Evaluation for Transformation:

A Cross-Sectoral Evaluation Framework for Farm to School

Cover: Students at PS 29 in Brooklyn, NY, learn about seed saving in their school garden. (Credit: Chelsey Simpson)

Table of Contents

National Farm to School Network: Growing Stronger Together

www.farmtoschool.org

This publication was developed and launched by the National Farm to School Network, August 2014. The National Farm to School Network (NFSN) is an information, advocacy and networking hub for communities working to bring local food sourcing and food and agriculture education into schools and preschools. Our network includes national staff, eight Regional Lead Agencies, 51 State Leads, a 17-member advisory board and thousands of farm to school supporters. NFSN is a project of the Tides Center.

Foreword

Despite the investments made over the past two decades to mitigate the impact of food deserts, disparities persist as evidenced by the higher rates of malnutrition and hunger in vulnerable communities. In order to address these disparities, efforts must be anchored in community-driven solutions that are focused on fostering equity. Farm to school programs are symbolic of these solutions.

These programs are inherently multi-sectoral in design and function and are built on the foundation of intersectoral policies anchored in sectors such as education, transportation and agriculture among others. They encompass the facilitating policies across multiple sectors that promote equitable access to local, fresh foods, as well as the protective factors that sustain favorable conditions at the local level.

Sustaining these programs to best benefit children and their families requires an understanding of what makes them work well within the environmental context of school and community. This understanding can be captured within user-friendly evaluation frameworks that encompass the intersectoral policy opportunities that support farm to school programs, as well as embody approaches that respect the voices and needs of the most vulnerable at all levels.

It is our hope that this evaluation framework report provides a deeper understanding of farm to school programs and their potential contribution to achieving equity, as well as an appreciation of what it takes to sustain them to meet the needs of children, their families and their communities.

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01
Introduction

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Image created by attendees of the 6th National Farm to Cafeteria Conference under the supervision of artist Bonnie Acker.

Introduction

What is Farm to School?

Farm to school enriches the connection communities have with local, healthy food and food producers by changing food purchasing and educational activities at schools and preschools. Farm to school activities and policies are unique to location, and can be defined in a multitude of ways. For the purposes of this evaluation framework, the core elements of farm to school activities are:

1. **Procurement** of local and regional food products;
2. **Gardening,** based at schools and preschools; and
3. **Education,** food and farm related.

What Does an Evaluation Framework Do?

First and foremost, an evaluation framework aims to move our collective work forward by identifying practices and policies that have demonstrated benefits and by recommending areas for additional exploration. Secondly, an evaluation framework grounded in a strong theoretical basis guides how sites consistently articulate and implement program elements, evaluate efforts and report on outcomes. An evaluation framework is useful not only to practitioners, but also external evaluators, researchers, policymakers and funders, who can make better decisions in response to an improved understanding of how and why program activities are operationalized on the ground.

An Evaluation Framework for Farm to School

Context

In nearly a decade, farm to school has expanded from a handful of programs to a full-fledged, thriving, grassroots-led movement in all 50 states, often supported and institutionalized by local, state and federal agencies and policies. The farm to school movement is at a critical turning point, with the potential for enabling significant transformations in how students eat and learn about food in the future.

As interest in farm to school has grown, a framework to continue guiding this practice is needed. Farm to school has been recognized as a potential strategy to significantly improve or enhance public health and economic development outcomes[1–4]. Researchers also hypothesize and are beginning to document associations with positive outcomes in the education and environmental quality sectors[2,5–7]. Farm to school activities have been identified as chronic disease prevention strategies[8–12] because of their potential positive influences on encouraging healthy eating behaviors in children. Farm to school activities and policies also have been embedded in efforts to increase community food security, reduce hunger and develop robust local or regional food systems that result in economic benefits for local and regional food producers and processors[13–17]. As farm to school sites have proliferated from just a handful in the 1990s to more than 40,000 in 2014, there is also a better understanding of how farm to school is adapted in different community conditions and in different agricultural growing regions[18–23]. Finally, funders are showing increasing interest in farm to school activities. Farm to school activities are increasingly being supported by existing community resources; funding by federal, state and local governments; or by local, regional or national private foundations.

Why Do We Need an Evaluation Framework?

To date, however, no evaluation framework exists to guide practice, research and policy development for the growing field of farm to school. Farm to school is a relatively new approach and hence literature on the topic is limited, as compared to some other childhood obesity prevention or food system development

approaches. Farm to school efforts over the last decade have focused on developing and institutionalizing programs, and not so much on research. As a result, baseline data are scarce and existing research protocols are inconsistent.

Several articles and reports discuss the broader context in which farm to school exists[16,24–30]. Since the late 1990s, several reviews of school site-level evaluations[1,2,18], school-based nutrition programs'[31–40] economic impacts of local food purchasing[3,13,14,17,41–44], and impacts of school garden programs have been published[1,2,38,45,46]. Recent literature on the potential and real benefits of farm to school is more robust related to the public health and nutrition outcomes[6,22,45–54] as compared to the economic, educational or environmental outcomes[2–4,7,41,55–57].

Because of the cross-sectoral nature of farm to school spanning public health, economic development, education and environmental quality, it is difficult for academic programs to focus their research efforts on this topic in a multidisciplinary way. To fully understand and realize the potential the model holds, a cross-sectoral and broad, collaborative approach to evaluation and research is necessary.

Farm to school activities at sites differ and draw strength from each unique local context. An evaluation framework is needed to provide guidance on how to consistently track and monitor program activities, along with local, state and national policies that influence farm to school. The field also needs agreed-upon priority outcomes worthy of consistent measurement, and validated instruments to measure those outcomes.

This evaluation framework is a first step in that direction — it has been developed collaboratively, to ensure that it is relevant for all program types and sizes, as well as a broad range of users. For anyone involved in farm to school activities, this framework provides a starting point for using common language on farm to school elements, touch points, measurable outcomes, indicators and tools.

Aims and Scope

The primary aim of the farm to school evaluation framework is to guide future farm to school research and evaluation efforts, while maintaining a view of the full farm to school picture — the core program elements and their linkages, the policy connections, and the potential cross-sectoral outcomes in four key sectors: public health, comunity economic development, education and environmental quality. Beyond the four sectors, the framework is structured around three levels of action:

Community

"A group of people with diverse characteristics who are linked by social ties, share common perspectives, and engage in joint action in geographical locations or settings (p. 1929)"[58].

Community Health

"A healthy community is one that is continually creating and improving those physical and social environments and expanding those community resources which enable people to mutually support each other in performing all the functions of life and in developing to their maximum potential (p. 24)"[59].

program, research and policy. This will enable all users to identify the parts of the framework most relevant for their interest. The framework recognizes that policy is a critical component of robust program development, evaluation and research.

For each of the four sectors, the framework provides a compilation of existing peer-reviewed research literature, program reports and white papers, and includes stories from on-the-ground activities demonstrating outcomes in that sector. Furthermore, the framework highlights priority outcomes vetted by the contributors, examples of existing measures, sample evaluation or assessment strategies, and recommended resources where available.

This evaluation framework is not a "how to" manual providing step-by-step guidance on program development, program planning, evaluation or policy analysis. Appendix 1 and 2 provide a list of existing program planning and implementation guides, and farm to school evaluation toolkits, which serve this purpose.

How to Use this Framework

The content of this evaluation framework has been structured to provide something for everyone involved in the farm to school movement. Each level of user, whether at the program site level, the research level or the policy level, will gain key messages and recommendations about farm to school evaluation priorities, outcomes, indicators, measures and tools. Priority outcomes, indicators and measures in Chapter 4 are categorized by program level (for use by program practitioners and evaluators), research level (for use by researchers) and policy level (for use by school boards, state, city and county decision makers, policymakers and policy advocates).

Program Site-Level users

- food service professionals
- teachers
- administrators
- farmers, processors
- distributors
- community supporters
- nonprofit staff
- internal and external evaluators

Program site-level users can use the framework for drafting, revising and expanding existing program design and implementation strategies. For example, they can compare their existing program goals and the methods to measure program outputs and outcomes with those listed in the different sectors of this document. For measures that a program is not yet tracking, they can determine which one(s) are most reasonable to include. The implementation and evaluation resources, and tools highlighted in the Appendices will be helpful for individuals at the program level. The framework is also useful for developing and modifying evaluation plans, including the types of prioritized outcomes, relevant measures that align with a program's unique goals, identifying possible evaluation tools, and existing data collection strategies. Additionally, users at the program site level can refer to cross-sectoral suggestions to build connections in their program model and activities, use literature cited in the framework for resources, consider new ways to communicate their program to their communities, and develop proposals to seek support for farm to school activities.

Research-Level users

- researchers and professors at colleges
- land grant universities or state and federal agencies

Research-level users can use this framework to get a quick snapshot of existing literature, and the existing gaps in farm to school research to guide their future research endeavors. They can use information on consistent program implementation to structure research protocols, build on program evaluation efforts for cross-site program studies, and take the lead on developing tools for data collection where none exist. Researchers can team up with external evaluators to support program site-level users in understanding how current activities can lead to short, intermediate, and long-term outcomes.

Policy-Level users

- school board members
- city and county level elected officials
- local, state and federal agencies
- policy advocates
- policy staff
- policymakers

Policy-level users can use this framework to determine which outcomes align with their priorities and develop policy initiatives to support these goals. The framework also can help people at this level explore how to remove barriers that hinder farm to school activities. The framework identifies possible policy levers in each sector for furthering farm to school activities at the local, state and national levels.

Funders

- foundations
- local, state and federal granting agencies

Funders can use the framework to guide grantees toward consistent program articulation and recommend common reporting requirements to build on the body of knowledge. They can also identify priorities for funding farm to school activities or research and evaluation to meet the needs of the movement.

Framework Organizing Theme: Farm to School Supports Community Health

This evaluation framework is grounded in the belief that farm to school activities support community health through outcomes spanning multiple sectors, including public health, community economic development, education and environmental quality. These four sectors have been presented as sub sections in this evaluation framework to guide the reader, but with the understanding that there are overlaps and connections to some degree within the sectors. Further, contributors to this framework agreed that the shared values of economic prosperity, equitable distribution of resources, individual well-being, education about food's relationship to personal health, and the quality of our natural environments are central to farm to school.

Farm to school supports public health goals through the development of healthy eating habits in children, such as preferences for and consumption of fruits and vegetables, while addressing family food security through boosting the quality of school meal programs[8–11]. Some programs also have targeted family-specific activities such as cooking classes, or after-school gardening activities to reinforce lessons children learn at schools. With diet-related chronic diseases such as type 2 diabetes, high blood pressure and obesity[60–69] on the rise and childhood poverty a continuing challenge[70,71,] farm to school activities can be a public health strategy that improves dietary habits and changes cultural norms of school food environments.

Farm to school supports community economic development goals by creating new jobs in school food service, agriculture and food processing and marketing-related industries, thereby keeping local dollars recirculating in the local economy. With 31 million children eating school lunch every day through the National School Lunch program, schools represent a burgeoning market for food producers, processors and distributors[72].

Farm to school supports the educational goals of schools and preschools, by engaging students in hands-on stimulating activities[73] and setting them up for educational success. Experiential activities that connect kids with the source of their food and provide nutrition likely support student learning of science, math and language arts.

Farm to school supports environmental quality goals: Communities benefit from healthy ecosystems that provide water, soil, air and other resources needed to live. Farm to school supports an increasing consumer demand for foods grown using alternative agriculture methods that do not harm the natural environment[74,75]. For example, some school districts participating in farm to school aim to purchase foods produced and processed with methods that conserve natural resources and reduce the use of inputs such as antibiotics, pesticides, herbicides and chemical fertilizers[76].

02
Background

This chapter provides background on farm to school in order to set the context for this evaluation framework. It includes a brief history of farm to school efforts in the country, consistent definitions for farm to school's core and supplemental elements, touch points and actors, and its relationship with policy development.

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Image created by attendees of the 6th National Farm to Cafeteria Conference under the supervision of artist Bonnie Acker.

The Evolution of Farm to School[1]

Efforts to connect products grown on local and regional farms with school lunches have existed for decades, albeit happening informally and independently through the early 1970s. School foodservice directors would purchase a crate or two of oranges or apples, peaches or plums from nearby farms when in season. However, as labor costs escalated and processed produce and entrees became more available, many of these practices began to disappear[1]. By the 1980s and 1990s, especially among larger school districts, these connections with farmers were almost nonexistent.

The farm crisis of the 1980s, which crippled sales for many small- and mid-scale growers, coupled with a growing recognition of obesity among younger and younger children, created a set of conditions that were ripe for reinvigorating the farm to school connection[1]. In the late 1990s, school foodservice directors across the country began to buy, tentatively at first, produce directly from local growers. Motivations were twofold: to introduce healthy, fresh, seasonal produce to children in school lunches and to support struggling regional farmers. In many of these schools, children were also exposed to the soil-to-table cycle through working in their school gardens, and cooking and nutrition education in their classrooms[1].These pioneering programs immediately became popular and began to spread from community to community. Almost 20 years later, farm to school programs have flourished and evolved into programs as diverse and vibrant as the school districts and communities that support them.

Today, farm to school is being implemented nationally, operational in 44 percent of schools across the country; that's a total of 40,328 schools and more than 21 million children in all 50 states[2]. Local, state and national policies have been passed to support farm to school, creating basic infrastructure, and establishing publicly funded grant programs. More recently, organizations involved in farm to school have been exploring the expansion of similar concepts to the preschool or early care arena, serving the 0-5 years age group. Farm to preschool is a rapidly growing area of interest, and a 2012 snapshot survey of farm to preschool activities reports 500 sites across the country[3]. In 2014, farm to school is part of the broader farm to table movement where organizations such as hospitals, colleges and restaurants work more closely with local producers to bring "local food" to consumers. Producers, processors and distributors who sell products that meet school foodservice requirements can more easily tap into other institutional markets such as hospitals, restaurants, colleges, juvenile detention centers and correctional facilities, thereby increasing their income potential.

Although the concepts behind farm to school programs are sound and the idea has grown in popularity from coast to coast, the implementation has not always been easy or consistent. Local, state and national food and farm policies, as well as the economics of school food, driven in part by the food industry, has made local procurement difficult for many school districts. One of the key lessons that has emerged from the evolution of farm to school programs is that to make these programs successful, support is needed from multiple sectors within the school community (parents, teachers, administrators) and outside it, including distributors, economic developers, health advocates and practitioners, policymakers, farmers and farm agencies, banks, media, community arts and others. Partnerships are the cornerstone of successful farm to school implementation.

Another key lesson is the important connection that school food needs to forge with community food systems, particularly those systems that are striving to build regional food system infrastructures and distribution systems that will not only help school districts procure more local, healthy food, but contribute to building sustainable food procurement for the entire community as well.

Finally, as the benefits of farm to school become more visible, the more advocates can focus on some of the more difficult social justice issues that farm to school programs allow communities to address[1]. For example, farm to school programs lift up foodservice

labor by providing opportunities for professional development, empowerment through foodservice employment and recognize our "lunch ladies" as the professional chefs that they are. Farm to school programs also allow us to address the challenges faced in underserved and rural communities where amenities and partnership present in urban settings may be scarce. On the food production and processing end, farm to school provides opportunities to small- and medium-sized farmers to engage in the institutional food market, and has the potential to bring attention to food justice issues, such as the conditions faced by farm workers and the labor force in the food processing and packing industries[1].

Defining Farm to School

Farm to school activities tend to be place- and site-specific with one or more stated goals. Interests from funders, support organizations and policy advocates can often influence how farm to school activities are framed and defined for a specific site. As a result, currently there are multiple definitions that describe what farm to school is, who participates, what they do when and where, and how they do it.

In the process of drafting this farm to school evaluation framework, it became evident that to consistently describe and measure outcomes related to farm to school programs and policies, there needs to be a clearer sense of "what is a farm to school activity?" There is general agreement that farm to school initiatives: connect schools (K-12) and early childhood education settings (subcategorized as farm to preschool) with local food producers; aim to serve healthy and local food; improve student nutrition; provide agriculture, health and nutrition education opportunities; and support local and regional farmers[4].

In this framework, project team members and authors scanned the most current terms used to describe the "who," "what," "where," "when," "why" and "how" of farm to school and it revealed that practitioners in different fields use different words to represent the same farm to school activity or goal. Taking into account the variety and scope of definitions and terms gathered through this process, the National Farm to School Network recommends the use of the following concepts as a starting point for consistently articulating farm to school activities.

Core Elements of Farm to School: Procurement, Gardening and Education

The three core elements of farm to school activities include: local food procurement, school gardening and food-based education as described in Table 1. These core elements serve as a guide for beginning and building a robust farm to school program, and for exploring how the three elements interrelate to support outcomes in four different sectors – public health, community economic development, education and environmental quality.

Due to differences in interest, assets and resources available to sites, any one of these core elements can serve as the starting point for establishing farm to school activities. Program sites will develop specific goals and outcomes that may result from resources and activities in the three core elements. Research indicates that multiple component approaches are more powerful in encouraging learning and behavior changes than any one element alone[8–10], and this is true of farm to school. When implemented alone or together, the three core elements are what makes farm to school unique for its potential cross-sectoral outcomes. Further, each core element catalyzes the other, enabling greater impact. For example, educational activities such as taste tests, farm tours or farmer in the classroom sessions conducted a week prior to when local products are introduced in the cafeteria can build student awareness and interest, and encourage students to choose those local products from the cafeteria line. As farm to school at a given site progresses, implementation of one core element can also lead to the other, and enable lasting change in the community.

Figure 1

Table 1: Core Elements of Farm to School (see additional details Appendix 3)

CORE ELEMENT	DESCRIPTION
Procurement (of local and regional food products)	The buying, preparing, serving and promoting of local foods and food products in schools or early childhood education centers. "Local" is defined uniquely at each site, and can range from a radius of miles around a school district, to state boundaries, to regional distances based on geography[5–7].
Gardening (school-based gardens)	The planting, tending, harvesting and eating of foods that takes place in outdoor garden spaces or indoors (such as through vertical gardening). Includes experiential or hands-on learning, direct food experiences, healthy food promotion, classroom curriculum and environmental education activities. It may also include garden-based food production to sell foods to the cafeteria or give to families and community members. Gardening is an active, experiential method of education that involves learning skills related to food production.
Education (food and farm related)	Education for children and families inside and outside the classroom may include the following: • Classroom curriculum aligned to local, state and national standards in math, science, health, nutrition, language arts and social studies. • Activities and lessons about food, food production, food systems, agriculture, how food contributes to human health, how the food system affects natural ecosystems, etc. • Experiential learning such as farm tours, farmers' market trips, visits from chefs, ranchers, farmers, producers and distributors, taste tests, recipe development, food preparation and cooking. • Skill development related to food production, food preparation, nutrition and cooking.

Supplemental Elements of Farm to School

Activities described in the core elements of farm to school significantly benefit from and are supported by additional inputs, such as:

- Training and professional development: developing school foodservice staff capacity to prepare and serve local foods, understand food safety requirements for handling fresh produce grown in school gardens, and embracing their role in encouraging children to try new foods. Educators may need training and support to teach subjects using hands-on activities with foods. Volunteers and visiting community members such as farmers may benefit from training on how to present farming, ranching, processing and cooking information to different age groups in classrooms or on field trips[11–13].
- Promotion and media: increasing community awareness and reinforcing the farm to school messages. Regular promotion and marketing of farm to school activities in the school environment ensures continued support and excitement.
- Planning, coordination and evaluation: monitoring and assessing progress toward program goals and outcomes. Volunteers or site staff can play this role.
- Outreach and community engagement: building relationships in the community is a cornerstone of farm to school. These can be with and between farmers, parents or community volunteers and leaders.
- Policy alignment: removing barriers for local farmers to supply school districts and to accelerate progress towards institutionalization. Policies can be at the local, state and national level.
- Funding: supporting additional staff time, infrastructure, or specific program activity costs.

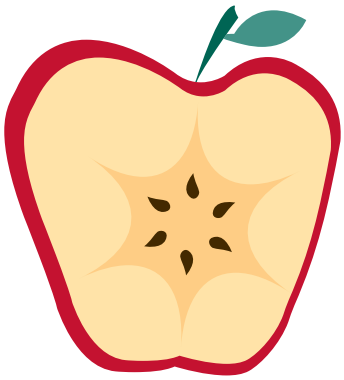
Many of these also have a catalytic impact on each other and on the core elements, and create a positive feedback loop for program improvement. For example, the more foodservice workers are trained, the better they align with the program model and are buy into the farm to school approach, seeing themselves as the gatekeepers of health in the school[14]. Media and marketing efforts create a buzz about farm to school in the community, which brings attention to the farm to school activities conducted at school, creates a demand for program expansion, and garners interest in policies to institutionalize farm to school.

Farm to School Touch Points

Activities within the three core elements of farm to school can occur in various locations and include one or more of the following intervention sites or "touch points," where a program activity may "touch" participants. (see Figure 3). The description of each touch point includes just a sample of possible activities.

1. Farms and other food production and processing facilities: local food is produced or processed for distribution to schools or early care centers. This is where farmers, processors and distributors can engage with students about local foods.
2. Cafeterias: where local foods are served and promoted to students, foodservice staff, teachers and other adults.
3. Classrooms: where educators or early care providers help students make curricular connections with food, health, agriculture and nutrition.
4. Outdoor learning spaces and school gardens: where teachers, volunteers and other adults engage children in hands-on learning to reinforce classroom lessons.
5. Home and family: where children share materials, such as seeds and plant starts, and lessons from school. Children can try new recipes with family members and encourage healthier eating habits.
6. Community: where schools or early care centers connect with farmers, ranchers, processors, grocery stores, farmers' markets, and chefs in activities that engage students and families and promote local foods.

Figure 2



6 SEEDS
OF AN EFFECTIVE PROGRAM

- Training and Professional Development
- Promotion and Media
- Planning, Coordination and Evaluation
- Outreach and Community Engagement
- Policy Alignment
- Funding

Figure 3: Farm to School Actors and Touch Points

Farm to School Actors

At any of the touch points there are multiple actors and participants involved in the development and implementation of farm to school activities.

1. Food producers, processors and distributors supply the local foods featured in the cafeteria or classroom for taste tests, and serve as resources for experiential learning opportunities via tours to a farm or processing facility and farmer in the classroom sessions. In turn, they reap the monetary benefits via expanded business opportunities and connections with the school community.
2. Foodservice staff directly engages in the activities needed to serve healthy foods procured from local and regional farmers in the cafeteria, but also play a role in educational activities in the cafeteria, such as taste tests.
3. Teachers conduct curricular activities to connect the core elements of farm to school in all subject areas. Teachers also serve as role models for healthy behaviors.
4. Teachers, volunteers, community members and garden coordinators plan and conduct learning opportunities for children in outdoor spaces including gardens.
5. Families, parents and caregivers reinforce the farm to school message to children in the home environment.
6. Community organizations and individuals (i.e. chefs, farmers' market managers and master gardeners) volunteer to support implementation of activities in the school. Decision makers at the local level (i.e. school district board and city mayors), and policymakers at the state and federal level set the guidelines for supporting or hindering farm to school activities.

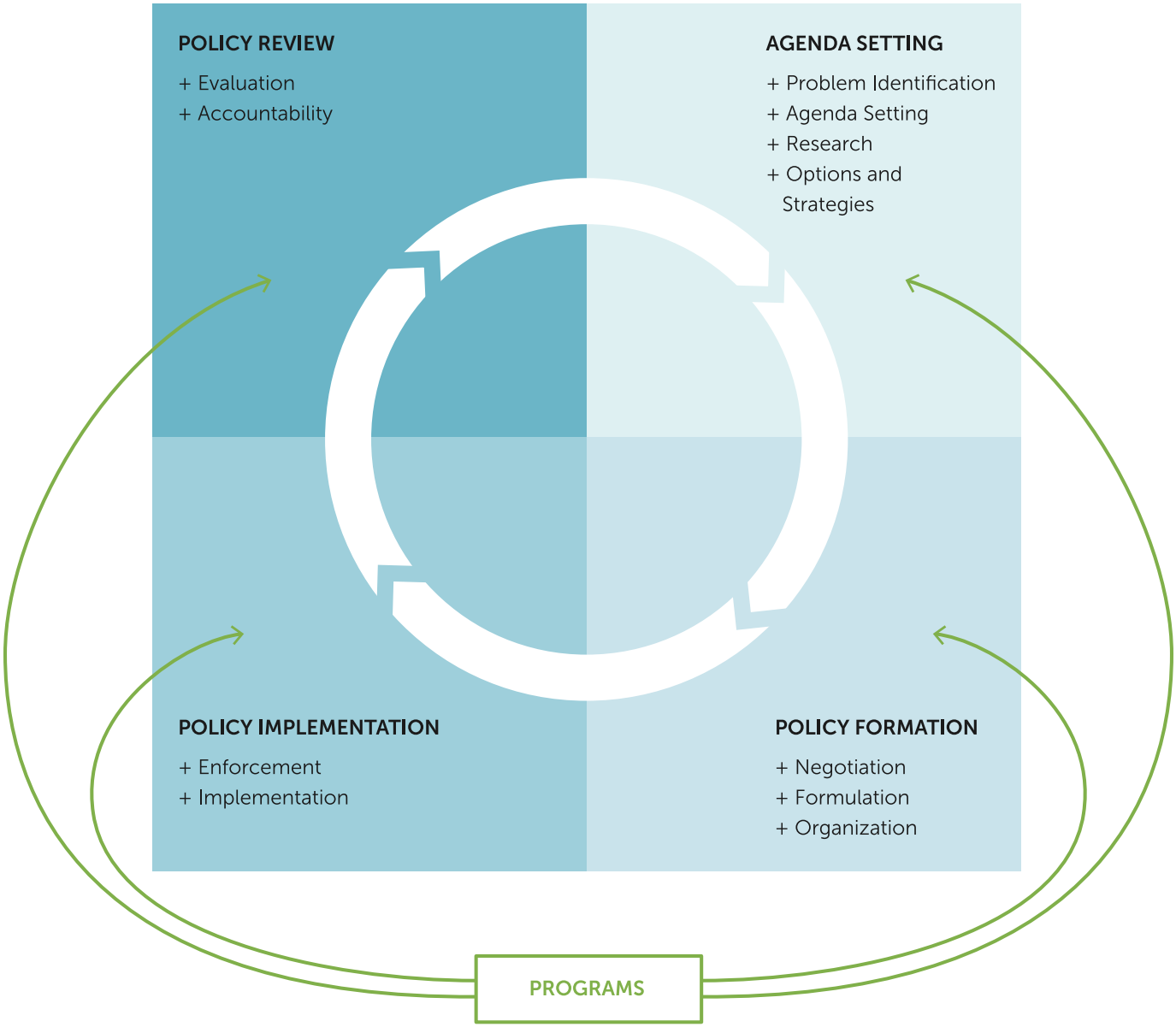
Farm to School's Relationship to Policies

A central rationale for structuring the evaluation framework at the program, research and policy levels is to highlight the way the three levels interact. Programs influence and feed into policy development and vice versa (see Figure 4)[15]. Research supports improvement toward societal goals in both policy and programs. It is important to monitor the extent to which policy is being used as a tool to develop, expand and support farm to school programmatic activities. It is also important to explore how on-the-ground practices, such as creating bids for local food procurement, may benefit from changes in existing policies.

Policy development can contribute to transformative institutional changes with improved access to resources and benefits for farm to school. For example, legislation passed in 2006 in Oklahoma created a paid farm to school coordinator position at the state Deptartment of Agriculture, was an impetus for expanding farm to school activities in the state. The Department of Agriculture's farm to school coordinator has connected producers and schools, conducted educational sessions, trainings and workshops to build capacity and awareness, and created materials to promote the agency's interest and commitment to farm to school. This dedicated staffing to support farm to school activities within a state department is not unique to Oklahoma; a total of eight states have created positions in either the state agriculture, education or health departments, or more than one position in multiple state agencies[16].

Alternatively, learning from on-the-ground programs can be utilized to champion policy changes. These could be in the realm of removing barriers to successful farm to school implementation or toward general support and encouragement for farm to school activities. For example, as more schools in the nation prioritized and sought locally grown produce, they lacked clarity on the administrative rules. This lack of clarity was proving to be a barrier for farm to school implementation. The 2008 Farm Bill included the "geographic preference" provision to make it easier for schools to buy locally[6,7]. Since then, USDA has provided trainings and webinars on this topic to assist school districts' understanding of the geographic preference rule and how it can be used for farm to school procurement. Additionally, the 2014 Agricultural Act (P.L. 113-79) established a new farm to school pilot program for procuring

Figure 4: The Policy Process: The Chicken or the Egg? [15]



local fruits and vegetables and a food and agriculture service-learning program in section 4201 and 4202[17]. As described in the examples above, the demand for farm to school activities in schools and communities can drive policy change.

Some policies affect farm to school activities directly, such as dedicated state positions, or the geographic preference procurement rule; others may have a more indirect impact. Below are a few examples of federal, state and local policies that can support farm to school.

Federal Policy

- **The Child Nutrition Act Reauthorization (CNR):** In 2004, for the first time ever, the CNR established a federal farm to school program, though it was unfunded. With increased demand and support from communities and Congress alike, the Healthy Hunger-Free Kids Act (or CNR 2010), provided $5 million per year in mandatory funding for the Farm to School Grant Program. The USDA's Food and Nutrition Service now administers this grant program. This act also required school districts to adopt local wellness policies.

State Policy

- **State legislation, agency programs and institutional policies:** Farm to school programs are more likely to occur in states with supportive legislation[18]. In 2013, 38 states and Washington, D.C., have passed policies supporting farm to school. In 2012 and 2013 alone, 20 states passed farm to school legislation and 17 others introduced legislation supportive of farm to school[16].

- **The Common Core State Standards Initiative:** A state-led initiative in the education sector set forth learning goals to help prepare students for college, career and life[19]. Farm to school education and school gardening activities will be most impactful if they align to these standards in support of education goals.

Local Policy

- **Local school district and school wellness policies** were supported through the 2004 Child Nutrition Reauthorization that required that all school districts receiving federal funds for school meal programs adopt a local wellness policy. Many school districts have included language in their wellness policies to encourage farm to school. Schools may develop and adopt their own wellness policies that expand on the district's template[20].

- **School district procurement policies:** Schools have significant purchasing power and through policy can encourage the production of and access to healthy, local foods in their communities. For example, the Los Angeles Unified School District signed on to the city's "Good Food Purchasing Pledge" in October 2012[21].

- **School district fundraising policies:** Smart policies can support a wide variety of farm to school-related fundraising endeavors, such as allowing a farm stand on the school campus or creating criteria for products included in fundraising efforts.

