Economic Contribution and Potential Impact of Schools Purchase of Local Foods in Vermont

FINAL REPORT

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Prepared for the Vermont Farm to School Network's
Economic Value Working Team

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ABOUT THE CENTER FOR RURAL STUDIES

The Center for Rural Studies (CRS) is a nonprofit, fee-for-service research organization that addresses social, economic, and resource-based problems of rural people and communities. Based in the College of Agriculture and Life Sciences at the University of Vermont (UVM), CRS provides consulting and research services in Vermont, the United States, and abroad. The research areas are divided into five main areas: Agriculture, Human Services and Education, Program Evaluation, Rural Community and Economic Development, and Vermont Community Data. The mission of CRS is to promote the dissemination of information through teaching, consulting, research, and community outreach. Primary emphasis is placed upon activities that contribute to the search for solutions and alternatives to rural problems and related issues. Bringing decades of experience to its work, CRS recognizes that answers to critical and timely questions often lie within a community or organization.

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The **Center for Rural Studies** completed this study in conjunction with the Vermont Farm to School Network **Economic Value Working Team**. Organizations represented on this team contributed to the completeness of this report.

The Vermont Community Foundation is committed to building philanthropic resources that will sustain healthy and vital Vermont communities now and into the future.

The UVM Center for Sustainable Agriculture advances sustainable food and farming systems through the cultivation of partnership, support of innovative research and practices, and assessment of policy impacts.

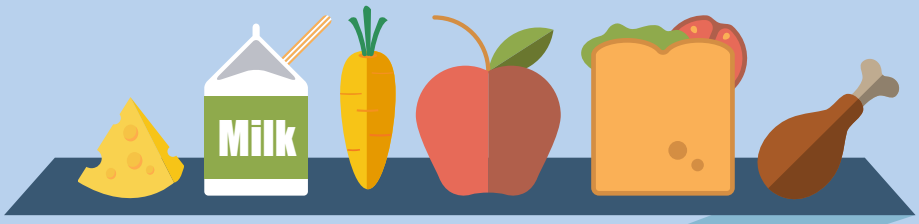
The Vermont Agency of Agriculture, Food and Markets facilitates, supports and encourages the growth and viability of agriculture in Vermont while protecting the working landscape, human health, animal health, plant health, consumers and the environment.

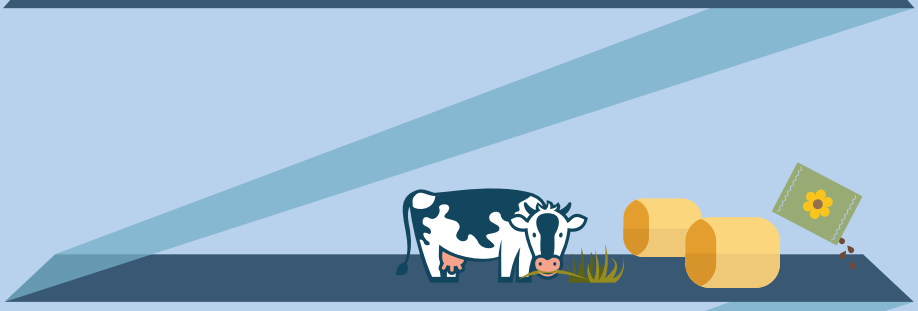
Vermont Food Education Every Day (VT FEED)—a program managed by Northeast Organic Farming Association of Vermont and Shelburne Farms—raises awareness about healthy food, good nutrition, and the role of Vermont farms and farmers in helping sustain a healthy community.

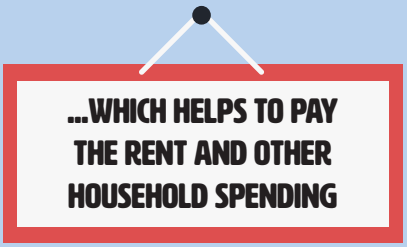
Farm to Plate is Vermont's statewide food system plan to strengthen the working landscape, improve the profitability of farms and food enterprises, maintain environmental resilience, and increase local food access for all Vermonters.

What happens when Vermont schools buy local food?

VERMONT SCHOOLS SPENT $915,000 ON LOCAL FOOD IN 2014







ADDED TOGETHER, LOCAL FOOD PURCHASES BY SCHOOLS CONTRIBUTED $1.4 MILLION TO VERMONT'S ECONOMY!

