

Local Food in Maryland Schools: A Real Possibility or a Wishful Dream?

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Abstract: In the recent past, “farm to school” and “farm to cafeteria” programs have proliferated. In 2008, Maryland passed the Jane Lawton Act, an unfunded program encouraging schools to serve Maryland produced food in schools. Similar federal policy exists. Like many other states, Maryland is seeking new markets, such as educational institutions, to enhance the viability of small and medium farms. However, school lunches are subject to numerous constraints, including regulatory and budget constraints. Distribution channels for local food sales are not well developed. Thus the success of local food usage in Maryland schools program is not certain. Using primary quantitative and qualitative data collected by the research team, this paper explores the feasibility of local food in Maryland schools. We identify scale and socioeconomic barriers to the use of local food in schools, suggesting that policy support would enhance the likelihood of long term success of serving local food in schools.

Keywords: Local food, agriculture in the middle, farm to school, small farms, distribution of local food, school lunch, logistic model, farm to school, farm to cafeteria.

Introduction

A national discussion about food is in process, with attention centering on the themes of obesity, food quality, and nutrition. Prominent examples include the “Let’s Move” campaign, targeting childhood obesity, promoted by the White House, as well as Jamie Oliver’s reality television show “Food Revolution,” featuring students in West Virginia (Lee, 2010; Hale, 2010). By focusing on childhood obesity and health, these two separate activities direct attention to the nutritional quality of lunches served to children in K-12 schools. The ongoing debates about school lunches complement long running discussions about the U.S. food sector, which extend beyond childhood obesity and health. One key aspect of the discussion targets consumers’ knowledge wedge between the source of food (farms) and the food they eat (see for example, Hinrichs 2003). The argument is as follows: most food is bought in supermarkets, much of it packaged and not resembling the plant or animal it comes from, and consequently consumers have lost their connection to the land and the farmer. The last dimension of the food discussion results from the desire to maintain an agricultural sector that supports small and medium-sized farms, which have been declining in number across the nation.

The “farm-to-school” movement touches on each of these aspects of our food system, as reflected in the statement that such programs produce “...*healthy children, healthy farms, and healthy communities*” (farmtoschool.org). We prefer to think about the issue as “local food in schools,” which recognizes that use of local food in schools does not have to rely on direct sales between farmers and schools. Serving locally produced food in schools can potentially accomplish several ends. First, through increased access to fresh and healthy foods, students may broaden their horizons and awaken a taste for different types of foods. Secondly, many farm-to-school programs contain an educational component, which typically consists of lessons or field

trips to nearby farms, and fosters an understanding of the link between the farm and the food they eat. Finally, schools potentially provide small and medium sized farmers with a new high valued market outlet; speaking generally, these farmers require high valued markets, such as those accruing from direct marketing or short channel sales, which bring in more revenue than sales through traditional wholesale channels.

This paper adds to the literature in several ways. Our state of focus, Maryland, is new to serving local foods in schools. Maryland is an interesting state to study from both the demand and supply side. Wealth varies across counties, thus our findings result from analyzing schools of various levels of affluence. In Maryland, (1) median income ranges from \$39K to \$101K per year and (2) the percent of students eligible for free lunch varies from 8 to 64 percent (ERS, 2010b). Maryland farmers are likely to have many of the skills needed to market local foods to schools, since direct marketing requires flexibility and an understanding of working outside of the typical farm-to-wholesale-to-retail market channels. In 2007, forty-one percent of the farms in Maryland had annual sales between \$10,000 - \$500,000, which is the group most likely to seek new nontraditional market outlets (ERS, USDA, 2010a).

In contrast to the bulk of the previous research documenting grass roots efforts to develop farm to school programs, our aim is to assess the feasibility, ex-ante, of serving local food in Maryland schools, primarily from the demand side. We consider different facets, such as regulatory and budgetary constraints, as we assess the feasibility of local foods in Maryland schools by analyzing, in the context of current policies, primary data (quantitative when possible, otherwise qualitative) from all parties involved in providing school lunch to students in the state: (1) public and private K-12 school food service directors in the state of Maryland, (2) distributors, and (3) local farmers.

School lunch policies and budget implications

Federal and state policies regarding local foods in schools reflect the multifaceted possibilities of the farm to school movement, and most explicitly have incorporated dual aims of increasing child health and providing economic opportunities for local small and mid-sized farms. The 2004 Child Nutrition Act, Section 122, created an unfunded farm to cafeteria program (Public Law 108-265, 2004). Bills currently (2010) circulating in both the House (H.R. 4710) and the Senate (S. 3123) would provide \$50 billion of mandatory funding for farm to school programs, through competitive grants and technical assistance. In their current forms, the bills place a high priority on projects that benefit small and medium sized farms, have an educational component, and target schools with a high proportion of students receiving free or reduced price lunches (S. 3123, 2010). The 2008 Farm Act incorporates language specifically allowing schools to list “local” as a geographic preference when purchasing unprocessed agricultural products (USDA ERS, 2009). Unprocessed agricultural products include fruits and vegetables, which may be washed, bagged, sliced, or diced; milk, which may be pasteurized; meat, which may be butchered; and eggs, put in cartons. State legislation targets school use of local food as well, and as of June, 2008, 18 states had passed legislation related to local foods in public schools (Community Food Security Coalition, 2008). In Maryland, the Jane Lawton Farm to School Act (2008) established a “Homegrown School Lunch Week,” which encourages schools to serve Maryland raised products in lunches for one week during the fall.