- Cities are beginning to explore their role in farm to school. Here are some specific examples:

  - **Healthy Eating Active Living (HEAL) Cities Initiative:** The campaign suggests policies cities can use to support and align with farm to school program activities[22].
  - **Good Food Purchasing Program Los Angeles:** A comprehensive and metric-based food purchasing policy, developed by the LA Food Policy Council. Los Angeles Unified School District became the first school district in the country to sign the Good Food Purchasing Pledge[21].
  - **Food policy councils (FPCs):** FPCs can be statewide, regional or at the city level. Many FPCs have made farm to school a priority, working to remove barriers for communities to implement farm to school core elements, such as local procurement. Of the 270 FPCs listed in the Directory of Food Policy Councils in North America, 33 specifically list food access or gardening in schools as a top priority[23].

03
Framework Development Process

This chapter describes the methodology used for development of this farm to school evaluation framework. It outlines the collaborative processes undertaken to engage multiple tiers of stakeholder groups, the theoretical basis of the framework, and the prioritization of farm to school outcomes, indicators and measures across the four sectors.

←

Image created by attendees of the 6th National Farm to Cafeteria Conference under the supervision of artist Bonnie Acker.

Stakeholder Engagement:

Informal Engagement:

Informal discussions about the need for an evaluation framework and what it would take to create one have been occurring for a number of years. Conversations on the need for a nationally coordinated effort for farm to school research and evaluation began to coalesce in 2007[1]. Since 2008, the National Farm to School Network has convened three short courses at the 2009, 2010 and 2011 National Farm to Cafeteria Conferences, and at the 2011 Community Food Security Coalition's Annual Conference, engaging a total of 250 people. All these events have informed the rationale and content for this evaluation framework. Discussions at these gatherings revealed that on-the-ground farm to school implementers were seeking guidance on common tools and metrics; researchers were seeking consistent program articulation, a theory of change and validated indicators in the four sectors; and policymakers were working to identify barriers or seeking opportunities to support farm to school.

Simultaneously, efforts were undertaken to review and compile informal reports and peer-reviewed literature on the topic[2–4] and evaluation tools used[5]. Data collection through state and federal government surveys where there were opportunities to insert questions related to farm to school were identified and recommended.

Formal Engagement:

Progress toward creation of this evaluation framework document was initiated in late 2012. In addition to a scan of recent literature on farm to school practice, evaluation and research, a stakeholder analysis[6] was conducted to identify different perspectives needed to inform the development of the framework. Using a participatory process, several experts in farm to school and related sectors — evaluators, researchers, policy experts and on-the-ground practitioners were engaged in the development of this framework (see the Acknowledgements section). This formal stakeholder engagement forms the basis of the process described below for developing the evaluation framework:

Phase 1: Identification of broad areas to guide the framework development process

In-person meeting in Hartford, Conneticut, September 10-11, 2013: Using a purposive sampling method[7,8] the project team identified and invited individuals or organizations to participate in the meeting. Participants had either produced a body of written and/or programmatic work related to farm to school, or had a strong understanding of farm to school programming, policy or systems interactions, or had experience in one of the four sectors aligned to farm to school. The project team also selected individuals who would be able to apply an equity perspective to farm to school practice. The two-day in-person meeting served as the kick-off to the framework development and drafting process, with 21 persons in attendance (listed as attendees in the Acknowledgments section). This group determined the need to use a social-ecological model to guide the framework, and agreed upon four sectors that influence potential outcomes of farm to school discussed in the literature, identified key principles and values to support the framework, identified potential audiences and how they may use the framework, and began outlining cross-sectoral connections.

At this meeting, the group agreed on these overarching principles to guide the development of the farm to school evaluation framework:

- Farm to school can support community health (described in Chapter 1).
- Farm to school interactions are complex, and it is important to understand the cross-sectoral linkages.
- The socio-ecological model is a useful tool to understand behavior change across sectors resulting from farm to school activities.
- The equity approach of farm to school should be emphasized.
- The framework should not be prescriptive, and should provide room for specific program sites to interpret the recommendations.

Phase 2: Framework content development

Sectoral workgroups (September 2013 to March 2014): After the in-person meeting, participants self-selected how they would continue to be involved in developing content for the framework. In September 2013, participants broke into workgroups. The project team developed two working groups of participants: (1) public health and education, and (2) community economic development and environmental quality, to take advantage of the knowledge and experience of the participants.

From November 2013 through March 2014, the workgroups completed the following activities through conference calls and individual assignments:

- Provided definitions for each sector as it relates to farm to school;
- Explored how various farm to school program elements influence short-term, intermediate and long-term outcomes;
- Identified priority farm to school outcomes using a set of agreed upon criteria and rationale for prioritization;
- Identified potential indicators and related measures to measure priority outcomes;
- Identified existing data sources and data collection methods;
- Identified cross-sectoral connections, and
- Developed recommendations for evaluators, researchers, policymakers and other users of the framework.

Phase 3: Content expansion and feedback from external reviewers

Internal and external framework review (March to April 2014): Workgroup participants in February 2014 reviewed a first draft of the framework. They contributed further to content elements, such as additional measurement tools or data sources, and confirmed prioritization of the proposed outcomes and indicators. In March 2014 the project team sent out a draft to reviewers selected based on their expertise in each sector area, and experience with farm to school and policy development. Through a systematized online form, reviewers provided feedback on usability of the document, content, prioritized outcomes, indicators, measures and sample tools. The project team and authors addressed reviewer suggestions

Equity

Equity means all people have full and equal access to opportunities that enable them to attain their full potential (King County, Washington Ordinance 2010-0509)

Just and Fair Food System

Whole Food Measures for Community Food Security notes that a food system is just and fair when it:

1. Provides food for all
2. Reveals, challenges, and dismantles injustice in the food system
3. Creates just food system structures and cares for food system workers
4. Ensures that public institutions and local businesses support a just community food system

and concerns by expanding possible measures or providing explanatory text about why the framework prioritizes specific outcomes, indicators or measures. In April 2014, the framework underwent a second external review process by additional reviewers, including those who gave input at the National Farm to Cafeteria Conference. Approximately 43 individuals from 35 different organizations reviewed and provided feedback on the document.

Phase 4: Working draft release at the 7th National Farm to Cafeteria Conference in Austin, Texas

Public review of the draft framework (April 2014): "Evaluation for Transformation" (a short course at the 7th National Farm to Cafeteria Conference, April 15, 2014) served as a limited release of a working draft of the framework, as well as an opportunity to get additional feedback, revisions and content suggestions from those in the farm to school practitioner, evaluation and research fields. Sixty-two individuals attended this short course. This exercise was crucial to meeting the overarching project goal to build capacity in the farm to school field for using existing evaluation methods and tools. The short course provided the opportunity for attendees (farm to school practitioners) to begin thinking about and working with the framework. The framework refers to many resources that are located on the National Farm to School Network's searchable database of resources and literature. The framework should be used in conjunction with those online resources.

Phase 5: Ground testing

Framework launch and testing (July 2014): The final framework document was launched online in July 2014. An online form collects practitioner feedback, which could be incorporated in future editions of the document.

Theoretical Basis of the Framework:

Farm to school activities at sites across the country vary widely and are largely determined by community needs and assets. In order to clearly articulate and understand what outcomes are feasible, the project team and contributors needed to ground farm to school core elements in a theoretical framework to guide practices across specific sites. The project team and contributors chose to use a socio-ecological model from health promotion to guide this evaluation framework, because it highlights the role of social relationships, cultural norms, physical environments and institutional policies in influencing individual behaviors[9–13]. Social ecological models are used extensively in the public health field[9], including by the Institute of Medicine to address diet-related issues[14], such as how environmental conditions affect children's behaviors related to chronic conditions like obesity[11–13,15].

Additional theoretical perspectives that guide farm to school efforts include social cognitive theory[16], the social-ecological transactional model[17], and the experiential learning model, along with others in school gardening[18]. The poly-theoretical model uses many of these same theories to understand how food- and garden-based education in school settings affects a school's learning environments in ways that directly and indirectly affect student characteristics and behaviors for outcomes related to public health and education[19]. The framework also applied a systems perspective in situating farm to school within existing contexts, such as the education system and the economy, as these larger systems affect what is feasible in farm to school[20].

The project team reviewed multiple socio-ecological models to find a good fit for grounding the evaluation framework and used elements of several models[9,19,21–24]. The hybrid model retains characteristics of other social ecological models while using descriptions that relate to farm to school activities. For example, the categories in the diagram describe different settings where the model can be used to predict how intrapersonal (such as knowledge), interpersonal (such as peer relationships), organizational environments (such as availability of healthy foods at school), community (such as expectations about access to healthy foods) and public policy factors interact to affect individual and institutional behaviors related to farm to school. Policy is typically built into social ecological models as

the outer-most ring that affects all environments and relationship settings within, the hybrid model used in this framework emphasizes it as a common thread across all the various environments (i.e. individual, family, community, region, country and state, and culture and society) and levels of influence. This hybrid model was used to outline outcomes in each sector, and across sectors (see Figure 5).

Figure 5: Socio-Ecological Hybrid Model Applied to Farm to School

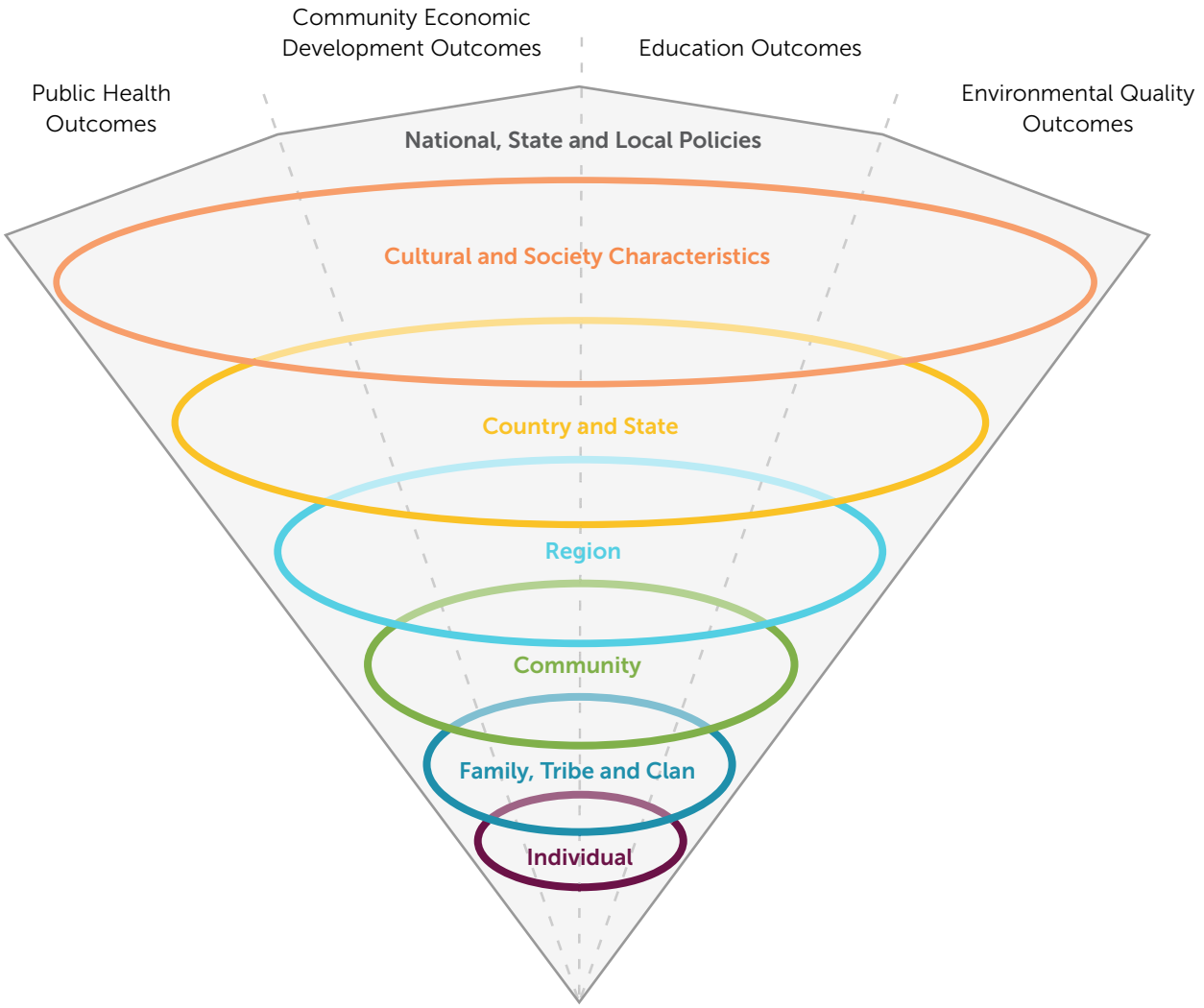


Figure 6: Criteria for Selecting Measures Aligned to Priority Outcomes[21]

- Should be reliable and consistent over space and time
- Verifiable and replicable
- Make use of available data/be easily measured
- Measure what is important to stakeholders
- Be diverse enough to meet the requirements of different users
- Be limited in number

Priority Outcomes, Indicators and Measures

Based on their field of expertise in the four sectors, workgroup participants identified an initial list of at least three outcomes for each sector, which was further edited and prioritized. Using an agreed-upon criteria, the groups identified indicators or measures for at least three priority outcomes (where feasible) in each sector for the following levels:

- Program-level outcomes
- Research-level outcomes
- Policy outcomes

The framework focuses on these three levels to 1) provide guidance for program sites who want to expand their program evaluation efforts, 2) build capacity in the field for developing common language and outcomes at each level, 3) support growth in the research field connecting program activities to researching associations, and causality between program activities and outcomes in the sectors, and 4) suggest areas for policy development that will support programs.

The differences between where program evaluation leaves off and research begins can be hard to distinguish. In general:

Program evaluation - uses systematic methods to collect, analyze, and report information about activities undertaken in order to improve, or further develop implementation. It serves as a feedback loop for program coordinators, partners, and participants. The program level outcomes prioritized in this framework are intended to be easiest to measure, requiring the least amount of resources to measure, and are site-specific. The project team, in scanning the literature and discussing current farm to school practice determined that long term outcome evaluation, surveillance, and monitoring to examine systemic changes is beyond the scope of evaluation efforts undertaken by an individual farm to school site – these practices need additional support from researchers.

Research - While researchers use similar methods as evaluators for conducting interviews, surveys, or quantitative data collection, unlike evaluation, the focus of research is to advance theory or what is known about a specific topic. The research level outcomes prioritized are intended to build on evaluation efforts at the program level. The project team learned from reviewers that some schools and districts are partnering with external evaluators or support organizations to examine many

measures in the four sectors at the research level. The evaluation framework is not intended to limit program activities, rather it sets realistic expectations about what is needed to do evaluative work at the program, research, and policy levels. Research-level outcomes are anticipated to require significantly more resources, are to be measured over longer time periods, and will likely need to use sophisticated data collection and analysis methods. Researchers can build on the efforts of program evaluators by conducting cross-site studies and examining multiple outcomes across sectors from similar program activities.

The group used the criteria in Figure 6 for selecting measures to ensure that the outcomes, indicators and measures could be measurable by practitioners at program sites. The project team selected research and policy measures by first applying the criteria in Figure 5 and further identifying those that have the most direct relationship to program activities and program articulation as described in Chapter 4.1. Based on feedback received from workgroups and reviewers, measures were modified or added to different sectors across the program, research and policy levels. The project team made final decisions on the selected measures based on feedback received, their understanding of the literature, current farm to school practice and vision for the field. Each working group discussed and addressed gaps in priority outcomes, indicators and measures; identified additional measures, if needed; and confirmed existing data collection mechanisms. While all members of the working groups did not always reach consensus on the prioritized outcomes, indicators and measures, there was general agreement on how any concerns or challenges raised should be addressed in the framework document.

Priority outcomes, indicators and measures are listed in Chapter 4 for each of the four sectors of public health, community economic development, education and environmental quality. A template is provided with descriptions and instructions on interpretation.

Table 2: Template for Interpreting Prioritized Outcomes, Indicators and Measures

LEVEL  Program  Research  Policy
PRIORITY OUTCOME Changes or benefits that result from activities and outputs. Short-term outcomes are the most closely associated to program activities. Intermediate outcomes result from short-term outcomes. Long-term outcomes evolve from the previous two outcomes. Most of the outcomes listed are considered intermediate to long-term outcomes.
INDICATOR State of a particular subsystem to help understand causes of problems and work to address them. A "system performance" indicator is one that reflects how the system is working and can help the community see how the system is working and anticipate potential breakdowns or changes in direction[22].
MEASURE 1, 2, ETC. Measures are different aspects that can help people explore how an indicator is changing over time.
ASSOCIATED CORE ELEMENTS Procurement, gardening or education activities required to result in the related outcome.
DATA SOURCES Recommended methods to gather, track or monitor information identified as a prioritized measure where relevant.
SAMPLE TOOLS Refers the reader to existing tools, data collection organizations or surveys at the program level.

04
Priority Outcomes, Measures and Indicators

This chapter is divided into five subsections, starting with program articulation, and followed by sectoral subsections aligned with public health, community economic development, education and environmental quality. Each sectoral subsection describes the connection to farm to school and the alignment to the hybrid socio-ecological model to help the reader understand how outcomes in this sector may affect individuals, families, communities, regions, states, the country, cultural and societal characteristics, and policies.

Then it sets forth a set of priority outcomes, indicators and related measures at the following levels:

Program level: to help sites establish a baseline for evaluating farm to school activities.

Research level: to guide researchers on priority outcomes needed to further the field.

Policy level: to provide policy advocates and policymakers guidance on policy opportunities to explore.

Finally, a description of the cross-sectoral connections is outlined to further highlight the multidimensional potential outcomes of farm to school activities.

Sector descriptions in the context of farm to school:

Public Health

Local and nutritious foods, including those that are sustainably produced and processed, should be available in all schools and early childhood education centers to nourish every child, regardless of race and ethnicity, economic standing, or geographic location. Farm to school activities aim to provide healthy food options and nutrition and food-based education to influence healthy eating behaviors and healthy lifestyles in children. These activities also aim to educate and engage parents, thereby reinforcing healthy family eating and food purchasing behaviors. Farm to school has the potential to connect people to the land to the source of food. Through the use of school and community gardens, farm to school can contribute to healthy neighborhoods where communities have a better understanding of how food is grown and how food affects their health and wellness. Farm to school activities encourage relationship building among community members such as farmers and educators, who might not otherwise collaborate.

Community Economic Development

Farm to school provides economic development opportunities to producers, (i.e. farmers, ranchers, fishers) laborers, distributors, processors, cooks and foodservice staff, as well as others who support the local food system. Beyond this, farm to school may also specifically benefit those who have historically lacked equal access to the traditional food system, such as small or mid-sized operations, lower income individuals, women and people of color, and those in rural areas. Farm to school activities can support these groups by building long-term economic vitality within the local food system through creating a demand for local food products. Further, the value of equity applied to the community economic development sector implies living wages, safe working conditions, and equal opportunities for marketing, value-addition, and distribution for vulnerable populations.

Education

A child's readiness to learn while they are at school is impacted by their health. School environments, which support learning about making healthy eating decisions at school and at home, are needed for children to develop to their full potential. Farm to school can support educational outcomes for students by increasing student access to healthy foods in the physical school environment, and promoting educational activities that engage children and families in learning about, and developing skills related to eating healthfully. Farm to school curriculum and experiential activities are also a platform to teach core content areas such as science, math and language arts through lessons on food and the food system.

Environmental Quality

As an essential part of creating healthy communities, farm to school activities can support environmentally sound, sustainable and socially just approaches to food production, processing, packaging, transportation and marketing. Farm to school activities can support practices that build healthy soil, clean air, clean water and ecosystem processes in urban, suburban and rural environments. Activities may promote an ecological ethic among participants, develop infrastructure that supports healthy environments, and promote agriculture and food distribution practices that mitigate climate change.

4.1 Program Articulation

This section describes the need for consistent program articulation as a basis for effective evaluation, and provides templates that can be used to describe the farm to school core and supporting elements implemented at school and early care sites.

The Need for Consistent Program Articulation

Consistency in describing farm to school activities is needed to distinguish the most effective elements and components, as well as inform how related outcomes are measured. Program evaluators need an understanding of which people are exposed to which type of activities, for what duration of time, in order to discern how they are meeting the targeted short-term outcomes for the selected activities, and to compare changes from year to year. Researchers who undertake cross-site studies need to understand which sites are using similar activities and are being implemented in similar ways in order to determine how specific activities and their combinations result in specific outcomes. For example, while every farm to school site may currently define "local" in their own way, if every site were to consistently communicate its geographic definition of "local," then researchers would have a way to understand how different farm to school sites around the country relate to one another in terms of outcomes related to the farm to school core element of procurement.

Further, consistent program articulation provides the context for understanding which activities work in which settings and why. For example, farm to school education and gardening activities overlap with other forms of instruction or curriculum, and can be merged with multiple core content areas in a school setting. The reporting on design and implementation of activities, such as information on the frequency, dosage and time children are engaged in these activities is a crucial factor for understanding the outcomes associated with farm to school education and garden activities (described in Chapter 4.4). Documenting which activities are specific to farm to school — beyond normal classroom or learning activities — will help program evaluators and researchers understand their unique contributions to educational outcomes beyond what children would otherwise experience in a classroom. Comparing the implementation and scope of various farm to school activities at sites will provide a better understanding of what combination of activities are linked to the desired outcomes.

Finally, with consistent program articulation, practitioners can easily share stories, data, successes and lessons learned from their experience with a variety of audiences. Practitioners should consider

Simca Horwitz, Massachusetts State Lead for the National Farm to School Network, tends a bed of strawberries at a community garden. (Credit: Chelsey Simpson)

writing quarterly or semi-annual descriptions of their farm to school activities; this can be used to report to the school board or funder, promote efforts in the local media and to elected officials, and celebrate success with participants and collaborators.

Communities want to hear about farm to school efforts and successes! Tell them about:

- Did farm to school activities help children learn new skills for preparing food?
- Did the school site purchase and serve a new product children had not tried before?
- Did chefs do a cook-off with local ingredients to raise funds for farmer visits?
- Did the school nutrition program start a catering business that serves other institutions?

A Guide for Consistently Describing Farm to School Activities

It is critical for sites to have systems in place for tracking and communicating how farm to school core and supplemental elements are being implemented. This is important because from year to year, participants may forget why one set of activities led to a specific outcome. For example, supporting elements such as training, promotion, volunteers hours and donations may make a difference in the number of children who are able to participate in the farm to school activities, or what combination of activities are possible.

Table 3 provides a recommended structure for consistently describing farm to school activities across the three core elements, and the six supplemental elements. These activities are aligned with the priority outcomes listed in Chapters 4.2-4.5, and have been informed by existing tracking tools used by organizations and grantors[1–5].

Table 3: A Guide for Describing Farm to School Activities

Farm to School Core Element	Recommended Activities and Descriptions
Procurement (of local and regional food products)	Variety and amount of local and sustainably produced products purchased (fruits, vegetables, meats, seafood or poultry, plant-based proteins, fluid milk, baked goods, grains/flour, herbs, eggs) Ways in which local foods and their producers are promoted to whom and how often Total dollar amount and percentage of school food budget spent on locally grown and processed foods Food preparation strategies used to increase local foods availability, accessibility or appeal Serving strategies used to increase line of site and reach of healthy local foods Number of local and regional producers/processors from where product is purchased Ways procuring local foods is connected to garden and/or educational activities in the school, home and community Number of students with access to local products
Gardening (school-based gardens)	The number and type of participants including students, parents, staff and community members (for students, include grades and ages) The number of times and duration participants engaged in various types of gardening activities of planting, tending, harvesting, preparing and consuming and over what time period Curriculum used in the garden, which content area(s) and standards it aligns with, if any Kinds and types of educational activities (i.e. taking measurements for math, project-based learning or other) used with participants Types, frequency and duration of garden activity engaged with the school cafeteria, farmers, food processors, community and the broader community Ways gardening activities are connected to procuring local foods in the cafeteria and/or educational activities in the school, home and community
Education (food and farm related)	The number and type of participants including students, parents, staff (for students, include grades and ages) Subjects, grade levels, number of classes where farm to school activities and if curriculum is aligned to core content standards Ways educational activities are connected to procuring local foods in the cafeteria and / or gardening activities in the school, home and community

Table 3 Cont.: A Guide for Describing Farm to School Activities

Farm to School Supplemental Element	Recommended Activities and Descriptions
Training and professional development	The number and type of participants including students, parents and staff who receive training and professional development What types of training and professional development is provided The learning objectives and skill development through trainings provided The specific goal area this training helps support. Is this cooking demonstration for a new seasonal product? Are farmers learning how to present to children in the classroom?
Promotion and media	In what ways and how often are the core farm to school elements promoted and to whom? In what ways and how often are farm to school outcomes promoted and to whom? For example, does your chamber of commerce realize that 250 children grew vegetable starts for a very successful fundraiser this spring?
Planning, coordination and evaluation	Who helps plan, implement, and evaluate the farm to school activities? Are they within school (teachers, students, nutrition services staff), or outside of school (parents, community members, farmers, external evaluators)? What is everyone's role and responsibility? How are evaluation findings shared within the site, with the community, and the media?
Outreach and community engagement	In what ways and how often are family and community members engaged? How frequently do volunteers participate? Consider keeping a volunteer log.
Policy alignment	List applicable local school district and school policies that support farm to school core elements, such as wellness policies. See Appendix 2 Implementation Resources for sample model wellness policy language that incorporates farm to school
Funding	Types and amounts of internal (within school district) or external funds or in-kind support secured for implementing farm to school core elements

Students in Riverside, CA show their approval for local salad greens. (Credit: Emily Hart Roth)

In addition to describing the core and supporting farm to school elements, it is useful to track how activities were implemented over the course of a school year. Table 4 provides a sample table shell that can be used for this purpose. This tool can be used for planning at the beginning of each year for those sites with multiple teachers and nutrition service staff working in a team. It provides a quick snapshot description of how and when the different core and supplemental elements are being implemented at a site.

Logic Models

A logic model can strengthen consistent program articulation, help practitioners easily describe the multiple components of farm to school, and support program planning and evaluation. It can assist program coordinators in identifying strategies and activities that most align with their goals, identify potential outputs and consider how those outputs can lead to outcomes[6]. It can help practitioners examine program strengths and weaknesses, identify which elements of a program are working, and identify areas that need improvement. See Table 5 for a template and Appendix 4 for an example of a program logic model.

Theory of Change Models

Especially for sites that seek to support family and community level changes, the articulation of a theory of change may serve as a useful tool to guide efforts. This version of a logic model has community members and program designers identify the community problem, assess a community's needs, note assumptions and take stock of other influential factors that may contribute to how the program could work[7].

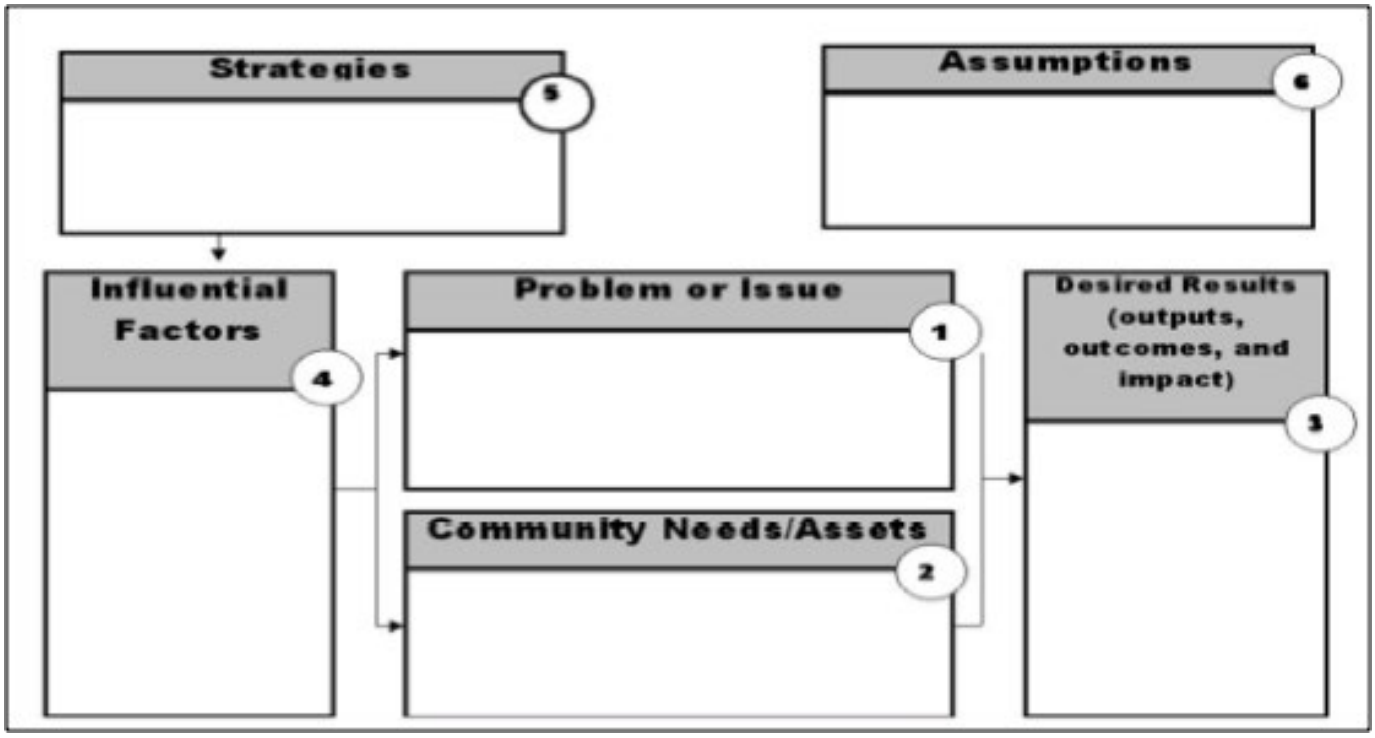
Table 4: Table Shell for Tracking Farm to School Activities Over a School Year

	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar.	April	May	June	July
Procurement										strawberries		
Garden												
Education												
Specific Supporting Element		training for kitchen staff										

Table 5: Table Shell for a Program Logic Model

Inputs or Resources	**Activities**	**Outputs**	**Outcomes: short term**	**Outcomes:**
Things we buy or have donated:	What we do:	*Because of our activities, we had these results:*	*And because of our results, these changes occurred:*	**intermediate and long term**

Figure 7: Theory of Change Template[7]



Program Articulation's Relationship with Evaluation and Research

This framework suggests farm to school sites begin consistently describing and documenting their activities in a way that makes sense in their context to support program evaluation. In this framework the intention is for program-level outcomes to be easiest to measure, connected to a specific program's goals and program plan, and require the least amount of resources to conduct. Similar to starting farm to school programs in one core element and building on success, it is unrealistic for external evaluators or researchers to expect program participants begin documenting every core and supporting element right away. The number of participants at a school and in a school district varies widely based on the program elements and who receives which activities. For example, it is often the case that one grade, or one class will receive more hours of garden activities that may be connected to a public health goal, while all students eating school meals potentially benefit from procurement activities. The purpose of Tables 3 is to propose that programs and researchers document and report what is needed to help describe outcomes, and the suggestions are aligned with priority outcomes and measures discussed in the rest of Chapter 4.