EXECUTIVE SUMMARY

In 2015, the Vermont Farm to School (FTS) Network's Economic Value Working Team partnered with the Center for Rural Studies (CRS) and the Department of Community Development and Applied Economics (CDAE) at the University of Vermont (UVM) to measure the economic contribution and impacts of FTS in Vermont. The dollar value of local food purchased by Vermont schools had never been quantified before, and the team was interested in understanding the current contribution of local purchasing as well as the estimated impact of several proposals.

To ensure that the results of the study were grounded in past research, an extensive review of the literature was conducted and a number of economic impact studies conducted in other states and regions were identified, most of which demonstrated that increasing local food purchasing by schools had a minimal effect on the broader economy. In some cases this was due to estimating the impact of a change in a small portion of the state on the whole state's economy. For other studies, including this one, increases in local purchasing were assumed to be shifted from non-local purchases (rather than new purchases), implying some loss of business for wholesalers.

This report also considers research on the potential effect of increased fruit and vegetable consumption and FTS programs on childrens' health, nutrition, and education, though much of this literature was speculative and less conclusive than the economic studies. Lastly, the research on the impact of "universal" school meals was reviewed. While this research is largely optimistic as to impact, most of it is based on pilot implementations of universal meals with gaps in data such as actual administrative savings, cost of implementation, and cost to the taxpayers.

This study of the economic contribution of local food purchasing by schools in Vermont demonstrated a small but measurable impact on the Vermont economy. It should be noted that the estimate of 5.6% of school food purchased from local sources is comparable to the recent estimate of 6.9% of food consumed in Vermont from local sources. Public K-12 schools face unique pressures on their food purchase decisions, as they must balance the National School Lunch Program regulations and the federal reimbursement for lunches provided. Increases in demand for local food is likely to result in higher prices, at least until the supply of local food increases to meet demand.

The IMPLAN input-output model was used to estimate the contribution and impact of school's local purchasing. IMPLAN can be used to assess the size of an economy or economic sector, as well as estimate the impact of a proposed change in the economy. The scenarios of potential impact (Scenario 1, 2a and 2b) show modest increases in the direct, indirect and induced effects to the Vermont economy. For comparison purposes, the scenario of no local purchases (Scenario 3) was provided and yielded a negative multiplier, as expected.

One outcome of this research is to put the Vermont Farm to School Network goal into context in Scenario 1. With 5.6% of school food puchases being local based on 2014 data and the goal of 50% by 2025, Scenario 1 provides an estimate of the impact of moving toward that goal by doubling the current spending to 11.2%. Stakeholders can now plan accordingly to meet that goal. In addition, this study concludes that for every additional job that directly supports food production in Vermont, an additional 1.3 jobs are created. If local purchasing doubles as a percentage to 11.2% of school food spending, the

jobs multiplier associated with school local food purchases remains the same but the total number of jobs increases from 7.3 to 10.5.

Scenarios 2a and 2b both looked at the impact of universal school meals on the Vermont economy. While the economic benefit was very small, it appears that at least the costs of the programming would be overcome through economic impact.

In conclusion, while the impact of schools' purchase of local foods may be a small contribution to the overall Vermont economy, the predictability of the school market provides a foundation upon which Vermont producers can reliably expect a market for their products. Further, this research has documented the opportunity for increasing local purchasing by schools in Vermont.

