

OKLAHOMA DEPARTMENT OF AGRICULTURE, FOOD & FORESTRY



Tips, Tools & Guidelines for Food Distribution & Food Safety







From the Authors:

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OKLAHOMA FARM-TO-SCHOOL PROGRAM

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The expansion of Farm-to-School (FTS) programs in most states, coupled with schools' efforts to provide more nutritious and healthy unprocessed offerings, have increased the demand for locally grown fresh fruits and vegetables.

However, efforts to provide more fresh, locally grown fruits and vegetables have been impeded by two barriers: the availability of local produce and ways to effectively and economically distribute farm produce to the schools. The supply barrier is slowly disappearing, as more and more local producers realize the market potential for locally grown produce and dedicate acres to fruit and vegetable crops. Even so, the distribution barrier is much more complex due to food safety requirements, school food purchasing policies and even geography.

How do you get farm-fresh produce delivered to schools in a timely, cost-effective manner? A few states, such as North Carolina, accomplish locally grown produce distribution to the schools through government-supported delivery. In many states, like Oklahoma, schools go through an open bid process and contract with private companies (food service distributors) to procure and deliver food items. Given the different political environments of states, the local availability of produce and even the varying sizes of schools, it is quite apparent that FTS distribution models cannot follow a one-size-fits-all formula.

Food safety is also a major concern for all FTS projects. Our nation has seen a number of high profile food safety scares in recent years. FTS programs are expected to follow standard food safety guidelines and adhere to specifications for quality, condition, grade and packaging. These important yet simple steps are ones that any produce grower, school kitchen or school garden should follow to ensure a safe locally grown fruit and vegetable supply to students.

This manual is intended to provide information, insight and useful tools for farmers and school food service directors interested in FTS program participation. The manual includes a brief overview of the FTS program in the U.S. and Oklahoma, gives guidance for meeting food safety protocols, discusses results from surveys of Oklahoma schools and food service distributors regarding FTS participation and perceptions, and provides a summary of tips and suggestions from FTS program coordinators and participants. The manual also includes information on two new tools for use by farmers and school food service directors that are currently being used in Oklahoma: a distribution cost template and a produce calculator.

The main goal of this publication is to help ease the distribution barriers existing within FTS programs. Obviously, not all possible distribution barriers are addressed in these pages, but it is hoped the manual will promote a better understanding of FTS principles and economic feasibility among schools, the farmers who provide locally grown produce and even food service distributors.

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DISTRIBUTION



DEVELOPMENT OF THE FARM-TO-SCHOOL PROGRAM IN THE UNITED STATES AND OKLAHOMA

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NUTRITIONAL SCIENCE AND ITS ROLE IN FOOD POLICY

Nutritional science originated from the concern for livestock and agricultural productivity, not human health. In was not until the end of the 19th century that European scientists began to apply discoveries about animal feeding to humans. But, the scientific discoveries regarding food and health then and now are subject to preference and politics. Because malnourishment and hunger is often linked to poverty, nutritional science was absorbed into social policy. Towards the end of the 19th century and beginning of the 20th century, also known as the "Progressive Era," social reformers and policy makers sought to shape American society. Improving public health was one of the objectives (Levine, 2008).

By the 1920s, nutrition was widely discussed in the United States (Levine, 2008), but it took the onset of World War I for nutrition issues to become apparent to American society as a whole. The severity of malnutrition was unknown until World War I, when one-third of the men called to serve were rejected because they were underweight or suffered from malnutrition (Levine, 2008). Public health physicians, policy makers and home economists reacted to this state of inadequate health by executing meal programs and policy to alleviate the problem. Focusing specifically on childhood nutrition was essential for two reasons. First, children under the age of 18 have more nutritional needs in their early years than in their latter years. A child's immune system develops and matures with time, and young children are more susceptible to infections compared to older children with developed immune systems (Martorell, Stein and Schroeder, 2001). Second, schools provide a conducive environment to learning and are "one of the primary locations for reaching the nation's children and youth" (Koplan, Liverman and Kraak, 2005).

Many of the concerns for childhood nutrition helped garner the policy that would provide lunch at schools nationwide. In 1946, the National School Lunch Program (NSLP) was established under the National School Lunch Act to "safeguard the health and well-being of the Nation's Children and encourage the domestic consumption of nutritious agricultural commodities and other foods" (Ralston et al., 2008). But in reality, the NSLP was in structure more of a subsidy for agriculture than a nutrition program for children (Levine, 2008).

In 1948, the commodity distribution program was also inaugurated. According to Cochrane and Ryan (1981), the purpose of this program was to find constructive uses for surplus agricultural commodities. Soon the USDA donated foods to school lunch programs and charitable institutions. Other food-related programs have been added over time: the Special Milk Program, 1954; the Food Stamp Program, 1961 (Cochrane and Ryan 1981); the School Breakfast Program (SBP); and the Summer Feeding Program, 1969 (Spark 2007). School food programs are "primarily administered by the USDA with some assistance from the Department of Defense" (Spark, 2007). Meals are subsidized by the federal government based on income and economic needs of children and families.

Despite all these efforts to improve the health of the nation's children, the problems did not subside. Instead, in addition to malnutrition, other health-related issues such as obesity and diabetes became prevalent. Within the past three decades, the obesity rate has more than doubled for preschool children aged two to five years and adolescents aged 12 to 19 years. "Approximately nine million children over six years of age are considered obese" (Koplan, Liverman and Kraak, 2005, 131).

The narrative is similar for children with diabetes. For children born in America in 2000, the risk of being diagnosed with type 2 diabetes is at 30 percent for boys and 40 percent for girls assuming the obesity rate does not increase (Koplan, Liverman and Kraak, 2005). Efforts have been made to address these chronic health problems. Partly created to promote healthy eating among children and partly to provide market outlets for local produce, Farm-To-School (FTS) projects began sprouting throughout the United States.

PREVIOUS STUDIES RELATED TO SCHOOL NUTRITION PROGRAMS AND LOCALLY GROWN PRODUCE

Many researchers have found relationships between participation in school lunch and breakfast programs and school characteristics. For example, Maurer (1984) used national data to estimate the effects various school and program characteristics have on lunch and breakfast programs. Variables listed under school and program characteristics were breakfast program availability, open campus policy, à la carte service availability, vending machine availability, number of meal choices, and offered versus served meals. Maurer found students from low-income families are more likely to participate in breakfast and lunch programs than those from families with high income. In addition, students tend to participate in the programs regularly (4 or 5 days) or not at all. It also was reported students are slightly more likely to participate in lunch programs at schools that had breakfast programs available.

A study by Ham, Hiemstra and Yoon (2002) estimated participation of school lunch programs in Indiana based on total average daily participation rate of all students (Total ADP) and paid average daily participation rate of paid meals (Paid ADP). Total ADP differs from Paid ADP in that Total ADP includes free and reduced-price meals in addition to those paid (Ham, Hiemstra and Yoon). Participation was measured by the number of meals served.

Ham, Hiemstra and Yoon (2002) found the percentage of students eligible for reduced lunch and free lunch were both significant and positive predictors for Total ADP. But for Paid ADP, reduced lunch and free lunch were significant, yet showed positive and negative relationships, respectively. This means as the number of students eligible for free lunch increases, the amount of Paid ADP decreases. Larger schools have higher school lunch participation rates and schools with open campus policies had lower rates (Ham, Hiemstra and Yoon 2002).

Gleason (1995) examined participation rates in the National School Lunch Program (NSLP) and the School Breakfast Program (SBP). Three main questions were addressed: Who is participating in the NLSP and SBP? What policy changes at the school, district or federal levels could directly influence the number or type of participants? Would policy changes designed to improve nutritional quality of school meals adversely affect program participation as a whole? The author found that free and reduced meal certification status of students is strongly related to NSLP participation. "More than three-fourths of certified students eat a school lunch on a given day, compared with fewer than half who pay the full price" (Gleason, 1995).

The final study included in this literature review is by Grainger, Senauer and Runge (2005). These authors measured student receptiveness to health innovations in a high school cafeteria in Minneapolis. When à la carte and full meals were analyzed together, students were clearly making healthier food choices, which were described as meals with less trans fats, low in sugar and high in fiber.

FTS IN THE UNITED STATES

In 1996-1997, FTS was initiated as a pilot project in California (Santa Monica Malibu Unified School District and the Edible Schoolyard, Berkley) and in Florida (New North Florida Marketing Cooperative). In Santa Monica, a farmers' market salad bar was launched at an elementary school (Vallianatos, Gottlieb and Hasse, 2004). Similar salad bars began appearing in schools throughout the district. In Gadsden County, Florida the New North Florida Cooperative began selling locally grown produce to schools. The awareness of these and other emerging programs began to build momentum.

In 2000, USDA's Initiative for Future Agricultural Food Systems (IFAFS) supported the establishment of the National FTS Program, which served as a catalyst for program development, research and policy (Kish, 2008). The following year, USDA AMS organized numerous FTS workshops nationwide. In 2003, the "Farm-to-Cafeteria Projects" Act was proposed in a bill submitted to the House and the Senate and failed. The purpose of this act was "to improve access to local foods in schools and institutions receiving funds under this act..." (Library of Congress, 2003). The requirements of the act were well defined: procure local foods from small and mediumsized farms for school meals, support nutrition education activities and develop a sustained commitment to farmto-cafeteria projects in the community. Despite the Farmto-Cafeteria Act not passing, there are continued efforts on the state level that have successfully incorporated FTS as law. According to the National Farm to School Network, to date FTS activities exists in 42 states with an estimated 2,051 programs that involves approximately 8,943 schools.

Farm to School 7

FTS IN OKLAHOMA

FTS in Oklahoma began in a way similar to the programs in California and Florida. In 2002, the Oklahoma Food Policy Council sent a survey to schools, colleges, prisons and resorts. These entities were asked questions about their practices and preferences on locally grown foods. The results of the survey showed large school (school districts with more than 1,500 students) systems were least likely to make local purchases (83%), whereas medium (300 to 1,500 students) and small (less than 300 students) school districts were slightly more likely to do so, with 72% and 74%, respectively. "If price and quality were competitive and local sources were available, 68% of the institutions would like to purchase locally produced foods" (McDermott, 2003).

FTS was initialized due to the positive feedback from the survey as a pilot program in 2004-2005 with assistance from the Oklahoma Food Policy Council. This pilot program consisted of distributing seedless watermelons grown near Hinton, Oklahoma, to 144 schools in six districts. In 2006, the State Legislature passed the "Oklahoma Farm-to-School Program Act" (Oklahoma State Courts Network, 2006). The purpose of the act is to provide schools with minimally processed farm commodities grown in Oklahoma. The act also encourages activities that integrate nutrition and agriculture in school curriculum and activities. To date, there are a total of 60 Oklahoma school districts and four universities participating in a FTS program.

Determining Local Food Costs Due to small school cafeteria budgets, it is difficult for

Due to small school cafeteria budgets, it is difficult for food service personnel to provide meals that meet standard nutritional requirements. School feeding programs have been under continuing pressure in recent years to keep prices consistent while food and labor costs are escalating (Daft et. al 1998). For these reasons, analyzing the cost associated with purchasing local foods is necessary.

Studies have been conducted on the cost of the National School Lunch Program (NSLP) and the School Breakfast Program (SBP) (Daft et. al, 1998; Bartlett, Glantz and Logan, 2008). According to Daft et al. (1998), large school districts tend to pay lower per unit prices for their food. It was undetermined as to whether this was due to economies of size or accessibility to more vendors allowing for more market competition.

According to the School Lunch and Breakfast Cost Study-II conducted by Bartlett, Glantz and Logan during the 2005-06 school year, the mean reported cost of producing a lunch was \$2.36 when the unit of analysis is a school food authority. For a breakfast, this value was \$1.92. The authors also reported that food costs, accounted for about 46% of reported costs while labor accounted for less than 45% (Bartlett, Glantz and Logan, 2008).

Through regression analysis, Wagner, Sanauer and Runge (2007) found nutritious meals do not cost more to produce; however, capital equipment costs were not included. This implies, in the short-run, capital investments are necessary to change to more nutritious meals, but the long-run costs of producing these meals are not higher. Mascarenhas and Gottlieb (2000) found shortly after a Farmers' Market Salad bar was implemented at an elementary school in California, more than three times the number of children selected the salad bar option than in the previous year when the produce used was purchased through a produce broker. In addition, the cost of the Farmers' Market Salad Bar meal was approximately \$0.77 with the price of a hot meal at \$0.88 (Mascarenhas and Gottlieb, 2000). The cost of meals from the salad bar with non-local produce was not reported; therefore, determining the difference in cost between local and non-local produce is not possible.

Another study conducted in California by Brillinger, Ohmart and Feenstra (2003) included a break-even analysis on a Farmers Market Salad Bar. It was reported, in two consecutive years, the project yielded profits; however, this included financial assistance from grants.