Program evaluation uses systematic methods to collect, analyze and report information about a program in order to improve, or further develop it. It can be simple or complex; for example, one action, if it is intended to improve outcomes, can be evaluated. Program evaluation serves as a feedback loop for program coordinators, partners or participants. The differences between where evaluation leaves off and research begins can be hard to distinguish. While researchers use similar methods as evaluators for conducting interviews, surveys or quantitative data collection, unlike evaluation, the focus of research is to advance theory or what is known about a specific topic.

Researchers can build on the efforts of program evaluators by conducting cross-site studies and examining multiple outcomes across sectors from similar program activity inputs. Consistent program articulation is crucial at the program level because evaluators and researchers need this information. The research level outcomes, indicators and measures will need a strong theoretical basis, often require sophisticated data collection and analysis, and require more resources and longer time periods in order to answer research questions. Long-term outcome evaluation, surveillance and monitoring to examine changes in systems or people's health status is beyond the scope of an individual farm to school site evaluation, and needs additional support from researchers and funders.

4.2 Public Health

There are well-developed lines of inquiry and conceptual frameworks hypothesizing how and why farm to school core and supplemental elements may lead to gains in knowledge, attitudes and behaviors related to public health outcomes[1–5]. Interest in farm to school from the public health sector has been spurred by the increased public attention toward, and funding for research and implementation of, innovative childhood obesity prevention programs (such as farm to school) over the past decade[6,7–12]. In turn, the field of farm to school has benefited due to the involvement of the public health sector in defining and evaluating the connections with the three core elements of procurement, gardening and education.

School meals are a critical point of access to healthy food for most children in the United States, with more than 5 billion school lunches and more than 2.2 billion school breakfasts served in 2013[17]. For many children, the meal(s) they consume at school are the only meal they will eat throughout the day[18]. School meal programs must meet the federally required nutrition standards[19], which are based on current Dietary Guidelines for Americans. With the incorporation of farm to school, school meals further serve as an access point for eating local and regional foods, education about local foods for children and their families, and sometimes the opportunity for engaging in preparation of local foods through cooking demonstration and food safety handling trainings. Farm to school is one component in a suite of school food improvement strategies to promote health and wellness by expanding access to healthy and local foods, while potentially encouraging skill building related to handling and using local foods[10,20–22]. Farm to school activities support children's development of healthy eating habits, such as preferences for, and consumption of, fruits and vegetables[7,23–25]. At the same time, farm to school activities can bolster the school nutrition program's efforts to address child and family food insecurity through boosting the interest in school meal programs, as well as potentially encouraging families to grow, safely prepare and cook healthy foods[26–32]. Key outcomes related to public health for farm to school listed in the literature include:

- Children's participation in school meals[33–40] and its relation to child food security
- Child knowledge and awareness about gardening, agriculture, healthy eating, local foods and seasonality in early care and K-12 settings[35,36,41–44]
- Students' willingness to try new foods and healthier options[35,45–47]

Public Health
For the purposes of this framework, "public health" is defined as "the combination of sciences, skills and beliefs that is directed to the maintenance and improvement of the health of all the people through collective or social actions. The programs, services and institutions involved emphasize the prevention of disease and [the] promot [ion] [of] good health ... of ... the population as a whole[13]." This includes "... policy development and population health surveillance[14]."

Sustainable Food System
A sustainable food system is one that provides healthy food to meet current food needs, while maintaining healthy ecosystems that also can provide food for generations to come with minimal negative impact to the environment. A sustainable food system also encourages local production and distribution infrastructures and makes nutritious food available, accessible and affordable to all. Further, it is humane and just, protecting farmers and other workers, consumers and communities[15].

Health Inequity
Differences in health that are not only unnecessary and avoidable, but in addition, are considered unfair and unjust[16].

Health Equity
Equity in health implies that everyone should have a fair opportunity to attain their full health potential and that no one should be disadvantaged from achieving this potential, regardless from social standing, ability, gender, economic factors, race, culture or ethnicity. Health equity is concerned with creating equal opportunities for health and with bringing health differences down to the lowest possible level, often through distribution of resources so that services and supports are available where they are most needed[16].

- Students' attitudes toward, preferences for, and consumption of, fruits and vegetables[45,47–58].
- Students' consumption of less unhealthy foods[45,50,51]
- Students' participation in physical activity in gardens[58,59]

A Public Health Lens for Farm to School

With a public health lens, farm to school activities aim to provide all preschool and school-age children and their families equitable access to healthy, local food and food education that empowers them to maintain and improve their health and well-being. It is important to note that the two words — local and healthy — are not synonymous and are not meant to be in the context of farm to school. The entire spectrum of farm to school activities provides opportunities for local foods that are healthy (such as fruits and vegetables, whole grains, lean proteins, etc.) to be introduced and incorporated into the school food environment, along with experiential nutrition and agricultural education activities for children. Schools and early childhood educators can use farm to school activities to build healthy cultural norms about food. This is crucial because a healthy diet and good nutrition are major factors, along with physical activity, in preventing chronic diseases such as type 2 diabetes and high blood pressure[61–66]. With the recent updates to the nutrition standards for school meals, based in part on recommendations of the Institute of Medicine[67,68], schools are serving healthier meal options to children than they were before. The addition of local foods to the mix offers unique educational opportunities that support the provision of healthier food options. Sensory activities with locally sourced foods — such as taste tests before new foods are introduced in the cafeteria, engagement in the school garden, cooking

"It's really important to bring the message that the kids are learning at school back to the home so they can get it again," Ashley Ponshok said. "If their parents feel strongly about the same things their teachers are telling them, kids are more likely to develop those lifelong eating habits[60]."

—Ashley Ponshok is with Live 54218, a nonprofit that aims to promote healthier lifestyles in Brown County, Wisconsin, through farm to school activities.

demonstrations and parent education, and creation of culturally relevant recipes — can bolster children's willingness to try new foods, thereby ensuring that school meals are eaten and enjoyed by children. Further, the purchase of local foods by schools can support local producers and processors, and in turn bolster individual or family health through employment and income generation, as discussed further in Chapter 4.3. Farm to school provides opportunities for public health agencies to collaborate with related agencies such as agriculture, education and child care licensing. Specifically from a public health lens, farm to school activities may:

- Respond to rising public health and nutrition concerns about childhood chronic diseases and obesity by providing opportunities for children to consume local, healthy food products such as fruits and vegetables[47–49,52,69–79], whole grains, and lean proteins.
- Provide schools opportunities for incorporating more fruits and vegetables in school meals, as required by the updated nutritional standards for school meal programs, 2010[19].
- Have the potential to change the school food environment through educational activities that emphasize healthy eating and the promotion of healthy lifestyles[10,12].
- Change a school's social and physical environments, including the curriculum and how it is taught[10,20,22,80,81].
- Positively reinforce how children learn about, their attitudes toward, and relationship with healthy food through health-promoting messages in schools and sent home to parents, hands-on activities, introduction of new foods at school meals and adult role-modeling[10,57].
- Inform early food preferences, especially for the youngest children (0–5 years)[44,82,83].
- Provide opportunities for family engagement, thereby ensuring that the healthy eating message is carried into homes[1,45,51,84].
- Can encourage food-production and food-preparation skill building, self-sufficiency and self-efficacy through experience in school gardening or cooking classes[32,85–89].

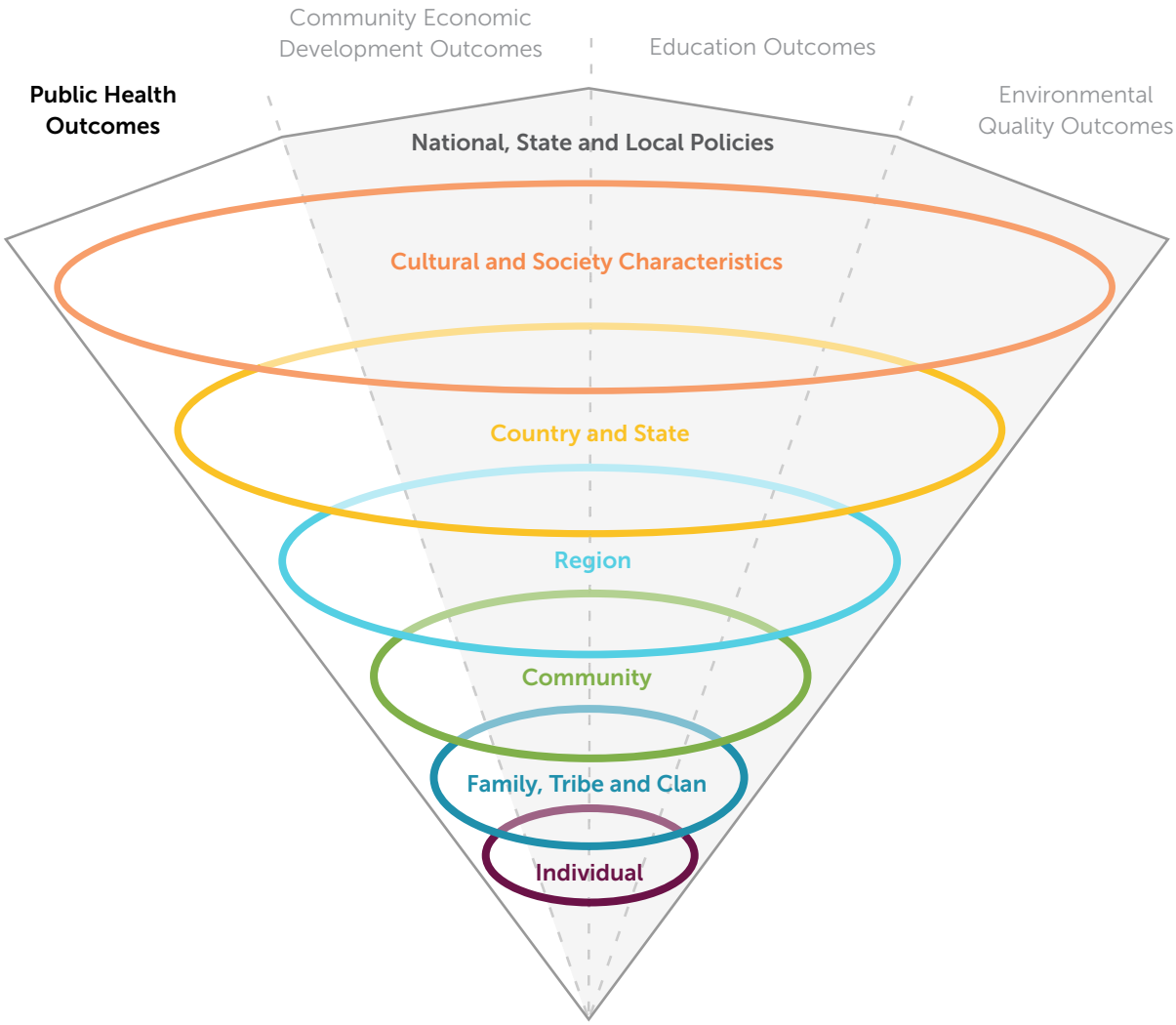
Using food as an educational tool is an avenue for increasing awareness and familiarity of healthy foods and local foods. For example, visits to regional farms can help children understand where and how food is produced, perhaps creating a personal connection with the farmer who grew the tomatoes served in the cafeteria. This is not possible when foods are purchased from much farther away. Emerging reports indicate that farm to school has been effective in strengthening children's and communities' knowledge about, and attitudes toward, agriculture, food, nutrition and the environment. Key social connection outcomes related to farm to school include:

- New connections between learning in classrooms and food eaten in cafeterias
- Improved school and community relationships[90]
- New relationships between producers and school districts[91–93].

Promotion of local and healthy foods can contribute to health promoting messages in our social and physical environments. At the local and state levels, promotional campaigns such as "Buy Fresh Buy Local" reinforce positive messages about local, healthy foods.

Farm to school activities can support public health outcomes at multiple levels of the socio-ecological model. Figure 8 provides examples of what this can look like using the SEM. Farm to school activities can impact physical environments, such as school settings, and social relationships at each level of this model because activities can influence institutional and individual behaviors.

Figure 8: Socio-Ecological Model Relating Farm to School Activities to Public Health



- Individual: Children are aware of and have positive attitudes toward healthy, local fruits and vegetables in their school lunches, and demonstrate new eating behaviors.
- Family, Tribe and Clan: Children bring home samples and recipes of local, seasonally available foods served in schools to try at home.
- Community: Families visit local farmers' markets and connect with farmers that produced the foods their children consumed in school and purchase products for home use.
- Region, Country and State: Land-use laws support development of gardens and urban agriculture to produce foods for communities.
- Cultural and Society Characteristics: Preference for local and healthy foods becomes the social norm.
- National, State and Local Policies: Legislation supports farm to school, such as state policies that encourage gardening in schools.

Public Health: Priority Outcomes, Indicators and Measures

The priority outcomes, indicators and measures for public health are presented in this section. They are categorized by program, research and policy levels. At all levels, program coordinators, external evaluators, researchers and policy developers will also need to consider collecting stories of changes related to health outcomes that are difficult to measure. For example, families sharing how students asked to try a new food at home, or are motivated to make nutritional changes through buying local items, or decided to garden in a local community plot. Stories are important to communicate beyond any data collected to help various audiences — including participants — relate to farm to school programming potential.

Program Outcome: Students and their families access locally produced, healthy food through schools

School meals play a critical role in ameliorating child hunger, and by extension family food insecurity, since for many students the school meal is likely the only meal they consume during the day[31,81,94]. Farm to school activities can increase the ability of school meal programs to support children of families experiencing hunger and food security, by improving the quality of school meals through introducing locally grown, healthy foods.

The first prioritized outcome for farm to school at the program level in relation to public health is focused on increasing access to local and healthy foods for students and their families at school. This is a means to help develop life-long positive eating behaviors and address food insecurity. Children can learn through educational activities to identify a variety of local and healthy foods that might be unfamiliar to them. Parents may accompany their children on field trips, take care of school gardens, participate in cooking classes, and help plan farm to school activities. These experiences can encourage child and adult understanding of where food comes from, how it is grown, which foods are healthy, and how foods affect their health. Schools may also become a center of community activity related to food, such as hosting farmers' markets on school grounds, hosting a drop-off site for a community supported agriculture program where families can buy local and healthy foods, and establishing small-scale farms where students and families can directly experience growing their own foods.

Measures Related to Indicator 1:

- Measures 1.1–1.4: These involve assessing farm to school program activity inputs and participants to ensure that program coordinators can track which activities, or combination of activities, are being experienced by which students. Tracking this can help program coordinators understand how activities can affect the degree to which students have access to healthy and local foods.
- Measure 1.5: This focuses on meal participation of students eligible for free and reduced-price meals to connect to food security as a health challenge. This measure will not be relevant to schools and districts where nearly all students are already eligible and participating in school meals based on economic circumstances before beginning farm to school program activities. Meal participation as a measure has many limitations discussed in the economic development section of this framework. Some contributors to this framework prioritized this aspect of meal participation as a measure despite these limitations because, 1) these students may be the least likely to have access to healthy, local foods in their communities; 2) farm to school procurement and education activities may connect these most vulnerable students with healthy, local foods; and 3) previous program evaluation results reporting general meal participation increases[26,51] have not focused on this more vulnerable group.
- Measure 1.6: This measure looks at whether local, healthy foods are incorporated into various school meal programs because these are key food access points beyond breakfast and lunch.

Table 6

Program Outcome: Students and their families access locally produced, healthy food through schools

Indicator 1: Student access to local, healthy foods in schools
Measure 1.1: Number of students participating in, or exposed to, farm to school activities such as school gardening, cooking, nutrition and food-based lessons
Measure 1.2: Food preparation strategies used to increase local food availability, accessibility or appeal of local, healthy foods, including use of culturally appropriate foods in schools
Measure 1.3: Food-serving strategies used to increase line of sight, accessibility and appeal of healthy, local foods, including use of culturally appropriate foods
Measure 1.4: The number of ways procuring local foods is connected to garden and/or educational activities in the school
Measure 1.5: Increase in the percentage of total free and reduced-meal eligible children participating in school meal programs when farm to school activities are present
Measure 1.6: Increase in use of local, healthy foods in school and outside of school meal programs, including breakfast, lunch, snacks, Department of Defense fresh produce program, summer and after school programs
Measure 1.7: Number of students directly engaged in the design and implementation of the food preparation and food serving strategies in Measures 1.2 and 1.3
Measure 1.8: Number of children directly involved in farm to school (students, teachers, administrators, farmers, food service) engaged in the design and implementation of farm to school activities
Measure 1.9: Number of students trained and participating in youth action research to help evaluate or assess impact of farm to school programs in public health measures such as food access, food literacy, etc.
Indicator 2: Family and adult access to local, healthy foods from farm to school program activities
Measure 2.1: Number of parent or caregiver participants participating in farm to school activities such as after-school programs, garden volunteers, field trips, nutrition and food-based learning, etc.
Measure 2.2: Number and type of nutrition, food- or agriculture-based learning materials sent home or shared with other community adults
Measure 2.3: Number and types of ways procuring local foods is connected to garden and/or educational activities in the home and community
Measure 2.4: Number and types of adults (i.e. teachers, parents or care givers, community partners, staff) engaged in the design and implementation of food preparation and serving strategies
Measure 2.5: Number of adults directly involved in farm to school (students, teachers, administrators, farmers, food service) engaged in the design and implementation of farm to school activities
Measure 2.6: Increased support and technical assistance for students and their families to grow and prepare their own food

Recommended program element(s) needed for this outcome: procurement, education and gardening

Data Sources: USDA Farm to School Census (Measure 1.1,1.2), school district meal participation tracking (measure 1.3), school district procurement records (measure 1.4)

- Measure 1.7–1.8: These examine the role students can play in developing activities they directly benefit from, and their involvement in evaluation of those efforts. This is connected to building student skills, empowerment and capacity.
- Measure 1.9: This measure examines the role schools may play in supporting family's skill and knowledge development in the use of growing whole, affordable, culturally appropriate foods and preparation techniques.

Measures related to Indicator 2:

- Measure 2.1–2.3: Parent involvement in farm to school activities can influence families' understanding of local and healthy food. Beyond this, it can motivate them to try new foods and increase access to local, healthy foods. Tracking the parental participation can help identify effective strategies schools can use to influence family access to local, healthy foods.
- Measures 2.4–2.5: Beyond involving parents as participants and learners, these measures encourage programs to engage families, school adults and other community adults as designers of activities and having a direct role (via the educators) in encouraging healthy, local food access.
- Measure 2.6: This measure examines the level of support adults in the community receive in growing or preparing food.

The framework does not prioritize a program-level outcome to directly measure student eating behaviors and related chronic diseases such as food consumption or changes in student body mass index (BMI); these can be found in the research section on the following pages. The authors classified these under the realm of research because of significant limitations in the ease of conducting consistent data collection at the program level. BMI remains a contested measure, and there are not clear ways to control for variables that affect student weight beyond farm to school activities in the school and community environments[95–99]. As a result, the framework recommends a focus on an outcome related to access to local and healthy foods that can support children being a healthy weight — in combination with educational activities for children and their families — as a plausible first step for developing long-term healthy food habits. Additionally, while it did not rise to a priority among contributors and reviewers, researchers should explore how student involvement in farm to school gardening activities may contribute to overall physical activity levels, given the relationship between being active and preventing chronic disease and a few emerging studies indicating that gardening increases physical activity levels[11,59,100].

Research Outcome: Farm to school activities influence awareness of local and healthy food availability in the community

Research-level outcomes, indicators and measures are those that the framework developers expect will require more resources, time or staff than is available at the program level. From a research perspective, one recommended outcome is focused on exploring how farm to school activities can increase family awareness of, and access to healthy, locally grown foods in their community. From a public health lens, this outcome is particularly important for families experiencing hunger or food insecurity. Many farmers who sell directly to schools may also engage in direct market sales to farmers' markets and connect with families in the community through this avenue. Additionally, when schools promote local and healthy foods through posters, newsletters and other media, it is likely that there is an increase in parental awareness about the availability and benefit of healthy, local foods.

This first research outcome focuses on access to local and healthy foods in farmers' markets and grocery stores to address the overarching goal of reaching vulnerable families. The indicator is centered on awareness because family and community activities may connect participants to local foods. The measures move from documenting program intervention elements specific to this outcome to exploring how these program inputs affect intermediate outcomes beyond the school.

Table 7

Research Outcome: Family access to local, healthy foods in the community

Indicator 1: Farm to school activities increase awareness of local food availability in the community.
Measure 1.1: Number of people who received local, healthy food through participation in farm to school program activities; for example, garden harvest baskets
Measure 1.2: Number of people who receive resources about accessing local, healthy foods in farm to school family outreach events
Measure 1.3: Number of families that begin gardening at home or in a community garden after participation in farm to school activities
Measure 1.4: Number of coupons given and redeemed by farm to school program for farmers' markets, farm stands or other access point for local, healthy foods
Measure 1.5: Self report of Supplemental Nutrition Assistance Program (SNAP) users who report using SNAP benefits to buy local, healthy foods, whole foods, edible plants and seeds and/or use at farmers' markets, food stands or other access points
Measure 1.6: The number of farmers' markets accepting SNAP electronic benefits transfer cards (EBT), Women Infant and Children (WIC) and Senior Farmers' Market Nutrition Program (SFMNP) vouchers participating in farm to school family activity programs
Measure 1.7: The percentage of direct sales to SNAP EBT clients participating in farm to school family activities at farmers' markets, including WIC and SFMNP vouchers
Measure 1.8: The number of local products that are SFMNP and WIC eligible sold by grocery markets in community participating in farm to school community activities
Measure 1.9: Number of farm to school sites that provide opportunities for students or families to engage in participatory research, service learning or action-based learning with family-related activities on food access

Recommended program element(s) needed for this outcome: procurement, education and gardening

Data Sources: USDA Agricultural Marketing Service data sets on SNAP, EBT, WIC and SFMNP at farmers' markets (measure 1), the Fair Food Network and the Farmer's Market Coalition and state farmers market websites may have data related to Measures 1, 5 and 6, What We Eat in America survey, Youth Risk Behavior Surveillance Survey

- Measures 1.1–1.4: Program activities and outputs are specifically connected to family engagement and promotion of local, healthy foods.
- Measures 1.5–1.9: Program activities ensure that family members have access to local, healthy foods and are reporting using them.

Research Outcome: Increased consumption of local and healthy foods

An exploration of the variables and strength of the relationship between farm to school activities and student dietary behavior is critical. Student eating preferences are connected to food exposures, sensory taste experiences, food quality, food attractiveness, role modeling and peer modeling, among many other factors that farm to school may influence[101–108].

An exploration of the variables and strength of the relationship between farm to school activities and student dietary behavior is critical. Student eating preferences are connected to food exposures, sensory taste experiences, food quality, food attractiveness, role modeling and peer modeling, among many other factors that farm to school may influence[101–108]. Farm to school activities may increase student knowledge of agriculture, food, health and nutrition, and life skills needed to select, prepare, serve and consume healthy snacks. It may also influence social and emotional development, such as motivation and self-efficacy to prioritize healthy eating behaviors, and attitudes and preferences such as the ability to grow their own food[1,49,109]. Emerging studies also indicate that farm to school can increase fruit and vegetable consumption, as mentioned earlier.

Broad associations between farm to school activities and population-level public health outcomes can be considered. For example, the Centers for Disease Control and Prevention's Youth Risk Behavior Surveillance System (YRBSS) is conducted in most states in the US every two years to better understand adolescent health-related behaviors. This data source is limited to children in middle and high school. Combined with data sets from the USDA Farm to School Census (currently slated to be repeated every two years), researchers could determine associations between school districts involved in farm to school activities and student-reported dietary measures, such as fruit and vegetable consumption. With this approach for comparing data sets across states, challenges related to sampling methods in each state will need to be addressed.

The School Nutrition Dietary Assessment Study (SNDA) conducted every five years examines the foods and nutrients provided to students through the National School Lunch Program and the School Breakfast Program, as well as other issues related to school food environments, such as school wellness policies, food safety and food availability. The SNDA includes data from a sample of students in grades 1–12 and their parents or caregivers, and could help researchers further understand the relationship between farm to school activities and student dietary behaviors.

Additionally, the National Collaborative on Childhood Obesity Research has an online catalogue of existing surveillance systems that researchers could use to explore prioritized outcomes for farm to school.

The second research outcome aligns with the public health field's increasing interest in encouraging people to eat healthy foods. Local food access can be a method of encouraging healthy eating behaviors. Indicator 1 relates to student changes; indicator 2 relates to adult changes.

- Measures 2.1–2.4: Focuses on self-reported information used in studies or through plate waste studies[110,111] where student plates are weighed or photographed before and after meals as a proxy for food consumption.
- Measure 2.5: This is an extension of the program level priority of increasing access to local, healthy foods among families.
- Measure 3.1: Involves parents or care-givers buying local foods. This can be a challenge in some areas where local foods are not affordable to some families. Program coordinators should consider alternative measures that are most relevant to their

programming, food availability beyond schools, and economic situation of families, such as number of school-provided coupons turned in at farmers' markets.

- Measures 3.2–3.3: Encouraging staff, teachers, parents and administrators to try new local foods can serve as role modeling for children, as well as support shifts in school culture around food.

With multiple factors working at the school and community level in tandem with farm to school activities, the framework developers recognize the challenge of clearly attributing long-term public health change to farm to school. More in-depth research is required to determine and isolate the impacts of multi-level activities in schools and communities on long-term health outcomes.

Table 8

Research Outcome: Increased consumption of local and healthy foods

Indicator 2: Student preferences for local, healthy foods
Measure 2.1: Increase in student awareness and knowledge about food and nutrition's impact on health
Measure 2.2: Increase in student willingness to try new local, healthy foods
Measure 2.3: Increase in amount of local fruits and vegetables students report eating
Measure 2.4: Increase in the number of students in schools and districts with farm to school (including procurement, gardening and education activities) consuming the daily recommended amount of fruits and vegetables
Measure 2.5: Decrease in fruit and vegetables or other healthy foods students discard after lunch
Measure 2.6: Decrease in amount of unhealthy foods students report eating
Indicator 3: Adult preferences for local, healthy foods
Measure 3.1: Increase in adult (i.e., family members, school staff or community partners if involved in learning activities) awareness and knowledge about food and nutrition's impact on health
Measure 3.2: Increase in the number of families who report purchasing local foods after involvement in farm to school activities
Measure 3.3: Increase in amount of local fruits and vegetables parents or care-givers report eating

Recommended program element(s) needed for this outcome: procurement, education, gardening

Data sources: USDA Farm to School Census, CDC Youth Risk Behavior Surveillance System, School Nutrition Dietary Assessment Study, Healthy Eating Research database, CDC Community Health Online Resource Center

Example indicators and measures that need further exploration are in Table 9.

Policy Outcome: Students and their families access locally produced, healthy food through schools

This outcome was prioritized at the program and policy levels, because programs require policy support to be fully realized. Increasing the availability and accessibility of local foods can be supported by policies that clearly articulate that this practice is allowed, is encouraged through allocation of resources, such as programming and staff time, and by providing dedicated funding for purchasing local foods and providing garden, food, nutrition and agriculture-based educational activities to school districts.

School district wellness policies and state policies were prioritized as an indicator, due to considerations related to ease of data collection (several organizations currently track these policies). The National Association of State Boards of Education's policy matrix has the potential to document farm to school language in wellness policies. The National Cancer Institute's project, the Classification of Laws Associated with School Students (CLASS) website, classifies state laws related to physical activity and nutrition in schools. The CDC also assesses health policies and practices at the state, district, school and classroom levels through the School Health Policies and Practices Study (SHPPS). The National Farm to School Network also maintains a listing of farm to school supportive policies at the state level. The National Council of State Legislatures online database provides information on state policies supportive of farm to school.

Cross-Sector Connections for Prioritized Outcomes in Public Health

With Economic Development:

Student interest in and preference for fruits and vegetables can influence family purchasing decisions, and thus impact local demand for local healthy products at farmers' markets, grocery stores and other outlets facilitating local economic development. Additionally, acceptance of electronic benefit transfer cards at these venues can incentivize the purchase of more fruits and vegetables by low-income customers.

Table 9

Public Health: Long-Term Outcomes Needing Further Research

Indicator 1: Chronic disease reduction
Measures: Reductions in the prevalence of Type 2 diabetes, obesity and high blood pressure among children and adult farm to school participants
Indicator 2: Participants meeting physical activity guidelines
Measure: Number of children and adults meeting the physical activity guidelines for Americans
Indicator 3: Participants meeting dietary guidelines
Measure: Number of children and adults meeting the Dietary Guidelines for Americans
Indicator 4: Reduction in child and family food insecurity
Measure: Number of children and families who report being food secure

Table 10

Policy Outcome: Students and their families access locally produced, healthy food through schools

Indicator 1: School district and school policy environment supports student access to local, healthy foods in school meals
Measure 1.1: Increase in number of local school district wellness policies that include language on farm to school activities as part of addressing nutrition and wellness efforts
Measure 1.2: Increase in the number of school-level wellness policies that include language on farm to school activities as part of addressing nutrition and wellness efforts
Measure 1.3: Increase in number of schools with policies that schedule recess before school lunch
Measure 1.4: Increase in number of schools with policies that support adequate time for student meals
Measure 1.5: Increase in number of times school boards review progress on implementation of school and district nutrition or wellness policies
Measure 1.6: Increase in the number of students, family and community members engaged in the development of school food policy, including representation on food policy councils, municipal councils, state legislative hearings, etc.
Measure 1.7: Increase in training farm to school stakeholders on policy and advocacy efforts, and follow ups conducted to engage youth, parents, growers and foodservice workers
Indicator 2: Federal, tribal, state and local government program and policy environments support local, healthy food access for schools and families
Measure 2.1: Increase in number of federal, state and tribal policies, initiatives or programs that support farm to school in relation to public health priorities (i.e., food policy councils)
Measure 2.2: Increase in number of city policies, initiatives or programs that support farm to school in relation to public health priorities
Measure 2.3: Increase in number of food policy councils or taskforces at the state, city, county or regional level that identify farm to school as a major priority and include representation of farm to school stakeholders such as youth, local producers and members of socially disadvantaged groups
Measure 2.4: Increase in number of state and tribal institutions with local, healthy food procurement policies
Measure 2.5: Increase in the number of state, tribal, county or city local food pilot programs that help establish needed distribution or other forms of infrastructure for farm to school activities
Measure 2.6: Increase in the number of times a review of the progress on implementation of policies is conducted or requested by the approving authorities
Measure 2.7: Increase in the number of training and support mechanisms for all farm to school stakeholders to engage in school or other food policy development efforts, including youth, parents or care givers, producers, laborers, foodservice workers, etc.