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INTRODUCTION

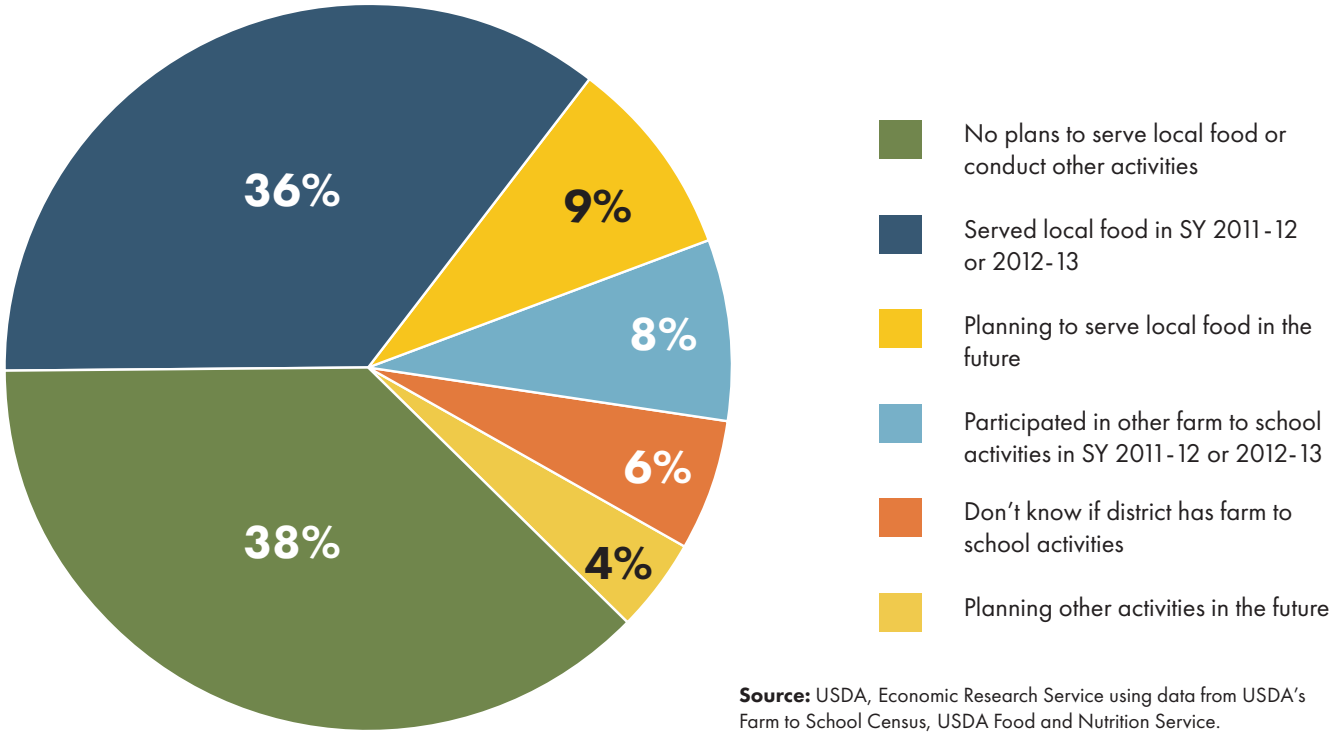
In 2015, the Vermont Farm to School (FTS) Network's Economic Value Working Team partnered with the Center for Rural Studies (CRS) and the Department of Community Development and Applied Economics (CDAE) at the University of Vermont (UVM) to measure the economic contribution and impacts of FTS in Vermont. In this report, we first present a review of the literature, which includes the current scope of FTS in the U.S. and impact of FTS programs on the economy, student nutrition and health, education and student engagement, school food service programs, and food access. We then present the economic contribution and potential economic impact of FTS programs in Vermont through five scenarios, using the input-output model IMPLAN. In the last section we discuss the results and discuss the implications of our findings.

REVIEW OF THE LITERATURE

Current Scope of FTS in the U.S.

The number of FTS programs in the United States has been increasing steadily over the last 20 years. Harris et al. (2012) reported that 2,300 school districts had some sort of FTS programming, up from just two in 1996. The graph below shows that, as of the 2011-2012 school year, at least 3,700 school districts (36% of U.S. school districts) had FTS programming in place.

Thirty-six Percent of U.S. School Districts Reported Serving Local Foods in School Years 2011-2012 or 2012-2013



Source: USDA, Economic Research Service using data from USDA's Farm to School Census, USDA Food and Nutrition Service.

The percentage of school districts implementing FTS programs varies by state. FTS is most prevalent along the east coast, particularly the Northeast, the West coast, and the Upper Midwest (USDA 2015). Purchasing from distributor channels is the most common source of food for school districts implementing FTS programs, whilethe second most prevalent procurement method is direct purchasing from producers. The majority of school districts source food for their FTS programs from multiple channels (USDA 2015).

FTS programming has the potential to address a variety of desirable outcomes. First, its focus on locally and regionally produced foods can impact the local economy. Second, better food service skills, better quality ingredients, and student connections to producers may result in students demonstrating healthier food choice behavior. Third, it can positively impact food service professionals through professional development. Fourth, it may lead to better (nutrition?) educational outcomes for students by providing unique ways to interact with the curriculum. The literature reviewed below demonstrates the available evidence for each of these areas.

The Economic Impact of FTS Programs

This section reviews studies that have assessed the economic impact of FTS programs including the methods used and the results. Table 1, at the end of the section, compares and contrasts the studies presented in this literature review. All of the economic impact studies that we identified used IMPLAN to assess the effect of local food purchases associated with FTS programs. IMPLAN is an input-output analysis model that can be used to assess the size of an economy or economic sector, as well as estimate the impact of a proposed change in the economy.