When viewed through the lens of policy and institutions, a school lunch is the complex result of the intersection of numerous constraints. All public schools participate in the school lunch program, and private nonprofit schools can elect to do so. “Complete” school lunches (in contrast to a la carte food items sold in the cafeteria) must satisfy the nutritional guidelines as

specified in the *Dietary Guidelines for Americans*, published every five years (the last update was 2005) (HHS and USDA, 2005). In practice, this means that a lunch must provide, over a school week, one-third of a student's recommended daily allowance of protein, calcium, and of other vitamins and minerals, with no more than 30 percent of the calories from fat (MDSE, 2010). Schools typically offer a la carte food items in addition to complete school lunches; these food items are currently exempt from the dietary guidelines and provide revenue for the school lunch program.¹ Current legislative discussions that are part of the 2010 reauthorization of the Child Nutrition Act suggest a shift in policy may be looming, requiring la carte items to meet dietary guidelines as well (Lincoln, 2010).

Schools participating in the school lunch program operate within a set of budgetary constraints created by federal and state regulations, which are usually binding. A School Nutrition Association study of 48 large school districts across the United States, 2008-09, found that the average cost to produce a lunch meal was \$2.90, with a range from \$1.50 to \$3.87 (School Nutrition Association, 2008a). With revenue from all sources varying from \$2.52 to \$2.77, the average potential cumulative loss faced by schools in the United States is \$4.5 million/day based on 30 million school lunches provided (School Nutrition Association, 2008b). A study by USDA of 356 schools for the academic year 2005-06 similarly found that the full costs of producing a complete lunch exceeded the federal subsidy for a free lunch (FNA, USDA, 2008).

Local foods in lunches: the perspective of Maryland schools

For local foods to be part of school lunches, two basic criteria must be met: (1) serving local food has to work both logistically and financially and (2) schools need to be interested in

¹ In the United States in 2005, a la carte sales and other non-reimbursable food sales made up 17 percent of revenues (FNS, USDA, 2008)

bringing local food to their students. Turning first to the budget, in Maryland, as in other states, school lunch service² is self supporting (Eidel, 2010). Federal reimbursements provide schools with a set amount per lunch for free, reduced price, and full priced lunches (Ralston et al, 2008). The current reimbursement amounts are listed in table 1; these amounts are likely to be increased in the upcoming reauthorization of the Child Nutrition Act. From a cost side, according the Maryland State Department of Education, food costs approximately \$1.15 per meal. Given the breakdown of expenses related to school lunch costs, we place an upper limit on the total cost per complete meal in Maryland (including indirect costs and other types of overhead) as roughly \$3.38.

Schools face procurement constraints as well. Fresh fruits and vegetables may be purchased through the Defense Department procurement produce system, and schools are required to make food purchases from the lowest bidder. These rules have implications for adoption of local food by schools: food sold locally is generally produced on smaller farms that do not sell through the Defense Department. Thus, local food likely has higher costs when considering the sum of price and transactions costs. Maryland law does allow schools to pay a 5% price preference above the lowest bid for local food grown in Maryland (Maryland HB 883, 2006). However, the standard procurement contracts may require some adjustment to accommodate local food usage in schools.

[table 1 about here]

[table 2 about here]

The need to balance costs and revenues for school lunches creates several incentives, not all of which are compatible with improving the nutritional quality of school lunch service. First, schools increase revenues by offering a la carte food items at lunch or in vending machines,

² The revenues for the lunch service come from complete lunches and a la carte items.

which are exempt from nutritional guidelines. Anecdotal evidence suggests that schools reduce labor costs by eliminating benefits for employees or outsourcing the entire food service operation. Schools also have strong incentives to use low cost federal commodities, which were valued at about \$0.20 per meal in 2009; these products are less costly than purchasing similar products in the open market (MacDonald et al, 1998). Critics have suggested that the federal commodities are higher in fat and less healthy. However, others rebut the criticism by stating that federal commodities are subject to dietary guidelines and are healthy unprocessed foods (Ralston et al, 2008; Eidel, 2010). Private schools that do not participate in the school lunch program face a different set of constraints. Following the dietary guidelines is optional, and lunch is either financed through tuition, out of which the food service receives an operating budget, or students pay a fee for lunches. Regardless of the funding mechanism, the food service director operates on a budget.

Survey of public and private schools reveals interest in local food

In order to understand whether local foods might fit into lunch service in Maryland schools, we collected both quantitative data from a survey of public and private schools and qualitative data from interviews with food service directors. While most previous “farm-to-school” ventures focused on public schools (see, for example, Izumi et al. 2006; Hurst, 2009; Kloppenberg, 2008), we included private schools in our study. We believed, ex ante, that private schools were subject to fewer procurement constraints than public schools and thus would be more flexible and possibly provide greater opportunities for Maryland farmers.