TRANSPORTATION COSTS FOR FOOD

Transportation costs can be absorbed in food costs and should be considered when determining a food distribution system. When determining which distribution system is least costly to schools, four different distribution options are commonly considered:

Option 1:	$Farm \rightarrow School$
Option 2:	Farm \rightarrow Distributor \rightarrow Schools
Option 3:	Farm \rightarrow Distributor (via
	backhauling) \rightarrow Schools
Option 4:	Farm \rightarrow Packing shed (near the supplying
	farms) \rightarrow Distributor \rightarrow Schools

The third option of distribution allows backhauling as a distribution alternative. Determining truck rates and alternative means of reducing transportation costs should be taken into consideration when determining distribution alternatives. A study conducted by Kilmer and Stegelin (1982) determined the amount of money saved when reducing empty backhauls of trucks when transporting Florida fresh fruits and vegetables. The authors found producers of fresh fruits and vegetables would benefit from reducing empty backhauls and the potential savings per truck would be \$364.90. Barnes and Langworthy (2003) described a methodology and spreadsheet for calculating the variable cost of operating cars and trucks. The authors provided a table of the fuel efficiency for various trucks and their associated maintenance and repair costs.

DISTRIBUTION METHODS
FARM SCHOOL
FARM > DISTRIBUTOR > SCHOOL
FARM DISTRIBUTOR (VIA BACKHAULING) SCHOOL
FARM PACKING SHED (NEAR THE SUPPLYING FARM) DISTRIBUTOR SCHOOL

The fourth option of distribution considers an added packing and handling facility utilized in addition to the distributor. Determining the associated cost and feasibility of building and operating a packing plant is needed. There are some studies that look at the feasibility of building a packing plant for different types of produce (Peacock e. al, 1995; Hattar et al., 1994; Pichop, 2005). However, the appropriateness of a packing shed or packing plant depends heavily on the volume of local production, the packing capabilities of nearby wholesale warehouses and the form in which the produce is desired by buyers.

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FRESH PRODUCE PURCHASING AND DISTRIBUTION PRACTICES OF SCHOOLS: SURVEY RESULTS OF OKLAHOMA SCHOOLS AND DISTRIBUTORS

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DATA COLLECTION

To assess participation in FTS and determine the school district characteristics most closely associated with FTS participation, a survey of Oklahoma school districts was conducted by the Robert M. Kerr Food & Agricultural Products Center at Oklahoma State University. Information obtained through the surveys included school district size, current suppliers of fruits and vegetables, the portion of schools' food budgets allocated for fruits and vegetables, distributors utilized by the schools, and produce preferences. The FTS coordinator with the Oklahoma Department of Agriculture, Food and Forestry (ODAFF) and the staff with the Oklahoma Department of Education were instrumental in this effort.

A web-based survey was sent to Oklahoma school districts via e-mail by employing a third party survey company. The survey populations consisted of food service directors, child nutritionists, superintendents and other school personnel from Oklahoma school districts. Contact information was obtained from the Oklahoma State Department of Education (OSDE), complete with names of school personnel, phone numbers, e-mails and addresses. Data on the districts that have participated in FTS also was provided by ODAFF.

The survey was sent out in August of 2008 to more than 800 school personnel in Oklahoma. Although there are only 535 school districts in Oklahoma, the contact list provided by the OSDE had more than one contact name listed for some of the districts. The emails were sent out a total of three times during a period of three months to remind the recipients of the survey. The response rate to the e-mailed survey was 57% overall: 30% from the first email, 17% from the second request and 10% from the third request. Some recipients requested that a hard copy survey be sent via the postal service. Less than one percent of the responses were obtained from mailed surveys.

In an attempt to avoid incomplete responses related to school district characteristics, additional data for incomplete responses were retrieved from the OSDE Web site. The retrieved data included the number of students enrolled in a district and the percentage of free and reduced meals offered by the district. Since ODAFF is aware of the current and past participants of FTS in Oklahoma, the respondents who did not state whether their district has participated in the program, also was added accordingly.

The distributors listed by the responding schools also were surveyed to identify their operational standards for FTS produce delivery. Responses from this survey have been summarized and are provided after the school survey responses.

SCHOOL SURVEY RESULTS

Findings from the survey provide a unique insight into the operational parameters and patterns of Oklahoma school nutrition programs. Results are provided in the following tables and in a variety of formats: some providing aggregate responses, some organized to show differences among school district sizes (based on student population) and some to highlight differences in responses between FTS and non-FTS participants.

Consistent with the makeup of school district sizes within the state, Table 1 illustrates the majority of the schools that responded to this question are of smaller size (population of 500 students or less).

Table 2 reflects the information gathered from the question, "On average, how many students does your district serve per day during the school year?" This question is pertinent because not all students participate in school meal programs. Some children have the option of bringing a sack lunch or buying food outside of the school lunch and breakfast program. Although the number of students served is divided into the same size groups as district size, Tables 1 and 2 cannot easily be compared because larger schools may feed less than 500 kids a day.

With the last option ("Other") in Table 3, respondents had the opportunity to state if there were beneficiaries in addition to those listed. A total of six different responses

Table 1: Response to survey according to district size (n=276)							
District Size							
	<500	500-1,000	1,000-2,500	2,500-5,000	5,000-10,000	>10,000	
Number	153°	54	45	13	3	8	
Percent	55.43%*	19.57 %	16.30%	4.71%	1.09%	2.90%	

^a 153 respondents (55.43%) reported that their school district has less than 500 students.

Table 2: Average number of students served daily (n=276) Number of Meals Served Per Day <500 1,000-2,500 2,500-5,000 5,000-10,000 500-1,000 >10,000 Number 179ª 50 27 7 4 6 65.57%^a 18.32 % 9.89% 2.56% 1.47% 2.20% Percent

^a 179 respondents (65.57%) reported serving less than 500 students daily.

Table 3: Perception of beneficiaries of FTS (n=182)					
	Schools	Students	Farmers	Community	Other
Number	135°	148	152	112	5
Percent	74.18% ^b	81.32%	83.52%	61.54%	2.75%

^a Respondents were able to choose more than one option when answering the corresponding question.

^bOf the 182 collected responses, 135 respondents(74.18%) states schools benefit from the FTS program.

were collected for this option. Some respondents said they did not participate in FTS; therefore, they did not state who benefits. Others stated that all of the listed beneficiaries, as well as taxpayers in general benefit from the program.

Surprisingly, the results shown in Table 4 suggest the greatest perceived barrier to FTS is not cost. The ability to provide timely and efficient delivery was perceived as a much greater issue. Of least concern were health issues and barriers not identified in the scope of the possible answers. Many school personnel and department of agriculture officials believe FTS can be affordable. When produce is in season within Oklahoma, many consumers are able to receive locally grown produce at a lower price than produce coming from outside of the state. Some argue the associated transportation and handling costs of non-local produce adds to the market price.

According to the results in Table 4, seasonality and availability of products are perceived as problems but not with the same severity as delivery. The prime season for fruits and vegetables within Oklahoma does not coincide with the traditional academic school year. There are, however, many fruits and vegetables that are in season in Oklahoma during the time children are in school. Some of the more prominent options are watermelon, cantaloupe honeydew melon, spinach, lettuce, tomatoes, cucumbers, and squash. Because of Oklahoma's growing season, most of these commodities are still being marketed by farmers in August and September. Some commodities, such as spinach, are available later in the fall and in the spring as well. The expanding use of greenhouses or hoop houses in Oklahoma may make a longer marketing season possible, however adequate supply might still be a problem.

In Table 5, the factors with the highest rating of importance (rating of nine or 10) and greatest influence on their participation in FTS are freshness of product, consistency in product quality and expense. Ease of participating in the program is ranked fourth among the factors of most importance that influence FTS participation. The least important factors affecting FTS participation are delivery frequency, willingness to provide specific products and produce origin.

Overall, Table 5 illustrates what factors are important to potential and current FTS participants. Produce origin had the lowest rating of importance comparatively. This could indicate that locally grown produce isn't necessarily of high demand, or rather that schools participate in the program because the fruits and vegetables are available locally and the program exists. Participation also may be a result of the Oklahoma Farm-To-School Act which encourages school food service personnel to buy local produce when available.

DISTRIBUTION

RESULTS ACCORDING TO DISTRICT SIZE

Table 6 shows the frequency of participation in corresponding programs according to school district size. The column "FTS programs" refers to the question, "Has your school district participated in any of the following Farmto-School programs?" There are a total of four options to this question: a) The Farm-to-School Pilot Program in 2004-2005 during which seedless watermelons were distributed, b) The Statewide Farm-To-School Program starting in 2006-Present, c) Working with local farmers without Farm-to-School assistance (working with farmers independently) and d) None of these.

The column "Breakfast programs" refers to the survey question, "Do your schools participate in breakfast programs? If so, how many students do you serve per day with the breakfast program?" The next column, summer feeding programs, refers to question five in the survey, "Do any of the schools within your district house a summer feeding program?" Having a summer feeding program was coded as "1," otherwise the result received the value "0."

The final column refers to question seven in the survey, "Is your school district a closed campus or an open campus for high-school students during lunch hours?" There are only two options to this question: open and closed. The numbers in Table 6 represent the percent of respondents with an open campus policy.

As shown in Table 7, the number of times produce is delivered within a period varies from district to district. Only districts with a student population size of 1,000 or less receive produce once a month. Because fresh produce has a short shelf life, delivery frequency is important to ensure that produce is fresh and of high quality. Overall, there is no apparent correlation in Table 7 between district size and produce delivery frequency. The majority of the districts (77.61%) have fresh fruits and vegetables delivered once a week. It is likely the reason why the majority of the districts have produce delivered once a week is freshness. In addition, refrigerated and cool storage space is limited in many kitchens which may not allow for many districts to store produce exceeding a week's worth of consumption.

The information in Table 8 is especially pertinent to FTS because the majority of the FTS products are received whole and unpackaged. According to Oklahoma Department of Health guidelines, cutting or processing produce in any form would be considered a "value-added processing" activity which has to meet the established food processing regulations (Oklahoma State Department of Health, 2009). Meeting the regulations required for a commercial food processor can be costly and time consuming for a producer. Therefore, the majority of farmers that participate in supplying FTS products do not cut or package their produce. The majority of the districts re-

Table 4: Perception of greatest barner to a successful FTS program (n=199)						
	Costs	Delivery	Seasonality	Healtth Concerns	Availability of products	Other
Number	18ª	107	24	13	25	12
Percent	9.05%ª	53.77%	12.06%	6.53%	12.56%	6.03%

^a 18 respondents (9.05%) stated the greatest barrier to FTS is cost.

Table 5: Rating (1-10 scale) of factors that influence participating in FTS (n=195)				
	High Importance (rating of 9 or 10)	Percent		
Freshness of Products	162ª	83.03%ª		
Consistency in product quality	152	77.95%		
Expense	140	71.79%		
Ease of participating in FTS program	133	68.21%		
Ability to produce desired quality	123	63.08%		
Convenience	119	61.03%		
Ability to adjust timing of deliveries	117	60.00%		
Delivery Frequency	117	60.00%		
Willingness to provide specific products	104	53.33%		
Produce ongin	88	45.13%		

^a 162 respondents (83.08%) rate freshness of product of high importance when participating in FTS.

ceive 25% or less of their produce precut and bagged. It is not unusual to see schools receive products ready for use. Labor is a large component of a school's cafeteria budget, which makes ready-to-use products more attractive. However, if the price point for precut produce is considerably higher than uncut produce, and if spoilage occurs faster with pre-cut produce, cafeterias may actually save money by purchasing uncut produce and utilizing their labor for cutting and preparation activities.

The results in Table 9 are gathered from the responses to an open ended question in the survey. The amount of free and reduced lunch reflects the amount of reimbursement the districts receive for the meals served to the students. According to Table 9, only two district sizes (500 to 1,000 and 1,000 to 2,500) receive the majority of free and reduced lunch in the 50 to 70% range. All other district sizes receive varied percentages of free and reduced meal reimbursements. Across all district sizes, approximately 50% of the districts receive reimbursements within the 50 to 75% range. Table 10 illustrates there is no apparent correlation between school size and the percent of the cafeteria food budget that is allocated to fresh produce. The majority of the schools spend less than 15% of their food budget on fresh produce. Fresh produce is often the "catch all" food cost category in school lunch programs. Primary budget items include entrees, milk and bread products. Fruits and vegetables, whether fresh or somehow preserved, must contend for the remaining available funds.

Use of Food Distribution Service Providers

Although FTS promotes delivery of locally grown fruits and vegetables to schools, the means of delivery and the definition of "local" vary. In some cases, direct delivery by the producer is the most appropriate and least expensive means of product delivery. However, for larger produce farmers and for opportunities to spread more state-based production to schools, utilizing existing dis-

Table 6: Program participation according to school district size					
District Size	FTS programsª	Breakfast programs [⊳]	Summer feeding programs ^c	Open campus policy ^d	
< 500	3.92% ^e	95.36%	18.95%	23.25%	
500 - 1,000	9.26%	90.57%	28.30%	36.54%	
1.000-2.500	15.56%	97.78%	36.36%	33.33%	
2,500 - 5,000	23.08%	100%	61.54%	53.85%	
5.000 - 10.000	66.67%	100%	33.33%	33.33%	
> 10.000	75%	100%	75%	42.86%	
All Districts	10.51% ^f	95.24%	27.37%	29.70%	

a n=276.

^b n=276.

^c n=274.

^d n=266.

^e This is the percentage of respondents that are within the corresponding district size that participate in the program or policy. For example, of the total number of districts with a student population size of 500 or less, 3.92% participate in FTS.