A detailed explanation of economic impact modelling and IMPLAN is available in the literature review.

IMPACT OF FTS ON THE ECONOMY

Several studies have studied the economic impact studies of FTS programs with varying levels of details, assumptions and model customization. In 2009 and 2010, a Minnesota team modeled the impact of different levels of involvement in FTS programs by schools, from little involvement, where all schools in Minnesota incorporate a local food product in a meal once a month, to greater involvement, with Minnesota schools sourcing as much local food as is available (Haynes, 2009; Tuck et al., 2010). This team used data from three school districts and 11 farmers to build the scenarios. They accounted for loss of wholesale business when demand shifted from wholesalers to farmers, as well asincreased food costs passed along to households due to schools paying an increased price for farm and intermediate price scenarios. The Minnesota study was to our knowledge the first in which the agricultural sectors were customized in IMPLAN to better match FTS farmers. The team found that increasing the amount of local food in Minnesota school food programs leads to between a .47 and .58% increase in the total annual food budget for low-involvement schools, and between a 7.6 and11.3% increase in the total annual food budget for high-involvement schools. They also found that based on regional production and student preferences, schools should be able to source 13 types of food locally. This study provides an excellent means of assessing the impact of various levels of local food purchasing on total school food program budgets. A valuable takeaway from this study is the wide

range of percent increases depending on how much food is purchased locally. At the lowest level of purchasing the increase is less than 1%, and at the highest level the increase is around 10%. A relatively large positive direct effect, but small and negative induced effects were found. This is due to the fact that the study accounted for price increases funded through taxes, leading to a reduction in disposable income for households. However, as a whole the total effect is greater than the direct effect, indicating economic growth.

In Oregon, Kane et al. (2010) set out to model the impact of spending an additional $0.07 per school meal to buy local food in two school districts, based on the premise of a proposed state law. Unlikeother studies that assume local food purchases are substituted from existing non-local food purchases, Kane et al. (2010) assumed new spending. Through a grant, the two school districts purchased $160,000 in local food; the study assumes that this grant led to an additional $461,000 in local food purchases by these school districts. In total, Kane et al. (2010) calculated the economic contribution of $1.6 million local food purchases and found a total impact of $2.1 million, and a multiplier of 1.86. The local purchases that Kane et al. (2010) chose to account for did not include milk and butter, which at the time represented 43% of local food purchase (these purchases were already made and they assumed that they would not spur additional economic activity.) Kane et al. (2010) conclude that local fruits and vegetables require more labor to prepare than non-local fruits and vegetables, which are usually purchased processed. Based on their model, they estimate that between $.07 and $.15 per meal would be the optimum amount required as a minimum incentive for schools to switch from current purchasing channels to local foods. However, it is important to note that further analysis is required to fully assess the impact of such a law, as it does not account for how the law would be funded. If the law was to be funded through tax revenues, it would impact households' disposable income, thus reducing the induced effect.

In Colorado, Gunter (2011) also used IMPLAN to model three FTS scenarios: 1.) no additional money is spent on local food, 2.) purchases shift from one area to another, and 3.) purchases shift from the wholesale sector to direct purchases from producers. This modelling approach is the most complex of the studies that we identified on the economic impact of FTS programs. To understand current spending patterns and potential shifts, Gunter interviewed producers, extension agents, and institutional buyers. To modify the agricultural sector in IMPLAN to better represent the Colorado FTS agricultural sectors, she used USDA expenditure data. Gunter (2011) posits that based on the results, local farmers will spend more in their community than a wholesaler based in another community, but purchasing only shifts from one sector to another and the amount of money spent is not fundamentally changed. She concludes that with FTS purchases, the direct benefit is small to negligible; because of this shift, money spent by a local farmer circulates in the local economy rather than leaking out.

A 2014 Minnesota study assessed the potential farm to institution (FTI) market in two areas to provide meals in all schools and hospitals daily (Pesch, 2014). This study estimated direct economic effect by assuming a switch from the wholesaler at 75% to producer at 100%. This means that if schools bought $100,000 directly from local producers, this caused a $75,000 decrease in purchases from wholesalers for a net economic output increase of $25,000. A novel approach was to model the impact of schools' food purchases with the standard growing season and extended growing season. Pesch argues that season extension techniques, including high and low tunnels, cold frames, and post-harvest

storage increases the FTS educational market from $725,000 to $1.36M, and the FTI healthcare market from $2.55M to $2.97M. The relative effect is greater for schools because schools are generally out of session during the prime growing season, and thus these technologies will greatly assist farmers in meeting school demand.