The quantitative findings are based on data obtained from surveys of public and private school food service directors. The instrument was developed by the research team in consultation with the Maryland State Departments of Agriculture and Education. In Maryland, the public

school lunch program is administered by district, which is organized by county and Baltimore City. In total, there are 24 school districts in the state. Of the private schools in the state, we distributed surveys to the population of schools with more than 150 students (310 schools). The schools include high, elementary, and middle schools, and thus the survey findings cover all grades between kindergarten and high school seniors. The response rates were 75 percent for public schools (18 school districts) and 17 percent for private schools (43 schools). Technical details on the survey methodology are included as an appendix.

Descriptive statistics of select survey results are presented in table 3, and are separated for private and public schools. Nearly all public schools and slightly less than half of the private schools served local food during 2008; note that this response does not reflect the intensity of local food usage. We hypothesize that the different levels of usage between public and private schools (94 percent vs. 48 percent) is the result of efforts of the Maryland State Departments of Agriculture and Education, mostly geared towards public schools, to promote Maryland Homegrown Week. Few schools reported purchasing directly from farmers. A larger share of primary vendors to the public schools carries local foods, while both private and public schools procure more than half of their needed food supplies from one vendor.

[table 3 about here]

The efficiency of the performance of market channels for local products to schools hinges upon the ease with which schools and farmers can exchange products, including factors related to (1) locating products, (2) locating buyers, (3) pricing products, (4) delivering to buyers, and (5) receiving deliveries. Perceived impediments to these factors inhibit a school's use of local foods. School food service buyers were provided with a long list of factors, and asked to indicate which factors were major obstacles, moderate obstacles, or not an obstacle to their use or

increased use of local foods. Private and public schools, as table 4 shows, view different factors as major obstacles to increasing their use of local food. For public schools, seasonal availability, lack of supply, and menu planning presented the greatest problem, while private schools indicated that knowledge of the timing and availability of local foods was their largest obstacle. A possible explanation is that, without the type of support for local foods in school lunches provided by the state, the majority of private schools have little knowledge of how to access local foods.

[table 4 about here]

While major obstacles are clearly an impediment for schools, some factors that are viewed as moderate may also have an impact on local food usage. Thus, to reflect the degree to which schools (in aggregate) viewed a factor, we created a weighted measure for each factor using school responses to whether they perceived a factor as a “major obstacle,” “moderate obstacle,” or “not a obstacle.” To do so, we assigned a higher weight (weight = 1) to the response “major obstacle” and a lower weight (weight = 0.5) to the response “moderate obstacle,” and then summed the scores across all respondents for each obstacle (see table 5). When compared to the list of major obstacles (table 4), the weighted measures yield a different ordering. While seasonal considerations remain the most significant obstacle, pricing and delivery considerations rise in the ranking with the broader measure. Liability issues, which refer to farmer compliance with food safety standards, do not appear as important when considering just major obstacles, yet the weighted measure suggests that such compliance is an important factor.

[table 5 about here]

Model of local food use in schools

The survey results indicate how schools view each factor independently. However, when making decisions about using local foods, schools implicitly consider all factors simultaneously. In order to capture this decision, we model a school's decision to serve (and therefore purchase) local food as a discrete choice, where the dependent variable takes the value of 1 if the school buys local food and 0 if it does not. The factors thought to explain this decision compose a vector, x , so that

$$(1) \text{Prob}(y = 1) = F(x'\beta), \text{ and}$$

$$(2) \text{Prob}(y = 0) = 1 - F(x'\beta),$$

where $x'\beta$ takes a linear form. Choosing a logistic distribution, equation (1) becomes

$$(3) \text{Prob}(y = 1) = \left(\frac{e^{\beta'x}}{1 + e^{\beta'x}} \right).$$

The marginal effects from the logit model are given by

$$(4) \frac{\partial E[y]}{\partial x} = \left(\frac{e^{\beta'x}}{1 + e^{\beta'x}} \right) \left(1 - \frac{e^{\beta'x}}{1 + e^{\beta'x}} \right) \beta.$$

where this expression is calculated at the means of the variables in x .

As previously discussed, schools are faced with the task of providing students with lunches that satisfy several constraints, including USDA nutrition guidelines, school lunch budget rules, and student tastes and preferences. Local foods, when part of a lunch, must fit into this framework as well. Some factors are constant for all schools, such as needing to meet the USDA nutrition guidelines, and thus are not a unique part of an individual school's decision. However, many factors do vary by school, and we are interested in estimating how these factors influence the likelihood that a school will use local foods in lunch. First, we hypothesize that higher interest in local foods will translate to a higher likelihood of using local foods; thus, we incorporated three dichotomous variables that reflect whether the food service, parents, and

students are “very interested” in local foods. Note that levels of parent interest and student interest are not obtained directly from parents or students, but from the food service director. However, it is likely that, if the food service responds to parents or students, all that matters is their perception of how interested parents and students are.