^fTotal percentage of participation in the corresponding program or policy across all school districts. For example, 10.51% of the respondents that answered to the corresponding question participate in FTS.

Table 7: Delivery frequency of produce according to school distinct size (n=259)					
District Size	Once a Month	Twice a Month	Once a week	Twice a Week	
< 500	4.90%ª	6.29%	77.62%	11.19%	
500 - 1.000	1.92%	3.85%	80.77%	13.46%	
1.000-2.500	0%	2.38%	64.26%	33.33%	
2.500 - 5.000	0%	0%	91.67%	8.33%	
5.000 - 10.000	0%	0%	100%	0%	
>10,000	0%	0%	100%	0%	
All Districts	3.09% ^b	4.63%	77.61%	14.67%	

^a Of the respondents with district size of 500 or less students, 4.90% have produce delivered once a month. ^b Across all district sizes, 3.09% have produce delivered once a month.



Table 8: Percent of produce precut and bagged when received, by district size (n=251)					
District Size	10%	25%	50%	75%	100%
< 500	39.72% °	26.95%	19.15%	12.77%	1.42%
500 - 1,000	32.65%	30.61%	18.37%	14.29%	4.08%
1,000-2,500	40%	32.50%	17.50%	10%	0%
2.500 - 5.000	8.33%	50%	25%	16.67%	0%
5,000 - 10,000	33.33%	33.33%	0%	33.33%	0%
> 10.000	33.33%	0%	100%	50%	0%
All Districts	36.65% ^b	29.48%	18.33%	13.94%	1.59%

^a Of the districts with 500 or less students, 39.72% report 10% of produce received is precut and bagged.

^b Across all districts, 36.65% receive 10% of their produce precut and bagged.

Table 9: Percent of free and reduced meals provided according to district size (n=273)					
District Size	<25%	25% to 50%	50% to 75%	>75%	
< 500	1.32%ª	16.56%	48.34%	33.77%	
500 - 1,000	3.70%	22.22%	53.70%	20.37%	
1.000-2.500	8.89%	26.67%	46.15%	15.38%	
2.500 - 5.000	0%	38.46%	46.15%	15.38%	
5.000 - 10.000	66.67%	0%	33.33%	3%	
>10.000	14.29%	14.29%	42.86%	28.57%	
All Districts	4.03% ^b	20.15%	50.18%	25.64%	

^a Of the districts with 500 or less students, 1.32% reported 25% or less of the students receive free and reduced meals.

^b Across all districts, 4.03% districts reported 25% or less of their students receive free and reduced meals.

Table 10: Percent of food budget allocated to fresh produce (n=265)					
District Size	<5%	5% to 15%	15% to 25%	25% to 50%	>50%
< 500	30.82% °	55.48%	3.42%	2.05%	8.22%
500 - 1.000	39.62%	54.72%	0%	1.89%	3.77%
1,000-2,500	40%	42.22%	0%	11.11%	6.67%
2.500 - 5.000	45.45%	45.45%	9.09%	0%	0%
5.000 - 10.000	0%	66.67%	0%	0%	33.33%
> 10.000	42.48%	57.14%	0%	0%	0%
All Districts	34.72% ^b	52.83%	2.26%	3.40%	6.79%

^a Of the districts with 500 or less students, 30.82% reported 5% or less of their food budgets are allocated to fresh produce. ^b Across all districts, 34.72% districts reported that 5% or less of their food budgets are allocated to fresh produce.

tribution networks may be a more efficient method for product delivery.

Tables 11 and 12 provide an insight into the more prominent distributors of food items to Oklahoma school districts. The list of distributors is meant to encompass the most widely used distributors in Oklahoma. If there is a food distributor that is not listed, the "other" option allowed for respondents to list the name of the distributor. This information can be obtained upon request from the researchers.

The choices shown in Tables 11 and 12 do not differ greatly among respondents, meaning that many of the districts use the same distributor for both fresh produce and items other than fresh produce. The two largest distributors used for both fresh produce and non-fresh items are U.S. Foods and Sysco, although the percentage of items received from assorted small suppliers and local grocery stores is relatively significant. Some of the listed small distributors were Guderian, Redland's Produce and Fadler's. The grocery stores were Walmart, Sam's and other local grocery stores.

DISTRIBUTOR SURVEY RESULTS

As a follow-up to the school survey, the distributors identified by the schools also were surveyed to assess their perceptions of and operational procedures for FTS produce shipments. These distributors, which included both large regional/national distributors and smaller local distributors, were asked to provide information related to their FTS produce distribution business. Nine of the distributors responded to the survey. The information they provided included the number of schools to whom they distribute, the percentage of their business derived from school deliveries, documentation/requirements for handling FTS produce from small farmers, fees for handling FTS produce and even the types of trucks they use to make deliveries.

The results of the survey are provided in this publication solely as an example of one state's distribution system. These results may or may not be similar to those obtained from distributor surveys in other states. However, they are intended to provide an idea of the issues faced by distributors who voluntarily agree to assist and support a state's FTS program. To protect the confidentiality of the respondents, only aggregate results are provided.

Table 13 provides a list of general findings from the survey. Collectively, the responding distributors deliver produce to more than 40% of Oklahoma's 535 school districts. Schools represent only a small portion of the business activity for these distributors, with an average of 9% of total business volume coming from school purchases. Surprisingly, the level of business (as a percentage of sales) that schools represent for these distributors did not significantly vary by size of the distributor. However, these distributors do view the schools as important clients and make significant efforts to meet their demands for locally grown produce, whether or not the purchases are officially designated as FTS purchases.

Three of the nine respondents had lower delivery charges for schools compared to their non-school customers, generally a percentage of the produce price. The methods for pricing produce items delivered to schools varied from daily quoted prices for produce to fixed yearly bids with only "act of God" provisions allowing price increases. Some even locked in prices on certain produce items for the year while allowing other prices to vary according to market conditions.

The risks of food borne pathogens are always present, whether produce comes from a small, local supplier or a large, nationwide supplier. Thus, all distributors maintain a strict set of required documents for suppliers, both large and small. Requirements for small, local suppliers included product liability insurance coverage (amounts varied by distributor), Hazard Analysis and Critical Control Points (HACCP) documentation, Good Agricultural Practices (GAP) documentation and if applicable Good Manufacturing Practices (GMP) documentation. Such documentation is commonplace in the food industry, and

Table 11: Distributors used for non-produce items for all distincts (n=261)

Small distributors	21.84%
U.S. Foods	14.94%
Sysco	11.49%
Grocery Stores	10.73%
Tankersley Food Company	6.13%
Tom E. Bo ₉₉ 5	6.13%
Mid-America	4.98%
Performance Food Group	4.98%
Ben E. Keith	4.6%
Vinyards	3.45%
Buddy's Produce	3.07%
Tulsa Fruits and Produce	3.07%
Southwest Food Service	1.53%
Thomas Brothers-Tulsa	1.15%
Okie Produce	0.77%
Frontier Produce	0.77%
Thomas Brothers-OKC	0.38%

Table 12: Distributors used for produce items					
for all districts (n=257)					
Small distributors	17.9%				
U.S. Foods	12.84%				
Sysco	12.06%				
Grocery Stores	10.89%				
Tankersley Food Company	8.56%				
Ben E. Keith	5.84%				
Tom E. Bo ₉₉ 5	5.45%				
Mid-America	4.28%				
Vinyards	4.28%				
Performance Food Group	3.89%				
Buddy's Produce	3.89%				
Tulsa Fruits and Produce	3.89%				
Southwest Food Service	1.95%				
Thomas Brothers-Tulsa	1.56%				
Okie Produce	1.17%				
Frontier Produce	1.17%				
Thomas Brothers-OKC	0.39%				

many of these concepts are covered in the section of this publication related to food safety.

Distributors participating in the Oklahoma FTS program have in the past graciously agreed to cap FTS produce handling charges to \$1.50 per case of product. In personal meetings with suppliers, some had suggested that this charge may eventually have to increase to cover the true costs of delivering small quantities of locally grown produce to schools. In fact, following the completion of the distributor survey, the handling charge for the 2009-2010 school year was increased to \$1.70 per case.

When asked about the handling fee in the survey, the thoughts of distributors varied greatly. Two of the respondents considered the \$1.50 fee, which was the fee at the time of the survey, to be an adequate amount if fuel prices did not return to record high levels. Two suggested increasing the fee, one by \$0.20 to the current \$1.70 amount

and one by \$0.50 to \$2.00. Three suggested at least doubling the old fee, i.e. charging \$3.00 or more per case. Follow-up comments from distributors suggested that the old \$1.50 per case fee could be more easily maintained if the FTS program was supported by larger and more consistent quantities of produce.

Quantity, and the consistency of that quantity, is viewed by distributors as the greatest barrier to the maintenance and growth of the Oklahoma FTS program. The quality of local produce also was viewed as a barrier by two of the respondents. The price of local produce was only mentioned as a potential barrier to the FTS program by one distributor. This is a contrast to the findings of the school survey, in which roughly 72% of the respondents considered "expense" as an issue of high importance in FTS program participation.



Table 13: Summary	results from the survey of produce distributors to Oklahoma schools (n=9)
Number of schools serviced	 Collectively, 233 Range = 5 to 100 Two large distributors accounted for 190 schools
Percent of business generated by school deliveries	• Average = 9% • Range = 1% - 15%
Different fee structure for schools versus non- school customers	 Three had different fee structures for schools, four did not, and two did not respond Those with different fee structures charged schools less than other customers, charging either fixed margins or margins that could be varied at certain times during the year.
Nature of produce (not FTS) bids with schools	 Two had fixed prices for the year, with only "act of God" changes allowed Two had pricing arrangements with schools for constant percentages above costs Three had fixed bids for some items and variable prices for others Two had weekly bids that accounted for weekly changes in market prices
Documentation required of small, local farm- ers to distribute their produce	 Eight of nine had strict documentation requirements, and the ninth did not purchase from small farmers Six had specific insurance requirements, ranging in detail but all with at least \$1M per incident coverage Six had specific requirements related to HACCP, GAP, and GMP (two didn't respond) One specifically mentioned a "hold harmless" agreement with small farmers before carrying their produce
Backhauls to keep down transportation charges	 Only one currently backhauls products from suppliers while making deliveries Three would like to have some/more backhaul opportunities Two more would consider backhaul opportunities under certain conditions
Thoughts on the \$1.50/ case handling charge for FTS produce deliveries (Note: The handling fee increased to \$1.70/case after the survey was completed.)	 Two had no issues with the current rate, assuming diesel prices remained low Two thought the charge should be increased by \$0.20 to \$0.50 per case Two thought the charge should be doubled (\$3/case) One thought the charge should be more than double its current rate Two did not offer opinions on the current rate
Segregating produce to specifically promote locally grown (besides FTS produce)	 Two purposely separate locally grown produce from non-local produce, with a marketing emphasis on the locally grown produce The other seven do not regularly segregate produce by locale, only identifying the locally grown produce when it is readily available
Perceived barriers to ex- pansion of the FTS pro- gram (multiple answers provided by each)	 Two specifically mentioned quality issues related to produce from local farmers Five said that quantity (consistency of supply) was a significant barrier One mentioned price One mentioned problems getting local producers to carry product liability insurance Three did not provide comments to this question

FARM-TO-SCHOOL DISTRIBUTION SYSTEMS: EXAMPLES FROM SELECT STATES

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The most immediate barrier facing state Farm-to School programs is the lack of an effective and economically sound distribution model for farm products delivered to the schools. As mentioned in the introduction, a few states, like North Carolina, carry locally grown produce to the schools through government delivery (USDA, 2003). But many states, like Oklahoma, have privatized distribution. During its pilot program, Oklahoma FTS produce was distributed through a partnership with the Department of Defense (DoD), which contracted with smaller distributors for delivery of locally grown products in 144 schools. The DoD is in the process of changing its contracting practices, thus necessitating that Oklahoma schools make their own plans for distribution in farm-toschool programs. Variations in school sizes, geographic dispersal of the schools and proximity to farmers make the use of a single distribution model unfeasible for most states.

States have adopted many different models for meeting their distribution needs. A community foods project director in New Jersey at Rutgers University identified the need for "making the best use of existing distribution channels" with regard to farm-to-school programs (Sullivan, 2003). Likewise, FTS programs in many other states have faced the challenge of overcoming local distribution barriers to grow their FTS projects. Table 14 on the following page provides a summary of information received from FTS program coordinators in various states. The information was obtained via an email survey in May 2009, so it is possible that some program changes have taken place since the information was provided. However, the findings from the survey provide a consistent picture: distribution barriers affect the ability of programs to both maintain and grow. Additionally, the information provides evidence that states make use of any and all available resources to establish their distribution channels, and there is no "one-size-fits all" distribution model.

DETERMINING THE "BEST" METHOD OF DISTRIBUTION FOR FTS PRODUCERS: TWO CASE STUDIES

Because each state has its own unique FTS program opportunities and limitations, the means of distributing fresh, local produce to schools may be producer-specific. The optimal distribution system for a producer is a function of the quantity of produce available, the proximity of the producer to schools wanting that produce, and sometimes even the special considerations for handling the produce in transit (see the Food Safety section). As examples of two different distribution systems supplying produce to many of the same schools, consider the cases of two Oklahoma-based producers: Perennial Produce and Peach Crest Farms.