In Florida, Kluson (2012) used a slightly different approach than other researchers. Instead of using school purchasing data, he used sales data from farmers who sold to local schools within a county. Kluson (2012) found that the multiplier for vegetable sales was higher than the multiplier for dairy sales. This implies that a greater economic impact would be achieve by purchasing more vegetables.

Table 1 summarizes the studies presented in this literature review, including scenarios, assumptions, modelling specification, and multipliers. Multipliers allow for some measure of comparison across studies, though it is important to note that direct comparisons are not recommended as the studies were conducted in various geographical areas of different sizes and with varying economic structures. The minimum a multiplier can be is 1.0, which indicates that every dollar spent locally generates no additional economic activity.

The sales multipliers varied from 1.03 in the 2010 Minnesota study to 2.4 in the Florida study. The employment multiplierranged from 0.49 in the 2014 Minnesota study to 3.3 in the Colorado study. This range of results can be partially attributed to customization of IMPLAN sectors, accounting for loss of sales by the wholesaler sector when more food is purchased directly from farmers, and considering that local food purchases are not additionall purchases but a shift in purchases.

A recent report by Meter and Goldenberg (2015) echo previous assessments on economic impact studies. When conducting economic impact studies, it is important to consider the structure of the economy under study. Researchers have found that IMPLAN does not fully capture the impacts of smaller, diversified farms and other small-to-medium scale operations that frequently participate in the localized food system (Lazarus, Platas, & Morse, 2002; Schmit, Todd, Jablonski, & Kay, 2013; Swenson, Dave, 2011). These researchers have found that farmers selling to local and regional markets, as well as smaller-scale farmers, tend to not only spend more money locally, but spent it differently than how it is assumed in IMPLAN. Therefore they may actually have a higher multiplier and greater impact than is assumed. Unfortunately, the data necessary to customize the agricultural sector in IMPLAN is complex and requires the use of secondary and primary data on spending and sales patterns of those farmers (Gunter, 2011; Schmit et al., 2013).

Considering the impact that sales to schools might have on farmers and their revenue, Izumi et al. (2010) as well as Conner et al. (2011) found that sales to schools came from a small percentage (1-4%) of farmers' overall sales. The primary benefits of FTS sales for farmers are market diversification (adding markets, having an outlet for small, visually imperfect, or otherwise unsold produce) and generating social benefits (embeddedness of farmers into the community, social networks leading to benefits such as shared transport for nearby schools arranged by employees). This is further corroborated by Joshi, Azuma, Feenstra (2008), who conclude that for most farmers, income from FTS is modest and generally less than 5% of total sales. In addition, the supply chain network for getting food to school children is complex. Conner et al.'s (2011) network map depicts the diverse actors, institutions, and relationships throughout the broader school food procurement system that affect the

Table 1. Summary of Identified FTS Economic Impact Studies

Study	Scenarios	Final Model Assumptions and Model Customization	Multipliers
Haynes (2009), Tuck et al. (2010) Minnesota	3 utilization scenarios (special meal, unprocessed substitution & sub all) and 3 pricing scenarios (farm, school & intermediate)	-shift from wholesale to ag sector -shift from non-local purchases to local -increased food costs paid through taxes -customized agricultural sector in IMPLAN	Sales = 1.03 - 1.25*
Kane et al., 2010 Oregon	Scenarios based on current purchases in 2 school districts and additional $0.07 spent on local food. Excluded fluid milk and butter purchases.	-some of the local food purchases are new -other assumptions and modelling customization not specified	Sales = 1.86 Value-added = 2.82 Jobs = 2.43
Gunter, 2011 Colorado	Scenario 1 = local impact, new demand and no shift from wholesale to agricultural sector Scenario 2 = regional impact, new demand and no shift from wholesale to agricultural sector Scenario 3 = regional impact, demand shift from wholesale to agricultural sector Scenario 4 = regional impact, demand shift from wholesale to agricultural sector and customized IMPLAN	-shift from wholesale to ag sector -shift from non-local purchases to local -customized agricultural sector in IMPLAN	Sales = 1.47-1.63 Employment = 1.27 – 3.30 (much lower when using custom FTS sectors) Labor income = 1.32-1.43
Kluson, 2012 Florida	Multi-county region around Sarasota, FL with 9 local farms	Assumptions and model customization not specified.	Sales = 2.4 for produce and 1.84 for dairy
Pesch, 2014 Minnesota	Scenario 1 = Standard growing season Scenario 2 = Extended growing season including high and low tunnels, cold frames, and crop storage	-shift from wholesale to agriculture -growing season is extended -shift from non-local purchases to local	Output = 1.7 - 2.19* Employment = -0.49 - 1.47* Jobs = 1.58 - 3.0*

***calculation made by authors.**

functioning of a typical FTS program, demonstrating the complexities of estimating the effects of any one change in the system.