One budgetary factor likely to influence the use of local foods is the percent of students eligible for a free lunch. More students receiving free lunches means that fewer students are paying full price, and such schools have a smaller stream of revenue (per student) to fund lunch service. We hypothesize that median income in the county will have also an impact on the likelihood of local food usage. Recognizing that there is likely correlation between median income and percent of students eligible for free lunches, a multiplicative interaction term between the two variables was included. Another factor thought to be important is whether a school (or district) uses one vendor for more than half of their purchases, which we hypothesize will reduce the likelihood of buying local foods.

The final factor considered is the intensity of barriers to using local foods that each school perceives; to incorporate this information, a “barrier index” was created from the responses to questions about supply and business barriers. Each question allowed the respondent to indicate whether the proposed barrier was a “major barrier,” “moderate barrier,” or “not a barrier.” Each response of major barrier was awarded a score of 1, the response moderate barrier was 0.5, and not a barrier was assigned a value of 0. We summed up the responses to each barrier for each school, and considered this number as our barrier index.³ The barrier scores ranged from a low of 0.5 to a high of 17.5. The mean index was 7.6, with a standard deviation of 4.09.

³ Table 5 presents a measure for each factor, across all schools, and thus is a vector of factors. The barrier index used in the regression analysis is the sum across all barriers for each school, and thus is a vector of schools.

This measure provides a fairly comprehensive measure of a school's perception of how easily they can procure local food.

Technical difficulties with the data limited the scope of our analysis. For example, because we did not have any measure of the intensity of local food usage, we could not hold constant for different levels of usage or tease out differences between high, moderate and low local food usage schools. However, to the best of our knowledge, only one school district in the state has incorporated local foods into their regular menu. Beyond that, we have little understanding of the differences in levels of usage by schools. Limitations notwithstanding, we estimated a reasonable logistic model that predicts the likelihood of a school buying local food.

We estimate two models – one examines the likelihood of a school buying local food, while the other explores the likelihood of a school buying local food directly from a farmer. The first is: $\Pr(\text{school buying local food}) = F(\text{food service interest, parent interest, student interest, whether a school buys more than 50\% from one vendor, median county income, percent of students free lunch eligible, interaction between median income and percent free lunch eligible, and barrier index})$. The second model estimated is: $\Pr(\text{school buying local food directly from a farmer}) = F(\text{whether a school buys more than 50\% from one vendor})$.⁴ The results of the two models and some post regression diagnostics are shown in table 6. The table shows the estimated coefficients as odds ratios. For the first model, which estimates the odds of buying local food, the results show that not all are statistically significant. The factors that are significant at the 5 percent level are median county income, the percent eligible for free lunch, and the barrier index. Median county income, while statistically significant, barely has a measurable impact on the

⁴ Initially, we estimated model (2) using the same list of explanatory variable as the first model; the model's fit was extremely poor. However, one of our research goals is to identify the conditions under which a school will be more likely to buy directly from a farmer. Thus we estimated the model with just one explanatory variable, which actually provides us with a result that has policy implications.

odds of a school buying local food. The interest of the food service director is significant at the 10 percent level, and is the only statistically significant variable that increases the likelihood of using local food in lunches. The greater the percent of students eligible for free lunch, the less likely schools are to use local foods. Further, the results indicate that perceived barriers are important, and the odds of buying local foods are significantly lower for schools that perceive many barriers.

Fitting the model predicting the odds of buying directly from a farmer revealed that none of the variables that had a statistical effect on the odds of buying local food had any impact on buying from a farmer. The data suggest that the one factor with a statistical effect is whether the school procures more than half of its supply from one vendor; these schools are less likely to buy directly from a farmer. The logic behind this is that schools heavily reliant on one wholesaler typically have warehouses designed to receive large delivery trucks (e.g., 18 wheelers) and, as a result, discourage the delivery of produce from individual farmers in small vehicles such as pickup trucks. Currently, there are three school districts in Maryland with a large central warehouse. The result is included because this finding has implications for policy promoting the use of local foods in schools, which will be discussed later in the paper.

Post regression diagnostics shed further light into the statistical results. Note that Long (1997) argues that marginal effects are not appropriate when the independent variables are binary, and suggests using a measure of discrete change in such cases. A discrete change for a change in X of ε is calculated as $\Pr(Y = 1|X, X_k + \varepsilon) - \Pr(y=1|X, X_k)$ (*SPost* command *prchange*). The discrete changes will equal marginal changes when the changes in X_k are small, or when the changes in the independent variable occur in a roughly linear portion of the probability curve (Long 1997; Hallahan 2006) In this case, we estimated the change in probability of a school

buying local food as the independent variable increased from its minimum level to its maximum level.

Given that most economics literature reports marginal effects for dummy variables, we have included marginal effects in addition to the discrete changes for the binary and continuous variables. The two measures yield similar findings regarding the impact of food service interest on the probability of school purchases of local food. The marginal effect of food service interest is 0.15, and the change in predicted probabilities (holding other variables constant at their means) when moving from food service is not very interested (i.e., indicator variable = 0) to food service is very interested (i.e., indicator variable = 1) is 0.19. The impact of percent of students eligible for free lunches varies by the measure used: the marginal effect is -0.02, while the discrete change of going from the minimum (8 percent of students) to the maximum (64 percent of students) is -0.99. However, both indicate that as the percent of students eligible for free lunch increases, the probability of a school buying local food decreases. The impact of the barrier index is similar: the marginal effect is -0.03, and the discrete change is -0.81.