TABLE 14: OPERATIONAL & DISTRIBUTION CHARACTERISTICS OF VARIOUS STATE FTS PROGRAMS

Arkansas Sylvia Blain, Arkansas Local Foods Initiative	 Limited processing for products, sweet potato sticks are a favorite. Some small distributors provide products to participating schools. One group of producers is trying to start their own distribution system.
California Vanessa Zajfen, Farm to Institution Program Coordinator, Center for Food & Justice	 Some schools receive produce directly from individual farmers or farmer cooperatives. Some schools source their local produce through distributors or wholesalers, which also deliver other products. Some schools pick up their local produce directly from farmers' markets. There is also a Farmers' Market Association that takes/facilitates orders for schools and coordinates deliveries by the farmers.
Colorado Jim Dyer, Colorado Liaison, Southwest Marketing Network	 Most FTS distribution is "ad hoc" at this time. As an example, for Durango the FTS food is delivered to a central cooler then distributed to each of the ten schools.
Georgia Erin Croom, Farm-to-School Coordinator, Georgia Organics	 Currently no K-12 FTS food procurement/distribution system for public schools. There are a few instances of FTS purchases by private schools in Atlanta and Emory University.
Maine Amy Winston, Regional Coordinator/ Director, National FTS Network	 Distribution by farmers, farmer cooperatives and wholesalers. Small niche distributors target local food markets while large wholesale distributors sell primarily Maine apples and potatoes.
Missouri Mary Hendrickson, Project Coordinator.	 Missouri FTS is a "piecemeal project" with many options used to meet the needs of the participants. One Kansas City area farmers cooperative is supplying retail markets but is also a de facto FTS supplier for area schools.

- Food Circles Networking Project
- At least one university has convinced a large distributor to start sourcing local products.
- Distribution is the key issue impacting success.

Perennial Produce

Perennial Produce has been in the watermelon business for more than 20 years. Perennial Produce originally became associated with the Oklahoma Farm-to-School Program as the broker for Ramming Produce, Sugar Creek Brand watermelons, in Hinton, Oklahoma during the pilot program of Farm-to-School. When Bob Ramming decided to retire in 2007, Kevin Hughes took control of the Sugar Creek brand and started a watermelon farm near Hinton, Oklahoma. Kevin, having close ties to southwest Oklahoma through his wife, purchased a closed peanut cooperative facility near Albert, Okla. and 140 adjoining acres. Kevin, along with daughter Shayli, father-in-law Bruce Price, and longtime friend Bob Ramming (former Sugar Creek owner), grow the fabulous seedless watermelons that are distributed across the state to more than 60 school districts in the FTS program.

Perennial Produce does business with farmers from Oklahoma to Mexico and deals only with watermelons, both seeded and seedless. Perennial is strictly a wholesale operation, shipping to grocery stores nationwide, food distributors and FTS programs in Oklahoma and Texas.

DISTRIBUTION

North Carolina Tommy Fleetwood, Ag Marketing Specialis NC Dept. of Ag.	• NC Department of Agriculture picks up and distributes produce for the FTS program via their Food Dis- tribution Program and its fleet of trucks.
Oklahoma Chris Kirby, FTS Coordinator, OK Dept. of Ag, Food & Forestry	 Seedless watermelons and cantaloupe have been the primary produce item distributed through the state-wide program that works largely with independent food distributors (vendors) to deliver the produce to the schools Schools that participate in the Department of Defense (DoD) Fresh Produce Commodities Program are assigned a produce vendor for commodity deliveries by DoD and can receive FTS product through the same vendor but not through a DoD contract. Some schools are receiving produce grown by a farmer that is directly delivered. Some schools are receiving produce through an independently owned distributor that picks up the produce from several farms and delivers to the school.
Rhode Island Kimberly Sporkmann, FTS Specialist, Kids First	 In RI most school districts are managed by food service corporations that require the use of a distributor, which purchases FTS products from local farmers and makes deliveries to the schools. Very few schools purchase directly from the farmer, but those that do have the farmer make the deliveries.
Tennessee Lisa Long, FTS Coordinator, Jubilee Project	 Currently focused mainly in Hancock and Hawkins Counties, and the largest school system has 17 schools spread throughout 80 mountainous miles. School systems require the same products go to all schools in their system, which prevents the development of pilot schools. Distribution is the primary problem facing FTS expansion.
Texas Andrew Smiley, FTS Project Director, Sustainable Food Center	 Texas FTS has two districts with pilot schools. Districts follow a regular outside bidding process for produce. District distributes call for bid/awards contract and has contact information for local farmers. Pilot schools contract fresh fruits and vegetables, as do some private schools. Costs for handling covered by a discounted markup by one local distributor.

Perennial's distribution system and industry knowledge base was already established when pilot programs with Oklahoma's FTS began in 2004. The original pilot program consisted of 300 cases of seedless watermelon going to four school districts via one distributor. However, in 2009 the program delivered more than 8,500 cases of seedless watermelons to 50 school districts and 4 universities using 12 distributors.

Perennial's melons, which include specific varieties of seedless watermelons, are highly sought after across the United States for their flavor and freshness. Because Perennial handles melons from Oklahoma to South Texas, the company has virtually no direct-to-school deliveries in Oklahoma. Instead, Perennial employs a full-time logistics, shipping and invoicing person to oversee dispersion of the melons to the distributors who service Oklahoma schools and their other wholesale accounts.

Although Kevin Hughes admits the FTS program accounts for a small portion of his sales (approximately 1-2%), he views the FTS program as an opportunity to get new, young customers for his melons and watermelons in general. His philosophy is one of generic commod-

ity marketing: if they like to eat watermelons at school, they'll want to eat watermelons at home – and hopefully some of those melons for at-home consumption will be from Perennial. Perennial Produce has gained additional business through its FTS distribution contacts.

Perennial maintains a Good Agricultural Practices (GAP) program for its fields. Additionally, the company has an established food safety plan for both the farm and the packing shed in Texas. The new packing shed in Albert will be third-party certified in 2010.

Peach Crest Farms

As Susan Bergen likes to say, "My husband came from a farming family, I came from Boston." However, having learned to love the farming lifestyle, Susan is now the name and face associated with Peach Crest Farm, located in Stratford, Oklahoma. Peach Crest has 9,000 peach trees, various other fruit trees (in much smaller quantities) and a packing shed for handling the peaches and other field crops. Peaches that don't have the perfect appearance for sale as fresh produce are processed into Peach Crest's line of jarred products, including jam, salsa, mustard and barbecue sauce at a small food processing facility in Tahlequah, Oklahoma. They also grow a variety of vegetable crops, including but not limited to cantaloupe, tomatoes, onions and lettuce. Twelve acres are certified organic.

Susan tells her customers, "When it is right off the farm fresh, you can taste the difference. You won't believe it until you try it for yourself."

Peach Crest Farm combines field, hoop house and soon greenhouse production for a year-round supply of fresh fruits and vegetables. Peach Crest is currently supplying fresh produce to restaurants, schools, universities and hospitals. The operation also sells products at local farmers markets, through the Oklahoma Food Cooperative (www.oklahomafood.coop), and through several large grocery chains – including Walmart. In essence, the farm is a combination of direct retail and wholesale businesses.

With growth has come the need to use a diverse distribution strategy. Early on, Peach Crest rented a 32-foot refrigerated trailer to make deliveries to customers, including cantaloupes marketed through the FTS program. Some deliveries, such as distributions to farmers' markets and close-by restaurants and schools, are still made using a pickup truck hauling a refrigerated trailer. However, the increasing number of delivery points has made the Bergens realize the value of outsourcing some distribution activities.

Peach Crest recently contracted some distribution services with Urban Agrarian, a new and locally owned distributor/marketer of exclusively Oklahoma-grown and Oklahoma-processed products. Urban Agrarian can drop off fresh produce at schools or universities, pick up processed food items as a backhaul and even deliver fresh and processed food products to the larger distribution warehouses that service some FTS schools.

For the first time, Peach Crest Farm pre-sold a large portion of its cantaloupes destined for the state 2009-2010 FTS program to distributors. Doing so required assistance finalizing the required paperwork, guidance on procedures with distributors (e.g. purchase orders, delivery appointments), and networking with contact people at the warehouses. Chris Kirby, the FTS coordinator with the Oklahoma Department of Agriculture, Food and Forestry, provided that assistance. Chris even traveled with Susan on the first round of deliveries to introduce Susan to the delivery contacts.

Peach Crest has established a food safety plan for the farm and successfully completed third-party certification for their field and packing shed. The Bergens also have learned best practices for boxes, palletizing, strapping produce on pallets (versus shrink wrapping), and loading trailers properly. Their work has paid off, resulting in additional opportunities for separate purchases for the distributor accounts.



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"It is an honor to be part of the process reuniting children with locally grown food," said Susan Bergen, owner of Peach Crest Farm. "There is nothing more gratifying than children enjoying produce from our farm." (Above: Susan and Shawn Bergen with their locally grown cantaloupes.)

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FOOD SAFETY





DEVELOPING A FOOD SAFETY PLAN FOR YOUR FRESH PRODUCE OPERATION

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The safety of fresh fruits and vegetables for direct consumption is an important issue for both consumers and producers. During the past few decades, consumption of fresh produce has increased substantially as people have learned more about the health benefits of a diet rich in fresh fruits and vegetables. Along with this increased consumption of fresh produce there has been an increase in food borne disease outbreaks associated with fresh produce. Both consumers and producers suffer adversely when fresh produce related outbreaks occur. Consumers suffer serious health risks and the produce industry suffers from a loss in consumer confidence and trust and the resultant loss of sales. Aside from the tragic losses in human productivity and potential caused by illness and even death, an outbreak can result in the loss of millions of dollars from lost sales and lawsuits.

Farm-to-School programs need to be proactive concerning food safety. This section provides the important simple steps that any produce grower, school kitchen or school garden should follow to ensure a safe locally grown fruit and vegetable supply to our students.

Good Agricultural Practices

Good Agricultural Practices (GAPs) are an important concept for producers of fresh fruits and vegetables to understand in order to assure the microbial safety of produce that is grown in their operation. GAPs involve many things, but suffice it to say they are practices used during planting, production, harvest and after harvest to guard the safety of fresh produce.

One point to understand is there is not a one-size-fitsall plan for food safety. GAPs must be uniquely tailored to crops and management practices for each farm. Basically, we should focus on reducing the risk of contaminating fresh produce. It is not possible at this time to completely eliminate food safety risks; in fact the Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables states "current technologies cannot eliminate all potential food safety hazards associated with fresh produce that will be eaten raw."

The worksheets mentioned in this section can be found at www.okfarmtoscool.com/resources/fts-distro-foodsafetymanual.

Times when producers should be vigilant to reduce and control food safety risks include prior to planting, during the planting stage, during production, and during and after harvest. Before planting, growers should complete a grower risk assessment. Cornell University has a great publication to help with this, titled "Food Safety Begins on the Farm – A Grower Self Assessment of Food Safety Risks." This publication is available online at http://www. gaps.cornell.edu/index.html. The document includes 24 sections that provide GAPs and checklists for everything from worker hygiene to petting zoos. Working through the assessment will help producers in developing a food safety plan for their operation.

Good Manufacturing Practices

Good Manufacturing Practices (GMPs) take over where GAPs leave off. GMPs cover issues such as sanitary design of the packing shed itself and any producehandling equipment or produce contact surfaces, packing shed pest control, packing shed sanitation, worker health and hygiene monitoring, and temperature control for produce that requires refrigeration. Sanitizing washes or dips, which rely on chlorine or other sanitizers to kill harmful microbes, also may be part of a GMP program. The overall goal of a GMP program is to minimize and control the risks of contamination that occur after harvest and during packing, and includes many of the same principles that are applied as part of a GAPs program.

It is important to note that an on-farm packing shed is not normally considered a food processing facility. This means that an on-farm packing shed is generally exempt from state and federal licensing and inspection requirements that apply specifically to food processing facilities. However, there are certain produce-handling operations that would commonly be called a packing shed that could be regarded as a food processing facility by state and federal authorities. Specifically, any process that alters the natural state of a raw agricultural product may be construed as food processing. Generally this would include operations such as peeling, shelling, cutting and sometimes re-packaging harvested produce into retail packs. Be aware these sorts of activities will likely change the regulatory status of an on-farm produce handling facility.

STEP 7: ADDRESS PRE-PLANT ISSUES

• Site Selection. Prevention should begin with proper field selection. Property surrounding the site should be checked to determine the chance contaminants can enter the field from dust, runoff or animals. See site selection worksheet.

• Water. Water for irrigation should be tested annually or more often for fecal coliforms (2.2 fecal coliforms per 100 ml is the EPA limit for non-potable uses). Overhead irrigation water should be treated if fecal coliforms exceed the limit mentioned above. See worksheet for irrigation and spray water.

• Land history. History of site use including past crops, applications of pesticides or other chemicals, animal waste applications, etc. This should indicate if the soil has potential for causing crop contamination or has potential for crop damage from previous land use. See site selection worksheet.