Recommended program element(s) needed for this outcome: procurement, education and gardening

Data sources: CLASS, SHPPS, National Council of State Legislature's online database, Growing Food Connections Policy database, Johns Hopkins Food Policy Council Directory

Offering samples of local products can be a great way for schools to introduce new vegetables and farm to school concepts. (Credit: Emily Hart Roth)

With Education

If students are eating fruits and vegetables, they have a greater likelihood of being and feeling healthy, which will affect their ability to concentrate and learn. Eating school breakfast is linked with positive outcomes in academic achievement.

Students who are healthy have higher attendance at school, and thereby have more consistent meal participation rates. In turn, student participation in school meal programs positively affects their ability to learn in class.

With Environmental Quality

When school meals have healthier (or higher quality) food options, it is expected that students will improve their nutritional intake, enjoy eating school food, and as a result reduce food waste from the cafeteria.

4.3 Community Economic Development

Creating community economic opportunities for producers who face barriers in the dominant food production, processing and distribution systems[1–3] is a priority of farm to school activities. Local and regional procurement for farm to school has evolved from a focus on fresh fruits and vegetables, to minimal processing and multi-ingredient "center of the plate" meal options. As a result, understanding the potential economic impact of farm to school and other local farm to table efforts across multiple agricultural industry sectors has become critical[4–11]. There are potential economic opportunities for those engaged in nearly all sectors of the food system, including producers, farm workers, distributors, processors, cooks and foodservice staff.

The first nationwide farm to school census for the 2011–2012 school year found that 4,322 school districts invested an estimated $385.8 million in local food purchases including fruit, vegetables, milk, baked items and herbs, among other products[16]. Put another way, results indicate that each school district engaged in farm to school procurement activities spent about 13 percent of their budget on local food, or on average about $89,300, although there is a wide range of school district budgets and dollars spent on local foods[16].

The existing literature on how farm to school, farm to table and other local purchasing initiatives can impact community economic outcomes has so far focused on job creation analyses and general economic activity from local foods at the local, state and regional levels[5,7,8,10,11,18–23]. Key economic outcomes cited in the literature include:

- Increased purchase of local foods served in school districts[24–34]
- Community interest about purchasing local foods[26,29]
- Market diversification[33–35]
- Opportunities to expand operations with processing and preservation methods[33,34]
- Development of grower cooperatives to supply institutional markets[33,34]
- Increased economic activity and development across sectors, job creation[8,20,21,36,37] Job training for adolescents[38].

A Community Economic Development Lens for Farm to School

Through a community economic development lens, the procurement of local and regional products by schools, and the education of children and communities about local and regional products, thereby creating a demand, are the critical goals of farm to school activities. In addition to small and mid-sized producers, farm to school may specifically benefit those who have historically lacked equal access to the traditional food system, such as lower income individuals, women and people of color, and those in rural areas. Farm to school in the context of community economic development provides opportunities to explore equity-related considerations in the food system, such as living wages, professional development, safe working conditions and equal marketing opportunities.

Jan Tusick of the Mission Mountain Food Enterprise Center, a division of Lake County Community Development Corporation in Montana, says, "Farm to school has resulted in a 40 percent increase in revenue for the center, and created two new jobs needed for processing additional product." She adds, "The Western Montana Growers Cooperative has seen their sales grow by $40,000 in the last quarter through farm to school alone. It is a win-win for everyone. I don't know why any school district board would not approve farm to school to be at their schools."[39]

—Local Farms, Local Kids: A Montana Farm to School Movie

Farm to school activities emphasize "local" in relation to community economies because of the "import substitution" concept[40,41]. Economies grow and are sustained by exporting goods and by producing goods they would normally import to avoid "leaking" dollars into external economies. Local food can potentially "plug the leak" of dollars that would normally be used to buy items from external economies and keep local dollars recirculating in a community's economy[40,41]. An emerging challenge in farm to school procurement is that as some programs "scale up" and incorporate more local product in school meals, their demand surpasses the local capacity to meet that need[42].

Farm to school activities may influence community economic development outcomes at multiple levels of the socio-ecological model. Examples are illustrated in Figure 9.

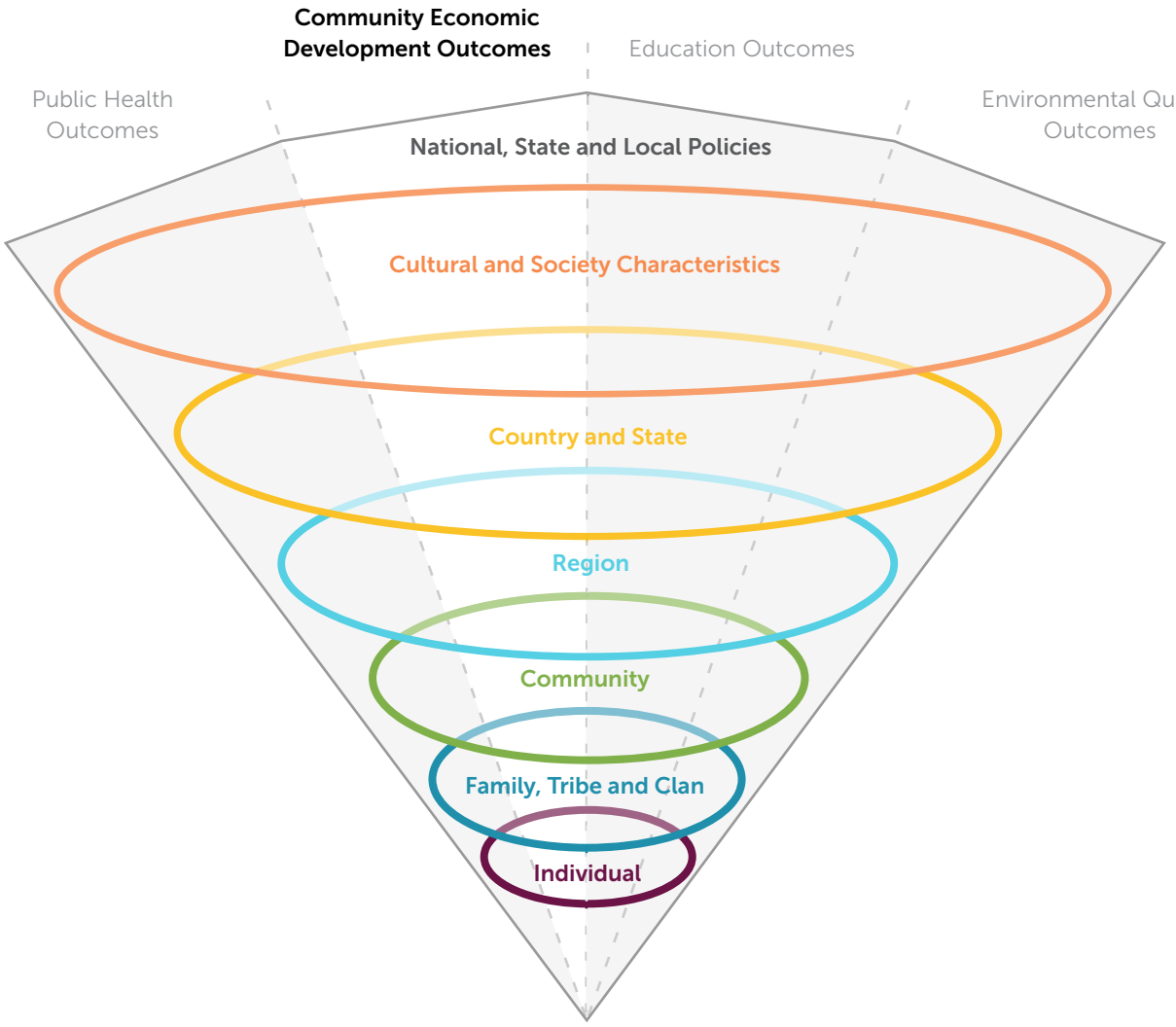
Economic Development:

The World Bank describes local economic development as offering local government, the private and nonprofit sectors and local communities the opportunity to work together to improve the local economy[12]. It focuses on helping businesses become more competitive, increasing sustainable growth and ensuring that growth is inclusive. The purpose of local community economic development is to build up economic capacity of a local area to improve its economic future and the quality of life for all. It is a process by which the public, businesses and nongovernmental sectors partner to create better conditions for economic growth and employment generation[12]. Community economic development in relation to farm to school supports organizations working together to support the local community food system.

Local:

What is "local" in farm to school procurement? "Local" is based on unique circumstances of the school site. Considerations include geography, climate, growing season and availability of agricultural products for use in schools. Schools may define "local" as within a certain number of miles from the school, within the county or within the state. Alternatively, definitions might include more than one state (i.e., Georgia, Alabama and Florida) or discrete parts of several states (i.e., specific counties in southwest Washington, northeast Oregon and Idaho)[13-15]. For example, the 2008 Food, Conservation and Energy Act of 2008 defined local and regionally produced food products as those that are "raised, produced or distributed so that the total distance that the product is transported is less than 400 miles from the origin of the product or the state in which the product is produced."

Figure 9: Socio-Ecological Model Relating Farm to School Programs to Community Economic Development



- Individual: People buy local food and know where it comes from, due to farm to school activities.
- Family, Tribe and Clan: Families visit farmers' markets and purchase from producers who supply their schools.
- Community: There are strong relationships between local producers, schools and the community. Parents request local foods at grocery stores; grocery stores increase the percentage of local foods available.
- Region, Country and State: Training for Good Agriculture Practices (GAP) certification is available to all growers who want it. Institutional food distributors carry more local products.
- Cultural and Society Characteristics: It is an expectation that local foods are readily available in school meals and communities.
- National, State and Local Policies: Lenders make loans for producers to meet local food demand. State procurement policies allow school districts and other public institutions to prioritize local food purchases.

Community Economic Development: Priority Outcomes and Indicators

The priority outcomes, indicators and measures for community economic development are presented in this section. They are categorized by program, research and policy levels. Besides the outcomes and indicators listed here, we encourage readers to collect stories of changes related to local and regional economic outcomes. Stories are important tools that can be used to communicate real-life examples of the data that emerges from farm to school evaluation and research.

Program Outcome: Local and regional economic impact

The scope of economic development outcomes associated with farm to school procurement is related to the amount and types of products purchased by schools, and associated income generation (actual dollars or potential) for local and regional producers, processors and distributors. As indicated earlier in this chapter, "local" is defined by the site. Note that the term "impact" in this chapter is borrowed from how it is used in economic impact analysis — or the effect of an event on an economy. This is unique from how the term "impact" might be used in a program evaluation logic model where it means long-term changes that result from program outcomes[43].

Table 11

Program Outcome: Local and regional economic impact

Indicator 1: Increase in market opportunities/income generation for local producers, processors and distributors through sales to school districts and potentially to other institutions through procurement activity.
Measure 1.1: Total dollar amount of all local products purchased by school districts and schools
Measure 1.2: Percentage of total food budget spent on local foods by school districts and schools
Measure 1.3: Type, quantity and monetary value of specific local products (i.e., fruits, vegetables, dairy, meats and processed foods) purchased by school districts and schools
Measure 1.4: Percentage of sales to local socially disadvantaged producers (i.e., growers, ranchers, processors).

Recommended program element(s) needed for this outcome: procurement

Data sources: USDA Farm to School Census, school district purchasing records, state farm to school grant reporting documents, USDA Agricultural Marketing Service data products on wholesale and direct markets

See Appendix 5 for lists of example tools for these measures.

Multiple measures and data sources on this indicator have been suggested. It is important to note that there are limitations to the use of these measures:

- Measure 1.2: There are many ways to calculate the percentage of a total food budget spent on local foods. These include total food budget; a total budget with or without commodity foods; a total budget with or without U.S. Department of Defense foods; and some school districts may choose to exclude one product from the "total budget" calculation that is nearly always local (fluid milk). The Oregon Department of Education requires that its farm to school and school garden program grantees omit fluid milk from the calculation for this reason[44.] The framework recommends that the measure represent the percentage of local product compared to the total food budget (including all products). For this program level measure to be useful, districts will need to establish and use consistent protocols to enable cross-program comparisons and for it to be additive.

Framework developers considered several other measures for the program site level that ultimately were not included as priorities because they fell short when evaluated by the selection criteria, or more discussion was needed to determine the best measures:

- School meal participation: School meal participation was not included as a priority measure for economic development (either at the program level or the research level), because overall school meal participation is influenced by many variables beyond farm to school activities, such as availability of seasonal foods, student food preferences and changes in the economy. Additionally, school districts may lose revenue from decreased meal participation attributed to weather-related school closures. School meal participation is a crucial factor for the financial solvency of the school nutrition program and thereby its ability to buy local foods, and invest in labor or equipment required for farm to school. Participation of free and reduced meal eligible students in the meal program is retained as a priority in the public health sector as a measure of childhood food security; similarly breakfast meal participation has been retained under the education sector, due to linkages with breakfast consumption and educational outcomes.
- Change in frequency with which local products are served (monthly, weekly or multiple times a week): This measure is difficult to track at the school site level, especially when multiple local products are served, and may vary amongst schools in the same district.
- Recording the name, quantity and type of local producers the schools buy products from: This is easier to track for smaller school districts who purchase directly from farmers, but more difficult for larger districts, or districts who work with distributors to purchase local products. Unless the district requires the distributor to report on this, distributors may combine two local sources of carrots into one bushel, thereby being unable to identify the source.
- Changes in product diversification or infrastructure that supports food availability, local food storage capacity, food safety, market access, distribution, processing capacity and other program implementation requirements that support farm to school within the food system.
- Changes to early child education or school meal provider's skills, such as meeting existing food regulations, food safety, recipe development and other training topics.

Program Outcome: Social capital built in school districts and the community

The definitions of "social capital" vary[45]. "Social capital" refers to features of social organization, such as networks, norms and social trust, which facilitate coordination and cooperation for mutual benefit. These relationships may provide people or organizations access to resources, services or goods[45–47]. Collaboration is fundamental to the success of community economic development, and

farm to school activities can support that through the seven capitals: built capital, financial capital, physical capital, social capital, human capital, cultural capital and natural capital[48,49]. Researchers examining community capacity and resiliency, or the ability of a community to meet their needs through creating and responding to opportunities, note that social capital is a fundamental asset[50].

Farm to school exists within the community food system due to the strong connections between farmers, farm workers, processors, distributors, packers, technical assistance providers, policymakers, researchers, funders, foodservice staff, farm to school educators, parents, teachers, administrators, garden educators and many more people. School districts interested in participating in farm to school procurement need relationships with producers and other players in the food system. Producers, in turn, reflect that in addition to the financial incentive for supplying product to schools, another motivating factor for their involvement is the ability to help schools and contribute to the community[51–56]. Several volunteers and community members contributing to farm to school activities also state that supporting the local community is an important benefit of their activities[41]. Food service, school administration and growers need multiple strategies to build and support ongoing relationships and dialogue in order to strengthen and increase market opportunities through farm to school.

Table 12

Program Outcome: Social capital built in school districts and the community

Indicator 2: Mutually supportive relationships result in access to resources shared between community and school districts.
Measure 2.1: Number and type of promotional and training activities related to local foods in the school environment and in the community
Measure 2.2: Number and type of sales producer has to chef, retailer or other wholesale accounts resulting from farm to school promotion and training efforts
Measure 2.3: Number and type of food-related businesses (i.e., farmers, ranchers, distributors, retailers) partnering with the school district to support farm to school through education, gardening and procurement efforts (i.e., field trips, site visits)
Measure 2.4: Financial value estimation of in-kind support provided by community volunteers, food donations, guest speakers, site visits, field trips, equipment donations provided to school or district in support of the farm to school activities
Measure 2.5: Amount of money generated at the school site through farm to school related activities, such as fundraisers with sales of plants grown by students in gardens, revenue from local governments or other institutions, grants and other sources of funding received

Recommended program element(s) needed for this outcome: procurement, gardening, and education

Data sources: Market Maker National Network linking agricultural markets (available in 20 states), state grant program reporting documents and foundation grant program reporting documents

See Appendix 5 for example data tracking tools for recording measures.

As indicated above, this outcome focuses on the social benefits from relationships. Measurement of social capital is complex, and its influence on community economic development may be viewed as indirect. However, the measures outlined for this outcome are fairly easy to capture from the program level, and hence were included as a priority.

- Measure 2.1: This is related to the promotion of local, seasonal foods in the school and in the community through newsletters, menus, posters, websites and other media. Local food promotion is often related to a product such as "harvest of the month"[57]. Some programs also participate in "buy local" campaigns that promote specific producers with farmer trading cards[58,59].
- Measure 2.2: Focuses on the producer relationships and what producers or other food-related businesses may gain from participation in farm to school, and through promotional efforts undertaken by farm to school sites.
- Measures 2.3–2.5: Focuses on relationships developed by farm to school sites with community organizations to facilitate volunteers, food donations, field trips and guest speakers. These benefits can contribute to expanded educational and enrichment opportunities for children, as well as new procurement relationships — a cross-sector connection.
- Only a few of the measures suggested have established data collection or reporting tools, because they need to be customized for specific sites. Only some state and foundation grant programs require reporting of farm to school promotional activities, community involvement including producers and documenting of in-kind donations.

Local and regional economic impact

Local and regional economic impact is a priority outcome for the research level, as well as the program level, because we recognize the resource limitations of the latter for collecting data on some suggested measures. For example, researchers can extrapolate data obtained from program level outcomes for assessing local economic job creation.

Farm to school activities emphasize "local" in relation to community economies because of the potential ability for dollars to cycle through a community due to school purchases. For example, when farmer Tina spends a dollar to purchase equipment from Juanita's feed business, Juanita can then spend that earned dollar on supplies from vendor Tony in the region. An economic multiplier measures how many times that earned dollar cycles through a locale before it leaves the region[20,41,60]. Analysts may calculate economic multipliers using economic benefit analyses to evaluate these transaction cycles within an economy, such as the impact on the number of jobs, additional sales or shifts in income. When the cycles send wealth into the local economy and amplify local purchases made by a local business, the multiplier number will be high. Economic benefit analysis methods face a number of limitations requiring further study in order to determine the impact farm to school purchases have on local community economic development[4,5,9,19].

The multiplier effect is related to the "import substitution" concept[40,41]. Economies grow and are sustained by exporting goods and by producing goods they would normally import to avoid "leaking" dollars into external economies. For example, if farmer Tina bought her feed from an online catalogue of a company based overseas, that dollar would leave her local region. When more dollars are spent locally at each step of local food production from farm to table, those funds can potentially "plug the leak" of dollars that would normally be used to buy items from external economies and keep local dollars recirculating in a community's economy[40,41]. As stated earlier, an emerging challenge in farm to school procurement is that as some programs "scale up" and incorporate more local products in school meals, their demand surpasses the local capacity to meet that need[42].

Table 13

Research Outcome: Local and regional economic impact

Indicator 1: Increase in market opportunities and income generation for local producers, processors and distributors through sales to schools and possibly other institutions.
Measure 1.1: Number, demographics (i.e., gender, ethnicity, age) and type of local producers, processors and distributors supplying local products to school districts
Measure 1.2: Number and type of local products distributors offer to schools
Measure 1.3: Number and demographics of food producers, processors and distributors that change business plans due to farm to school market demand, i.e., new products, change in number of acres grown
Measure 1.4: Number and demographics of locally owned businesses created to meet farm to school demand
Measure 1.5: Number of new product development opportunities created through farm to school training, technical assistance, or dialogue between school food procurers, foodservice workers, students and farmers
Measure 1.6: Number of new jobs created by food producer, processor or distributor due to farm to school market demand
Measure 1.7: Amount of new income generated from local farm to school sales
Measure 1.8: Frequency of producer sales to schools (i.e., year round, one-time sales) including breakout of socially disadvantaged producers
Measure 1.9: Number, demographics and type of producers selling local products to other farm to table markets, or newly established marketing relationships
Measure 1.10: Number of school districts purchasing from regional and local food hubs
Measure 1.11: Number and type of local/regional food hubs, buyers served and products sold
Measure 1.12: Increase in use of pre-season/forward contracting or "producer acres under contract" to grow food for a school district

Recommended program element(s) needed for this outcome: procurement

Data sources: USDA Census of Agriculture Facts on Direct-to-Consumer Food Marketing, Market Maker National Network and the Agricultural Marketing Service's data products on wholesale and direct markets

- Measures 1.1–1.7: These are variations of market opportunities or impacts that could provide a stable income to food producers and other food businesses. The number of new jobs, added income or jobs maintained, in relation to school food markets, as well as the frequency of sales can help researchers understand over time the stability of the school food market.
- Measure 1.5: Businesses that hire a part- or full-time position to manage school accounts is included as a research level measure (but not at the program level), because this data is difficult for a school site to collect and measure consistently. Researchers, on the other hand, may have additional time and resources available to analyze data received from the school site using tools such as input-output models, impact analysis for planning (IMPLAN), economic impacts of studies of direct marketing to consumers and farm level studies modeling potential impacts from hypothetical changes in food consumption[4–6,9,40]. However, there isn't consensus in the field on a preferred methodology for any of these studies and there are challenges in interpreting the findings from one study to the next[5]. While the field of economic impact analysis evolves, researchers can continue to explore how farm to school activities lead to market opportunities and new revenue sources for local food system actors through sales to schools and to other markets. These measures form a plausible link between schools and other market opportunities[61], which can include community supported agriculture sales to families, farmers' markets, and sales to restaurants, juvenile detention centers, detention centers, grocery stores, universities, hospitals and other institutions.
- Measures 1.7–1.11: These measures reflect market opportunities that may develop as a result of working with schools, such as food hubs (organizations combine products from different producers, market and distribute these products on behalf of farmers and ranchers)[62,63]. A related research question worth exploring is the relationships between producers who sell to schools (for example, are there collaborative structures being formed to meet the demand) and how that affects their potential to sell to other markets such as hospitals, universities, etc.

The project team explored three other areas of research that are needed in the long term, but did

Table 14

Community Economic Development: Long-Term Outcomes Needing Further Research

Indicator 1: School district nutrition service program financial stability
Measure: Net balance stays in the black over time with increased local purchases
Indicator 2: Farm to school market profitability
Measure: Producer, processor and distributor's revenue is higher than expenses for invested time and resources to bring local products to school markets
Indicator 3: Infrastructure is in place to support local food production, processing and distribution
Measure: Access to financial capital for small and mid-sized businesses Measure: Access to material capital such as micro-processing, refrigeration units, trucks, etc. Measure: Access to aggregators and distributors to connect producers to wholesale markets

not prioritize them (Table 14). The first includes possible connections between the financial solvency of a school district's nutrition program (to support long-term purchase of local foods) and community economic development. A school nutrition program's ability to stay in the black is dependent on a variety of factors, including school meal participation, which is commonly referenced in existing literature as a short-term outcome of newly introduced farm to school activities, as it may result in added revenue contributing to the school nutrition program's bottom line[21,64]. Anecdotally, many school districts use existing resources to buy more local foods; at the same time, there are others who assert the need for initial start-up funds to develop relationships with vendors, provide training to work with more local food items and purchase new equipment to process local foods[65]. Researchers seek a deeper understanding of how farm to school activities affect school nutrition program finances over time, and if there are consistent inputs needed across sites to run a financially viable site with farm to school activities.

The second is the long-term profitability any food- or agriculture-related business experiences through farm to school involvement. This document puts forth a variety of measures related to the short- and mid-term outcomes of market opportunities and income generation, but more research is needed over the long term to determine how profitable these efforts can be for those involved.

The third longer-term outcome is related to the infrastructure needed to scale-up local or regional food production. Various local and regional food reports indicate the need for changes in distribution infrastructure and additional access to financial and material capital to help producers and processors purchase equipment or other resources in order to meet a growing demand for local foods[42,65–68].

Policy Outcome: Institutional support for local and regional foods

Tracking institutional support for farm to school activities through school district procurement policies, state and federal policies, and state agency programs and positions is a significant outcome influencing community economic development. The establishment of a supportive policy is a first step, its implementation is critical to ensure that its intent is met. This policy outcome aligns closely with policy outcomes in the environmental quality and public health sectors. For example, school wellness policies are identified as a public health policy outcome, due to their influence on nutrition and physical activity at schools.

- Measures 1.1 and 1.2: These focus on institutional and state agency local procurement policies. Institutional policies such as school wellness policies or early care center procurement policies can include language to support farm to school activities, such as a preference for local products, when feasible, or establishment of school gardens. "Supportive language" in this context refers to procurement policies that allow purchasing preferences for state-produced agricultural products[69]. As of October 2013, only 22 states had one or more state policies that encourage state organizations, agencies and schools to use local foods by allowing purchasing preferences for state-produced agricultural products[69]. If institutions are applying a preference for local products, this supports farm to school procurement activities, and can be part of creating a cultural norm related to expectations of buying local foods.

For example, one type of supportive policy at the federal level is the geographic preference option authorized in Section 4302 of Public Law 110-246 of the 2008 Farm Bill. It allows participating schools to apply an optional geographic preference in the procurement of unprocessed locally grown or locally raised agricultural products. Here "unprocessed" means those products that retain their inherent character, such as fruits, vegetables, meats, fish, poultry, dairy, eggs and grains[14,70]. It is in this final rule that the USDA gave discretion to the procuring institution to define their "local" area. Policies specifying the ability to purchase local foods ensure that institutions beyond school districts, such as early childhood education centers, juvenile rehabilitation centers and others can easily access local foods.

Table 15

Policy Outcome: Institutional support for local and regional foods

Indicator 1: Institutional procurement policies supporting local and regional foods.
Measure 1.1: The number of institutional procurement policies with supportive language
Measure 1.2: The number of state and local procurement policies with supportive language
Measure 1.3: Government agency allocation of resources and creation of programs, grants and positions for farm to school
Measure 1.4: Government programs that provide community food project grants to support local and regional foods, including farm to school efforts
Measure 1.5: Number of state agencies that identify local food systems as a priority
Measure 1.6: Number of states with "buy local" food programs that include farm to school
Indicator 2: Institutional programs supporting local and regional foods
Measure 2.1: Government agency allocation of resources and creation of programs, grants and positions for farm to school
Measure 2.2: Government programs that provide community food project grants to support local and regional foods, including farm to school efforts
Measure 2.3: Number of training opportunities created for local producers and producers owned by socially disadvantaged individuals
Measure 2.4: Number of farm to school stakeholders sitting on economic and community development councils or decision-making bodies within the community

Recommended program element(s) needed for this outcome: procurement

Data sources: NASBE policy matrix, NFSN policy scan, CLASS, SHPPS, National Council of State Legislature's online database

- Measures 2.1 and 2.2: Focus on institutional policies that result in public agency support of farm to school activities. As of 2013, 27 states have policies that establish a statewide farm to school program and provide support from local government agencies such as program coordination, technical assistance or financial assistance[69].

Both types of policy support (supportive language and financial support) indicated in these measures are needed to support farm to school activities. On-the-ground farm to school activities may also drive these policy changes. For example, Oregon farm to school advocates recognized the desire from school districts to strengthen local school food networks and requested policy changes to support farm to school positions in the state departments of agriculture and education[71].

Data sources listed in this section are referenced in the public health subsection due to overlaps in the policy levers that influence farm to school activities in general, although the focus here is on community economic development. See Appendix 6 for additional economic development outcomes related to farm to school.

Cross-Sectoral Connections for Economic Development Outcomes

Program actions and institutional decisions that support farm to school may influence trends in other sectors.

With Public Health

The change in expenditures from non-locally sourced food to locally sourced food is an economic measure related to how the local marketplace is expanding. It also is the first step for increasing children's access to more local foods, such as fresh produce and minimally processed foods. Increased access to local foods through salad bars, snacks and school meals is one part in supporting student awareness and understanding of how foods affect health. For example, researchers recently found an association between the level of local foods (as measured by direct sales figures from USDA) and chronic health outcomes like obesity, diabetes and mortality[72,73]. It is estimated that for each $100 increase in per capita direct farm sales, the county-level obesity rate can be expected to decline by 0.90–1.0 percent[73]. While this is only an association, and there is no way of determining if people with these behaviors are moving to these areas or if the changes in these sales is affecting behaviors, it is an indication that there is a connection between community local food purchases and health outcomes[73].

With Environmental Quality

The number of farms selling locally and regionally grown foods to schools is an economic development measure, which could be related to positive environmental outcomes if farms selling to schools choose to use less chemical inputs such as fertilizers, herbicides, pesticides, growth hormones or antibiotics, or if schools give preference to purchases from such sources. There is not currently a data source that collects the type of agricultural practices used by producers selling to schools, especially when producers may not choose to become certified with specific practices.

4.4 Education

School gardening, plant-based education and agricultural studies have enjoyed a long history in the US[1]. Over the past fifteen years, food and garden-based activities have proliferated nationwide. They seek to improve students' academic achievement, environmental literacy, health and wellness, and civic participation. Farm to school includes food- and garden-based education as a way to bring subjects like math, health, language arts, science and geography to life. These activities may enhance learning environments through encouraging inquiry that appeals to different learning styles[2–4]. Hands-on, place-based and project-based methods used in farm to school through gardening or other food-based activities engage students and reinforce learning through visual, written and experiential strategies[5–7].

With respect to farm to school outcomes, the education sector overlaps with content in the environmental quality sector because food education and garden-based activities may support knowledge and skill development in environmentally friendly behaviors, such as composting or recycling[6,9–12].

An Education Lens for Farm to School

In K–12 environments, farm to school activities can align with the "whole child" concept of a comprehensive education that supports student knowledge and emotional and physical health. Engaging children in their learning and alongside their larger community, prepares them for work and economic self-sufficiency, and establishes an understanding about the world[13]. An extensive review of education research indicates that student academic behaviors such as attending and participating in class, academic perseverance such as self-discipline and tenacity, academic mindsets such as a feeling of being able to succeed in learning, and learning strategies such as goal setting and study skills directly impact student grades and academic performance[14]. Researchers argue that teaching youth to become learners involves transforming classrooms with ideas that engage students' natural curiosity, a desire to learn, and building a sense of what is possible for their future[14].

In pre-K and early child education centers, farm to pre-school activities align with the eleven domains set forth in the Head Start Child Development and

Early Learning Framework. For example, early child education environments can incorporate food-related activities that support a child developing health knowledge, knowledge of family and community, and the growth cycle of plants as an entry point for learning the scientific method. They can learn patterns and relationships as plants grow in a garden — examples that fit within four example domains of the Early Learning Framework. The linkages between farm to school activities focused on education and gardening and student skill development and academic success need to be explored further.

