Ask specific probes if they do not mention them in their response, one at a time.]

Probes: For example, I'd like to mention a few common changes you didn't mention to confirm... Does your company now seek out more local producers? Has your company hired new staff? Are you now providing different information to your potential buyers? Do you respond to different RFPs/IFPs than before? Has your company developed local order/availability guides? Does your company now offer local expenditure reports? Are there any other changes in how you and your colleagues engage with school districts or local producers based on local food requests?

IF NO, just to confirm, common changes include things such as "seeking out more local producers;" or, "hiring new staff to be more responsive;" or "answering different RFPs/IFPs than you would have before." Has your company made any of these types of changes to provide local foods to school districts? What would motivate you to make changes?

5e. **IF THEY HAVE NOT RECEIVED REQUESTS FOR LOCAL FOODS** (Responded "none" in Q5.): If you were to receive requests for local foods, what business practices would you need to implement to fulfill these requests? [Changes may include: seeking out more local producers; providing different information to potential buyers; developing a local order/availability guide; offering reports on local expenditures; answering different RFPs/IFPs; or any other changes.]

6. What types of solicitations do school districts use to procure local foods from your company? [**PROMPT IF NECESSARY:** Such as: invitation for bid, request for proposals, informal solicitation, or use of micro-purchases (micro-purchases are for \$3500 or less)?]
- 6a. What contract types have you used to provide local products?
- ☐ Fixed-price contracts
 - ☐ Fixed-price with economic price adjustment contracts
 - ☐ Cost-reimbursable contracts (no fixed fee)
 - ☐ Cost-reimbursable with fixed-fee contracts
 - ☐ Forward contracts
7. Does providing local foods give your company a competitive advantage with school districts? Do you promote or advertise this capability? If so, how? [**PROBE:** How do schools know you have local products? Do you label local products on an online database or in printed catalogues provided to schools?]
- 7a. Do you market or promote your company's ability to sell local products? If so, please describe. [**PROBE:** Do you offer educational programs or farmer visits?]
8. Does your company set goals for local products you make available to school districts? For example, do you have a target where X percentage of items will be locally sourced? Please describe these goals.

Supply chain & Top 3 foods

These next few questions focus on supply chains and the most commonly requested local foods. Your responses should focus on your experiences when requests have been made by the school districts with whom you work.

9. In order to supply local foods to school districts, have you had to establish new supply chains to connect with local producers?
- ☐ YES → CONTINUE TO QUESTION 9a.
 - ☐ NO → SKIP TO QUESTION 10.
 - ☐ REFUSED → SKIP TO QUESTION 10.
 - ☐ DON'T KNOW → SKIP TO QUESTION 10.
- 9a. Please describe the process of establishing new supply chains. How do you find local vendors? Where/how do you find/recruit them? [**PROBE:** Is it competitive? On what basis are they selected as vendors?]
10. What is the process for sourcing local foods for the school districts you serve? [**PROBE:** What are the biggest factors that determine whether or not you would bring in a local product for a school customer? From your perspective, what are the challenges?]
11. Do you have staff specifically dedicated to working with local vendors to procure local foods on the supply side? Who is responsible for local food sales? [**PROBE:** Or, do you have one designated local foods representative?]

12. What would motivate your company to provide more local products to schools? [**PROBE:** Think about factors that would encourage you to find new local vendors, or expand your current supply chains if school districts showed more interest in purchasing local foods.]
13. What are the top 3 local food items, by volume, your company sold to school districts in 2018? Please be as specific as possible. For example: sliced apples, whole apples, chicken drumsticks, bags of lettuce, fish sticks. Is the cost of sourcing these local items more, less or the same as a non-local alternative? Does the volume depend on the season?

Item	Volume Estimated	Cost of sourcing locally: more, less or same as non-local alternative	Is seasonality a factor?
1.			
2.			
3.			

14. What are the top 3 local food items, by dollar sales, your company sold to school districts in 2018? Please be as specific as possible. Is the cost of sourcing these local items more, less or the same as a non-local alternative? Is seasonality a factor?

Item	Dollar Sales Estimated	Cost of sourcing locally: more, less or same as non-local alternative	Is seasonality a factor?

Changes over time

Section 18 of the Richard B. Russell National School Lunch Act was amended to create a Farm to School Program to assist eligible entities, through grants and technical assistance, in implementing farm to school programs that improve access to local foods in schools. For school districts, farm to school activities may include purchasing local foods for school meal programs, taking students to farms, bringing farmers into classrooms, and cultivating school gardens, among other activities. The next set of questions asks about changes you or your industry may have experienced over time because of farm to school efforts, since 2010.

15. Based on your definition of local, has the number of local producers you work with increased, decreased, or remained the same over the past ten years?
- ☐ INCREASED
 - ☐ DECREASED
 - ☐ REMAINED THE SAME → SKIP TO QUESTION 17
 - ☐ DON'T KNOW → SKIP TO QUESTION 17
16. From your perspective, what are the top 3 factors driving that change?