• Wildlife and domestic animals. Animals have serious potential for contaminating the crop with feces. Scout the field for game trails and adjacent areas for the potential of harboring wildlife or domestic animals that could enter the field. If concern exists, you will need to develop a plan to reduce these risks. See site selection worksheet.

• **Crop selection.** Different crops vary in their potential for being contaminated. Root and leafy crops have a much greater potential for contamination than crops that flower and fruit (i.e. tomato, tree fruits, brambles, snapbeans), grain or forage crops.

• Other potential risks. These might include contamination by pets, workers, visitors, field machinery, etc.

STEP 2: ADDRESS PRODUCTION ISSUES

• **Irrigation / spray water.** Water is the most likely way of spreading contamination to fresh produce. During production, pay special attention to monitoring irrigation water safety and using only potable water for crop sprays. Water supplies should be tested at least annually and more often if well sites have experienced flooding or are uncapped. See worksheet for irrigation and spray water.

Irrigating using drip or furrow irrigation is less likely to spread contamination to produce than overhead or flood irrigation.

• **Field worker hygiene.** Field worker hygiene is an important part of keeping fresh produce safe during production. Provide not only convenient clean restroom and hand-washing facilities, but also training to

ensure workers understand the importance of personal hygiene for keeping fresh produce safe to eat. Worker training materials and videos are available at the National GAPs training website (http://www.gaps.cornell.edu/educationalmaterials.html). See worksheet on worker training.

• **Fertilizer use.** Fertilizers vary in their potential to harbor microbial contaminates. Synthetic fertilizers have low potential for contamination while un-composted and improperly composted manure has a high potential. Sidedressing during the growing season should use only well composted manure or synthetic fertilizers. See worksheet on fertilizer, compost and manure application.

• Wildlife control. Controlling access to the field will reduce the risk of contamination from people, livestock and wildlife. Exclude livestock, including pets and poultry, from the field with fencing or other means. Develop and implement a plan to manage wildlife access through appropriate methods. Workers and visitors access to the field should be controlled to limit access when wet field conditions exist. See worksheets on wildlife control.

STEP 3: ADDRESS HARVEST ISSUES

• Harvest worker hygiene. Worker and U-Pick customer health and hygiene is a key component of the overall program to guard the safety of fresh produce during harvest. Workers will need to be trained in their responsibilities, and well-maintained facilities will need to be provided to allow them to carry these out. U-Pick customers will need convenient well maintained restroom facilities and signage to encourage them to follow good sanitary practices. See worksheets for worker training and field and packing shed restroom cleaning. · Harvest equipment cleaning. Harvest equipment must be maintained in a clean and sanitary condition. Pressure wash, rinse, and sanitize all harvest bins, harvest aids, and machinery daily. Cover washed and sanitized bins to prevent recontamination by wildlife. Maintain harvest equipment to minimize abrasion and wounding of fresh produce. See worksheets for worker training, field harvest/

processing / packing / cleaning and the field and packing shed restroom cleaning and service log. • **Avoid damaging produce.** Wounds or other damage provides an entry point for harmful microorganisms into fresh produce. And once inside, these microorganisms cannot be removed or killed by washing or sanitizing agents. Therefore, is it very important to avoid damaging produce before or after harvest. Be aware of equipment or contact surfaces that may cut, bruise, or compress produce. Minimize operations that transfer produce from one container to another. Also, beware of damage to produce that may occur during harvest from improper use of equipment, untrimmed fingernails and so on. Remove damaged produce from packaging area to a cull pile.

• Holding / transport equipment cleaning. Transportation and holding equipment including bins, trailers, trucks, etc. should be checked on a daily basis and maintained in a clean and sanitary condition. Follow a checklist for inspection of vehicles that will be carrying fresh produce. See worksheets for truck checklist and processing, packing line, facility cleaning.

• Fresh produce cleaning. Safe produce handling should include removing soil from produce as it may be a source of contamination. Clean equipment and produce before it enters the packing shed. Consider using a sanitizing agent as part of the cleaning process. Damaged or diseased produce should be culled in the field to avoid contamination. Note culled produce should be transported to a remote cull pile as soon as possible in order to avoid attracting pests or creating a reservoir for both human and plant pathogens.

STEP 4: POST HARVEST ISSUES TO ADDRESS

• Packing shed cleaning. The packing shed should receive a general cleanup to remove dirt, debris, and culled produce at least once a day. Produce-handling equipment and any surface coming in contact with produce should be cleaned and sanitized daily. Bathrooms, sinks, waste receptacles and floor drains also should be cleaned and sanitized daily, or more often if needed. Frequent inspections of the facility should be performed throughout the day to ensure sanitary conditions are maintained. Cold rooms should be cleaned and sanitized once a month or as operations allow. Rodent and insect traps and other pest control aids should be inspected and renewed as necessary - generally at least once a month. See worksheets on field, packing shed restroom cleaning and service, processing packing line facility cleaning, and pest / rodent control.

Note high-pressure hoses are not recommended for general cleaning when produce is being packed because high-pressure water sprays can spread harmful microorganisms over fairly long distances.

A 200 PPM chlorine solution (1 tbsp household bleach / gallon water) makes an effective sanitizing solution when applied with a contact time of at least two minutes. Prior cleaning is important to ensure that the sanitizer is effective. Note surfaces sanitized with 200 PPM or stronger chlorine should be rinsed with clean water or allowed to air dry before coming into contact with produce.

• Cooling or wash water sanitation. Water used for cooling or washing must be clean and potable (drink-able). If water is being sanitized by adding chlorine, then the strength of the chlorine solution must be checked at least daily, more often if required, or whenever a fresh tank of water is prepared. See Washing / Cooling / Sanitizing Water Treatment worksheet.

• **Cooling water temperatures.** If a water tank is being used to hydrocool fresh produce ensure the cooling water is no more than 10°F cooler than the incoming produce to minimize the risk that produce will imbibe water during cooling.

• Strength of sanitizing washes. Table 1 gives basic recommendations for chlorine-based sanitizing solutions that can be used to help ensure the safety of fresh produce. If a sanitizing wash is appropriate, the strength of the chlorine solution should be monitored at least once a day, more often if required or whenever a fresh tank of solution is prepared. Be aware the strength of the chlorine will dissipate over time, and the more soil is present on the produce, the more quickly the strength of a chlorine-based sanitizing solution will be lost. See Washing / Cooling / Sanitizing Water Treatment worksheet.

• **Proper storage of packed produce.** Hold and store produce away from possible hazards, e.g. cleaning agents, pesticides, etc. Hold and store produce off the floor, away from walls and in such a way as to avoid damage. If the produce is stored in a cold room, be sure to monitor and record temperatures. See cooler temperature worksheet.

• **Transportation of packed produce.** Trucks used to transport produce should be cleaned and sanitized prior to loading. If trucks are not used exclusively to transport produce, then be aware of what other items may have been previously transported and clean accordingly. If refrigerated transportation is being employed, consider using temperature monitoring systems to help ensure proper refrigeration temperatures are being maintained during shipping. See truck checklist worksheet.

STEP 5: ADDRESS IMPORTANT RECORD

KEEPING ISSUES

• Create and maintain records for all employee trainings (see worker training log).

• Create and maintain records of facility cleaning and sanitizing (see processing, packing line, facility cleaning and field, packing shed restroom cleaning and service worksheets). • Create and maintain records of produce sanitizing, if applicable (see washing / cooling / sanitizing water treatment worksheet).

• Develop a traceback system for your farm that will allow you to trace produce to the field it was harvested from, including harvest date (see produce tracing and recall traceback worksheets).

• Consider developing a HACCP-like program for your farm (Hazard Analysis Critical Control Points). This system will identify where contamination problems are likely to occur (Critical Control Points) and will provide ways to address these potential hazards.

• Records of all produce leaving your farm should be maintained to assist you in traceback and in any other problems that may occur. Remember if you don't record it, you didn't do it (see produce tracing worksheet).

Table 1. Strength of chlorine sanitizing wash recommended for various types of produce.

Type of Produce	Recommended PPM Chlorine	Bleach/gallon of water ¹
Apples, pears, squash, cucumbers	65 PPM	1 tsp/gal
Leafy greens, peaches, peppers, tomatoes, as- paragus, broccoli, carrots	130 PPM	2 tsp/gal
Melons, citrus, root crops	400 PPM ²	2 tbsp/gal
Berries (strawberries, blueberries, blackberries, raspberries, etc.)	No washing	N/A

¹Bleach/gallon of water based on using household bleach containing no fragrances or thickeners with a base concentration of 5.25% sodium hypochlorite.

and facilities

Inexpensive

• Available

• Corrosive

Irritating fumes

rinse

² Sanitizing wash should be followed by a potable water rinse

Sanitizer

Uses

Recommended

Concentrations

Contact Time Required

Advantages

Disadvantages

Food Safety Log & Worksheet Templates

The following worksheets, as found on www.okfarmtoschool.com/resources/fts-distrofoodsafetymanual are intended to serve as templates pertaining to documentation and record keeping occuring within a typical fresh produce food safety program.

Site Selection Review

First Aid Kit Monitoring Log

Quaternary

ammonia "Quats" Hands, facilities, food contact-

surface, & equipment

H2O rinse

>1 minute

Non-corrosive

Relatively non-irritating

Good residual activity/stability

Less effective than others for

control of E. coli

*<200 ppm without rinsing

*200-500 ppm with potable

Irrigation Spray Water Treatment Log Worker Training Log Fertilizer / Compost / Manure Applications Log Wildlife Control Log Field / Packing Shed Restroom Cleaning and Service Log Field Harvest / Processing / Packing Cleaning Log Truck Checklist Processing / Packing Line / Facility Cleaning Log Pest / Rodent Control Log Washing / Cooling / Sanitizing Water Treatment Log Cooler Temperature Log & Calibration of Your Thermometer Information Produce Tracing Log Recall / Traceback log Illness / Injury Reporting Log

Visitor Log These worksheets were adapted from documents developed by Cornell University Department of Food Science.

equipment

>1 minute

•Effective at:

low concentration

wide pH range hard water

Non-irritatingGood penetration

Good residual

Not a cleaner

Expensive

May stain

Iodophors

"lodine-based"

Facilties, food contact-surfaces &

*>25 ppm with potable H2O rinse

*12.5-25 ppm without rinsing

Prevents biofilm formation

Table 2	Common t	vices of san:	tzors and the	r characteristics
			iller 2 on 101 mer	

Chlorine-based

Produce wash water, equipment

*< 2,000 ppm with potable H2O

*<200 ppm without rinsing

1 to 5 minutes at 200 ppm

• Wide range of effectiveness

Rapid loss of effectiveness

Farm	to	School	27

GLOSSARY OF FOOD SAFETY TERMS

Case. The illness of one person associated with food.

Clean or cleaning. Removing soils and residues from surfaces by washing and scrubbing with soap or detergent and rinsing with clean water.

Cold chain. The maintenance of proper cooling temperatures throughout the food system (farm to fork) for fruits and vegetables to assure product safety and quality.

Contaminate. To transfer impurities or harmful microorganisms to food surfaces or water.

Cull. To pick out and destroy fruits or vegetables that are not up to quality or food safety standards due to blemishes, wounds, bruises, being misshapen or due to obvious contamination, e.g. with fecal matter.

Foodborne illness. An illness transmitted to people through food products resulting from ingesting foods that contain pathogens, their toxins or poisonous chemicals.

Good agricultural practices (GAPs). The basic environmental and operational conditions necessary for the production of safe, wholesome fruits and vegetables.

Good manufacturing practices (GMPs). The basic environmental and operational conditions necessary for the packing and processing of safe, wholesome fruits and vegetables.

Hepatitis A virus. Virus that causes a disease of the liver. It can be found in water that has been contaminated with raw sewage. Infected workers also can transmit hepatitis A.

Imbibe. To absorb moisture into a fruit, leaf tissue or other plant part.

Glossary of food safety terms were adapted from "Food Safety Begins on the Farm, A Grower's Guide, Good Agricultural Practices for Fresh Fruits and Vegetables" by the Cooperative State Research, Education and Extension Service, the United States Department of Agriculture and United States Food and Drug Administration. **Microorganism or microbe.** Bacteria, molds, viruses, etc. so small they cannot be seen without a microscope. Some are beneficial others spoil food, and some cause sickness and even death.

Nonpotable water. Water that is not safe to drink. Sources may be polluted by sewage, animal waste or chemical runoff from agricultural fields and urban landscapes.

Outbreak from foodborne sources. An incident in which two or more persons experience a similar illness after eating a common food and epidemiological analysis implicates the common food as the source of the illness.

Pathogen. Any microorganism that causes disease in humans.

pH (Acidity/Alkalinity). pH is the measure of acidity or alkalinity in a food product, expressed on a 0 to 14 scale with 7 being neutral, below 7 being acidic, above 7 being alkaline.

Potable water. Clean water that is safe to drink. Produce contact surfaces. Surfaces of equipment with which fruits and vegetables come into contact.

Rinsing. Removal of residues, soil, grease, soap and detergents from surfaces by flushing with potable water.

Sanitizer. A chemical compound designed to kill microorganisms. Two commonly used sanitizers are chlorine bleach and quaternary ammonium compounds ("quats"). Sanitizer solutions are made by mixing a measured amount of the sanitizer with potable water, according to label directions.