Food, nutrition and agriculture related educational activities and school gardening provide opportunities for children to learn about food and agriculture to prepare them to make responsible choices that benefit their bodies and their community. A school's primary mission is to educate children and encourage academic achievement; metrics for success emphasize test scores, school attendance, classroom management and graduation rates. As a result, to be incorporated and institutionalized within the educational system, farm to school activities need to align with these school priorities.

Farm to school outcomes in the educational sector fall in the following key themes:

- Enhance schools' curricular, physical and social learning environments[15–17].
- Increase students' knowledge of specific content areas and promote academic and cognitive skills such as inquiry, critical thinking, ordering and communication[2].
- Support student social and emotional development such as motivation and improve students' attitudes toward school and learning[15,16,18,19]. Increase student engagement and reduce absenteeism[16,20].
- Potentially increase test scores and general achievement[1,6,18,21,9,22–25].
- Increase achievement in science, math, botany, ecology, nutrition or food systems content areas[6,17,9,22,26–31].
- Improved student and teacher knowledge and attitudes about foods[18,31–40]Garden learning environments and outdoor greenspaces could provide temporary reduction in behavioral disorder symptoms[41–43].

Learning

Merriam-Webster's definition of learning is "the acquisition of knowledge or skills through experience, study or by being taught." Education in relation to farm to school means the opportunity to interweave concepts about science, math, health, language arts, history and nutrition into a framework that has the potential to engage and motivate students.

Common Core State Standards

A state-led initiative to develop a set of state education standards that measure proficiency by grade level in mathematics and English language arts.

Food Literacy

A collection of inter-related knowledge, skills and behaviors required to plan, manage, select, prepare and eat foods to meet needs and determine food intake. Food literacy is the scaffolding that empowers individuals, households, communities or nations to protect diet quality through change and support dietary resilience over time[8].

Head Start Child Development and Early Learning Framework

The Office of Head Start updated this framework, which was first published in 2000. The second edition, released in 2011, guides curriculum and assessment decisions and assessment data and program design for programs for 3–5-year-olds. It includes eleven domains for childhood development and early learning essential for success in school and the long-term. The domains include: physical development and health, social and emotional development, approaches to learning, literacy knowledge and skills, mathematics knowledge and skills, science knowledge and skills, creative arts expression, logic and reasoning, social studies knowledge and skills, and English language development.

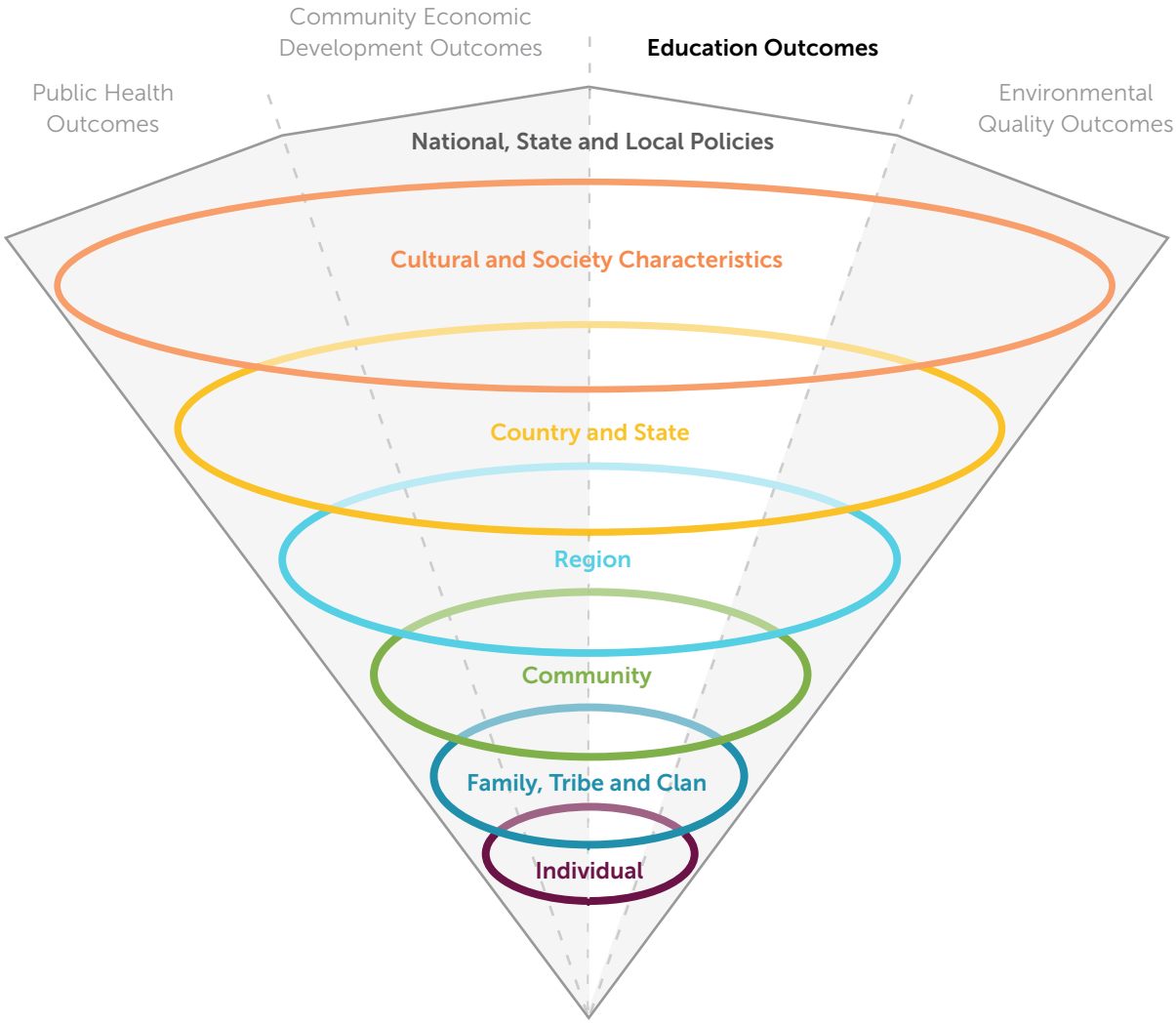
A student in Riverside, CA receives a sample of salad greens during a taste-test activity. (Credit: Emily Hart Roth)

- Support improvements to children's self-efficacy, social skills, self-esteem and work ethic[6,17,26–28,44] serve as an entry point encouraging parent engagement with schools through field trips, food preparation homework or visits to the school garden to assist with planting, tending or harvesting foods[38].

Schools can adapt farm to school activities to align with the Early Learning Framework, Common Core State Standards or state adopted standards — ensuring that lessons on food, nutrition and environment align with other content areas. As of 2013, 44 states, four territories and the Department of Defense Education Activity have adopted the Common Core standards[45]. Other states have their own adopted standards. Farm to school can support schools in reaching the goal of educating the whole child through promotion of health, learning about a healthy lifestyle, and student engagement in hands-on stimulating activities[46].

From an education lens, the socio-ecological model can be used to explore the outcomes of farm to school activities at the various levels of influence.

Figure 10: Socio-Ecological Model Relating Farm to School Programs to Education



- Individual: Student forms positive attitudes and self-efficacy about learning through farm to school activities.
- Family, Tribe and Clan: The family incorporates hands-on experiences such as cooking or gardening to support student learning about food at home.
- Community: Hands-on activities included at farmers' markets and community centers to engage children and families.
- Region: School district policies support school gardens.
- Country and State: Farm to school curriculum is readily available and aligned to Common Core standards.
- Cultural and Society Characteristics: Farm to school is one part of supporting the whole child in educational settings.
- National, State and Local Policies: Legislation prioritizes a whole-child approach, supports hands-on learning and gardening at schools.

Education: Priority Outcomes and Indicators

Farm to school activities reinforce what and how students learn, but to establish any significant influences on academic achievement, their alignment with core content standards needs to be established. For example, if farm to school educational activities support middle school science curriculum, and the site is interested in determining educational outcomes, then it is desirable to align activities to core content standards. This can be done using an external reference tool such as the Next Generation Science Standards[47]. Once this alignment has been established, changes in student learning and engagement as a result of farm to school activities can be assessed.

Program Outcome: Farm to school activities are aligned to core content standards to support student engagement and learning

As the field has matured, farm to school educational activities (usually food-system education and gardening education) are beginning to be aligned with content standards and taught across different subjects. Rather than attempt to focus directly on establishing association with the desired long-term outcomes such as academic achievement, school attendance and classroom behavior management, it may be more realistic to focus current efforts on short-term and intermediate outcomes that lead to the long-term outcomes. Beyond the outcomes and indicators listed here, the framework developers encourage readers to collect stories of changes related to education outcomes. Stories are important tools that can be used to communicate real-life examples of the data that emerges from farm to school evaluation and research.

The measures selected for this indicator are opportunities for sites to document the status of their farm to school activities in conjunction with core content standards. The measures provide useful information needed for planning, coordination and evaluation, and are listed in order of increased difficulty:

- Measure 1.1: provides information for training teachers to incorporate farm to school activities that are in alignment with Common Core standards.
- Measure 1.2: provides data on how many and which students are benefiting from activities.
- Measure 1.3: highlights the extent to which curriculum is aligned with school gardening efforts.
- Measure 1.4: helps ascertain how farm to school lessons are supporting and reinforcing existing educational requirements.
- Measure 1.5: assesses the depth (low, medium or high implementation) of farm to school activities in relation to a specific subject/core content area.
- Measure 1.6: determines changes in attitudes or learning due to farm to school educational activities. This measure is the most time-intensive as it would require pre- and post-testing. There are numerous validated instruments that measure aspects of engagement in children[48]. This information can feed into the development of farm to school activities.

Achievement scores are not selected as a priority measure at the program level, as it will require greater alignment between farm to school educational activities and Common Core standards. Sites across the country may need a national curriculum for farm school aligned with Common Core standards and a version for early child education settings aligned with the Early Learning Framework so they can adapt it. Use of curriculum aligned with content standards or early learning development is not assessed currently but could be in the future, as farm to school activities at sites across the country mature and become more institutionalized.

Table 16

Program Outcome: Farm to school activities are aligned to Early Learning Framework, the Common Core, or state content standards to support student engagement and learning.

Indicator 1: Sites offers a range of learning opportunities aligned to support learning skills, and content areas such as service learning, community connections, inquiry-based learning, experiential learning and hands-on field experiences related to food.
Measure 1.1: Number of teachers using food system or gardening curriculum aligned to Early Learning Framework, Common Core or state-adopted content standards
Measure 1.2: Number of students participating in farm to school activities aligned to Early Learning Framework, Common Core or state adopted content standards
Measure 1.3: Number of school-based gardens with curriculum components aligned to Early Learning Framework, Common Core or state adopted content standards
Measure 1.4: The subjects (i.e., nutrition, science), grade levels, number of classes and type of activities (i.e., taste tests, hands-on learning, gardening) where farm to school activities and curriculum are aligned to Early Learning Framework, Common Core or state-adopted content standards
Measure 1.5: Number of hours, frequency and type of learning opportunities in each subject area that are aligned with Early Learning Framework, Common Core or state-adopted content areas
Measure 1.6: Student attitudes about specific content taught through farm to school learning opportunities
Measure 1.7: Family, youth, community member and producer input and engagement in design of activities, curriculum and learning opportunities (i.e., on food literacy, nutrition, local foods, agriculture) connected to Early Learning Framework, Common Core or state-adopted content standards

Recommended program element(s) needed for this outcome: food-based education and/or school gardening

Data Sources: Youth Risk Behavior Survey

See Appendix 5 for a list of possible evaluation tools

Program Outcome: Increase food literacy in students and staff

Food literacy is a content area that can enrich understanding of science, health and language arts. This outcome supports other prioritized outcomes in public health and aligns with outcomes in environmental quality. While teaching food literacy is not unique to farm to school activities, food- and farm-based education and gardening activities are designed to help students, staff and even families learn about local foods, where food comes from, and how it is grown. Documenting the extent to which different types and combinations of farm to school education and gardening activities result in food literacy can help program coordinators and evaluators fine-tune their approach.

The indicators and measures at the program level that support increases in student and adult food literacy are centered on documenting levels of participation and ways individuals are engaged.

- Measures 2.1–2.5: Ways a program coordinator, or educator, can document what they are doing in relation to food literacy for students.
- Measures 3.1–3.2: Ways the site involves adults in farm to school activities related to food literacy.

Research Outcome: Farm to school activities support student educational success

The farm to school field needs a better understanding of how farm to school activities can enhance the school learning environment and related measures of educational success, and hence it has been included as a research level outcome. This outcome is intended to align with multiple concepts that the Association for Supervision and Curriculum Development (ASCD) set forth in their "whole child" platform to support healthy school communities[46].

Table 17

Program Outcome: Increase food literacy in students and adults in schools

Indicator 1: Increase in student and staff knowledge about food and its impact on their health.
Measure 1.1: Number of teachers integrating curriculum designed to improve food literacy
Measure 1.2: Number of teachers using culturally appropriate curriculum, including recipes that align with diverse student ethnic or cultural heritage
Measure 1.3: Number of students participating in farm to school activities designed to improve food literacy
Measure 1.4: Number of hours, frequency, sequence of curriculum (i.e., grade level) and type of learning opportunities students receive in each subject area focused on food literacy in the classrooms, outdoor learning environments and eating areas
Measure 1.5: Number and types of ways that food literacy lessons or activities are occurring across the school environment, such as in gardens, classrooms and cafeterias
Indicator 2: Increase in school adult knowledge about food and its impact on health
Measure 2.1: Number and types of ways adults in the schools are involved in training, activities or other learning experiences related to food literacy
Measure 2.2: Number and methods of incorporating farm to school activities in school employee wellness policy efforts related to a healthy diet

Table 18

Research Outcome: Farm to school activities support student educational success

Indicator 1: Student readiness to learn
Measure 1.1: Student participation in school breakfast programs when farm to school activities are conducted with breakfast
Indicator 2: Student engagement and academic behaviors
Measure 2.1: Changes in classroom attendance numbers or consistency during farm to school activity days or modules
Measure 2.2: Student participation during farm to school activity days or modules
Measure 2.3: Student classroom disturbances while participating in farm to school activities
Measure 2.4: Increased demonstration of leadership and initiative in students who have access to training and support through farm to school activities and opportunities
Indicator 3: Student academic mindset
Measure 3.1: Feeling of success at completing farm to school activities
Measure 3.2: The degree to which students value the work undertaken to complete farm to school related assignments
Measure 3.3: Belief in self-ability and competence to complete and demonstrate leadership in farm to school related assignments
Measure 3.4: Sense of belonging in the classroom/outdoor learning environment
Measure 3.5: Self-esteem while completing farm to school activities
Indicator 4: Student academic competency gains
Measure 4.1: Student content area test scores in relation to farm to school activities used to teach those subjects (i.e., math, science, language arts)
Measure 4.2: Student course grades in relation to farm to school activities used to teach those subjects (i.e., math, science, language arts)
Measure 4.3: Students' ability to identify and claim ownership of practical experience, including planning, organizing, implementation and evaluation of farm to school initiatives

Above: Recommended program element(s) needed for this outcome: procurement, food-based education and/or school gardening

Previous Page: Recommended program element(s) needed for this outcome: food-based education and/or school gardening

See Appendix 5 for a listing of evaluation tools.

The rationale and limitations of selected indicators, outcomes and measures at the research level are outlined below:

- Indicator 1 and related outcomes and measures: Eating breakfast has long been associated with improved ability for students to concentrate in class[49–57]. Because student nutrition is one aspect of a child's readiness to learn, an exploration of farm to school activities' influence on participation in school breakfast programs is suggested. Existing literature on farm to school has not yet examined the inclusion of activities during breakfast, or their ability to influence breakfast participation. This may be worth examining further. It could prove most useful in determining the educational outcomes for farm to school activities in children from vulnerable families who may participate in school breakfast on a regular basis. It should be noted that this measure is limited by the fact that student participation in any meal program is influenced by factors beyond the influence of farm to school activities.
- Indicator 2 and related outcomes and measures: Student engagement and active participation in activities is an important indicator for academic success. After building on the evidence for this indicator, further research can be explored on related longer-term outcomes such as average daily attendance and chronic absenteeism. Farm to school "activity days" are a first step schools or early child learning settings can with farm to school activities to establish success before they become more commonplace.
- Indicator 3 and related outcomes and measures: Mindset is argued as a basis for the development of different learning strategies, supporting tenacity with challenging tasks, and is reinforced or impeded by academic performance[14]. This is related to social and emotional learning that needs to be studied further in relation to farm to school activities.
- Indicator 4 and related outcomes and measures: Course grades predict future college success better than standardized achievement tests[14]. Academic mindset, engagement and learning behaviors are precursors to general achievement, and thus research is needed to better understand which farm to school activities, or combination of activities, influence student academic performance.

Research Outcome: Increase food literacy in students and staff

Building on efforts at the program level, this outcome encourages external evaluators and researchers to determine how farm to school activity affects student and adult knowledge and skill attainment related to growing, preparing, cooking and eating healthy, local foods.

- Indicator 5 and related measures 5.1-5.5: Represent a spectrum of ways to measure food literacy through knowledge and skills. Programs focused on staff professional development, in addition to student learning, can apply these measures to both students and adults. Changes in student or adult knowledge can be assessed through pre- and post-testing in the classroom, or as part of existing tests for nutrition, health or science content. It is suggested that program practitioners limit the number of surveys and tests given to students, and hence framework developers recommend that wherever possible, questions on these topics be aligned with existing survey efforts to minimize the burden. Data collection on these measures may require the services of an external evaluator, with additional financial resources and technical support for sites.
- Measure 5.1: Is focused on the basics of where food comes from and how it is grown. This content is in the Next Generation Science Standards[47] and educators may be able to use existing tests and homework assignments to determine how well students are learning this information. See example attitude survey from Wisconsin.
- Measure 5.2: Extends into how food impacts health. It can encompass nutrition or other aspects of food.

Table 19

Research Outcome: Increase food literacy in students and adults

Indicator : Increase in student and school adult knowledge about food and its impact on health
Measure 1.1: Knowledge of local foods, where food comes from and how it is grown
Measure 1.2: Knowledge of food impact on health
Measure 1.3: Knowledge of at least one element of food heritage, such as foods unique to different cultures, and including food histories native to the region/community/their own family
Measure 1.4: Increased awareness and knowledge of food and nutrition issues facing community
Measure 1.5: Attainment of food-related skills, such as recipe development, food-preparation, gardening and cooking
Measure 1.6: Number of students communicating and promoting information about local foods, where food comes from, how it is grown and physical and mental impacts of healthy eating to families and community members
Measure 1.7: Number of leadership development opportunities for students and adults to share and demonstrate their knowledge of food literacy
Measure 1.8: Knowledge of how purchasing local food affects the local economy
Measure 1.9: Knowledge and understanding of potential for local food procurement to affect systemic changes for social and economic equity

Recommended program element(s) needed for this outcome: food-based education and/or school gardening

See Appendix 5 for listing of tools.

- Measure 5.3: Food heritage explores the origins of food that include native plants, culture, seasonality and rationality of food.
- Measures 5.4–5.7: These measures help students and adults apply their knowledge of food-related skills.
- Measures 5.7–5.8: Students and adults understand what "buying local" means; this measure bridges with community economic development and environmental quality sector outcomes.

It should be noted that numerous other outcomes in the educational sector are possible. The outcomes prioritized above are the most direct and address short-term impacts of farm to school educational activities, when aligned to core content standards. Additional research is needed to understand how farm to school activities can influence student classroom behaviors, attendance and academic performance. Student referrals were not listed due to limited existing associations between farm to school activities and classroom behavior.

Long-term indicators and measures in the education sector needing further research are listed below in Table 20. Several contributing factors may influence these indicators and measures, and hence extensive resources will be required to undertake a comprehensive study on them.

Table 20

Education: Long-Term Outcomes Needing Further Research

Indicator 1: Student classroom behavior
Measure 1.1: Student classroom referrals by age level compared to the implementation and expansion of farm to school activities over time
Indicator 2: Student attendance
Measure 2.1: Average daily attendance in schools implementing different levels of farm to school activities
Measure 2.2: Chronic absenteeism (missing 10 percent or more school days in an academic year) in schools implementing different levels of farm to school activities
Indicator 3: Student academic performance
Measure 3.1: Overall grade point average in schools with different levels of farm to school activities
Measure 3.2: State academic achievement test scores in schools implementing different levels of farm to school activities

Table 21

Policy Outcome: Education policy and programs support farm to school activities

Indicator 1: Education agencies allocate resources to support farm to school programming
Measure 1.1: State legislatures provide funding to create farm to school positions, programs, grants or other resources to support farm to school activities
Indicator 2: Teachers, child care educators, foodservice workers, students and producers are trained in farm to school education and gardening activities
Measure 2.1: Increase in professional development programs for teachers, foodservice workers and growers that include farm to school curriculum, project-based and hands-on learning activities, procurement requirements and procedures, food safety requirements, budgeting best practices and innovations, safe growing standards, socio-cultural aspects of food and gardening education
Measure 2.2: State education departments and school district policies encourage professional development by providing funding or technical assistance for programs in state agricultural departments for producers and processors
Indicator 3: Teachers, child care educators, school administrators, nutrition service directors, foodservice workers and producers have resources they need to implement farm to school activities as a collaborative team
Measure 3.1: School district policies support school gardens and hands-on learning approaches
Measure 3.2: Farm to school activities aligned to Common Core or state adopted standards are readily available for teachers as they are updated
Measure 3.3: School district policies, teacher/foodservice worker union contracts and early child education organizations provide adequate time for planning farm to school activities, such as through planning periods or other preparation time
Measure 3.4: Increase in number of training and technical assistance opportunities available for incorporating farm to school strategies into the buying, preparing, serving and recycling of school food

Recommended program element(s) needed for this outcome: procurement, food-based education and/or school gardening.

Farm to school practices can help ensure that students actually eat the healthy, local food on their school lunch trays. (Credit: Emily Heart Roth)

According to a recent policy scan[58], farm to school policies are not fully integrated in the education sector. For example, less than one-third of US states, territories or tribal nations include positions or programs specific to farm to school in departments of education[58].

- Indicator 1 and its related measure focus on resource allocation, such as government bodies creating farm to school positions or programs.
- Indicators 2 and 3 and related measures are intended to ensure that school or early child education educators have resources such as curriculum, training, materials and time to prepare for integrating farm to school activities into existing education efforts.

Cross-Sector Connections for Prioritized Outcomes

With Public Health

Farm to school education activities teach core subject areas. Through hands-on, experiential learning, students may become more excited and engaged. Further, if they are more excited about healthy foods, this could result in better attitudes toward healthy eating.

With Economic Development

Farm to school activities such as using produce from a school garden in school meals can increase the demand to have these foods at home, encouraging parents to purchase them. This can lead to economic development outcomes when retailers carry local foods familiar to students.

With Environmental Quality

Farm to school activities such as composting, recycling or reducing food waste can have an impact on environmental quality outcomes. These behaviors can translate to new practices at home if parents or care givers are involved in farm to school activities. See Chapter 4.5 for more information.

4.5 Environmental Quality

The potential influence of farm to school activities on environmental quality is mostly in the exploratory phase, focused along three lines of inquiry related to the core elements of farm to school. For example, school food procurement practices can promote agriculture and food distribution methods that reduce negative environmental impacts. Food-based education and school gardens may result in infrastructure that supports healthy environments as students and teachers may engage in environmentally friendly practices to build healthy soil and participants may learn an ecological ethic. Students also may learn how individual behaviors affect environmental quality.

The relationship between food systems, climate change and environmental quality has gained public attention in recent years[1–4]. This evaluation framework defines "environmental quality" as including both the natural environment and the built environment, where landscapes support healthy ecosystems in relation to farm to school. This framework also considers farm to school activities as being a small part of the food system. Environmental quality is one component of a sustainable food system where food production methods maintain healthy ecosystems, while also protecting farmers and other workers, consumers and communities — a connection to the public health sector in Chapter 4.2 (see definitions). "Environmental quality" can refer to a variety of aspects of environments — indoor or outdoor — that affect human mental and physical health or maintain natural resources. This framework focuses on the natural and built environments affected by farm to school activities. As mentioned in the public health sector (distinctions between local foods and healthy foods), the project team recognizes that for this sector, "environmentally sustainable" and "local" are distinct.

Evaluating the true environmental impact of food from farm to table is challenging to assess. The evaluation and research literature related to farm to school impacts on environmental quality is thin, with most studies available from the perspective of the school garden, garden-based curriculum or environmental education. Garden curriculum and hands-on, project-based learning activities can support student awareness and practice in environmental activities such as composting[11–14] and there is anecdotal evidence that school gardens can enhance students' learning in academic, social, and health-related domains. There has been little rigorous research, however, on the effects of school gardens or on the factors that promote the sustainability of these program activities. This review draws on ecological theory to conceptualize school gardens as systemic interventions with the potential for promoting the health and well-being of

Learning

Merriam Webster's definition of learning is "the acquisition of knowledge or skills through experience, study or by being taught." Education in relation to farm to school means the opportunity to interweave concepts about science, math, health, language arts, history and nutrition into a framework that has the potential to engage and motivate students.

Sustainable Agriculture

Congress addressed sustainable agriculture in the 1990 Farm Bill[5]. Under the law, the term "sustainable agriculture" is defined as "an integrated system of plant and animal production practices having a site-specific application that will, over the long term:

- satisfy human food and fiber needs
- enhance environmental quality and the natural resource base upon which the agricultural economy depends
- make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls
- sustain the economic viability of farm operations
- enhance the quality of life for farmers and society as a whole [5]."

Environmental Quality

The USDA's Natural Resources Conservation Services Environmental Quality Incentives Program defines "environmental quality" as practices that address natural resource concerns and have opportunities to improve soil, water, plant, animal, air and related resources on agricultural land and non-industrial private forestland.

individual students in multiple interdependent domains and for strengthening the school environment as a setting for positive youth development. Key outcomes of environmental quality associated with individual knowledge, attitudes and behaviors in farm to school actors (especially students) include:

- Students' knowledge of specific content areas, including ecological principals[15].
- Students' knowledge and development of life skills, including those needed for environmentally responsible behaviors, including skills related to composting and recycling[15–17].
- Students' learning environmental attitudes, including their concern, awareness and appreciation of the environment, as well as their environmental ethics[18–22].

The farm to school practice and research literature does not currently document the degree to which children learn about the effect of their food and diet choices; or about how food production, processing, distribution, preparation and disposal impacts natural resources such as water, land, or biodiversity.

Schools tend to be major landholders, particularly in urban areas, with the ability to create gardens and greenspaces for community use. The ability of school gardens and naturalized school yards to improve physical living conditions in communities is being explored. The hypothesis being that added greenspace makes the school surroundings and setting more attractive and hospitable, while improving the environmental quality of urban areas. Research indicates that urban area greenspace may filter pollutants, cool temperatures, replenish groundwater, provide food and reduce noise[23–28]. Not all children and communities have equal access to greenspace —access often differs by income, ethnicity and race, age, gender and ability[29,30]. Emerging research links physical activity in greenspaces with a reduction in attention deficit disorder symptoms and promotion of well-being[31–34]. Key outcomes related to environmental quality include those associated with physical environments, such as:

- Gardens and naturalized school grounds may increase the diversity of vegetation, providing more diverse habitats for wildlife[35–38].
- Green school yards may improve the environmental quality of urban areas by increasing shade, decreasing storm run-off and improving air quality[35,36].

- Gardens provide youth and adults with places of refuge, safer after-school environments and a physical location where they can connect with nature and nurture living things[39–42].

The environmental implications of agriculture and food production, transportation, packaging and waste, opens up potential linkages with school food procurement practices. Producers who use fertilizers efficiently, rely less on fertilizers and pesticides, restore degraded lands, or cultivate soil health support environmental quality. With practices such as organic amendments, composting, wetland set-asides, crop rotation with legumes, providing food for pollinators, optimizing management of manure, increased productivity relative to lower resources used (i.e., fertilizer, fuel, water, land), and use of erosion control mechanisms, producers can contribute to reducing greenhouse gases as well[43–46].

As an essential part of creating healthy communities, farm to school activities are hypothesized to support environmentally sound, sustainable and just approaches to food production, processing, packaging, transportation and marketing. Key outcomes related to environmental implications include:

- Purchase of food products that use more sustainable methods, such as poultry raised without antibiotics[47].
- Students' performance of environmentally responsible behaviors including composting, recycling and starting gardens at home[40,48].
- Reduction in food waste[38,49].

There are other potential sustainable food production methods such as pasture-raised animals, organic foods and integrated plant-animal production systems used in permaculture (see definitions on this page) that farm to school program activities could support butt have not yet been fully examined in practice and in research[9,10,50].

An Environmental Quality Lens for Farm to School

When applying the environmental quality lens to the socio-ecological model for farm to school, all three core elements of farm to school — procurement, gardening and education — are relevant and contribute to various levels of behavior change. There are numerous ways that environmental quality goals could be met through farm to school activities at the various levels; see examples in Figure 11.

Sustainable Food System

A sustainable food system is one that provides healthy food to meet current food needs while maintaining healthy ecosystems that also can provide food for generations to come with minimal negative impact to the environment. A sustainable food system also encourages local production and distribution infrastructures and makes nutritious food available, accessible and affordable to all. Further, it is humane and just, protecting farmers and other workers, consumers and communities[6].

Ecosystem Services

Ecosystem services are the benefits people obtain from ecosystems. These include provisioning services such as food, clean water, timber and fiber; regulating services that affect climate, floods, disease, pollination, wastes and water filtration; cultural services that provide recreational, aesthetic and spiritual benefits; and supporting services such as building soil, photosynthesis and nutrient cycling[7].