[table 6 here]

Interpreting the results so far suggests that two local factors are critical to successful use of local foods in schools in the state of Maryland: food service directors' interest in the idea of local foods and food service directors' perceptions of the barriers that make the process difficult. This finding suggests that (1) if the director is interested, and (2) the barriers can be reduced, schools in Maryland are open to the idea of serving local food in their cafeterias. From a national perspective, increasing the reimbursement rate for free and reduced price lunches would increase the likelihood of using of local food in Maryland schools.

Insights gained through interviews with food service directors

In order to gain deeper insight into local foods in Maryland schools, qualitative data were collected through interviews with food service directors on the phone and at the Future Harvest Conference (West Virginia, 2010). A member of the research team followed up with school food service directors who answered the survey and stated they were also willing to be interviewed. Fourteen interviews were conducted – seven with private schools and seven with public schools. The interview methodology followed standard protocols for qualitative data collection, and relied on an interview instrument that was developed by the research team in consultation with the Maryland State Department of Education. The questions covered topics such as interest in local foods, what schools need to increase their use of local food, whether schools have worked directly with farmers, and whether farmers wanting to sell their products have ever contacted the school. Note that response bias tilts the qualitative data towards local foods, since the research team contacted only those food service directors who (1) answered the survey and (2) indicated that they were willing to be contacted for an interview.

Those interviewed reveal a wide variation regarding interest in local food, as well as the feasibility of serving local food in schools. Most public school foodservice directors indicated some interest in local foods, yet the level varied widely. For example, many schools consider local food exclusively during “Maryland Homegrown Week,” while Baltimore City schools have already integrated local food into the school lunch program. For example, out of Baltimore City’s total budget of \$35 million, \$1.3 million was spent on local products, and all the fruits and vegetables served are produced in Maryland (Geraci, 2009). All of the private schools interviewed indicated interest in local foods, although this response is likely not representative of all private schools in Maryland. Several private schools work closely with farmers, while others have a preference for local and make extra efforts to procure local produce or meat. Most of the

private schools contract out their foodservice, and these firms tried to incorporate local foods in the menu. Directors from both public and private schools mentioned that the harvest season in Maryland is not completely in sync with the school year, but that issue became less of a concern after they began using local foods in the school.

Public school food service directors attending the Future Harvest conference (2010) reported a myriad of obstacles to using local foods, which differed across school districts. This is evident starting with delivery; large counties have one distribution site for deliveries, while smaller counties have numerous delivery locations. Thus, large counties buy large quantities of food, and have it delivered to one location. In many cases, because of the sheer volume they purchase, they seek to reduce transaction costs of procurement and of multiple deliveries and so will only accept deliveries from a distributor. However, they have inserted clauses into their purchasing contracts that encourage the purchase of local foods by distributors when economical. In contrast, smaller school districts often require small deliveries to multiple locations, and thus can receive deliveries directly from farmers or small distributors. Differences are apparent with food preparation, as well, with staff of some school districts well trained, while other districts struggle with language barriers and so are unable to effectively communicate with their staff.

Access to local food varies and is problematic for many schools. Not all distributors carry local products, and buying directly from farmers is not always feasible. Many schools require produce that has been cleaned, sliced, diced and prepped, and farmers are not always set up for this type of processing. Private schools face additional problems. Those operating their food service have problems, at times, finding farmers and distributors willing to sell small quantities, while those who have contracted out foodservice are unable to purchase directly from growers and must procure all food through the contractors' corporate headquarters. One example of

sourcing difficulties is readily explained by a food service director of a private school, who stops at a farmer's home in the morning, on his way to school, to pick up local apples. While he would prefer to have the product delivered to his school, the farmer is unwilling to deliver such a small quantity.

A final significant problem that private schools face is related to insurance. Maryland law requires that farms selling value added food (i.e., food that has been peeled, sliced, or prepped) carry product liability insurance. Private schools stated that farmers they do business with must have two million dollars in liability insurance; most farmers who sell at a local farmers market do not carry this type of insurance.

Local foods in lunches: the perspective of distributors

Just two distributors in Maryland granted interviews, and despite our efforts, other firms were unwilling to participate. Both distributors sell to schools in Maryland, and have a natural preference for local food because of lower freight and transportation costs associated with distribution. Most local foods are limited to fruit and vegetables, and for food that is "in season," prices are the same or lower for local food. Timing is an issue, as the height of the harvest season in Maryland occurs before the school year begins. The start of the school year is chaotic, as well, and so schools are not organized enough to make effective use of local foods right away. School needs vary by product, which can be easy for the distributor in the case of apples, grapes and strawberries, and harder for other products, such as nectarines and peaches.