Sanitizing. Process to kill microorganisms. Includes rinsing, soaking, spraying or wiping the surface with a sanitizing solution. Surfaces should be properly washed and rinsed before they are sanitized.

Total titratable chlorine. The amount of chlorine determined by an acidified starch iodide and thiosulfate titration.

Traceback. Ability to trace a fruit or vegetable back to its field of origin.

Washing. Removing all solid soil or food residues from surfaces by scrubbing with soap or detergent.

FRESH PRODUCE HANDLING TIPS FOR SCHOOLS

There are many resources available and already in place for food safety in the school food service program. You will find a sample for Standard Operating Procedures for washing fruits and vegetables and other resources for more in-depth food safety information.

Staying Healthy ... Staying Safe

Fruits and vegetables are an important part of a healthy diet. Local farmers carry an immense variety of fresh fruits and vegetables that are nutritious and delicious.

As you enjoy fresh fruits and vegetables, it is important to handle these products safely to reduce the risks of foodborne illness.

Buying Tips for Fresh Produce

You can help keep produce safe by making wise buying decisions with your local farmer.

- Purchase produce that is not bruised or damaged.
- Bag fresh fruits and vegetables separately from meat, poultry and seafood products.

Storage Tips for Fresh Produce

Proper storage of fresh produce can affect quality and safety. To maintain quality of certain perishable fresh fruits and vegetables - such as strawberries, lettuce, herbs and mushrooms - store them in a clean refrigerator at a temperature of 40°F or below.



Preparation Tips for Fresh Produce

What About pre-washed produce? Many bagged produce items, such as lettuce, are pre-washed but usually need to be washed prior to use. As an extra measure of caution, you can wash the produce again prior to use. Precut or pre-washed produce in open bags should be washed before using.

Begin with clean hands. Wash your hands for 20 seconds with warm water and soap before and after preparing fresh produce.

Cut away any damaged or bruised areas on fresh fruits and vegetables before preparing and/or eating. Produce that looks rotten should be discarded.

All produce should be thoroughly washed before eating. This includes produce grown conventionally or organically at home, or produce that is purchased from a grocery store or farmers' market. Wash fruits and vegetables under running water just before eating, cutting or cooking.

Even if you plan to peel the produce before eating, it is still important to wash it first.

Washing fruits and vegetables with soap or detergent or using commercial produce washes is not recommended.

Scrub firm produce, such as melons and cucumbers, with a clean produce brush.

- Drying produce with a clean cloth towel or paper towel may further reduce bacteria that may be present.
- Separate for Safety Keep fruits and vegetables that will be eaten raw separate from other foods such as raw meat, poultry or seafood - and from kitchen utensils used for those products.

Wash cutting boards, dishes, utensils and counter tops with hot water and soap between the preparation of raw meat, poultry and seafood products, and the preparation of produce that will not be cooked.



For added protection, kitchen sanitizers can be used on cutting boards and counter tops periodically. Try a solution of one teaspoon of chlorine bleach to one quart of water.

If you use plastic or other non-porous cutting boards, run them through the dishwasher after use.

FRESH, HEALTHY, AND SAFE FOOD: BEST PRACTICES FOR USING PRODUCE FROM SCHOOL GARDENS

These best practices were created as a collaborative effort among school garden practitioners from across the country. Thanks to Kelly Erwin, Deb Habib, Tegan Hagy, Noli Hoye, Dana Hudson, Marion Kalb, Emily Jackson, Catherine Sands and Amy Winston.

School Gardens serve as exciting living laboratories and are an important component of Farm to School efforts. The bounty from school gardens can contribute to the school cafeteria, students' families or be used in classroom and afterschool taste-testing activities.

The following practices are intended to provide basic food safety guidelines for those involved with school gardens. They include principles from Good Agricultural Practices and safe food handling procedures and are intended to serve as a framework that may easily be adapted to meet individual school settings and regional requirements. The safety benefits of fresh food grown on site include the avoidance of potetial contamination that accompanies long-distance travel (where products frequently change hands) and control over the supply chain direct from garden to table.

Safe handling information should be provided to students, teachers and others involved in growing, harvesting and preparing. In addition to the many benefits of fresh food, healthy activity and learning, your school garden can be an educational tool that helps teach students about food safety procedures.

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Recently the USDA Child Nutrition clarified that school nutrition programs participating in the National School Lunch and Breakfast Program could use federal reimbursable dollars from their school lunch and use for certain supplies for a school garden.

It also clarified that programs such as school gardens, FFA and 4-H could sell garden produce they grow to their school cafeterias.

With the clarification being made, it is important for school organizations to follow simple food safety protocol to ensure the safety of the produce they would sell to the school cafeteria or school markets.



All organic matter should be fully composted in aerobic conditions and at high temperatures prior to application. Avoid raw manure and limit composted manure to what can be purchased from a commercial outlet to ensure traceability.

When using water for irrigation make sure it is potable and from a tested source. Check with your state cooperative extension or state health offices for simple testing kits.

If soil used for growing is coming from school property, test for contaminants before planting. Testing kits are usually available through your state, same as water testing above.

There are many places to purchase seeds for your school garden, so be conscious of where your seeds come from and consider source and quality. Look for those that are preferably non-genetically modified and come from companies that have taken a "safe seed pledge."

Materials used for garden beds, containers, stakes or trellises should be constructed of non-toxic, non-leaching material (no pressure treated wood or used tires).

No synthetic pesticides or herbicides should be used.



Q: Can the school food service use funds from the nonprofit school food service account to purchase seeds for a school garden?

A: Yes, with the understanding the garden is used within the context of the program, i.e. selling the food or providing food in the classroom as part of an educational lesson.

Q: Can the school food service use funds from the nonprofit school food service account to purchase items for the school garden such as fertilizer, watering cans, rakes, etc.?

A: Yes, as long as the items are used for the purpose of starting and maintaining the garden.

Q: Can a school sell food grown in its school garden that was funded using the nonprofit school food service account?

A: Yes, as long as the revenue from the sale of the food accrues back to the nonprofit school food service account. Schools can serve the produce as part of a reimbursable meal or sell it à la carte, to parents, to PTA members, at a roadside stand, etc.

Q: Are there health/safety issues involved with school gardens?

A: Yes. School Food Authorities need to familiarize themselves with the federal, state and local requirements regarding health and sanitation issues.

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Q: Can the school food service purchase produce from another school organization that is maintaining and managing the garden, such as FFA? A: Yes, the school food service may purchase produce from a garden run by a school organization such as FFA, which is an agricultural education program for students.

Q: Can funds received through the Fresh Fruits and Vegetables Program (FFVP) be used to purchase seeds/tools/equipment for a school garden? A: No. FFVP funds may not be used for the purchase of any materials for school gardens.

Q: What if there is excess produce from the garden at the end of the school year?

A: The school should first see if the excess food can be used to benefit another program such as the SFSP. If that is not possible, they could try selling the food (as always, the profit must accrue back to the nonprofit school food service account) or donate it in accordance with state and local health/safety regulations.



http://www.fns.usda.gov/cnd/governance/policy-memos/2009/sp_32-2009_os.pdf





HARVESTING AND HANDLING

Students, staff, parents or volunteers involved in harvesting should wash hands thoroughly in warm soapy water for at least 20 seconds prior to harvesting. Anyone with open cuts or wounds on their extremities should not participate in harvest until they have healed.

All harvesting tools — scissors, bowls, tubs — should be food-grade and/or food service approved and designated solely for harvest and food handling. The tools should be cleaned regularly with hot water and soap, then dried.

School garden produce delivered for use in a school cafeteria should be received and inspected by food service personnel upon delivery with the same system used to receive and inspect all other incoming products.

If storage is necessary, produce should be cooled and refrigerated promptly after harvest. Temperatures vary on type of produce being harvested; specific post-harvest storage and transportation temperatures can be found at http://postharvest.ucdavis.edu/produce/storage/index. shtm.

School garden produce should be washed according to the same standards that the cafeteria has in place for conventionally received produce. A person with ServSafe or comparable food-safety certification should supervise students, parents or staff who participate in any food preparation, i.e. taste-testings or special cafeteria events.

OTHER CONSIDERATIONS AND RECOMMENDATIONS

Those planning and planting the school garden should review your school's rules and regulations. Some plants that can cause serious allergic reactions may be prohibited. If the garden is near parking areas or other high-traffic zones, consider testing for contaminants before growing fruits and vegetables. Many states have agriculture extension services that can help with this. If building a raisedbed garden, consider purchasing soil meant for food production from an established retail entity to ensure soil safety and traceability.

If your school has a composting program for cafeteria waste, use the resulting compost for flowers, ornamental plants and trees rather than for garden beds where food is grown. Compost that comes from garden waste can be applied to food-growing beds if deemed appropriate by the school garden supervisor and/or compost coordinator.

Be sure to coordinate with school grounds-keeping or custodial staff about your garden's goals, protocols and maintenance plan. If you are concerned about the presence of pesticides on or near your garden, be sure to communicate that, too. Consider using your school garden as an educational tool that can teach students about food safety procedures and incorporate curricula that teach to these issues in your garden educational plan.

Be sure your school garden program is aligned with any relevant school district policies including, but not limited to, wellness policies, school procedures for receiving gifts and donations, working with parent and community volunteers, and liability policies.

TIPS & TOOLS



TIPS AND TOOLS FOR FARM-TO-SCHOOL DISTRIBUTION: Helpful Hints and Materials for Producers, Schools and Distributors

Chris Kirby and Rodney Holcomb Oklahoma Department of Agriculture, Food and Forestry Robert M. Kerr Food & Agricultural Products Center

The decision to become a Farm-to-School supplier is not one to be made lightly. As previously eluded to in the Food Safety section, there are many aspects of Good Agricultural Practices (GAP), quality assurance and even Hazard Analysis Critical Control Points (HACCP) that need to be considered. However, to help in making that decision, a combination of advice/tips, document examples, suggested publications and descriptions of helpful programs has been provided.

TIPS FOR FARMERS DELIVERING TO A DISTRIBUTOR

The following tips and suggestions were provided by producers who have made the decision to deliver their produce to a food service distributor. These tips are not all-encompassing and may vary by distributor (usually depending on the size of the distributor), but they do serve as good advice for a range of requirements and expectations.

• **Contact information:** Distributors will want to know as much information as possible, but will definitely require farm name, address and Employment Identification Number (EIN).

• **IRS form number:** This form will need to be completed and signed.

• **Product liability insurance:** Although there may be a few distributors who will not require product liability insurance (however doubtful), most will ask for coverage in the range of \$1 million - \$3 million per incident per product. If the insurance requirement is cost prohibitive, ask the distributor to discuss the potential for a lower insurance exception with their risk management. Some companies will make a lower exception because the farmer is not delivering on a 12-month basis.

• **Memorandum of Understanding (MOU)**: Prior to delivering anything, a MOU needs to be in place. An example has been provided on the following page.

• Food safety documentation: Make sure the farm has a food safety plan in place with standard operating procedures for produce production, harvesting and post-harvest handling. Your state fruit and vegetable extension specialist, State Department of Agriculture or State Department of Health can be an excellent resource when developing a food safety protocol. Resources will vary from state to state. This can be used as a marketing tool as well.

• Third-party certification: Third-party certification requires that an outside company audits the farm and packing shed and certifies that a food safety plan and documentation system is in place. Certification can be quite costly, but will satisfy most grocery store chain and food distributor requirements. With the increased emphasis on food safety, more distributors are requiring third party certification.

• **Delivery vehicle:** Delivery may mean using a refrigerated truck. See the Food Safety section for proper storage temperatures for various fruits and vegetables.

• **Produce packaging:** All products should be packed in sturdy, heavy boxes either on a pallet or ready to be be stacked on a pallet at a distribution center. Use heavy plastic straps to hold boxes in place on pallet, do not shrink wrap fruits or vegetables (this limits airflow to products), and date every box to guarantee the level of freshness. Note using a distinct box with farms name is recommended; however a 5"x7" label applied to the box can help preserve product integrity.

• **Cross-docking:** Many smaller produce companies in outlying areas will purchase their produce from larger produce companies in metropolitan areas. For efficient use of farmer and distributor time, crossdocking arrangements can be made for a small fee. In such a case, produce is delivered to a large produce company, where it will be used by that company for their school customers but also picked up by smaller produce companies to deliver to schools in their area. Cross-docking arrangements need to be made prior to delivery and are usually charged a per-case or perpallet fee.

• **Produce quality:** Quality is extremely important to the distributors and the schools. Quality means size of the fruit or vegetable, freshness, storage temperature, and ripeness. A farmer should already know how many days it will take to get the produce from the farm and to the schools, including the time the produce is held by the distributor. For example, produce companies may deliver orders Monday mornings, so a producers will have to deliver their produce on Friday so it is ready to be loaded on the delivery truck Sunday or early Monday morning. Most distributors do not receive produce on Saturday or Sunday.

• **Pricing:** Pricing can vary tremendously. Some companies will take mark-up on the produce and charge a delivery fee. Some statewide programs, such as the one in Oklahoma, have negotiated a set price that is paid to the farmer and then a distributor agrees not to charge a mark-up on the produce, instead delivering for a (currently) set \$1.70 per case fee. It is important for the farmer to be within 10% of the prevalent wholesale price for the schools to be able to afford the produce.