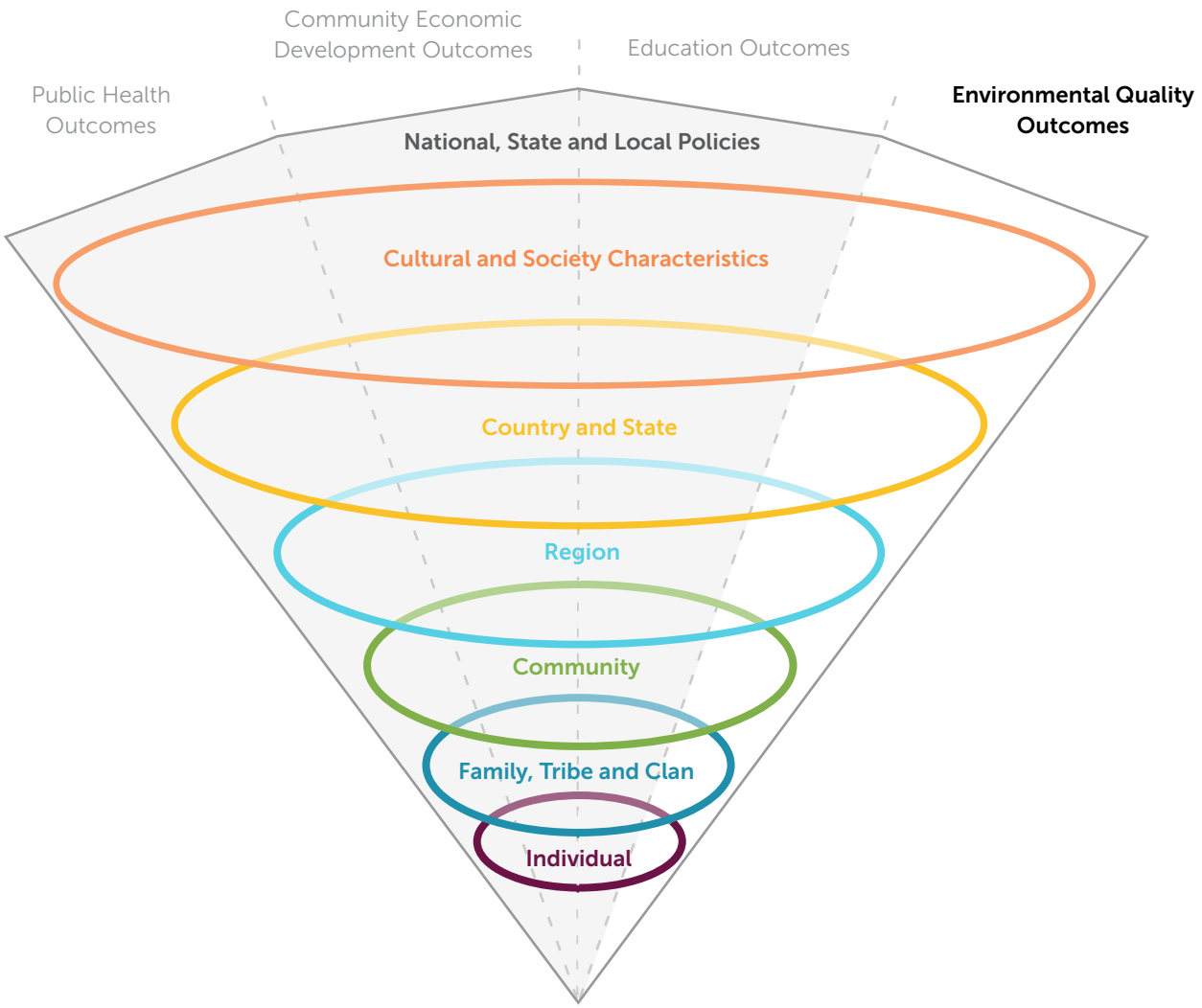
Biodiversity

Biodiversity is the totality of genes, species and ecosystems in a region. It can be divided into three hierarchical categories — genes, species and ecosystems — that describe different living systems that scientists measure in different ways[7,8].

Permaculture

Permaculture involves the design of sustainable agricultural systems and human habitats that mimic the patterns and relationships found in natural ecologies. The term refers to permanent agriculture and permanent culture[9]. The ethical foundation of the approach is to care for people, care for the Earth's environments, and redistribute resources surplus to one's own needs[10].

Figure 11: Socio-Ecological Model Relating Farm to School Programs to Education



- Individual: Students learn to grow food in a garden using environmentally supportive methods such as composting
- Family, Tribe and Clan: Increase purchase of foods produced with less chemicals
- Community: School districts use integrated pest management policies to maintain their school grounds with less chemicals
- Region, Country and State: Producers increase agricultural innovations to reduce environmental impact
- Cultural and Society Characteristics: Increased demand for local foods that are also sustainably produced
- National, State and Local Policies: Policies support gardens at every school in the state

School gardens can have a variety of academic applications including art, as demonstrated at this garden in New Jersey. (Credit: Chelsey Simpson)

Environmental Quality: Priority Outcomes and Indicators

Program Outcomes: Students are environmentally literate through engagement in farm to school activities.

Program level outcomes, indicators and related measures encourage program sites to document the types of activities used in education and school gardening to promote student understanding of environmental literacy and environmentally responsible behaviors. Besides the outcomes and indicators listed here, we encourage readers to collect stories of changes related to environmental quality outcomes. Stories are important tools that can be used to communicate real-life examples of the data that emerges from farm to school evaluation and research.

The limitations of using these measures:

- Measure 1.1–1.2: Require program coordinators to identify aspects of the curriculum and education activities that align with environmental quality.
- Measure 1.5: Requires that students be tested before and after instruction. Currently, there isn't a national environmental literacy assessment related to farm to school that occurs at regular intervals.
- Measure 1.6: This measure can help students learn about different agricultural methods, and reveal information on how producers are using sustainable methods that are not necessarily certified by a third-party label.
- Measure 1.7: Environmental literacy plans to incorporate, or align with, farm to school program activities.
- Measures 1.8-1.9: Students can build on their knowledge and skills through teaching or leading others about their efforts
- Measure 1.10: This measure may require support from anecdotal evidence or elaboration to show that an analysis of justice issues is embedded in the teaching or curriculum.

Research Outcome: School supports environmentally friendly practices

In this sector, schools already may be collecting many of the measures at the research level.

Table 22

Program Outcome: Students are environmentally literate through engagement in farm to school activities.

Indicator 1: Increase in student knowledge about the relationship between the environment and food systems, including environmental impacts of food production, processing, distribution, and waste or composting.
Measure 1.1: Number of children, at what grades, for what length of time, are receiving what type of lessons on environmental concepts connected to food systems and/or school gardening
Measure 1.2: Types of curriculum aligned with Common Core standards used to teach environmental literacy connected to food systems
Measure 1.3: Number of children, at what grades, for what length of time, are participating in what types of environmentally responsible behaviors in schools, such as composting, waste reduction, energy conservation or recycling
Measure 1.4: Number of ways procuring local foods is connected to garden and/or educational activities in the school, home and community
Measure 1.5: Student knowledge of specific environmental concepts that align with science, such as biodiversity, water conservation, pest control, pollination, natural resources and ecosystem services
Measure 1.6: Number of children, at what grades, for what length of time, visit local farmers to learn about sustainable production methods such as integrated pest management
Measure 1.7: Number of schools with environmental literacy plans connected to farm to school activities, food systems or some other connection to food production
Measure 1.8: Number of leadership development opportunities for students to share and demonstrate their knowledge and passion for, and experience with, environmental practices, such as the benefits of eating sustainable, local foods
Measure 1.9: Number of students monitoring, evaluating or innovating the school's environmental sustainability practices
Measure 1.10: Student capacity to analyze environmental quality issues related to the food system through a justice lens

Recommended program element(s) needed for this outcome: Education and Gardening

Data Sources: 2008 and 2011 National Environmental Literacy Assessment of 6th and 8th graders

Table 23

Research Outcome: School supports environmentally friendly practices

Indicator 1: School district purchase of sustainably produced foods
Measure 1.1: Quantity purchased and amount spent on local foods that are also third-party eco-label certified foods
Measure 1.2: Producers track and provide measures to school or district about other environmental production practices for foods schools buy that are not third party certified, such as integrated pest management, multi-cropping or aquifer restoration plantings
Indicator 2: Reduction in cafeteria waste
Measure 2.1: Number of school-based composting programs that are part of existing waste reduction programs or are stand-alone
Measure 2.2: Documented use of school curriculum connecting food waste, composting and hands-on learning
Measure 2.3: Number and types of promotion activities to decrease food waste
Measure 2.4: Measure the proportion of food waste to total waste over time after using curriculum and other methods aimed at reducing food waste
Measure 2.5: School engagement with the community (including growers) regarding alternative uses for waste
Indicator 3: School, school garden, naturescape and landscape practices support diverse natural food environments
Measure 3.1: Number and size of school yards and gardens that grow and teach about food
Measure 3.2: Number of schools that use integrated pest management practices on school grounds and gardens
Measure 3.3: Number of schools that use water conservation practices on school grounds and gardens
Measure 3.4: Number of schools where food gardens are combined with naturescaping to promote biodiversity
Measure 3.5: Number of school gardens that recycle, repurpose or reuse building materials for structures
Measure 3.6: Improvement in soil quality in school garden over time

Recommended program elements needed for this outcome: procurement for Indicator 1; promotion activities for Indicator 2; school gardening for Indicator 3

Data Sources: State garden surveys and inventories for Indicator 3; environmental programs such as Green School surveys and inventories for Indicator 2

See Appendix 5 for a procurement resource related to Indicator 1

The limitations of using these measures are:

- Measure 1.1 and 1.2: This involves tracking school food purchases of items produced using sustainable practices. These procurement choices align with trends in the Greenhealth Healthier Hospitals Initiative that has a sample data tracking sheet that could be adapted for school use[51,52]. This data can be difficult to collect, as third-party certifications are not always clearly labeled and the different labels may result in varying degrees of environmental quality outcomes in relation to ecosystem services. For example, one eco-label may focus on social sustainability efforts, such as fair wages or treatment of workers, while another may emphasize lower chemical inputs, such as fertilizers or pesticides. Measure 1.2 has been included because many producers, processors or distributors may engage in sustainable practices such as integrated pest management, water conservation or reduced packaging that are difficult to measure and won't be captured in a third-party label.
- Measures 2.2–2.5: Food waste has its own impact on the environment[53–55]. Solid waste as an indicator is volatile and subject to shifts based on waste from school activities not connected to farm to school, changes in seasonal foods, consistent programming emphasizing reducing waste, taste tests to develop foods acceptable to student tastes and other factors. Schools may find collaborating with innovators, such as city recycling programs outside of schools, helpful for finding alternative uses for food waste. This is an area where more research is needed, such as plate waste studies, monitoring of solid waste changes over time across farm to school sites, and comparison studies of schools implementing different farm to school activities connected to these measures[56].
- Measure 3.1–3.4: There is very limited existing research on this indicator, hence there are no tools recommended for these measures.

Framework developers discussed other areas that need research in this sector. For instance: Is there is a reduction in greenhouse gases due to schools purchasing local products? Existing research shows reductions are not guaranteed by local procurement. Greenhouse gases released in transportation depend on the method of transport[57], (ship, train, semi-truck, light duty truck, etc.) distance traveled and fuel used. The literature on the impact of food transportation and distribution is inconclusive, tending to indicate local food purchase does not have a significant impact and needs further examination[58–63]: Generally, if producers are driving small volumes of food in less efficient light-duty trucks, they will produce more greenhouse gases than more efficient transportation options. For this reason, the framework does not include this as a priority indicator, but is mentioned in Table 24 as needing further exploration.

Table 24

Environmental Quality: Long-Term Outcomes Needing Further Research

Indicator 1: Dietary food intake
Measure 1.1: Increase in school food purchases of legumes, alternative protein sources and lean meats
Indicator 2: Environmental impact of local food miles
Measure 2.1: Food miles traveled by different food items (i.e., fruits, vegetables, herbs, meats, grains) compared to distance they otherwise would have traveled if not purchased locally

Table 25

Policy Outcome: Institutional support for local, environmentally sustainable foods

Indicator 1: Institutional procurement policies and programs that encourage purchase of, allocate resources to developing, or create infrastructure that encourages the markets for sustainable products that are also local.
Measure 1.1: The number of school district procurement policies that set goals or other support for purchase of local products that are sustainable
Measure 1.2: Reporting on progress the school district makes on implementing and attaining goals related to local and sustainable product purchases
Measure 1.3: The number of state or tribal procurement policies with goals or other support for purchase of sustainable, local products
Measure 1.4: The number of comprehensive plans (in local jurisdictions, agricultural economic development, agritourism or smart growth) that include zoning, resource allocation or other programs to encourage more sustainable food production locally
Indicator 2: Institutional policies and programs support healthy ecosystems related to food production (i.e., maintaining ecosystem services)
Measure 2.1: School districts create joint-use agreements with local communities when communities use school gardens
Measure 2.2: State agencies and public universities support sustainable agricultural practices through technical assistance and research
Measure 2.3: Number of producers, including socially disadvantaged and small-scale growers trained or assisted to access farm to school market and engagement opportunities
Measure 2.4: State agricultural agencies and university extension agents develop and implement no-cost or low-cost methods to promote use of sustainable practices (by producers), such as integrated pest management, wetland set-asides and other efforts included in USDA's Natural Resources Conservation Services Environmental Quality Incentives Program
Measure 2.5: Regulations and incentive programs support resource stewardship for producers, such as setback requirements, agricultural uses, agricultural zoning or incentive zoning
Measure 2.6: State agencies and university extension agents provide technical assistance and information about the incentive programs in measure 2.5
Measure 2.7: Government positions (i.e., rural planning, agricultural planning) or programs at the state, tribal and local levels act to maintain the agricultural land base through programs such as transferable development rights, lease or purchase of development rights
Measure 2.8: The number of comprehensive plans (county or city, agricultural economic development and smart growth) that include farmland protection policies
Indicator 3: Risk from chemicals or other hazards used in food production is minimized for farmworkers and laborers
Measure 3.1: Number of institutional policies encouraging safe living and working conditions for farmworkers and laborers

Minimum recommended program element(s) needed for this outcome: procurement

See Appendix 5 for a listing of tools.

The farm to school field needs further exploration of how farm to school procurement activities can support reducing a school's environmental impact through changes in food production for schools, food transport, packaging and food consumption — also called "life-cycle analysis" of food products. There are extensive research reviews documenting the potential that food production, processing, packaging, distribution, consumption and waste or recovery has on the environment[43,64–67]. It can be hypothesized that: 1) Local foods may come in less packaging; 2) Local food processors may choose to use energy- or water-efficient methods; 3) There may be efficiencies gained through transporting local food; and 4) Changing school meal protein composition over time through school purchase of foods such as local legumes, alternative protein sources and lean meats could support reduction in greenhouse gas emissions[67–69]. Nearly all life-cycle analysis studies indicate that some of the largest greenhouse gas reduction results come from reducing red meat consumption[4,53,66–69]. Such procurement and dietary choices align with the recommended Dietary Guidelines for Americans[69,70]. A model for estimating and monitoring the potential carbon footprint of a school lunch will be available in 2014 through the Journal of Industrial Ecology[69].

A reduction in the "ecological footprint" of schools was considered as a priority outcome, but not prioritized. This complex concept measures the human demand on global biological resources. Originally developed as an indicator to help nations, communities or individuals understand their impact on the environment, the footprint is increasingly used as an indicator of product sustainability or an organization's values. Calculating an ecological footprint of a school or school district will involve examining practices beyond the scope of farm to school activities, such as building size, efficiency of a school bus fleet, energy use, energy efficient heating and cooling systems, and purchases beyond food[71].

Policy Outcome: Institutional support for local, environmentally sustainable foods

Similar to policy outcomes suggested in community economic development, institutional policies supporting local, sustainable foods is also an outcome related to environmental quality. Other policy suggestions are in the area of land stewardship related to food production.

The policies in this sector involve institutions beyond school districts to take action in order for schools to have a sufficient supply of local, sustainable products to purchase (Indicator 1), to support the local, regional agricultural land base (Indicator 2), and to support the workers who help provide those foods (Indicator 3). Limitations and explanations to the measures are:

- Measure 1.1–1.3: Requires more transparency in food labeling and documentation of efforts by producers and processors who are not certified or labeled.
- Measure 1.4: Policymakers may not think about local food supply as supporting environmental quality in agriculture-related plans.
- Measure 2.1: Joint-use agreements, also "good neighbor" agreements, can be used by institutions such as a county government and a school district to set terms for shared use of public property, such as gardens or school yards.
- Measures 2.2–2.6: These are limited by financial resources to pay for research, training and technical assistance.
- Measures 2.7–2.8: These were included because maintaining a local agricultural base is fundamental to farm to school activities. More research is needed on the success of transferable development rights (TDR) to keep agricultural or ranch lands from being developed[72]. TDR allows private property owners to transfer development rights to separate their ownership status from the piece of property. The ownership rights can then be transferred to another piece of property in a different location. When ownership has been transferred to another location, the original property owner is restricted from further developing the land, meaning that a piece of farm or ranch land possibly can stay undeveloped, while another location in the city or a suburb will be

further developed[72]. To date, approximately 140 TDR programs are in place in the U.S. with varying degrees of success in preserving existing rural lands[72].

- Measure 3.1: This indicator and related measure is included because similar to maintaining an agricultural base, food production requires continued healthy workers.

Cross-Sector Connections from Environmental Quality Outcomes

With Community Economic Development

When a school district purchases sustainably produced foods, it supports economic viability for those growers or ranchers in the region who may not have as many market opportunities. If the farm to school activities are successful at reducing food and total solid waste collected at schools, this is good for the environment and economical. These saved dollars can be used in other ways that support the program, such as purchasing more local foods. In Davis, California, the saved revenues through recycling and composting programs were used to hire recycling coordinators in the schools to keep up the momentum and keep educating children and teachers about how they can reduce waste[73,74].

With Public Health

Reducing the use of antibiotics in meats procured for school meals can reduce related human health issues of antibiotic-resistant infections. There has been a rise in the use of nontherapeutic antibiotics in animal production, which may be a contributing factor to increases in antibiotic-resistant strains of bacteria that contribute to illness in human populations[75,76].

Reducing the use of pesticides or herbicides used in food production can reduce the potential of farmers, farm workers and their families' exposure to chemicals and thereby their risk for developing respiratory illness, skin conditions or other related illness[77–84]

School yards that include gardens may provide another access point for families and community members to learn how to grow, tend, harvest and prepare their own food. This additional local food access can support healthy eating behaviors outlined in the public health section. School gardens also can help participants be physically active during some periods of the year, such as harvesting or turning cover crops into the soil.

With Education

Educational activities link with environmental quality outcomes through awareness and an increase in knowledge facilitated through environmental education topics covered as part of farm to school curriculum and gardening.

05
Conclusion and Next Steps

This chapter provides a discussion of the major conclusions emerging from the evaluation framework, describes lessons learned during the framework development process, and identifies limitations of both the framework and of the process used to develop it. Also presented are implications of the framework content for practitioners, researchers, policymakers and funders. This chapter concludes with recommendations for next steps.

Discussion and Lessons Learned

Researchers, funders and practitioners have expressed the need for a comprehensive evaluation framework for farm to school for several years. This document is a first step at meeting this felt need for the field of farm to school.

This evaluation framework fulfills two significant needs to guide and proliferate relevant farm to school research and evaluation. First, the framework describes a common language for consistently articulating farm to school activities through core and supporting elements, touch points and actors. Secondly, it identifies priority outcomes, indicators and measures for the four sectors of public health, community economic development, education and environmental quality, along with an exploration of cross-sectoral connections among outcomes in the four sectors.

Through the process of engaging stakeholders in the drafting of this framework, multiple outcomes that have been studied or hypothesized within different sectors were explored, and the strength of those outcomes related to farm to school elements assessed. These rich discussions revealed that there is much more agreement from practitioners and researchers about possible relationships between farm to school activities and outcomes within the sectors of public health and economic development as compared to those within the education and environmental quality. This may be attributable to the relatively higher volume of available data, peer-reviewed literature, media attention and the number of school sites with stated goals related to health and the economy. Within all four sectors, there was a relative lack of longitudinal, multifaceted studies. Further, the discussions regarding cross-sectoral connections are still very much in their infancy, and much more work needs to be done in this area.

In practice, farm to school activities look surprisingly similar on the ground, regardless of whether the desired goals are related to health, economy, education or the environment. This suggests the promise of farm to school programs and policies as a lever to systemically address multiple societal issues related to health, economy, education and the environment. Actualizing that promise will take identifying the commonalities between elements and outcomes between sectors. For example, at the confluence of improved behavioral outcomes within the sectors of public health, education and the environment are common mediating variables related to social and emotional development, such as motivation, self-efficacy and engagement. Thus the gaps this framework fills in both consistent program articulation and identifying priority outcomes for multiple sectors are critical first steps toward understanding the collective impact potential of farm to school activities nationwide.

Another major finding of the participatory approach used for developing this framework revealed there isn't "one right answer" for prioritizing outcomes, indicators and measures. Rather, the outcomes, indicators and measures identified in this framework are based on levels of agreement among participants and existing information in the literature base.

Several of the priority outcomes presented in the framework do not have readily available data from existing data sources, nor are validated instruments available for documentation. This is a short-term problem that can be resolved with prioritized efforts in the future to further the field of farm to school. Appendix 5 provides a list of sample data collection tools appropriate at the program level for many of the identified outcomes, indicators and measures. This list is not prioritized in any way, or tested by framework developers. It is intended as a starting point for users to consider developing their own customized tools, if needed.
A fuller repository of additional evaluation and tracking tools has been gathered and is available online at www.farmtoschool.org.

It is anticipated that different stakeholders will use this framework as a guide to develop, describe, implement and conduct farm to school evaluation and research. Readers are encouraged to work with the proposed templates for consistent program articulation, priority outcomes and measures offered in the evaluation framework and provide feedback on

its applicability and use (access the feedback form at www.farmtoschool.org/resources-main/evaluation-framework).

Limitations

There are several inherent challenges to developing a cross-sectoral evaluation framework for a field of practice that is rapidly evolving and gaining traction in communities all across the country. The farm to school outcomes and indicators prioritized in each sector are influenced by the realities that there are: (1) few institutionalized, publically available, data collection and analysis mechanisms for farm to school; (2) few validated instruments for researchers and evaluators for identified priority outcomes; and (3) few systems for regular tracking and monitoring of farm to school activities and related state and national policies that influence farm to school.

Further, there are a handful of hypothesized and observed outcomes regularly identified with farm to school activities that were not included in the priority outcomes and measures in this framework. For example, outcomes such as improvements in academic achievement and body mass index were extensively debated during the framework development process, but ultimately not included as priority outcomes. Chapter 4 includes rationale for exclusion of such outcomes within each sector.

There were also limitations to the framework development and review processes. During the development phase, participants were intentionally asked to first apply a specific sector's lens to farm to school activities, to then predict plausible ways the farm to school core elements might have impacts in that sector, and then look at the same outcomes with a cross-sectoral lens. The purpose was to push thinking beyond participants' specific area of expertise. It was a challenge, however, to come to agreement from individuals approaching farm to school from different vantage points with limited experience from the other perspectives.

During the review process, extensive feedback was sought from both on-the-ground and research perspectives. Reviewers were limited by internet-based interactions and thus feedback that was incorporated may have missed nuances in explanation. Additionally, the content of this framework reflects the combined expertise and experience of all those who formally and informally contributed to its development. Despite the high number of individuals involved, their perspectives may not have contributed the full spectrum of diversity in socio-economic background, race, age, ability and cultural perspective that farm to school does or could encompass. This limitation may be addressed in the future through field testing, new understanding of specific needs and conditions, and increased availability and institutionalization of data collection and analysis systems.

Implications of The Framework

The framework was written by and for various groups, including farm to school practitioners, researchers, policymakers, decision makers and funders.

For practitioners

In tandem with consistently articulating the core and supplemental farm to school program elements, sites also need to consistently measure farm to school outcomes using suggested tools and templates. Practitioners can use the table templates presented in Section 4.1 to consistently talk about how each site implements farm to school core and supporting elements. Farm to school practitioners can ground-truth the articulation templates, outcomes and indicators identified in the framework, and suggest alternatives from their learning. As more practitioners commit to following a farm to school program articulation template, more evaluation and research studies will be feasible to support the field.

New program sites can begin establishing evaluation plans and strategies in early planning stages, and then build from there using this framework. Similar to starting farm to school activities, it can be easiest to focus on one area — such as buying local and telling everyone about it — and as success builds in that area, the program can expand to include changes in curriculum, gardening and community involvement.

Similarly, it may be easiest for practitioners to begin evaluating efforts in one area of farm to school, rather than attempting to analyze all of them right away. As tracking of measures becomes more mainstream and regularized, sites can expand their evaluation efforts to cover more activities in other core and supporting elements.

For researchers

Researchers can utilize the recommendations in this framework to explore theoretically grounded avenues for farm to school studies where gaps have been identified. The evaluation framework has put forward a set of prioritized outcomes and indicators for research in each of the sectors; these will need to be tested, explored further, validated and amended, if needed. Testing the strength, directionality and causality between farm to school core elements and intended outcomes is another critical research area that needs attention.

Researchers can further explore and work on the limited number of experimental or quasi-experimental studies, particularly in the domains of education and environmental quality, and on longitudinal, multifaceted experimental and quasi-experimental studies in all four sectors.

In terms of methods and tools for data collection, researchers can help develop additional resources or formats for priority outcomes; as well as facilitate the institutionalization of data collection and analysis by connecting with and informing existing data collection schemes at the federal and state level. Finally, researchers can push the needle on the future of farm to school activities across the country by engaging in studies that approach the cross-sector connections within and among the four sectors outlined in this framework.

Researchers may find that some outcomes often hypothesized to be influenced by farm to school activities are not prioritized in the framework. Samples include student attendance, discipline through referrals and academic achievement through standardized tests in the education sector. Since in the current understanding of farm to school, the associations between these outcomes may be indirect or limited, they are listed as long-term outcomes for possible exploration in the future. The field would greatly benefit from researchers digging into these long-term outcomes that have been prioritized by practitioners and funders. A summary list of these outcomes presented in Table 26 is at the end of this chapter.

For policymakers and decision makers

Local, state and national policymakers should test, expand and amend the policy outcomes and indicators prioritized in the framework. A deeper understanding of policy levers for addressing barriers to farm to school is needed to be able to advocate for supportive policies that institutionalize this innovative model. Decision makers are encouraged to connect with researchers and practitioners to understand the reality of farm to school implementation, and associated policy implications across the four sectors: public health, community economic development, education and environmental quality. Finally, policy support for farm to school is imperative to scale up and fully institutionalize the model. Dedicated attention from policymakers will enable this change.

For funders

Farm to school activities can be supported by external funds from private and public foundations, or local, state and federal grants. Funders are uniquely positioned to drive widespread adoption of the recommendations in this framework — for both program articulation, and priorities for evaluation and research. By guiding grantees and researchers to focus on the appropriate-level outcomes presented in this framework, funders can accelerate the growth of farm to school knowledge, and support the implementation of programs and policies that result in the intended goals.

Specifically, funders can readily incorporate the program articulation descriptions provided in Chapter 4.1 into their grant applications and reporting requirements. Proposal submission forms can guide applicants to describe their proposed farm to school

activities in relation to the three core elements of: (1) procurement, (2) gardening, and/or (3) education. An additional consideration is to request grantees provide information on supplemental elements that support farm to school activities at the site. This would provide the fullest picture of the exposure and engagement of farm to school of each site and would significantly increase the reliability and interpretation of data collected through grantee reports.

Further, with regard to grant reporting guidelines, grantees may be requested to report based on the identified priority outcomes and indicators. This would fast-track the adoption of evaluation efforts focused on the priority outcomes among practitioners. As more funding entities require reporting on similar outcomes, it will be more likely to discern the effectiveness of specific activities or combinations of activities, and in the long-run the collective impact of farm to school activities across multiple grantees. Funders should recognize that grantees likely will need technical assistance evaluating prioritized outcomes, and support for documenting cross-sectoral connections where applicable.

Another important consideration for funders is if, how and where to make publicly available the data aggregated from multiple sites). An ideal scenario for quickly building the evidence-base would be for multiple public funders to collect and make available program components and outcomes data as it has been done with the USDA Farm to School Census and the Food Environment Atlas data. Finally, funders can play a critical role in enabling grantees to tell their farm to school story: activities, outcomes, learning and evaluation findings related to a wider audience through strategic media and communications support.

Recommendations and next steps

A central goal of this framework is to catalyze implementation of farm to school activities, research and policy initiatives that align with the four sectors of public health, community economic development, education and environmental quality. An intermediate step toward that goal is to develop nationwide capacity to conduct evaluation and research on farm to school, and build the field of scholars who focus on farm to school. This framework guides the increased capacity for evaluation and research. However, the new findings emerging from these efforts will need to be translated and disseminated to practitioners, funders, policymakers and the media, in order to fully support the field. Presented below are some recommendations for facilitating this process.

Communications

To be adopted and used in the field, this evaluation framework needs to be disseminated widely. Multiple communication strategies should be used to inform and engage the primary audiences: program practitioners, evaluators and researchers, policymakers and funders. Examples of specific opportunities to communicate the need for, and direction of, relevant research in the priorities identified in the framework includes: letters to the editor, viewpoints, opinion pieces and articles in peer-reviewed journals for scholarly audiences. These communications should outline the cross-sectoral connections farm to school can potentially influence, and the need for focusing on priority outcome areas. Further, as additional research is conducted or policies implemented, the findings must be contextualized for different audiences, framed in easy to understand language and disseminated widely.

Systematic tracking of program outcomes

This document suggests a variety of priority measures to be tracked for outcomes in the four sectors. There are unanswered questions related to who should track this information, where the data should be housed, who updates, maintains, cleans and analyzes it, and who has access to the data. One possible solution that has emerged in several discussions is an online tool that facilitates consistent program articulation through a series of check-off boxes, and then provides users the preferred evaluation tools and methods for administering, along with the ability to enter data and receive analysis. The result would be a national repository of data different from what is currently collected and would significantly aid

practitioners in evaluation.

In practice, there are many challenges to establishing baseline program evaluation efforts, attaining consistency across these efforts, and connecting program evaluation with research. Several national organizations engaged in farm to school activities, as well as states with farm to school grant programs are tackling these challenges. Consistent and common language and methodology used across all these efforts will build and support each other, and the farm to school field. Program practitioners would additionally benefit from, and overall data collection will consistently improve, with a generic logic model or theory of change for farm to school core and supporting elements.

Until the development of these models, program sites are encouraged to use the provided templates and tools in this framework to consistently articulate and evaluate farm to school activities across the country. Additional resources for evaluating farm to school activities are listed in Appendix 1, as well as available online through the National Farm to School Network repository of evaluation tools and resources.

Capacity building for farm to school research and evaluation

Because farm to school outcomes span across the sectors of public health, community economic development, education and environmental quality, there are few academic programs or agencies that focus their efforts exclusively on this topic. Strategic activities that would build national capacity to conduct research and evaluation in this field include: regular national meetings bringing together key researchers that are engaged in farm to school; focused webinars to share recommended tools, findings and emerging research topics; matchmaking between program sites that seek evaluation and researchers looking for study sites; mentoring of early career entrants in farm to school research; and fellowships and monetary awards to stimulate doctoral-level studies in the field of farm to school.

Conclusion

Farm to school is rapidly evolving and institutionalizing at local, county, state and federal levels. It is likely that the outcomes and indicators identified in this framework will not remain static, but rather evolve, as our shared understanding of farm to school activities and policies advances. This evaluation framework should be viewed as a living document, which charts the course for the future of farm to school implementation, evaluation and research. To remain relevant to the various stakeholders it seeks to benefit, the content of the evaluation framework will need to be periodically field-tested and amended to reflect new knowledge in farm to school theory, practice and policy.