Transportation of the food is a key problem for distributors, who would prefer that farmers deliver their products, although they are willing to make different arrangements. Volume is a related issue; the distributors require a fairly regular supply, such as 240 cases every three days, and not all farmers are able to meet their needs. For the local farmer-distributor

relationship to be effective, the distributor needs advance notice of products, which requires advance planning on the part of farmers.

Several factors would facilitate greater use of local food in schools. First, expanding school requirements from Maryland-grown food to regional food would broaden the supply and types of products available for school use. Next, developing local processing facilities would be helpful by providing canned or frozen food for year round use; right now, products are processed in Pennsylvania. One example would be pizza sauce made from Maryland tomatoes during the summer and fall, for use throughout the school year. Finally, farmers could form an entity, similar to a cooperative, so they can merge their supplies, consequently meeting the needs of the distributors and schools.

Local foods in lunches: the perspective of Maryland farmers

We hypothesized that farmers in Maryland would be open to the idea of local food in the schools, particularly those with \$500K or less in sales per annum. This group of farmers is broadly classified into two categories. The first, commercial small commercial farms with sales between 10K and 250K, has been shrinking. The share of small commercial farms in the state has fallen from 44% to 29.6% between 1982 and 2007 (USDA, NASS, 2008). Another fragile portion of the Maryland farm sector is made up of farms “in the middle,” which are those farms with sales between \$250K and \$500K. While the share of farms in the middle has remained roughly constant at about 4 percent, these farms are declining in number throughout the U.S. as the number of very small and very large farms rises (Hoppe et al, 2010). Farms in the middle are not tapped into the vertically integrated commodity system, and thus require alternate markets

(Kirschenmann et al, 2005). These two groups of farmers are those mostly likely to be interested in an additional outlet, such as supplying food to schools, either directly or through a distributor.

Gathering data to analyze Maryland farmers' interest in pursuing this new market proved to be difficult. Initially, we developed a survey instrument for a Maryland regional extension specialist to administer at grower meetings, but the growers were resistant to the idea of filling out the form. Instead, we opted to ask the survey questions to growers attending meetings, and record their responses. This data collection method, however, ruled out the feasibility of statistically analyzing their responses.

A member of the research team attended 3 grower meetings, located across the state, which were attended by 120 growers. The majority of the growers directly supplied retailers or sold to retailers through wholesalers. The idea of working with schools was met with mixed degrees of interest. Most farmers older than 68 years were not at all interested in the school markets. Most stated they would not be willing to get GAP (good agricultural practice) certified. Approximately 40 percent of the farmers indicated a willingness to test out the school markets. The farmers most interested in the prospect of supplying Maryland schools had farms sized between 1 and 100 acres. Schools were viewed as good outlets for products, particularly fruit, too small for their retail customers; typically farmers sold these seconds to processors. Schools like the smaller fruit because the portion-size was more appropriate for the students (Future Harvest, 2010).

The discussions illuminated several dominant themes. The first, and most critical, is that a workable distribution system would have to be developed. Two farmers had already worked with schools, and had made deliveries to multiple locations, which they did not like doing. Most growers thought that the best arrangement would have a central distribution point where they

could drop their products, with a distributor making the final deliveries to schools. About half of the farmers were willing to expand production, if they were certain that schools would buy the additional production. Pricing was an issue, as well, and the farmers wanted to receive retail prices if they sold to schools; otherwise, they would only be willing to sell seconds.

Communication was identified as another critical issue. Nearly everyone wanted additional information; more specifically, the phone number and name of one person in their county about the mechanics of the sale, the types of products wanted, and who to call if problems arise. Some producers had attempted to contact school districts, but had difficulty establishing contact with the food service buyers.

While some farmers appear interested in the school market, the distribution channels are currently unable to facilitate these sales. The farmer discussions point to several serious impediments. First, the farmers seek retail, not wholesale prices, but at the same time are not interested in delivering directly to schools. Second, the farmers are not interested in sending much of their current production into the school system; in fact, one farmer specifically thought schools would be a good outlet for over abundant products. Third, given that so few farmers were experienced in this type of sale, there would likely be an adjustment period as they learned to navigate the new market. That said, there seems to be enough farmer optimism regarding this potential new market, and so these problems could likely be addressed.

Policy implications/discussion

The research has yielded results that can potentially inform federal and state policies regarding local foods in schools. First, school interest in serving local food does seem to exceed farmer interest in providing local food to schools; however, it is possible that farmers will become more interested after some have successful experiences in this market. If policymakers

are interested in expanding school use of local foods, policies encouraging farmers to increase the supply of local food for school markets may be warranted.

Several barriers to serving local food in Maryland schools were identified. The first is a socioeconomic barrier: schools with a higher percentage of free lunch eligible students were less likely to use local foods. This has short and long run implications. In the short run, the food service director faces variable and fixed costs. As a result, the additional free lunch students reduces the fixed cost deficit faced by many school systems, potentially freeing up funds, which can be used to purchase local foods. In the long run, however, because all costs are variable, the ability of the food service director to purchase local foods is limited if federal reimbursement is less than the full cost of meals, especially if the local food is more expensive or perceived to be more expensive. Thus the costs of local food (either cost of the food or the higher costs associated with procurement, processing, and preparing) can be more easily borne by schools with fewer free lunch eligible students. This suggests that the relationship between free and reduced lunches and the ability to incorporate local food into the school lunch menu deserves additional research.