17. Based on your definition of local, has the volume of local sales to school districts increased, decreased, or remained the same over the past ten years?

- ☐ INCREASED
- ☐ DECREASED
- ☐ REMAINED THE SAME → SKIP TO QUESTION 19
- ☐ DON'T KNOW → SKIP TO QUESTION 19

18. What are the top 3 factors driving that change?

19. How do you think farm to school efforts may have affected purchasing trends in school food? [**Probe** for changes in grade, aesthetics, value-added of foods purchased.]

Reporting

FNS is interested in collecting more accurate, concrete information on local food purchases by school districts nationwide in future studies. The following questions are asked so we can better understand what information on local products is being requested by and reported to school districts, as well as whether this information is tracked by your organization.

20. Have you been approached by school districts for reports of volume or price for locally sourced products? Sometimes these are called “velocity reports.”

- ☐ YES → CONTINUE TO QUESTION 21
- ☐ NO → SKIP TO QUESTION 22
- ☐ REFUSED → SKIP TO QUESTION 23
- ☐ DON'T KNOW → SKIP TO QUESTION 23

QUESTION FOR DISTRIBUTORS WHO HAVE RECEIVED REPORT REQUESTS FROM SCHOOL DISTRICTS

21. When these types of reports are requested by school districts, are you able to provide them? [IF NECESSARY: Reports on the volume and/or price of locally-sourced products.] [IF NO PROBE: Why not?]

SKIP TO QUESTION 23

QUESTION FOR DISTRIBUTORS WHO HAVE NOT RECEIVED REPORTING REQUESTS FROM SCHOOL DISTRICTS

22. What type of information or reporting do you provide for school districts on locally sourced products? [PROBE: Please describe in detail the elements of these reports. Examples could include volume, list of local items, and price.] [PROBE: Even if you do not regularly provide information on locally sourced products to school districts, what information would you be able to provide if requested?]

23. How do you track velocity information? Is that process specific to local products?

Demographics

24. Please estimate the total number of school districts with whom you work.

[Note to Interviewer, for Q24, record numbers here.] TOTAL NUMBER of school districts: _____.

24a. Within these districts, about how many schools does this represent?

[Note to Interviewer, for Q24a, record number here.] TOTAL NUMBER of schools: _____.

24b. For these schools, do you have an estimate of how many of these are urban, suburban and rural? [IF NECESSARY: By urban, we mean an area with high population and infrastructure density. By suburban, we mean a smaller community outside of, but within the vicinity of, an urban area. By rural, we mean non-metro areas, located in areas with low populations of people.]

Percent urban _____.

Percent suburban _____.

Percent rural _____.

24c. What TOTAL NUMBER of States do these districts/schools represent? _____

Thinking about your definition of local, how many of the following do you directly source from?

25. How many are local individual farmers, ranchers or fishers? Please let me know if these are actuals or estimates.

NUMBER OF Farmers: _____ Actuals? (Y/N) ☐ DON'T KNOW

NUMBER OF Ranchers: _____ Actuals? (Y/N) ☐ DON'T KNOW

NUMBER OF Fishers: _____ Actuals? (Y/N) ☐ DON'T KNOW

[Note to Interviewer: Use "other" if another type of producer is mentioned by R.]

Other: _____ Actuals? (Y/N) ☐ DON'T KNOW

26. How many are local producer cooperatives, including farmer, rancher, or fisher cooperatives? Do you know how many producers each cooperative represents? Please let me know if these are actuals or estimates.

Cooperative Name/Type	Number of Producers	Estimated?

27. Do you source from "food hubs"? Please describe your relationship with the food hubs and what kinds of items you source in that manner.

28. What were your company's estimated total sales for all customers in 2018? Please include all customers, and not just school districts.

TOTAL SALES (\$) _____

29. What percentage of your company's total sales was accounted for by sales to school districts in 2018?

PERCENTAGE TO school districts (%) _____

30. **Earlier, you defined local as: [insert response from Q2.]** Using that definition of local, what is the estimated percentage of your total school district sales that were local food in 2018? [IF NECESSARY: For this question, the term local is defined as ANSWER TO QUESTION 2]

PERCENTAGE LOCAL SALES (%) _____

Final Thoughts

Now, we'd like to find out from you if there are things we may have left out or you think are important for us to know about farm to school efforts or local food sourcing.

31. From your perspective, what action(s) could schools and/or school districts take to make it easier to fulfill their local (product) requests?
32. What resources, if any, could your company (or the industry) use to better meet local product requests?
33. Is there anything else you would like to tell us about farm to school or local food sourcing?

Closing

Thank you for completing the Distributor Interview! Do you have any questions for me?

If you have any additional questions or comments, please feel free to contact our project team, toll-free, at 866-778-1316 or by email at farmtoschool@abtassoc.com.