Table 26: Summary of Priority Outcomes, Indicators and Measures

Program Level

Sector	**Public Health**	
Priority Outcome	**Students and their families access locally produced, healthy food through schools**	
Indicator(s)	**1: Student access to local, healthy foods in schools**	**2: Family and adult access to local, healthy foods from farm to school program activities**
Measures	1.1 Number of students participating in, or exposed to, farm to school activities, such as school gardening, cooking, nutrition and food-based lessons	2.1 Number of parent or care-giver participants participating in farm to school activities, such as after-school programs, garden volunteers, field trips, nutrition and food-based learning, etc.
	1.2 Food preparation strategies used to increase local food availability, accessibility or appeal of local, healthy foods, including use of culturally appropriate foods in schools	2.2 Number and type of nutrition, food-based or agriculture-based learning materials sent home or shared with other community adults
	1.3 Food serving strategies used to increase line of sight, accessibility and appeal of healthy, local foods, including use of culturally appropriate foods	2.3 Number and types of ways procuring local foods is connected to garden and/or educational activities in the home and community
	1.4 The number of ways procuring local foods is connected to garden and/or educational activities in the school	2.4 Number and types of adults (i.e., teachers, parents or care givers, community partners, staff) engaged in the design and implementation of food preparation and serving strategies
	1.5 Increase in the percentage of total free and reduced-meal eligible children participating in school meal programs when farm to school activities are present	2.5 Number of adults directly involved in farm to school (students, teachers, administrators, farmers, food service) engaged in the design and implementation of farm to school activities
	1.6 Increase in use of local, healthy foods in school and outside of school meal programs, including breakfast, lunch, snacks, Department of Defense fresh produce program, summer and after school programs	2.6 Increased support and technical assistance for students and their families to grow and prepare their own food
	1.7 Number of students directly engaged in the design and implementation of the food preparation and food-serving strategies in Measures 1.2 and 1.3	
	1.8 Number of children directly involved in farm to school (students, teachers, administrators, farmers, food service) engaged in the design and implementation of farm to school activities	
	1.9 Number of students trained and participating in youth action research to help evaluate or assess impact of farm to school programs in public health measures such as food access, food literacy, etc.	

Program Level Cont.

Sector	 Community Economic Development	
Priority Outcome	**Local and regional economic impact**	**Social capital built in school districts and the community**
Indicator(s)	**1: Increase in market opportunities/ income generation for local producers, processors and distributors through sales to school districts and potentially to other institutions through procurement activity**	**2: Mutually supportive relationships result in access to resources shared between community and school districts**
Measures	1.1 Total dollar amount of all local products purchased by school districts and schools	2.1 Number and type of promotional and training activities related to local foods in the school environment and in the community
	1.2 Percentage of total food budget spent on local foods by school districts and schools	2.2 Number and type of sales producer has to chef, retailer or other wholesale accounts resulting from farm to school promotion and training efforts
	1.3 Type, quantity and monetary value of specific local products (i.e., fruits, vegetables, dairy, meats and processed foods) purchased by school districts and schools	2.3 Number and type of food-related businesses (i.e., farmers, ranchers, distributors, retailers) partnering with the school district to support farm to school through education, gardening and procurement efforts (i.e., field trips, site visits)
	1.4 Percentage of sales to local socially disadvantaged producers (i.e., growers, ranchers, processors)	2.4 Estimate of financial value of in-kind support provided by community volunteers, food donations, guest speakers, site visits, field trips, equipment donations provided to school or district in support of the farm to school activities
		2.5 Amount of money generated at the school site through farm to school related activities, such as fundraisers with sales of plants grown by students in gardens, revenue from local governments or other institutions, grants and other sources of funding received

Program Level Cont.

Sector	Education	
Priority Outcome	**Farm to school activities are aligned to Early Learning Framework, the Common Core, or state content standards to support student engagement and learning**	**Increase food literacy in students and adults in schools**
Indicator(s)	**1: Sites offers a range of learning opportunities aligned to support learning skills and content areas such as service learning, community connections, inquiry-based learning, experiential learning and hands-on field experiences related to food**	**1: Increase in student and staff knowledge about food and its impact on health**
Measures	1.1 Number of teachers using food system or gardening curriculum aligned to Early Learning Framework, Common Core or state-adopted content standards	1.1 Number of teachers integrating curriculum designed to improve food literacy
	1.2 Number of students participating in farm to school activities aligned to Early Learning Framework, Common Core or state-adopted content standards	1.2 Number of teachers using culturally appropriate curriculum, including recipes that align with diverse student ethnic or cultural heritage
	1.3 Number of school-based gardens with curriculum components aligned to Early Learning Framework, Common Core or state adopted content standards	1.3 Number of students participating in farm to school activities designed to improve food literacy
	1.4 The subjects (i.e., nutrition, science), grade levels, number of classes and type of activities (i.e., taste tests, hands-on learning, gardening) where farm to school activities and curriculum are aligned to Early Learning Framework, Common Core or state-adopted content standards	1.4 Number of hours, frequency, sequence of curriculum (i.e., grade level) and type of learning opportunities students receive in each subject area focused on food literacy in classrooms, outdoor learning environments and eating areas
	1.5 Number of hours, frequency and type of learning opportunities in each subject area that are aligned with Early Learning Framework, Common Core or state-adopted content areas	1.5 Number and types of ways that food literacy lessons or activities are occurring across the school environment, such as in gardens, classrooms and cafeterias
	1.6 Student attitudes about specific content taught through farm to school learning opportunities	
	1.7 Family, youth, community member and producer input and engagement in design of activities, curriculum and learning opportunities (i.e., on food literacy, nutrition, local foods, agriculture) connected to Early Learning Framework, Common Core, or state-adopted content standards	

Program Level Cont.

Sector	Education	Environmental Quality
Priority Outcome	**Increase food literacy in students and adults in schools.**	**Students are environmentally literate through engagement in farm to school activities**
Indicator(s)	**2: Increase in school adult knowledge about food and its impact on health.**	**1: Increase in student knowledge about the relationship between the environment and food systems, including environmental impacts of food production, processing, distribution and waste or composting**
Measures	2.1: Number and types of ways adults in the schools are involved in training, activities or other learning experiences related to food literacy.	1.1 Number of children, at what grades, for what length of time, are receiving what type of lessons on environmental concepts connected to food systems and/or school gardening
	2.2 Number and methods of incorporating farm to school activities in school employee wellness policy efforts related to a healthy diet.	1.2 Types of curriculum aligned with Common Core standards used to teach environmental literacy connected to food systems
		1.3 Number of children, at what grades, for what length of time, are participating in what types of environmentally responsible behaviors in schools, such as composting, waste reduction, energy conservation or recycling
		1.4 Number of ways procuring local foods is connected to garden and/or educational activities in the school, home and community
		1.5 Student knowledge of specific environmental concepts that align with science, such as biodiversity, water conservation, pest control, pollination, natural resources and ecosystem services
		1.6 Number of children, at what grades, for what length of time, visit local farmers to learn about sustainable production methods such as integrated pest management
		1.7 Number of schools with environmental literacy plans connected to farm to school activities, food systems or some other connection to food production
		1.8 Number of leadership development opportunities for students to share and demonstrate their knowledge and passion for, and experience with, environmental practices, such as the benefits of eating sustainable, local foods
		1.9 Number of students monitoring, evaluating or innovating the school's environmental sustainability practices
		1.10 Student capacity to analyze environmental quality issues related to the food system through a justice lens

Research Level

Sector	 Public Health		
Priority Outcome	**Family access to local, healthy foods in the community**	**Increased consumption of local and healthy foods**	
Indicator(s)	**1: Farm to school activities increase awareness of local food availability in the community**	**2: Student preferences for local, healthy foods**	**3: Adult preferences for local, healthy foods**
Measures	1.1 Number of people who received local, healthy food through participation in farm to school program activities, for example garden harvest baskets	2.1 Increase in student awareness and knowledge about food and nutrition's impact on health	3.1 Increase in adult (i.e., family members, school staff or community partners if involved in learning activities) awareness and knowledge about food and nutrition's impact on health
	1.2 Number of people who receive resources about accessing local, healthy foods in farm to school family outreach events	2.2 Increase in student willingness to try new local, healthy foods	3.2 Increase in the number of families who report purchasing local foods after involvement in farm to school activities
	1.3 Number of families that begin gardening at home or in a community garden after participation in farm to school activities	2.3 Increase in amount of local fruits and vegetables students report eating	3.3 Increase in amount of local fruits and vegetables parents or care givers report eating
	1.4 Number of coupons given and redeemed by farm to school program for farmers' markets, farm stands or other access point for local, healthy foods	2.4 Increase in the number of students in schools and districts with farm to school (including procurement, gardening and education activities) consuming the daily recommended amount of fruits or vegetables	
	1.5 Self-reporting of Supplemental Nutrition Assistance Program (SNAP) users who report using SNAP benefits to buy local, healthy foods, whole foods, edible plants and seeds and/or use at a farmers' market, food stands or other access points	2.5 Decrease in fruit and vegetables or other healthy foods students discard after lunch	
	1.6 The number of farmers' markets accepting SNAP electronic benefits transfer cards (EBT), Women Infant and Children (WIC) and Senior Farmers' Market Nutrition Program (SFMNP) vouchers participating in farm to school family activity programs	2.6 Decrease in amount of unhealthy foods students report eating	
	1.7 The percentage of direct sales to SNAP EBT clients participating in farm to school family activities at farmers' markets, including WIC and SFMNP vouchers		
	1.8 The number of local products that are SFMNP and WIC eligible sold by grocery markets in community participating in farm to school community activities		
	1.9 Number of farm to school sites that provide opportunities for students or families to engage in participatory research, service learning or action-based learning with family-related activities on food access		

Research Level Cont.

Sector	 **Community Economic Development**
Priority Outcome	**Local and regional economic impact**
Indicator(s)	**1: Increase in market opportunities and income generation for local producers, processors and distributors through sales to schools and possibly other institutions**
Measures	1.1 Number, demographics (i.e., gender, ethnicity, age) and type of local producers, processors and distributors supplying local products to school districts
	1.2 Number and type of local products distributors offer to schools
	1.3 Number and demographics of food producers, processors and distributors that change business plans due to farm to school market demand (i.e., new products, change in number of acres grown)
	1.4 Number and demographics of locally owned businesses created to meet farm to school demand
	1.5 Number of new product development opportunities created through farm to school training, technical assistance, or dialogue between school food procurers, foodservice workers, students and farmers
	1.6 Number of new jobs created by food producer, processor or distributor due to farm to school market demand
	1.7 Amount of new income generated from local farm to school sales
	1.8 Frequency of producer sales to schools (i.e., year round, one-time sales) including breakout of socially disadvantaged producers
	1.9 Number, demographics and type of producers selling local products to other farm to table markets, or newly established marketing relationships
	1.10 Number of school districts purchasing from regional and local food hubs
	1.11 Number and type of local/regional food hubs, buyers served and products sold
	1.12 Increase in use of pre-season/forward contracting or "producer acres under contract" to grow food for a school district

Research Level Cont.

Sector	Education			
Priority Outcome	Farm to school activities support student educational success			
Indicator(s)	1: Student readiness to learn	2: Student engagement and academic behaviors	3: Student academic mindset	4: Student academic competency gains
Measure s	1.1 Student participation in school breakfast programs when farm to school activities are conducted with breakfast	2.1 Changes in classroom attendance numbers or consistency during farm to school activity days or modules	3.1 Feeling of success at completing farm to school activities	4.1 Student content area test scores in relation to farm to school activities used to teach those subjects (i.e., math, science, language arts)
		2.2 Student participation during farm to school activity days or modules	3.2 The degree to which students value the work undertaken to complete farm to school related assignments.	4.2 Student course grades in relation to farm to school activities used to teach those subjects (i.e., math, science, language arts)
		2.3 Student classroom disturbances while participating in farm to school activities	3.3: Belief in self-ability and competence to complete and demonstrate leadership in farm to school related assignments.	4.3 Students' ability to identify and claim ownership of practical experience including planning, organizing, implementation and evaluation of farm to school initiatives
		2.4 Increased demonstration of leadership and initiative in students who have access to training and support through farm to school activities and opportunities	3.4: Sense of belonging in the classroom/ outdoor learning environment	
			3.5 Self-esteem while completing farm to school activities	

Research Level Cont.

Sector	Education
Priority Outcome	**Increase food literacy in students and adults**
Indicator(s)	**1: Increase in student and school adult knowledge about food and its impact on health.**
Measures	1.1 Knowledge of local foods, where food comes from and how it is grown
	1.2 Knowledge of food impact on health
	1.3 Knowledge of at least one element of food heritage, such as foods unique to different cultures, and including food histories native to the region/community/their own family
	1.4 Increased awareness and knowledge of food and nutrition issues facing community
	1.5 Attainment of food-related skills, such as recipe development, food-preparation, gardening and cooking
	1.6 Number of students communicating and promoting information about local foods, where food comes from, how it is grown and physical and mental impacts of healthy eating to families and community members
	1.7 Number of leadership development opportunities for students and adults to share and demonstrate their knowledge of food literacy
	1.8 Knowledge of how purchasing local food affects the local economy
	1.9 Knowledge and understanding of potential for local food procurement to affect systemic changes for social and economic equity

Research Level Cont.

Sector	Environmental Quality		
Priority Outcome	School supports environmentally friendly practices		
Indicator(s)	1: School district purchase of sustainably produced foods	2: Reduction in cafeteria waste	3: School, school garden, naturescape and landscape practices support diverse natural food environments
Measures	1.1 Quantity purchased and amount spent on local foods that are also third-party eco-label certified foods	2.1 Number of school-based composting programs that are part of existing waste reduction programs or are stand-alone	3.1 Number and size of school yards and gardens that grow and teach about food
	1.2 Producers track and provide measures to school or district about other environmental production practices for foods schools buy that are not third-party certified, such as integrated pest management, multi-cropping or aquifer restoration plantings	2.2 Documented use of school curriculum connecting food waste, composting and hands-on learning	3.2 Number of schools that use integrated pest management practices on school grounds and gardens
		2.3 Number and types of promotion activities to decrease food waste	3.3 Number of schools that use water conservation practices on school grounds and gardens
		2.4 Measure the proportion of food waste to total waste over time after using curriculum and other methods aimed at reducing food waste	3.4 Number of schools where food gardens are combined with naturescaping to promote biodiversity
		2.5 School engagement with the community (including growers) regarding alternative uses for waste	3.5 Number of school gardens that recycle, repurpose or reuse building materials for structures
			3.6 Improvement in soil quality in school garden over time

Policy Level

Sector	 Public Health	
Priority Outcome	**Students and their families access locally produced, healthy food through schools**	
Indicator(s)	**1: School district and school policy environment supports student access to local, healthy foods in school meals**	**2: Federal, tribal, state and local government program and policy environments support local, healthy food access for schools and families**
Measures	1.1 Increase in number of local school district wellness policies that include language on farm to school activities as part of addressing nutrition and wellness efforts	2.1 Increase in number of federal, state and tribal policies, initiatives or programs that support farm to school in relation to public health priorities (i.e., food policy councils)
	1.2 Increase in the number of school-level wellness policies that include language on farm to school activities as part of addressing nutrition and wellness efforts	2.2 Increase in number of city policies, initiatives or programs that support farm to school in relation to public health priorities
	1.3 Increase in number of schools with policies that schedule recess before school lunch	2.3 Increase in number of food policy councils or taskforces at the state, city, county or regional level that identify farm to school as a major priority and include representation of farm to school stakeholders, such as youth, local producers and members of socially disadvantaged groups
	1.4 Increase in number of schools with policies that support adequate time for student meals	2.4 Increase in number of state and tribal institutions with local, healthy food procurement policies
	1.5 Increase in number of times school boards review progress on implementation of school and district nutrition or wellness policies	2.5 Increase in the number of state, tribal, county or city local food pilot programs that help establish needed distribution or other forms of infrastructure for farm to school activities
	1.6 Increase in the number of students, family and community members engaged in the development of school food policy, including representation on food policy councils, municipal councils, state legislative hearings, etc.	2.6 Increase in the number of times a review of the progress on implementation of policies is conducted or requested by the approving authorities
	1.7 Increase in trainings to farm to school stakeholders provided on policy and advocacy efforts, and follow ups conducted to engage youth, parents, growers, foodservice workers	2.7 Increase in the number of training and support mechanisms for all farm to school stakeholders to engage in school or other food policy development efforts, including youth, parents or care givers, producers, laborers, foodservice workers, etc.

Policy Level Cont.

Sector	 Community Economic Development	
Priority Outcome	**Institutional support for local and regional foods**	
Indicator(s)	**1: Institutional procurement policies supporting local and regional foods**	**2: Institutional programs supporting local and regional foods**
Measures	1.1 The number of institutional procurement policies with supportive language	2.1 Government agency allocation of resources and creation of programs, grants and positions for farm to school
	1.2 The number of state local procurement policies with supportive language	2.2 Government programs that provide community food project grants to support local and regional foods, including farm to school efforts
	1.3 Government agency allocation of resources and creation of programs, grants and positions for farm to school	2.3 Number of training opportunities created for local producers and producers owned by socially disadvantaged individuals
	1.4 Government programs that provide community food project grants to support local and regional foods, including farm to school efforts	2.4 Number of farm to school stakeholders sitting on economic and community development councils or decision-making bodies within the community
	1.5 Number of state agencies that identify local food systems as a priority	
	1.6 Number of states with "buy local" food programs that include farm to school	

Policy Level Cont.

Sector	Education		
Priority Outcome	Education policy and programs support farm to school activities		
Indicator(s)	**1: Education agencies allocate resources to support farm to school programming**	**2: Teachers, child care educators, foodservice workers, students and producers are trained in farm to school education and gardening activities**	**3: Teachers, child care educators, school administrators, nutrition service directors, foodservice workers and producers have resources they need to implement farm to school activities as a collaborative team**
Measures	1.1 State legislatures provide funding to create farm to school positions, programs, grants or other resources to support farm to school activities	2.1 Increase in professional development programs for teachers, foodservice workers and growers that include farm to school curriculum, project-based and hands-on learning activities, procurement requirements and procedures, food safety requirements, budgeting best practices and innovations, safe growing standards, socio-cultural aspects of food and gardening education	3.1 School district policies support school gardens and hands-on learning approaches
		2.2 State education departments and school district policies encourage professional development by providing funding or technical assistance for programs in state agricultural departments for producers and processors	3.2 Farm to school activities aligned to Common Core or state-adopted standards are readily available for teachers as they are updated
			3.3 School district policies, teacher/foodservice worker union contracts and early child education organizations provide adequate time for planning farm to school activities, such as through planning periods or other preparation time
			3.4 Increase in number of training and technical assistance opportunities available for incorporating farm to school strategies into the buying, preparing, serving and recycling of school food

Policy Level Cont.

Sector	 Environmental Quality		
Priority Outcome	**Institutional support for local, environmentally sustainable foods**		
Indicator(s)	**1: Institutional procurement policies and programs that encourage purchase of, allocate resources to developing, or create infrastructure that encourages the markets for sustainable products that are also local**	**2: Institutional policies and programs support healthy ecosystems related to food production (i.e., maintaining ecosystem services)**	**3: Risk from chemicals or other hazards used in food production is minimized for farmworkers and laborers**
Measures	1.1 The number of school district procurement policies that set goals or other support for purchase of local products that are sustainable	2.1 School districts create joint-use agreements with local communities when communities use school gardens	3.1 Number of institutional policies encouraging safe living and working conditions for farmworkers and laborers
	1.2 Reporting on progress the school district makes on implementing and attaining goals related to local and sustainable product purchases	2.2 State agencies and public universities support sustainable agricultural practices through technical assistance and research	
	1.3 The number of state or tribal procurement policies with goals or other support for purchase of sustainable, local products	2.3 Number of producers, including socially disadvantaged and small-scale growers trained or assisted to access farm to school market and engagement opportunities	
	1.4 The number of comprehensive plans (in local jurisdictions, agricultural economic development, agritourism or smart growth) that include zoning, resource allocation or other programs to encourage local sustainable food production	2.4 State agricultural agencies and university extension agents develop and implement no-cost or low-cost methods to promote use of sustainable practices (by producers), such as integrated pest management, wetland set-asides and other efforts included in USDA's Natural Resources Conservation Services Environmental Quality Incentives Program	
		2.5 Regulations and incentive programs support resource stewardship for producers, such as setback requirements, agricultural uses, agricultural zoning or incentive zoning	
		2.6 State agencies and university extension agents provide technical assistance and information about the incentive programs in previous measure	
		2.7 Government positions (i.e., rural planning, agricultural planning) or programs at the state, tribal and local levels act to maintain the agricultural land base through programs such as transferable development rights, lease or purchase of development rights	
		2.8 The number of comprehensive plans (county or city, agricultural economic development and smart growth) that include farmland protection policies	

Table 27: Summary of Long-Term Outcomes Needing Further Research

Sector	Public Health	Community Economic Development	Education	Environmental Quality
Indicator	**1: Chronic disease reduction**	**1: School district nutrition service program financial stability**	**1: Student classroom behavior**	**1: Dietary food intake**
Measures	1.1 Reductions in the prevalence of Type 2 diabetes, obesity, high blood pressure among children and adult farm to school participants	1.1 Net balance stays in the black over time with increased local purchases	1.1 Student classroom referrals by age level as schools begin implementing and expanding farm to school activities over time	1.1 Increase in school food purchases of legumes, alternative protein sources and lean meats
Indicator	**2: Participants meeting physical activity guidelines**	**2: Farm to school market profitability**	**2: Student attendance**	**2: Environmental impact of local food miles**
Measures	2.1 Number of children and adults meeting the physical activity guidelines for Americans	2.1 Producer, processor and distributor's revenue is higher than expenses for invested time and resources to bring local products to school markets	2.1 Average daily attendance in schools implementing different levels of farm to school activities	2.1 Food miles traveled by different food items (i.e., fruits, vegetables, herbs, meats, grains) compared to distance they otherwise would have traveled if not purchased locally
			2.2 Chronic absenteeism (missing 10 percent or more school days in an academic year) in schools implementing different levels of farm to school activities	
Indicator	**3: Participants meeting dietary guidelines**	**3: Infrastructure is in place to support local food production, processing and distribution**	**3: Student academic performance**	
Measures	3.1 Number of children and adults meeting the Dietary Guidelines for Americans	3.1 Access to financial capital for small and mid-sized businesses	3.1 Overall grade point average in schools with different levels of farm to school activities	
		3.2 Access to material capital such as micro-processing, refrigeration units, trucks, etc.	3.2 State academic achievement test scores in schools implementing different levels of farm to school activities	
		3.3 Access to aggregators and distributors to connect producers to wholesale markets		
Indicator	**4: Reduction in child and family food insecurity**			
Measures	4.1 Number of children and families who report being food secure			

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Chapter 1

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06
Appendices

Index of Appendices

Appendix 1

Evaluation Resources

Evaluation, in the context of this framework, includes a suite of tools that can be used to examine and understand the effectiveness of farm to school activities. This appendix provides a curated list of program evaluation guides that may be helpful for program sites and for researchers who aim to build on program evaluation. This list is organized by program sites and by goal area. For a list of case studies, program evaluation reports and research articles presenting evaluation results, search "evaluation reports" in the National Farm to School Network online searchable website.

There are various ways to describe the different stages of program evaluation; below are helpful definitions to navigate the related terms. The project team gathered definitions from reviewer suggestions; some terms have emerged in the last 10 years and have not been vetted for comprehensiveness, potential applicability to farm to school sector outcomes or ease of use.

Cross-Sector Evaluation Resources:

These resources are helpful for supporting measurement of nearly any outcomes described at the program level across the four sectors.

- Bearing Fruit: Farm to School Program Evaluation Resources and Recommendations, 2008
  National Farm to School Network and the Urban and Environmental Policy Institute at Occidental College. This comprehensive resource provides a series of case studies in farm to school evaluations, as well as tools and resources available for measuring impact.
- Colorado Farm to School Evaluation Toolkit, 2013
  Colorado Farm to School Task Force and Spark Policy Institute. This toolkit guides practitioners through program evaluation by different groups, such as parents and teachers.
- Farm to School Evaluation Toolkit, 2011
  National Farm to School Network and the University of North Carolina Center for Health Promotion and Disease Prevention. This collection of survey instruments and other evaluation tools can help practitioners assess farm to school outcomes with different participants including students, foodservice staff, foodservice directors, farmers, educators and other stakeholders.

Formative or Process Evaluation

This phase of evaluation measures the "what" of the program: What is it setting out to do? How is it being implemented? How well is it meeting its goals? This phase of evaluation may use a logic model to lay out a road map about how the program's resources can potentially arrive at the program's destination: the desired outcomes.

Logic Model

In a logic model you can identify program inputs, activities and outputs that lead to short-term and direct outcomes as part of developing feedback for program improvement. It can examine program strengths and weaknesses, identify which elements of a program are working, and identify areas that need improvement. See "cross-sector resources" in this appendix for a great guide on logic model development.

"Theory of Change" Logic Model

A theory of change process can influence program planning and design, such as identifying other inputs or activities needed to address community needs[1].

Summative or Outcome Evaluation

This stage of evaluation identifies the "so what?" of programs in terms of short-term and intermediate-term outcomes. Outcome evaluations, also called "impact evaluation," determine if the effects can be attributed to the program and may examine various short-term impacts, such as changes in participant knowledge, attitudes, beliefs or behaviors.

Monitoring

This form of evaluation examines the implementation of planned interventions. This can include ongoing data tracking related to programs or policies. For example, environmental monitoring involves systematic collection of measures to characterize system changes in the quality of the environment such as air, soil or water quality indicators[2]. Public health law and policy monitoring involves the "ongoing, systematic collection, analysis, interpretation and dissemination of information about a given body of public health laws and policy."[3]

Surveillance

This involves the ongoing, systematic collection, analysis and interpretation of health outcome-specific data in order to plan, implement and evaluate public health interventions[4]. Community health assessments may involve collecting baseline data that is then repeated in surveillance, such as the Youth Risk Behavior Surveillance System (YRBSS). In farm to school, surveillance can include ongoing data on different outcomes to plan cross-site approaches.

- Community Food Security Assessment Toolkit, 2002
  USDA's Economic Research Service. This report provides a toolkit of standardized measurement tools for assessing various aspects of community food security, including food availability and affordability, food resource accessibility and community food production resources.
- Whole Measures for Community Food Systems, 2009 — Community Food Security Coalition's guide to values-based planning and evaluation.
- Program Evaluation Strategic Planning Kit for School Health Programs, 2008
  Developed by the Centers for Disease Control and Prevention's Division of Adolescent and School Health (DASH), this toolkit provides evaluation technical assistance on developing a strategic plan that includes evaluation for school-based health promotion programs.
- The Logic Model Guidebook: Better Strategies for Great Results (2nd Edition), 2013
  Lisa Wyatt Knowlton and Cynthia C. Phillips examine logic models in relation to programs and organizational initiatives. Sage Publications. See Chapters 1-4 here: http://www.sagepub.com/upm-data/50363_ch_1.pdf.
- Community Schools Evaluation Toolkit, 2009
  The Coalition for Community Schools designed this toolkit to help community schools evaluate their success and plan future efforts.
- Impact Evaluation Handbook, 2010–2011
  Network for a Healthy California. A guidebook that includes multiple data entry templates, planning templates and surveys.
- Evaluating Community Programs and Initiatives and the Evaluating the Initiative Toolkit, updated 2013
  Community Toolbox, a service of the Work Group for Community Health and Development at the University of Kansas. This toolkit provides guidance on evaluating school sites with a community-level approach.
- A Guidebook to Strategy Evaluation —Evaluating Your City's Approach to Community Safety and Youth Violence Prevention, 2008
  This guide, while focused on youth violence prevention, offers a different perspective called "strategy evaluation," which emphasizes evaluating an overall strategy toward a given outcome, rather than specific program elements.

- Evaluation Planning Matrix Template, 2008
  Evaluators may find developing an evaluation plan in addition to using logic models helpful. This is one sample from the New York State Department of Health.

- Spectrum of Prevention framework
  This framework is useful for programs using community-wide approaches.

Farm to School Surveillance Resources:

These resources are useful for external evaluators or researchers who want to build on evaluation efforts for cross-site studies at the research level across the four sectors.

- The State of Farm to School in San Diego County, 2013
  San Diego County Farm to School Taskforce.
  An example of a comprehensive, county-wide baseline assessment.

- The Farm to School Census, 2013
  The United States Department of Agriculture, Food and Nutrition Service surveyed the prevalence of farm to school in the U.S. and will repeat the census in spring 2015.

Public Health: School and Community Program Evaluation Resources

- Sample farm to school grant reporting documents in states that have grant money allocations and/or additional reimbursements includes examples of tracking the number of students exposed to farm to school activities, the number of parent participants, and the increase in the use of local foods in school meal programs. See California, Illinois, Maine, Michigan, North Carolina, New York, Ohio, Montana, Pennsylvania, Texas, Washington, D.C., Wisconsin, West Virginia, Oregon, Vermont and Alaska for examples[5].

- Measurement resources from Cornell University's Office for Research on Evaluation
  This compendium of resources includes measurements of fruit and vegetable consumption, food knowledge and food preparation skills.

- Case study evaluation reports of farm to school programs often include appendices of student food attitude surveys, such as the 2012 Wisconsin Year One Report or Washington's farm to school survey for students.

- The Spectrum of Prevention
  A framework that the public health field has applied to change social norms, such as creating healthy eating and active living environments.

Community Economic Development Evaluation Resources

- Sample farm to school program grant reporting documents in states that have grant money allocations and/or additional reimbursements; includes examples of tracking the type of products, number of products and changes in local vendors in school meal programs. See California, Illinois, Maine, Michigan, North Carolina, New York, Ohio, Montana, Pennsylvania, Texas, Washington, D.C., Wisconsin, West Virginia, Oregon, Vermont and Alaska[5].

Education: Food, Garden and Food System Education Evaluation Resources

- The Center for Ecoliteracy resources page has a list of books and journals for educators interested in environmental literacy, place-based education, teaching the food system and other farm to school relevant literature.

Environmental Quality: Environmental Education Program Evaluation Resources

- Measuring Environmental Education Outcomes, 2014
  The Environmental Education Capacity education training program sponsored by the Environmental Protection Agency, led by Cornell University Civic Ecology Lab, the North American Association for Environmental Education and other partners. This guidebook walks through the basics of program evaluation within an environmental education context, including examples of different short- and long-term outcomes and ways to measure them. NAAEE website: http://www.naaee.net/publications.

Appendix 1 References

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Appendix 2

Farm to School Program Implementation Resources

The National Farm to School Network maintains an extensive database of farm to school resources, including publications included on other websites listed in this appendix. Please visit the website for resources. The definitions were gathered from reviewer suggestions; some terms have emerged in the last 10 years and have not been vetted for comprehensiveness, potential applicability to farm to school sector outcomes or ease of use.