Next, the analysis points to a scale barrier: schools that buy more than half of their products from one vendor were less likely to buy directly from farmers. New distribution channels may have the potential to broaden the availability of local food for school use. For example, as several farmers suggested, the establishment of a drop-off point for farmers would make it possible for a distributor to collect a large quantity of Maryland products at one time. This would both reduce farmer cost (i.e., those who currently drive around to several schools would no longer have to do so) and increase the size of the school market. These two factors might result in increased farm production to meet the demand for local food. Aggregating supply

from small growers would also enhance the ability of smaller school systems to purchase local food directly from farmers. A centralized facility where fruits and vegetables could be partially processed would also increase sales to schools already facing labor shortages. These ideas are supported by experiences through the U.S. regarding scaling up through aggregation and distribution centers for local food (Day-Farnsworth et al., 2009) and in Minnesota for partial processing of local fruits and vegetables (Berkenkamp, 2006).

The study also suggests that the greater the barriers a school food service buyer perceives, the less likely will local foods be served in her school. The types of barriers identified differ for public and private schools. Public schools have greater awareness of the possibilities for local foods in their schools, yet have significant financial constraints. Private schools, in contrast, have a smaller base of knowledge, but also face budget constraints. Schools could address these issues by (1) contracting with farmers in advance, so they can bypass the spot markets; (2) relying on a central drop-off and distribution site, or even a local auction; and (3) processing foods, or contract out processing, during the height of the season (i.e., summer) and store for use throughout the year.

A role for Maryland cooperative extension is clear. Some suggestions are as simple as information provision. Understanding how local foods can work in a school setting can be enhanced by providing information about products demanded by schools to farmers, and information about product availability by season and producer to schools. Such lists of buyer and seller names would reduce search costs for both sides. A similar need has been identified in Minnesota (Berkenkamp, 2006). More elaborate solutions might include Maryland extension lending expertise towards the development of new distribution channels in the states, via a central drop off location.

These research findings not only add to the body of knowledge in our profession regarding local foods and school use of food, they also provide new findings for several stakeholder groups: Maryland extension, in their role as supporters of small and medium farms in the state; the Maryland State Department of Education, in their role working with schools on their lunch programs; and state and federal policymakers, creators of unfunded farm to school programs, who may have visions about how to modify current legislation so that schools can better incorporate local foods into their lunch programs.

Appendix: Summary of the Survey Methods Collection

The survey of *public school K-12 food service directors* was developed by researchers from the University of Maryland, Penn State University, and USDA's ERS. The survey included over 30 questions to study the current use of local foods in public schools, the level of stakeholder interest, whether schools procured directly from local farmers, interest in procuring local foods in the future (as well what types of agricultural products they were interested in procuring), barriers to using local foods in school meals, and perceptions of the effectiveness of the Maryland Farm to School legislation. Some basic characteristics of the food service operation were also collected.

The survey was implemented in late 2009 and early 2010. The list of 24 County and Baltimore City directors was obtained from Maryland State Department of Education. Because the vast majority of Maryland counties and Baltimore City procure agricultural and food products and then process and cook those products at a central location, distributing the school meals to each school, we targeted the food service directors as having the most knowledge about the use of local foods in school meals.

The survey was conducted via Survey Monkey over a two month period from December, 2009 through January 2010. Food service directors received a pre-notification letter, the invitation to take part in the survey, and approximately 2 follow-up emails. In some cases, personal contact via telephone was also made. Three-quarters (18 out of 24) directors responded to the survey. One director was excluded from responding due to county rules governing surveys of staff

The survey of *private school K-12 food service directors/principals* was developed by researchers from the University of Maryland, Penn State University, and USDA's ERS. The

survey included over 45 questions to study the current use of local foods in private schools, the level of stakeholder interest, whether schools procured directly from local farmers, interest in procuring local foods in the future (as well what types of agricultural products they were interested in procuring), barriers to using local foods in school meals, and perceptions of the effectiveness of the Maryland Farm to School legislation. Basic characteristics of the food service operation and school were also collected

The survey was implemented in early 2010. Less was known about the private schools than the public schools. A list of over 310 schools with over 150 students (assumptions were made by the researchers as to the minimal student enrollment for the presence of food service) was developed using lists of schools from the Maryland State Department of Education and various online resources. Researchers did not have access to food service director names, so the survey was directed to the school's food service director or the principal.

The survey was conducted via Survey Monkey over a two month period from late January through March, 2010. Food service directors/principals received a pre-notification letter and letter invitation to take part in the survey via mail (with a link to the online site), and 2 follow-up postcards. Incentives were included in the survey; respondents who completed the survey were entered in a raffle for 1 of 2 \$50 gift certificates. Of the valid addresses/schools, 50 valid surveys were completed, resulting in a 17 percent return rate. Although the letters and survey encouraged schools without kitchens and food service to complete the survey (they were directed through a different set of questions about local food and food service), we can assume that a good deal of non-respondents were from the group of schools that may not provide food service to their students for various reasons.