• **Bill of lading:** A bill of lading is similar to an invoice but is used more for tracking delivery times and drivers, documenting receipt and delivery of products. A producer needs to provide a bill of lading with every delivery.

• **Delivery appointment:** Farmers need to set appointments with distributors for delivery of produce. Larger distributors in particular have to orchestrate delivery of many products at one time, and a scheduled delivery may keep a farmer from having to wait in a line to drop off products.

• **Purchase orders:** Some distributors will require a purchase order to be in place before delivery. Farmers need to be able to provide this document and all other documents in a uniform and timely manner.

• Unloading: When delivering produce to different distributors, some docks may be unionized for unloading and extra fees may apply. A farmer must be prepared to pay these fees or personally unload the produce. It has even been suggested that a farmer carry his or her own pallet jack. It also has been sug-

gested that a big smile – and possibly even a tasty treat – can go a long way in establishing a good relationship with dock crews.

TIPS FOR FTS PROGRAM ADMINISTRATORS AND VOLUNTEERS

For those helping to establish or expand a FTS program, whether farmers or volunteers, additional tips and lessons learned include:

• Change doesn't happen overnight. Patience, communication and willingness are vital. Keep a log of the program's results on a monthly basis to track growth and spot potential problems.

• Say thank you to all the farmers, school representatives and distributors participating in the effort.

• Meet with distributors every year.

• Go with farmers for their first FTS delivery if possible, especially if they are inexperienced with delivering to a distributor.

• Don't add more than one or two crops per year on a statewide program.

• Don't incorporate more produce items than can be controlled. The inability to guarantee quantities and/ or quality of produce due to crop failure causes problems for larger schools to make adjustments on orders and menus, resulting in a loss of momentum for the program.

• Make sure when notifying schools of crop problems the distributor is notified as well. Ask schools if they want their distributor to fill the order with non-FTS produce to maintain their scheduled menu.

TIPS FOR SCHOOLS WANTING TO RECEIVE FTS PRODUCE THROUGH THEIR DISTRIBUTOR

For schools considering FTS program participation, steps must be taken to ensure their distributor(s) can and will also become active participants in the program. Tips include:

• Ask the distributor if they are purchasing from any local growers.

• If they are not currently purchasing produce from local growers, ask them if they would do so.

• When developing bid specifications for distributors, make one of the requirements be sourcing local produce when available.

• Bid specifications also can include requirements on the number of days from harvest to delivery to school for locally grown produce.

Distribution Memorandum of Understanding Sample (Name of Distributor), (Name of Farm) & Oklahoma Farm to School (Season that the MOU covers)

Overview of agreement with (name of distributor), the Oklahoma Farm-to-School Program & (name of farm).

1) Farm to School Coordinator will notify (name of contact person at distributor), three days prior to delivery into the (name of Distributor's) warehouse, which in most cases will be the Tuesday before the produce is delivered to its warehouse on Friday morning, the following information:

- a) What produce will be coming in and who the product will be coming from. Prior approval of the produce, the company and the paperwork will already need to have taken place with **(contact name at distributor)**.
- b) What school districts will be receiving the farm to school produce.
- c) Any instructions of individual school deliveries within the school district.
- d) Will notify (contact person's name) if there are any shipping challenges that will affect their weekly order or the school's weekly order.

2) (Name of Farm) will:

SAMPLE

- a) Will contact (name of contact person who makes delivery appointments at the distributor may be the same person listed above and may be a different person depending on the size of the company) by Tuesday of each week to schedule an appointment for delivery for each Friday morning.
- b) Will place a packed by date on each case of produce delivered.
- c) Will deliver order on a pallet and either not charge for the pallet or do a pallet exchange.
- d) Will ship in a refrigerated truck, if required.
- e) has provided a copy of their insurance for (amount of insurance required by the distributor) in liability.
- f) Will practice Good Agricultural Practices in all stages of growing, harvesting and shipping the (type of produce).
- g) Will give credit for any quality problems with the produce.
- h) Will provide the distributor with a Bill of Lading for the order that is delivered.
- i) Will bill the distributor for the shipment in a timely manner.

3) (Name of distributor) will:

- a) Issue a purchase order in their system after being contacted by the Farm-to-School Coordinator with the information outlined above (If the distributor requires a purchase order to be in place for delivery. That will be required more so for the larger companies but should be discussed and agreed as needed).
- b) Will let the school sales representatives know what farm-to school produce will be delivered to the schools.
- c) Will pay (name of the farm) for the product and then add (amount of agreed on delivery fee or markup) delivery fee to each case, deliver to the schools and bill the schools for the entire amount of the school's order. To be able to get such a low delivery fee, the delivery needs to be in the warehouse prior to the distributor loading the truck, and they will "drop it off" so it becomes a part of the load that they are already delivering to.
- d) Will notify the Farm-to-School Coordinator immediately of any problems encountered.
- e) Will notify the Farm-to-School Coordinator of any procedural problems or changes.
- f) Will deliver farm-to-school produce to the assigned schools within 1 week of receipt in distributor's warehouse.

Signature of Distributor	Date	
Signature of Farmers	Date	
Signature of Farm-to-School official	Date	

TIPS & TOOLS

TIPS FOR DISTRIBUTORS WORKING WITH LOCAL GROWERS AND SCHOOLS FOR FTS PROGRAMS

In many cases, distributors actively support and pursue the expansion of local produce programs such as FTS. As the link between the farmers and the schools, they have the responsibility of developing sound business relationships with both. Tips for distributors include:

• Be upfront with growers and/or the FTS coordinator in what your requirements will be for the farmer – packaging, quality, insurance requirements, food safety documentation, etc.

• Consider reasonable exceptions when asked to do so.

• Linking with local growers can provide a new source for produce and an additional marketing benefit for your company.

• If your company is interested in doing business with local farmers, be flexible when possible and consistently communicate your needs.

• Take advantage of backhauling opportunities.

Tips for Farmers or Groups of Farmers Delivering Directly to Schools

Individual farmers, collective participants at farmers markets and farmer cooperatives may all form ideal partnerships with schools. Topics such as food safety, purchasing methods, pricing, supply reliability, quality, etc. have already been discussed in this publication, but listed below are additional tips for developing a direct delivery partnership with schools.

Develop a relationship with local schools: Individuals or representatives for farmer groups should contact and meet with food service directors to determine their willingness to purchase locally grown produce. State FTS program coordinators may be helpful in this area. If the schools are interested in purchasing locally grown produce, determine their demands for various commodities and assess your individual or collective ability to meet some of those demands (see the Produce Calculator also discussed in this section of the publication). Consider providing typed lists of the commodities (and varieties) that will be produced, the expected harvest season for each commodity and plans to ensure food safety and quality (e.g., GAP and HACCP plans). If possible, bring samples of the produce, information on crop production plans and/or pictures of the farm(s).

• Learn how schools obtain and serve food items, especially fresh produce: Food service directors and administrators are paying closer attention to

the overall nutritional role served by school meal programs. In general, much of the fresh produce served in schools is not necessarily aligned with the local seasonal availability. Some school food service managers create menus several months in advance. Others have more flexibility, especially with secondary schools and when offering fruit, vegetable and salad bars. Schools participating in the Federal School Lunch and Breakfast program only can use foods produced in the U.S. with the exception of a couple of items and are required to meet minimum USDA dietary requirements for their meals.

Develop a clear understanding of ordering methods and delivery needs: School food service managers must follow state and federal procurement guidelines. Small purchase thresholds will vary from state to state. Identify the number of drop sites per school district (e.g. central warehouse or drops for each school in the district). Ask about the preferred time of day and day(s) of the week for delivery. Ask about packaging needs for specific crops. If using stackable, recycled plastic containers, discuss arrangements for recovering and "trading out" containers. Discuss desired product quality guarantees by the farmer and the protocol for handling any complaints upon delivery. Schools should verify product condition upon delivery and ensure the produce is stored and handled accordingly.

• Determine the economic potential for "wholesale" pricing/marketing: Education programs encourage food service managers to purchase the highest quality food items they can afford, advising that "cheapest is not always best." Farmers selling produce to schools can expect to receive prices very comparable, if not higher, than those at the wholesale terminal market prices. Daily prices are posted at www.ams.usda.gov/fv/mncs/TERMVEG.htm. Farmers selling through "wholesale" channels should carefully evaluate their production costs relative to prices received. One pricing strategy is to offer products at current wholesale value plus an agreed upon percentage above the market price.

• **Discuss payment arrangements:** Food manager concerns regarding this topic may stem from their knowledge that payments to distributors/vendors are often made within 30 days, sometimes longer for new vendors. Farmers should be aware payment upon delivery is highly unlikely. However, once an account is established with the school district and deliveries with proper invoices begin, payments will follow. To avoid payment delays, sales invoices should in-

clude the following: all provider contact information, date, invoice number, purchase order number (if the schools assign one), specific items sold, weight and/ or units sold, unit cost, total cost, and signed and dated documentation by food service staff indicating products were received and approved.

• Weigh the possibilities of participating in both farmers markets and FTS: Farmers/farming groups selling their produce for direct retail price through farmers' markets may be reluctant to sell their commodities at a wholesale price to schools. However, a FTS program may provide additional benefits to farmers' market participants. For example, the school year begins when most farmers' markets are slowing down or closing, and FTS programs provide excellent markets for cool season crops. Additionally, the time commitment for marketing to a school district will be considerably less than selling in a farmers' market, and bulk packaging to meet school needs is less expensive than individual packaging for farmers market customers.

FOR THE SCHOOL FOOD SERVICE

When developing a Farm-to-School program, there are many resources that can assist you in building your program. Partnerships are very important and helpful. Work with school principals and PTA. Ask for parent volunteers to assist with the kitchen prep of fresh produce, pick up produce at the farm or in planning and coordinating hands-on nutrition education activities, such as food tastings, cooking activities, farm visits and school gardens. Members of your school's Health Advisory Committee may be able to help. Farm-to-School is a wonderful opportunity to work together toward the common goals of improving school meals. A good strategy is to have an organizing meeting to present your ideas and to allow others to express theirs.

For a school that wants to approach their local farmer/ farming group, the process is the same as listed above. Look for those growers who show a real willingness to work with you – and be willing to work with them. The school food procurement system does not naturally lend itself to buying direct from farmers. In developing a procurement system that works for farmers and schools, both sides will have issues and concerns that deserve consideration and discussion.

Ask the farmer about crops they grow and tell what you are looking for: supply reliability, quality (ask for samples and if interested, ask if you could visit their farm). Another item to discuss is price, delivery, packaging and payment. Most farmers will prefer payment within 15 - 30 days, but some will accept payment up to 45 days after the sale.

During the main produce growing season, farmers will work from sun up to sun down. Ask them when the best time to call them would be. Once the relationship begins, the farmer can e-mail a weekly availability sheet with prices to the school food service and have them return the orders a day or two later for the upcoming weeks harvest and delivery.

TIPS FOR WORKING WITH AN EXCLUSIVE LOCAL DISTRIBUTOR

While the "typical" wholesale food service distributors control a vast majority of the school food deliveries, recent years have shown an increase in the development of small distributors catering specifically to food service demands for locally grown items. These specialty distributors market both the locally grown commodities and the sustainable agriculture characteristics of the supplying farms/farmers. These distributors usually work with small- and medium-sized growers who are too small for more conventional distributors, but pooling the output from these growers allows the exclusive distributors to meet demands for both quantity and quality of product. As a result, the farmers represented by these specialty distributors often avoid some middleman costs and, therefore, receive a higher percent of the consumer dollar. The following are tips for farmers considering the use of exclusive local distributors:

• Ask about year-round marketing potential. Some of these distributors will change their marketing practices and channels to match the seasonal availability of produce.

• For some producers, these distributors may charge either a flat rate or a percentage fee to deliver products to restaurants, hospitals, schools/universities and even farmers' markets.

• Some exclusive local distributors also provide facilities where crops can be washed, graded and packed.

• These distributors may use backhauls to keep down the distribution costs for the farmers they represent, so it may be in the farmers' best interests to help them identify backhaul opportunities.

• Pick-ups at the farm may be possible, or a convenient point of exchange may be negotiated.

• Produce turn-around is often faster with these specialized distributors, which should mean a faster payback for the farmer.

• Some of these distributors are brokers for the farmers, but others may simply purchase produce from farmers at the prevailing wholesale price.