Farm to School Program Development Resources

- Establishing a Farm to School Program: A model school board resolution — ChangeLab Solutions.
- Food Hub Knowledge Base: Farm to School
  This Ecotrust-curated library includes instructions for getting started, resources, evaluations and much more.
- Wisconsin Farm to School Toolkits
  University of Wisconsin-Madison Center for Integrated Agricultural Systems.
- Vermont farm to school resources.
- USDA Farm to School
  A series of resources for implementing farm to school activities — from procurement, food safety, distribution and processing, and making connections with producers.
- Center for Disease Control and Prevention School Food Environment Resources This list includes farm to school programs, district wellness policies and others.
- Delivering More: Scaling Up Farm to School Programs
  This booklet helps programs consider procurement and distribution issues.
- Visit your state program's farm to school website, as many have toolkits relevant to your local area.
- The Preschool Initiative: Building a Healthy Foundation for Life
  This toolkit includes farm to school procurement guidance.
- Harvest for Healthy Kids
  Curriculum and resources for early childhood education.

Public Health: Wellness Policy and Nutrition Education Resources

See the education section in this appendix for other related resources

- Sample School Wellness Policy: Farm to School
  From the Public Health Law Center.
- Promoting Local Purchasing and Farm to School Activities: Model Wellness Policy Language for Schools
  University of Wisconsin–Madison Center for Integrated Agricultural Systems.
- Proposed Federal Rules on Local Wellness Policy Implementation Under the Healthy, Hunger-Free Kids Act of 2010, February 2014.
- The USDA has an extensive list of various education resources, including nutrition education on its website.
- Nourish Curriculum Guide
  This curriculum and companion DVD can be used in social studies, science, health or English classes. Activity themes include the story of food; seasonal, local food; food traditions; food and ecosystems; analyzing food ads; school lunch survey; and action projects.
- Healthy Foods for Healthy Kids
  A kindergarten–5th grade garden-based program.

Community Economic Development: Procurement, Promotion and Food Preparation Resources

- Visit your state's Buy Fresh Buy Local website.
- Many states have basic how-to guides for schools who want to buy local, for example Washington, D.C.'s, Guide to Purchasing and Serving Local Foods in Schools, Vermont's Guide for Using Local Foods in Schools, Washington state's guide, or Colorado's farm to school resource.
- Many states have institutional food purchasing reports to help schools or other institutions increase their local purchases, such as the Michigan Good Food Charter. Check with your NFSN.
- Public Health Law Center's Compilation of General Procurement Regulations and Resources.
- Check with your state department of agriculture or education to see if there are Harvest of the Month or other state-specific promotion resources (see Oregon's Harvest for Schools) to help students and parents identify local foods.

Education: Food, Garden and Food System Education Resources

- Common Core in the Garden
  This site has a Growing Classroom Standards Database where anyone can sign in and find lessons on math and language arts using the Next General Science Standards.
- Farm-Based Education Network
  Provides a list of curriculum resources for farm and food based education.
- Life Lab's School Garden Resources.
- Edible Schoolyard's extensive set of resources for educating children and adults about healthy foods in the kitchen, the garden or the classroom.
- The Food Project has a toolbox of curriculum, books, manuals and activities for incorporating farm- and food-based education.
- Washington State University Extension The People's Garden Education Toolkit includes lessons, webinars, training and support. You can access the resources by contacting your state extension lead for login information.
- Virginia Technology Horticulture Department School Garden Resources
- Junior Master Gardener Curriculum and Resources

Environmental Quality: Environmental Education Resources
See the education section in this appendix for additional environmental education tools

- The Center for Ecoliteracy has instructional tools and strategies to help children learn about sustainability and environmental issues in schools.
- Some states in the U.S. have a sustainable schools program, such as one in Vermont through Shelburne Farms or the Green Schools model in California, which includes curriculum or other guidance that may be relevant to a farm to school program.
- The National Gardening Association's kids gardening website has information specifically for school gardens and incorporates environmental lessons.
- Land grant university extension offices may have nutrition, environmental education and food-based curriculum, such as Illinois' School Gardens: Dig it!
- Green Schools Initiative Environmental Footprint Calculator

Training and Professional Development

Training and professional development can mean different things to various participants in farm to school. This list is only a brief sample of resources.

- The Farm to School Toolkit by the Gretchen Swanson Center for Nutrition includes detailed information for school nutrition services staff, including recipes, menus, food safety, local

procurement and a guide to using the geographic preference option.

- Land grant universities with extension offices may offer training and professional development for farmers, ranchers and processors interested in conducting outreach to local schools or other local markets. For example, Utah's Farm-Chef-Fork program helps farmers connect with restaurants or Michigan State University's Farm to School Training.
- Producers interested in using sustainable or alternative agriculture methods can visit the list of educational and training opportunities through the USDA.
- Farm School NYC helps train NYC residents in urban agriculture.
- Regional farm to school leads provide technical assistance or training to different groups, such as the Massachusetts training for local fishermen.
- Farm to School Showcase Toolkit: A Guide for Connecting Local Food Suppliers with School Food Buyers at School Nutrition Trade Shows.
- Food Safety, Colorado Farm to School

Planning, Coordination and Evaluation
See the Appendix 1 for these resources

Outreach and Community Engagement

- How to Develop a Logic Model for Districtwide Family Engagement Strategies
- Farm to School Field Guide for Parents and Community Members

Policy Alignment

See the public health section in this appendix for resources related to wellness policies

- The Healthy Eating Active Living Cities Campaign in Oregon developed a factsheet on how cities can align their policy efforts with farm to school.
- Los Angeles Food Policy Council's Good Food Purchasing Program includes policy language for a Good Food Purchasing Pledge.
- The National Farm to School Network listing of state policies that support farm to school.

Funding

- Grants, loans and support, USDA Know Your Farmer Know Your Food Initiative — This webpage lists over two dozen programs at USDA that can help build local and regional food systems.
- Online Grant-Writing Training Courses, Foundation Center — Several free, online training courses and tutorials meant to help users enjoy better success in approaching foundations.
- Farm to School Fundraising, National Farm to School Network — Tips for acquiring funds for your farm to school program through grants, donations and special events.
- A+ Fundraisers for High Schools: A guide to having a successful fundraiser while keeping your community healthy, New York City Healthy High Schools Initiative — This thorough guide presents lots of ideas for healthy fundraisers, such as family dinner events, flea markets, fitness-based fundraisers, plant sales and more! Resources, pricing and profit information, tips and steps are provided for each idea.
- School Fundraiser, REAP Food Group — One example of a fundraiser based on selling local and fairly traded goods.

Appendix 3

Menu of Options for Farm to School Activities

This appendix provides a menu of options for farm to school activities possible under each core and supplemental element. This is not an exhaustive list of the types of activities that can be conducted at school or early care sites; it is intended to serve as a starting point for exploration by specific sites. This list has been compiled from other sources[1-4].

Farm to School Core Elements

Procurement (of local and regional food products)
• Serving and promotion of foods during meal times. • Tasting of new foods and recipes using local products, such as in-class taste-tests and cooking demonstrations. • Student and adult participation in menu planning and school meal preparation to incorporate local products. • Adult participation in the school lunch program or other meals (role modeling for children). • Cooking at home using local and regional food products. • School or early care site specifies local foods (as defined by site) for procurement from producers and distributors. • School or early care site documents local food purchases at least annually (i.e. product type, product volume, amount of budget spent on local foods). • School or early care site engages in innovative local food procurement methods, such as a buying cooperative or forward contracting.

Gardening (school-based gardens)

• Hands-on, place-based, project-based and interdisciplinary food, agriculture and nutrition education provided across grades and subjects through gardening activities such as:
  ○ planting, tending, harvesting and tasting of foods grown in the school garden;
  ○ planting, tending, harvesting and tasting of foods grown in the community garden. (Sometimes schools that lack garden space may utilize a community garden plot; other schools may host a community garden; and in other instances youth may provide labor to support community garden projects.)
• Adults participate in food-growing area development, planting, harvesting and tending (role modeling for children).

Farm to School Core Elements Cont.

Education (food and farm related)

- Tasting of new foods and recipes using local products, such as in-class taste-tests and cooking demonstrations.
- Culinary education and programs where students prepare foods.
- Recipe development with new foods to support child learning.
- Hands-on, place-based, project-based and interdisciplinary food, agriculture and nutrition education provided across grades and subjects about:
    - food origins, nutrition, math, language arts, science and culture;
    - food's impact on their health, on the community and the environment;
    - food across multiple subjects in connection to food served at meal times.
- All children receive at least 10 hours of food, garden-based or agriculture activities in a school year or across three seasons of early child care participation.
- Farmers, fishers, processors, distributors, chefs and ranchers visit classrooms as guest speakers
- New food learning experiences through field trips to:
    - destination, educational or demonstration farms where students participate in hands-on nutrition education experiences;
    - production farms such as row crops, orchards, ranches and fisheries (including aquaponics facilities);
    - farmers' markets, grocery stores and other food retail outlets;
    - food processing and packaging facilities; food distribution facilities or food hubs;
    - composting facilities where food waste is sustainably managed to support soil quality.
- College students serve as instructors for farm to school educational activities in school.
- Older students teach younger students about foods or participate in menu planning, food growing space, cooking demonstrations, etc.
- Teaching of integrated topics across ages and subjects:
    - educators connect lessons across subject areas and "team teach";
    - educators connect lessons across ages on agriculture, food and garden-based topics.

Farm to School Supplemental Elements

Training and professional development

- Trainings for foodservice staff on: how to procure, prepare, serve and promote local foods; nutrition education; farm tours and other training opportunities for school food services and staff to learn about food production and on-farm food safety and make potential market connections.
- Trainings for teachers on: nutrition education; food and garden-enhanced nutrition education.

Promotion and media

- Hold celebration events related to the farm to school activities or efforts.
- Developing and displaying farm to school or local food promotion materials, such as signs for community gardens, public buses, community events, bulletins, before/after school programs, food pantries, etc.
- Promoting local foods seasonally, monthly, weekly or daily through newsletters, websites, posters, menus or other innovative method.
- Developing promotion materials for the farm to school program and/or local foods, such as signs in the lunch line or salad bar, table tents, garden signs, handouts or bulletin board signs.
- Farm to school participants and community members get engaged in and gain recognition by telling the story of the farm to school program to the school community and press, and through social media, videos, films, etc.

Planning, coordination and evaluation

- Planning committee to plan program changes over time, such as setting goals, promoting successes, coordinating efforts, conducting training and developing external partnerships.
- Parents or care givers, students, producers, community members and foodservice staff have opportunities to volunteer in creating, coordinating, developing, planning and revising farm to school activities, such as developing a food growing area, ensuring volunteer recruitment, and sufficient training for staff and management.
- Staff and volunteers plan for school gardens, greenhouses and naturalized school yard space
- Planning for evaluation to document program outputs and outcomes.

Outreach, family, and community engagement

- Collect information on recipes, menus and meals using local foods from community members and families.
- Provide information to families and community members about:
    - Community events related to local foods, nutrition and health;
    - Promotions at local grocery stores, convenience stores and bodegas that have been encouraged to procure and promote local foods featured in schools;
    - Nutrition education, information about farm to school activities, healthy eating and active living through events at school, including Parent Teacher Association night, and materials such as newsletters sent home.
- Hosting tours of food production, processing or distribution facilities or with chefs at restaurants; training on how to teach youth about their role in food system.
- Expanding local food market connections for farmers through:
    - Speed dating, tradeshows, showcases and online market platforms;
    - Trainings and technical assistance about: unique needs and requirements of the school food market, food safety and good agricultural practices;
    - Tours to learn about school food needs and make market connections; and
    - Participation in community-wide events, such as garden work parties or harvest celebrations for youth and their families.

Policy alignment

- School wellness policies include or reference farm to school.

Funding

- Seeking and securing funding and in-kind support for farm to school activities.

Appendix 3 References

1. Joshi, A., Ratcliffe, M.M. Causal pathways linking farm to school to childhood obesity prevention. Child Obes. 2012;8(4):305–14.

2. Grant Reporting Tool, 2013 Oregon Farm to School and School Garden Grants. Oregon Department of Education, contact Rick Sherman for a copy rick.sherman@state.or.us; 2013.

3. Request for Applications: 2013 Farm to School and School Garden Grants. Oregon Department of Agriculture, contact Rick Sherman for a copy rick.sherman@state.or.us; 2013.

4. USDA Farm to School Grant Program Prosposal Score Sheet Template, Activity Checklist, Implementation and Planning Grants FY 2014. United States Department of Agriculture Farm to School Program; 2013.

Appendix 4

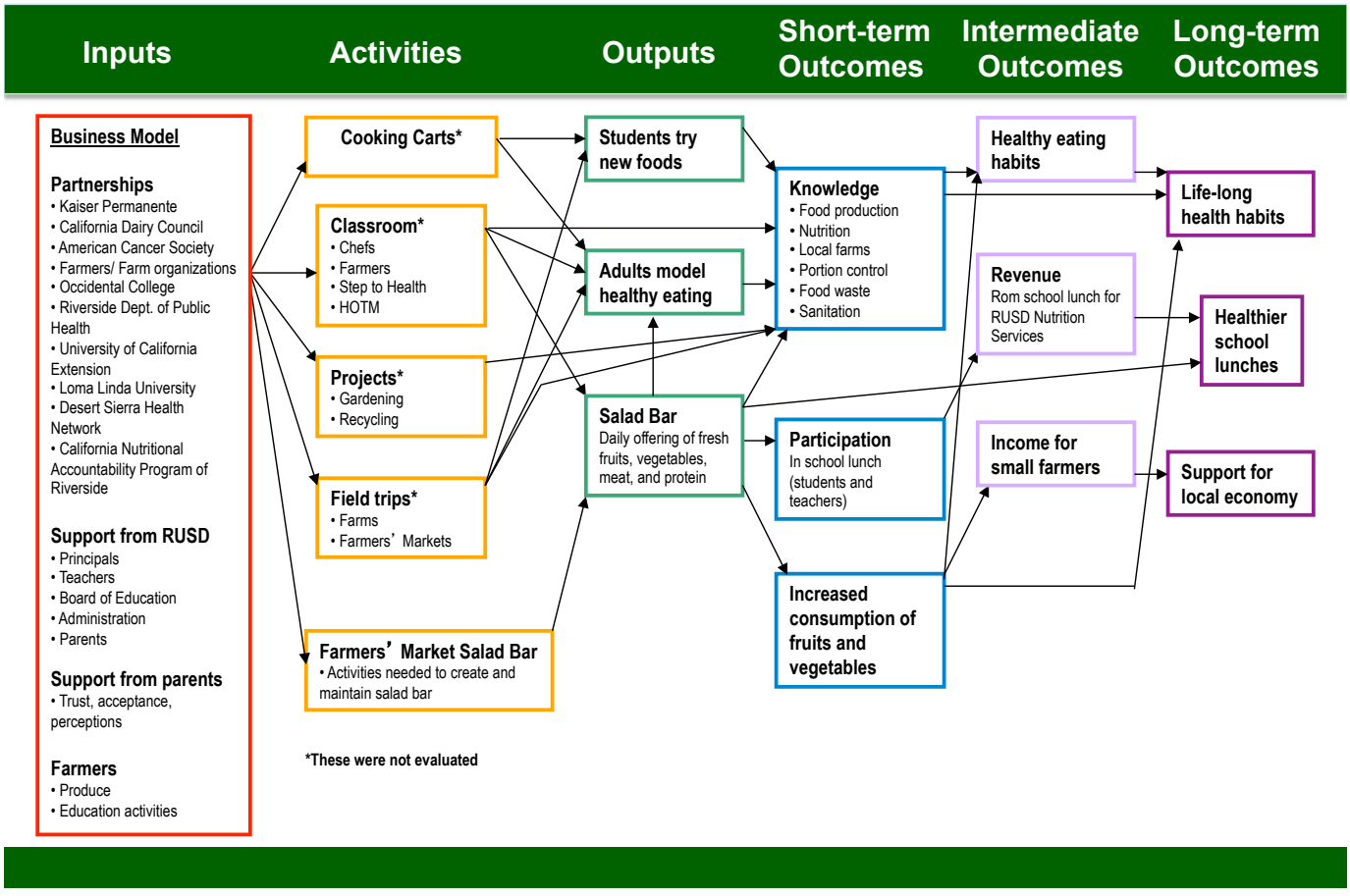
Sample Logic Model

Program coordinators will need to develop logic models that are specific to their program, site and unique context. This is only one example among many.

Farm to School Program Evaluation: Riverside Unified School District, California.

The evaluation was conducted as part of a coordinated program evaluation at four sites, supported by the National Farm to School Network and conducted by the Center for Health Promotion and Disease Prevention, University of North Carolina at Chapel Hill. This logic model and others are available on the NFSN website.

Logic Model



Appendix 5

Sample Evaluation Tools

To find tools that are not hyperlinked, please visit the National Farm to School Network's searchable website for resources. This is a sampling; practitioners develop more every year and the NFSN adds submissions to its repository as they become available.

The "V" notation after some listings indicates tools have gone through a validation process that also was published in a peer-reviewed journal. Other tools listed here may have been validated, but not published, or were reviewed and pilot tested — these do not have the "V" designation. Validation is a process where researchers test and evaluate how well a specific measurement instrument (i.e. a survey, a physical assessment, an observation tool) consistently captures the information it seeks to measure, regardless of who uses it and with what group of people it is used (i.e. elementary-aged children from resource-limited homes versus a survey that is only piloted with school nutrition service directors). When using any tool, it is the responsibility of the user to ensure that the tool is available for public use; to our knowledge these tools do not require fees.

Sample Evaluation Planning and Program Articulation Tools

- A Guide for Farm to School Community Action Planning
  Includes multiple tools, such as Farm to School Institute Action Planning Template and the Planning Rubric, Vermont FEED, 2013–2014

- The Wisconsin Farm to School Toolkit Monthly Activity Worksheet
  Helps evaluate changes in school food purchases over time; available in conjunction with other tools on the University of Wisconsin-Madison Center for Integrated Agricultural Systems website. The tool includes multiple documents in an Excel file format, including a user guide, school meals tracking sheet, classroom education tracking sheet, engagement activities tracking sheet, garden description document, and a garden activities tracking sheet.

- Oregon Farm to School Grant Reporting Document
  This document is required by the Oregon Department of Education from its farm to school program grantees.

- D.C. Farm to School Approved Field Trip Rubric

- Arkansas Farm to School Program Evaluation, University of Arkansas for Medical Sciences, Delta Garden Study, Arkansas Garden CORPS, The Arkansas Grow Healthy Study.

Sample Evaluation Tools Related to Public Health Sector Outcomes

- NCCOR Measures Registry
  List of validated tools and measures for school food environment and healthy eating (V).

- USDA National Agricultural Library Research
  Tools on dietary assessment instruments.

- Go! Austin/Vamos! Austin (GAVA
  Parent survey in English or Spanish on access to food, attitudes, food around the house, eating habits, physical activity, physical activity opportunity, community participation, questions about your kindergarten child, University of Texas School of Public Health (V).

- Go! Austin/Vamos! Austin (GAVA)
  Adult survey on access to healthy foods, motivation and social norms, food intake, physical activity, access and utilization of physical activity facilities, University of Texas School of Public Health (V).

- Go! Austin/Vamos! Austin (GAVA)
  Student survey in English or Spanish on physical activity opportunities, physical activity, food consumption, University of Texas School of Public Health (V).
- Community Readiness Assessment for School Foodservice and Administration Personnel, University of Texas School of Public Health (V).
- Washington State University Extension, The People's Garden Research Materials (some are validated, some are not)
  Resources are password protected, contact your state extension educator for necessary login information.
- Student fruit and vegetable consumption at home and school
  Kindergarten–6th grade survey, inquire with author.
- Alliance for a Healthier Generation Resources
  This site has resources such as a Healthy School Assessment Tool; users have to create a login to access it.
- School Physical Activity and Nutrition Environment Tool (SPAN-ET), Oregon State University
  Contact the GROW Healthy Kids and Communities research team.
- Child Care Nutrition and Physical Activity Assessment Survey,
  Yale Rudd Center for Food Policy and Obesity.
- Wellness School Assessment Tool (WellSAT), Yale Rudd Center for Food Policy and Obesity (V).
- School Wellness Policy Evaluation Tool, Robert Wood Johnson Foundation Healthy Eating Research Program (V).
- Piloted survey, plate waste protocol and group interview guide for farm to school program.
- Food diary, semi-structured interview questions and other tools used in the evaluation of the school lunch Initiative.
- Fruit and Vegetable Neophobia Instrument (3rd–5th graders) (V), Hollar, D., et al., 2012.
- Personal, Social and Environmental Correlates of Fruit and Vegetable Intake Survey for 10–11 year olds (V), De Bourdeaudhuij, I., et al., 2004.
- School Lunch Recall, University of North Carolina Chapel Hill Center for Health Promotion and Disease Prevention (V).
- 10-Item Questionnaire
  Measuring fruit and vegetable consumption in 9–11-year-old children living in low-income households.
- Parent Survey, Community Alliance with Family Farmers.
- Farm to School Program Parent Survey, Georgia Organics.
- USDA Farm to School Parent Survey, Growing Minds of Appalachian Sustainable Agriculture Project (ASAP).
- Farm to School Education Project, Parent Survey, Western Carolina University, Appalachian Sustainable Agriculture Project (ASAP).
- Adult Taste Test Tool and Teacher Taste Testing Processing Guide (TTT), University of California CalFresh (V).
- Teacher Observation Tool (TOT), University of California CalFresh (V).
- Taste testing resources and evaluation tools, Ohio Action for Healthy Kids.
- Farm to School Student Survey (7th, 10th, 11th grade), Kent School District.
- Harvest of the Month Pre- and Post-Student Survey, Community Alliance with Family Farmers.
- Healthy Eating, Active Communities (HEAC) Student Nutrition and Physical Activity Student Survey.

- Healthy Eating, Active Living (HEAL) Youth Nutrition and Physical Activity Student Survey.
- Knowledge, Attitudes, and Consumption Behavior Survey, Wisconsin Farm to School Evaluation.

Sample Evaluation Tools Related to Community Economic Development Sector Outcomes

- Farm to School Census, USDA
  Piloted and reviewed survey for public use on procurement.
- Foodservice Professional MEALS Survey
  Measures interest, perceived benefits, perceived usefulness of foods, perceived barriers for serving and purchasing local foods. Hyperlink takes you to dissertation that references adapted surveys and validation process. See also Herron, J., Izumi, B., Lopez, E. and Mersamin, A. (in preparation). Feasibility of implementation of farm to school in Alaska: School foodservice professional's perspective, Journal of Nutrition Education and Behavior (V).
- Alaska foodservice professional survey on farm to school, 2013.
- Alaska farm to school evaluation interviews with farmers, producers, school foodservice personnel.
- Local food purchasing survey of school foodservice staff and survey of food marketing for farmers, Michigan State University Center for Regional Food Systems
  Note: This tools is not yet available online.
- Assessing Alternative Food Distribution Models for Improving Small Scale Producer Direct Marketing, Interview Protocols for Distributors, Buyers, and Producers.
- Roanoke Valley Farm to School Questionnaire for Schools.
- Roanoke Valley Farm to School Questionnaire for Farmers.
- Buyer, Distributor and Farmer Interviews, University of California Sustainable Agriculture and Education Program.
- Washington State Department of Agriculture Farm to School Farmers and Producers Survey, 2012.
- Washington State Department of Agriculture Processing Survey, 2012.
- Central Minnesota Potential Local Grower Survey.
- Central Minnesota Restaurant Interview Questions.
- Minnesota School Foodservice Director Survey: Farm to School.
- Survey of Cooperative Extension Offices in Western North Carolina, Appalachian Sustainable Agriculture Product.
- Survey of Hospital Foodservice Directors, Appalachian Sustainable Agriculture Product.
- Farm to School in New York State: A Survey of Foodservice Directors.
- Oregon Farm to School Director/Provider Surveys, 2007 and 2009.
- Farm to School Kansas Survey for Foodservice Directors.
- South Dakota School Food Survey for Foodservice Directors.
- Washington State Department of Agriculture School Survey on Farm to School for Foodservice Directors.
- Farm to School in Minnesota Survey of School foodservice leaders.
- Food Vendor Assessment Survey, Healthy Kids, Healthy Communities Grant County, New Mexico.
- Food Hub Background Information Survey for Food Hubs.
- Food Hub Phone Interview Questionnaire.

- National Food Hub Survey and Report.
- South Dakota Local Food Producer Survey 2013.
- Western North Carolina Camp Foodservice Survey.

Sample Evaluation Tools Related to Education Sector Outcomes

- Student Achievement-Relevant Actions in the Classroom (SARAC)
  A teacher report and self-report measure of student engagement vs. disaffection in schools.
- Washington State University Extension, The People's Garden Research Materials (some are validated, some are not), resources are password protected, contact your state extension educator for necessary login information.
- Penn State Extension On-Demand Lessons for Child Assessment.
- Science Achievement Evaluation Instrument (V) (contact author).
- Compendium of Surveys for Nutrition Education and Obesity Prevention, compiled by the Research and Evaluation Section, the Network for a Healthy California.
- Pre- and post-assessments of food literacy, E.A.T. South.
- Farm to School for Educators Workshop Evaluation Survey, Georgia Organics.
- Annual New Jersey School Garden of the Year Contest and Survey.
- Know Your Farmer Kentucky Pre- and Post-student Survey.
- Pre- and Post-test, Edible School Yard.
- Pre- and Post-test, Willamette Farm and Food Coalition.
- Youth Garden Best Practices Checklist.
- The Instructional Practices Inventory: A Process for Profiling Student Engaged Learning for School Improvement (V).
- The Classroom Engagement Inventory (contact authors) (V).
- Student Engagement Instrument (V).
- National Survey of Student Engagement (V).

Sample Evaluation Tools Related to Environmental Quality Sector Outcomes

- Children's Environmental Response Inventory (CERI) (V), requires access to online peer-reviewed journals.
- Environmental Attitude Inventory (V), requires access to online peer-reviewed journals.
- Revised Perceived Environmental Control Measure (V), requires access to online peer-reviewed journals.
- School Garden Assessment Tool
  The D.C. School Garden Program listed at the Edible Schoolyard Project website; available through a Creative Commons license.
- Assessment of Sustainability Knowledge (ASK), Ohio State University Environmental and Social Sustainability Lab for adults and undergraduate students (V).
- Parent survey, Community Alliance with Family Farmers.
- Farming the College Market: Food System Issues Survey, The Center for Agroecology and Sustainable Food Systems, University of California, Santa Cruz.
- Sustainable Food Choices: Supply and Demand
  Questions for Group Purchasing Organizations and Food Distributor Representatives.

Appendix 6

Ideas for Further Exploration

This rough listing of additional outcomes, indicators or measures is included to provide researchers some ideas for further exploration. These items are not presented in the prioritized lists included in this framework. They have emerged through informal and formal engagement by and with authors and contributors to the framework, or through previous discussions regarding farm to school research and evaluation conducted through National Farm to School Network or its partners.

Public Health

- Student preferences for:
  - Unhealthy foods
  - Water consumption
  - Soda consumption
- Student snacking behaviors
- Measurement of student physical activity and calories spent during gardening or other relevant farm to school activity
- Changes in student physical activity levels in relation to participation in farm to school activities
- Changes in screen time in relation to participation in gardening or other outdoor activities related to farm to school
- Intergenerational mentoring through increased parental and community involvement at farm to school sites
- Families exercise with their children at home
- Parents/caregivers understand importance of buying school lunch
- Food producers know about local food system and the specific needs of school food market
- School foodservice staff morale and motivation toward their school and job improves
- Increased workplace satisfaction for teachers, foodservice providers, etc.
- Profitable foodservice nutrition programs
  - Increase in number of staff, staff wage or staff benefits
  - Increase in number of fresh-from-scratch meals prepared
  - Increase in net profits
  - Increase in number of full-pay students participating in all meal programs
  - Increase in number of adults buying school lunch
- Improved quality of the school and school community environment
  - Visual and sensory aesthetics
  - Opportunities for visual reinforcement of learning, consuming vegetables, nurturing living things
  - Health promotional messages in classroom
  - Visual reinforcement of learning in messaging/ posters in cafeteria
  - Improved school culture and identity
  - Strong youth-adult and youth-youth relationships in the school

Community Economic Development

- Increase in wages in local/regional food sectors
- Increased wages for school nutrition services
- Influence of school gardens or farm to school activities on property values
- Number of cooperative purchasing agreements established between schools and farmers
- Increased variety (diversification) and quantity of crops grown by local farmers selling to schools

- Development of value chains for the school food market

Education

- School (or school district) employs garden- or ag-specific employee to work with classrooms (like a music or arts teacher)
- Safe places available for students and adults in schools — before, during and after school
- Developmentally appropriate learning and play opportunities
- Diversity of environments in which students play and learn
- Opportunities for visual reinforcement of learning, consuming vegetables, nurturing living things
- Improved quality of the school and school community environment, including:
  - Visual and sensory aesthetics
  - Promotional messages in classroom
  - Visual reinforcement of learning in messaging/posters in cafeteria
- Student willingness to stay on task
- Student adaptability to various learning styles
- Students improve processing and inquiry skills, such as:
  - Observing
  - Communicating
  - Comparing
  - Relating
  - Ordering
  - Inferring
- Student development in social competence, such as:
  - Citizenship skills
  - Cooperation
  - Gentleness
  - Patience
  - Respect
  - Responsibility
  - Democracy
- Student development in problem solving skills, such as:
  - Behavioral capacity
  - Decision making
  - Focus
  - Mastery of skills and knowledge
  - Multicultural cooperation
  - Teamwork
  - Work Ethic
- Student development in autonomy, such as:
  - Happiness
  - Self-awareness
  - Self-efficacy
- Student development in sense of purpose, such as:
- Cultural identity
- Ownership
- Pride
- Sense of accomplishment

Environmental Quality

Producer conversion of acres of land to innovative production methods that maintain soil and water quality, i.e., integrated pest management, no-till agriculture and drip irrigation

- Producer involvement in USDA conservation programs
- Amount of shade contributed by school gardens
- Change in urban heat island effect as a result of school yards/school gardens
- Number of community gardens in use by schools

- Amount of acres set aside for agriculture (measure of land use)
- Sustainable distributor practices such as total food miles during transportation process
- Use of chemical fertilizers, pesticides or herbicides by producers selling to schools
- Walkability (as a measure of "livability")
- School facilities are in alignment with Food Safety Modernization Act
- Changes in school menus over time to reflect any decreases in purchase of beef or meat-based protein sources
- Inclusion of edible plants and native plants in school gardens
- Families of children participating in farm to school start or maintain gardens at home
- Families of children participating in farm to school start or maintain community gardens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