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Table 1. Revenues from complete school lunches in Maryland

Lunch subsidies	Free lunch	Reduced price	Full price
	<i>-per lunch -</i>		
Federal share	\$2.68	\$2.28	\$0.25
Maryland share	0.01	0.01	0.01
Family cash outlay	0.00	0.40	1.80 – 3.00
Total revenue	2.69	2.69	2.06-3.26

Notes: The state share is an imputed amount, based on state contributions. The full price for lunches varies by school district across Maryland. The reimbursement rates are set annually by the Food and Nutrition Services of the USDA. These rates are for the 2009-2010 school year, and apply to schools located in the continuous states with less than 60 percent free lunch eligible students. Reimbursement rates are \$0.02 higher in each category for schools with 60 percent or more students eligible for free lunches.

Source: personal communication, S. Eidel (Maryland State Department of Education), 2010; Federal Register, 2009.

Table 2: Breakdown of school lunch service costs in Maryland

Cost for:	Share of expenses
Food	34
Labor	37
Administrative	16
Indirect	4
Utilities/maintenance	6
Other	3

Notes: Average percentages for Maryland. Food costs vary among school districts depending on the number of free and reduced lunches, labor costs vary depending on benefits paid or not paid to cafeteria workers, and many schools have different arrangements for indirect and utilities/maintenance expenses.

Source: Personal communication with S. Eidel (Maryland State Department of Education), April 8, 2010.

Table 3. Descriptive statistics of select survey responses

Variable	Public school	Private school
	<i>percent (standard deviation)</i>	
Bought local food in 2008	94 (24)	48 (51)
Bought direct from farmer	35 (49)	35 (48)
Food service “very interested” in local food	59 (51)	51 (51)
Parents “very interested” in local food	24 (44)	54 (51)
Students “very interested” in local foods	12 (33)	25 (44)
Primary vendor offers local food	76 (44)	44 (50)
Buys more than half of supply needs from one vendor	89 (32)	70 (46)
Very interested in buying local from farmer in future	47 (51)	48 (51)
Very interested in buying local from distributor in future	82 (39)	50 (51)

Table 4. Perceived major obstacles to schools for increasing local food usage

Type of Obstacle	Public school	Private school	All schools
	<i>percent</i>		
<i>Supply factors</i>			
Seasonal availability	73	34	46
Lack of local supply	50	34	33
Developing relationships with farmers	20	26	24
Distributor does not offer local	13	36	27
Pricing of local foods	18	32	27
Consistent product quality	25	19	21
Lack of partially processed products	32	18	22
<i>Business factors</i>			
Delivery considerations	35	32	33
Menu planning	50	18	12
Extra staff time needed to prepare fresh food	38	26	30
Lack of information about where and when local foods are available	7	45	33

Note: The perceived major barriers in this table consider each barrier across all respondents.

Table 5. Obstacles towards increasing local food usage: weighted school perceptions

Obstacle	Score	Standard Deviation
Seasonal availability	31.0	0.42
Delivery considerations	25.5	0.23
Pricing	25.5	0.27
Liability (farmer compliance with food safety standards)	25.0	0.31
Lack of local supply	24.0	0.26
Extra staff time needed to prepare fresh food	22.5	0.42
Lack of partially processed products	22.5	0.37
Product quality	22.5	0.34
Developing relationships with farmers	22.0	0.40
Consistent product quality	21.0	0.39
Lack of information about where and when local foods are available	20.5	0.41

Note: The score represents the sum of the weighted measures for each factor, across all schools.

Table 6. Results of logistic regressions: (1) buying local food and (2) buying from a farmer

<i>Dependent variable: buys local</i>	Odds Ratio (standard error)	Marginal effects	Discrete change
Buys at least 50% from one vendor	0.79 (1.02)	-0.01	-0.01
Median county income	1.00* (0.00)	-0.00	-0.99
Median income*free lunch (interaction term)	1.00 (0.00)	0.00	0.31
% eligible for free lunch	0.71* (0.12)	-0.02	-0.99
Barrier index	0.66* (0.13)	-0.03	-0.81
Food service interest	9.17** (11.69)	0.15	0.19
Parent interest	1.56 (2.23)	0.03	0.03
Student interest	2.24 (3.33)	0.05	0.05
Pseudo r ² = 47%			
Number of observations 45			
LR chi ² (8) = 23.76			
Prob > chi ² = 0.0025			
<i>Dependent variable: buys from farmer</i>			
Buys at least 50% from one vendor**	0.24 (0.20)	-0.33	-0.33
Pseudo r ² = 6%			
Number of observations 36			
LR chi ² (1) = 3.00			
Prob > chi ² = 0.08			

Notes: * indicates significance at the 5 percent level; ** indicates significance at the 10 percent level. Discrete change is measured as difference in probability of buying local food (model 1) or directly from farmer (model 2) as the variable moves from the lowest to highest possible values, with other variables measured at the mean. Marginal effects are calculated with other variables measured at their mean.