The following are examples of exclusive local distributors:

• Appalachian Harvest - http://www.asdevelop.org

- Eastern Carolina Organics http://www.easterncarolinaorganics.com
- Growers Collaborative http://www.caff.org/programs/growerscollaborative.shtml
- Urban Agrarian http://www.uaoklahoma.com

USEFUL SOURCES OF INFORMATION AND ASSISTANCE

The national FTS Web site (www.farmtoschool.org) provides links to a number of useful organizations, publications and online materials. Some examples of beneficial organizations, publications and online references (in no particular order) include:

USDA-Food & Nutrition Service

3101 Park Center Drive
Alexandria, VA 22302
(703) 305-2062
Fruits and Vegetables Galore – Quality Food for Quality
Meals – Buying Fruits & Vegetables
http://www.fns.usda.gov/tn/resources/quality intro.pdf

Applying Geographic Preferences in Procurements for the Child Nutrition Programs http://www.fns.usda.gov/cnd/governance/Policy-Memos/2008/SP_30-2008.pdf

Eat Smart—Farm Fresh! A Guide to Buying and Serving Locally-Grown Produce in School Meals (Note: This publication has an extensive list of information providers, research reports and planning guides.) http://www.fns.usda.gov/cnd/Guidance/Farm-to-School-Guidance_12-19-2005.pdf

Healthy School Meals Resource System USDA's Team Nutrition

3101 Park Center Drive, Room 632Alexandria, VA 22302(703) 305-1624http://healthymeals.nal.usda.gov

Community Food Security Coalition

Distribution Models for Farm-to-School http://www.foodsecurity.org/f2s_distribution_method.pdf

DoD Farm-to-School Program – Frequently Asked Questions http://www.foodsecurity.org/dod f2s.pdf

USDA-Agricultural Marketing Service

1400 Independence Ave., SW Room 2646 - S, Stop 0269 Washington, DC 20250-0269 (202) 720-8317 *How Local Farmers and School Food Service Buyers Are Building Alliances* http://www.ams.usda.gov/tmd/MSB/PDFpubList/localfarmsandschool.pdf

Quality Standards by Commodity http://www.ams.usda.gov/AMSv1.0/standards

Guidance for Schoo Developing a Sch Program Baser Vegetable

FARM-TO-SCHOOL TEMPLATES: TOOLS FOR PARTICIPATING PRODUCERS AND SCHOOLS

Rodney Holcomb and Anh Vo Oklahoma State University Department of Agricultural Economics Robert M. Kerr Food & Agricultural Products Center

In addition to these tips and resources, two new software programs have become available to assist producers in the planning and financial analysis of FTS program participation: the Produce Calculator and the Farm-to-School Distribution Cost Template.

The Produce Calculator helps farmers determine the amount of produce to be delivered to meet the demands of a school nutrition program. The Produce Calculator allows its users to define the type of produce and, with input from the school regarding the number of meals to be prepared, determine the amount of raw produce needed to meet that demand and cost per serving size to the school.

The Farm-to-School Distribution Cost Template helps producers understand the true costs of produce delivery and assists in the determination of "farm gate" values for their crops. This template allows users to consider and compare different delivery methods for their crops, helping them to make determinations regarding the optimal delivery method(s) for their FTS produce.

The following sections provide a detailed description of these software programs and their applications.

FARM-TO-SCHOOL DISTRIBUTION COST TEMPLATE

The costs of getting food products from the point of production to the point of consumption are often poorly understood. The many options involved in distributing food products are one factor leading to this lack of transparency – both in the understanding of distribution logistics and the assessment of cost efficiencies.

Distribution of produce can occur in many forms or even combinations of forms. Some of the most common distribution methods are:

- **Direct delivery by the producer.** In this form of distribution, the producer maintains direct and complete control over the produce from the farm to the user, which may be the final consumer (e.g. buyers at a farmer's market) or a food service provider (e.g. a school, a restaurant, etc.).
- *Farm-to-warehouse delivery.* For this distribution system, a producer sells and delivers (directly or by contracted shipment) bulk product to a warehouse, which in turn distributes the produce to customers across a larger geographic region. The warehouse, typically operated by a broker or a food distributor firm, may or may not perform some minor value-add-ed activities (e.g., sorting, cutting, packaging) prior to distribution.

• Farmer contracted use of an intermediary.

In this case, a producer will directly deliver his or her produce to an intermediary that does not take ownership of the produce but does perform certain marketing/distribution services for a fee. An intermediary may be another producer, a group of producers acting as a cooperative entity or a broker. The intermediary serves as an agent for the producer and charges a fee for services rendered. These services may also include activities such as washing, sorting/grading and packaging.

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3	General Information			
4	Commodity to be delivered	watermelons	Enter "1" if using the IRS standard mileage rate	
5	Commodity unit (case, pound, carton, etc.)	2-count	(otherwise leave blank)	
6	Selling price per unit (what schools pay)	\$8.50	Current IRS standard mileage rate (\$/mile)	\$ 0.55
7	Delivery size, in units	100		
8	Labor rate (\$/hr)	\$10.00	Operating Costs per Mile	
9	Unloading time per delivery (minutes)	20	Fuel costs	\$0.02
10	Number of deliveries per trip	2	Maintenance/Repair	\$0.15
11	Delivery route (miles, round trip)	150	Tires	\$0.01
12	Fuel cost (gas or diesel, \$/gal)	\$2.39	Depreciation	\$0.25
13			Labor	\$0.27
14	Vehicle Information	· ·	Total Operating Costs per Mile	\$0.70
15	Farm truck fuel economy (mpg)	9.00		
16	Vehicle tire costs (set of tires)	\$575.00	Total Operating Costs per Trip	\$104.31
17	Vehicle tire life (thousand miles)	45,000		
18	Expected maint./repair expenses this year	\$1,500.00		
19	Expected depreciation this year	\$2,500.00	The Farm-to-School Distribu	tion Cost Template is
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It is certainly possible and quite probable for more than one of these distribution methods to be utilized by a producer. For example, a producer participating in a FTS program might make direct deliveries to local schools in his or her farm truck, participate in a cooperative effort to deliver large quantities to larger schools with one or more neighbors (e.g., paying a weight-rated share of trucking fees), and deliver produce to a warehouse that will in turn deliver to foodservice providers statewide. The mix of options can be further complicated if the use of refrigeration or activities such as sorting, cutting and packing are involved.

Each method of distribution has its pros and cons. For a small producer with limited output, one method may be vastly superior to all others. For producers with large quantities of perishable commodities, all options may be necessary to market the produce in a timely manner and avoid losses due to spoilage. Each distribution channel represents a certain set of costs, thus a different set of returns to the producer. The challenge is to maximize profit potential across the available options.

To help producers recognize the costs associated with different distribution channels and the farm-gate margins resulting from their choices, agricultural economists with the OSU Food & Agricultural Products Center (FAPC) developed a publicly-available, spreadsheet-based template that makes cost calculations much easier to determine and compare. With user-provided information on produce, delivery vehicles, travel distance, number of delivery points, labor costs and fee-based distribution services, the template calculates a producer's operating cost per mile for deliveries (to a school, a warehouse or an intermediary), the total distribution costs per unit of produce, and the farm-level returns for each unit of produce.

One valuable attribute of the template is the ease with which producers can examine the sensitivity of their returns to changes in one or more cost factors and/or a change in the market price for their produce. A person with even a little spreadsheet experience can easily create sensitivity tables by making incremental changes in one cost factor (e.g., fuel price) or the distance traveled and recording the impacts on farm-level returns.

Even seemingly small changes in one cost factor may have great impacts on total distribution costs. For example, the costs of operating a refrigerated truck are greater than a non-refrigerated truck. Backhauls, whether by the farmer or by the intermediary, affect the costs attributed to the delivery of produce (e.g., one-way costs versus roundtrip costs). Even road conditions and their impacts on travel speed and vehicle/tire wear impact distribution costs.

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Determining vehicle operating costs

What are the true costs of operating a vehicle? This question has been and remains to be the cause of lengthy debates and detailed research efforts. The type of vehicle, fuel economy, tire costs, insurance expense, expected annual maintenance costs and road conditions all affect the true costs of operation. For some, the best proxy for permile operating costs is to use a reported estimate, such as the IRS allowable mileage rate for expenses. For others, the Farm-to-School Distribution Cost Template may be used to establish an operation-specific estimate.

Fuel economy

Fuel economy is probably the easiest and most commonly measured vehicle operating expense: start with a certain level of fuel in the vehicle, drive a specific distance and find out how many gallons of fuel were needed. Stated fuel economy estimates (miles per gallon) for modern vehicles, or owner knowledge of fuel efficiency from operating the vehicle, and a current price of fuel make fuel-per-mile costs easy to estimate.

Vehicle tire costs

Many factors may go into determining the tire costs per mile of travel: style of tire, the amount of highway travel versus non-paved travel, hills and curves versus flat ground and straight roads, tire inflation level, vehicle weight and wheel alignment. The template asks users to consider these factors, but in a simple, straight-forward manner: What would (did) it cost to purchase a new set of tires for your delivery vehicle? How many miles of travel do you expect to get from that set of tires? Although the possibility of road hazards may drastically shorten the useful life of a set of tires, the vehicle's owner can anticipate from past experiences roughly how long a set of tires should last.

Maintenance, repairs and insurance costs

Expenses for maintenance and repairs may be accounted for by using annual estimates from manufacturers or auto industry organizations. These estimates are typically based upon the make and model of the vehicle and vary by age of the vehicle. On the other hand, the vehicle owner may base these cost estimates on a budgeted amount for annual maintenance and repairs, taking into account variations in the costs of repairs that may be performed on the farm and those that might require the services of a trained mechanic. Maintenance costs also may include the annual costs of vehicle registration/tags and legally-required insurance coverage. An annual estimate of these costs, divided by the expected number of miles driven for the year, provides an appropriate estimate of these expenses per mile of operation.

Depreciation

The useful life and value of a vehicle is a function of age (years owned) and miles driven. A vehicle with an expected operating life of 10 years is not necessarily worth half its original value after 5 years. Similarly, a vehicle with an expected operating life of 200,000 miles is not necessarily worth half its original value after 100,000 miles of use. While it is possible to estimate vehicle depreciation over time using a straight-line method (value of the vehicle divided evenly over a period of years) or per mile by a straight-line method (value of the vehicle divided by the expected mile-life), these methods may not accurately capture the current depreciation rate of the vehicle. A more precise method for capturing vehicle depreciation expense is to incorporate both age and miles driven. Most business-use vehicles are depreciated on the books according to the MACRS (Modified Accelerated Cost Recovery System) accounting method. The MACRS method accounts for the fact vehicles lose more value in their early years than in their later years. Older vehicles, because they have already been partially or fully depreciated by the business, do not lose as much market value per year or as the result of having a few more miles on the odometer.

The template allows for either a straight-line or MACRS depreciation method to capture the fixed costs of vehicle ownership. The user inputs the amount of depreciation for the year, whether that be determined by the straight-line or the MACRS method, and the expected miles driven for the year. Older vehicles may have very little or no depreciation expense per year, but may conversely have much higher annual maintenance and repair costs than a newer vehicle.

Determining labor costs

The template allows users to capture the costs of labor associated with making produce deliveries. For producers using hired help to make deliveries, the template requests information about the length of the trip based on miles traveled, driving speed and the time required to drop off produce at each delivery point.

For producers personally making deliveries, labor costs may be accounted for in two ways. If the producer chooses to input the value of his/her time as the labor rate, the computed labor cost represents an opportunity cost, or the value of time that could have been used elsewhere on the farm. However, the producer may choose to treat the delivery activity as being directly related to his/her farm activities for the crop. In this case, no labor costs are estimated by the template. The producer would need to subtract all production costs from the "farm gate" margin provided by the template to determine the returns to his/ her direct labor and farm management.

Suggested information sources

The introductory segment of the template suggests a few sources of information for determining distribution costs. In addition to the provided references, the template user also may be able to get more state-specific vehicle operation costs from state agencies such as the state agriculture department, state department of transportation and/or the state department of commerce. The Distribution Cost Template is available in a downloadable format www.okfarmtoschool.com/resources/fts-distro-foodsafetymanual.

PRODUCE CALCULATOR

For any FTS program, it is important that the buyers (school nutrition program directors) and farmers communicate effectively and efficiently regarding the quantities of desired produce. Food service providers typically calculate their produce needs in terms of number of servings and the cost per serving. Farmers usually market their fruits and vegetables on the basis of pounds or cases/cartons that represent a set number of pounds. A Produce Calculator program has been developed to help producers and food service providers calculate quantities and costs of various fruits and vegetables needed by a school food program. This spreadsheet-based program calculates poundage needed from a farmer based on the school's desired number of servings and serving size. This calculator also calculates the per serving cost based on the price of the produce. Conversion calculations for produce have been taken from the USDA Food Buying Guide for Child Nutrition Programs. Use of the program is very simple:

1) Provide the number of servings to be prepared, based on 1/4 cup or 3/8 cup serving size, and the price per pound of the selected produce item.

2) The Produce Calculator quickly calculates the pounds of produce needed to provide that number of servings and the cost per serving.

3) For some items, such as melons, the Produce Calculator can estimate the number of melons to be purchased using a standard melon size/weight. For berries, the Produce Calculator similarly estimates the quantity in quarts of berries to be ordered by the school.

4) For larger serving sizes, such as 1/2 cup portions, simply double the 1/4 cup quantities and cost per serving.

This calculator can be useful for schools, colleges/ universities, caterers, restaurants, day care facilities and other venues where fresh fruits and vegetables are served. The Produce Calculator is available in a downloadable format at www.okfarmtoschool.com/resources/ fts-distro-foodsafetymanual. The Produce Calculator was collectively developed by the following individuals for the Oklahoma FTS program:

Doug Walton

Kerr Center for Sustainable Agriculture Poteau, Oklahoma

Dawn Holt

Edmond, Oklahoma

Chris Kirby

Oklahoma Department of Agriculture, Food & Forestry Oklahoma City, Oklahoma