Last, Rosenberg (2014) depicts a virtuous cycle in which more local food increases school meal participation, allowing schools to leverage more federal dollars and ultimately increase budgets for food, allowing more local products to be purchased. FTS is presented as a means to enhance nutrition and eco-literacy education, and that programs with a parental component resulted in positive changes in parental behavior and attitudes toward healthy food. These other outcomes of FTS are presented in the following section.

Impact of FTS on Student Nutrition and Health

When asked about the value of FTS programming for Vermont, many stakeholders focused on the nutritional and health benefits of better school meals. At the broadest level, through better nutritional outcomes, FTS could affect childhood obesity on the one hand and access to food (hunger prevention) on the other.

The challenge of obesity in general-and childhood obesity more specifically- has been well documented. Persistence of obesity from childhood into adulthood has consequences including cardiovascular disease, diabetes, stroke long-term morbidity, and premature mortality (Must & Strauss, 1999; Reilly & Kelly, 2010). Obesity lowers life expectancy and quality of life, and adds health care expense. Childood obesity is not only a health concern, but comes with an economic cost. Finkelstein et al. (2014) found the incremental difference in lifetime medical costs for an obese child and normal weight child to range between $12,000 and $39,000 depending on the data and methodologies. At the aggregate level, they calculated that obese 10 year-olds represent $14 billion in incremental healthcare costs, which represents twice the annual budget for the Head Start Program in 2012. Ma & Frick (2011) found that spending between $1.4 billion and $1.7 billion for each birth cohort would break even if the intervention achieved a 1% point reduction in obesity among children. This represents between $280 and $339 per child for each 1% reduction in obesity. If the intervention was targeted at obese children, the spending threshold could be as high as between $1,648 and $2,735 for each 1% point reduction in obesity. While Vermont tends to have lower rates of obesity than the rest of the U.S., it follows the nation's upward trend. The obesity rate of high school students in Vermont is 14th highest in the nation, suggesting that the rising rate of adult obesity is at least a partial result of a maturing population of obese children and adolescents (Trust for America's Health, 2014).

Just as there is an economic cost to childhood obesity, research has shown that there is an economic benefit to better child nutrition and health. Karnik and Kanekar (2012) performed a review of published articles between 1999-2011 related to public health and school food programs, and concluded that school meals can provide healthy food and a balanced diet.Coupled with classroom education, this can make students more self-aware of their energy balance.

Better child health and nutrition has been an expected outcome of FTS programming. Though the research is limited, several studies have explored the relationship between child health and FTS. Joshi, Azuma, Feenstra (2008) reviewed 53 articles and reports on FTS studies. Out of 11 studies that looked

at the impact of FTS on dietary intake, 15 found that dietary intake was improved when students were served more fruits and vegetables. Additionally, three of these studies reported improved behavioral items, including self-esteem, money-saving, social skills, responsible behavior, and improved work ethic. One of these studies reported no changes in dietary behavior from FTS, and another study examined BMI and found no significant changes after one year. Only three studies examined parental behavior change, and they indicated a slight increase in parental encouragement of healthy snacking, and a 90% rate of self-reported positive changes in healthy grocery shopping, cooking at home, and conversations with kids about healthy food. However, Joshi, Azuma & Feenstra (2008) acknowledged that the extent of data driven research is still very small. Much of the available research cited results from those responsible for instilling and promoting FTS, potentially biasing results. Further, most studies did not include a control group and few included statistical analysis.

While the most frequent impact of FTS is an increase in fresh fruit and vegetable consumption, other studies have highlighted other impacts such as an increase in student knowledge of growing cycles and seasons, food systems, and healthy foods,; increased gardening skills/experiential education opportunities; and an increase in student lunch participation (Aftosmes, 2011; Izumi, et al., 2010; Kolodinsky, Goldstein & Roche 2011; Ridgeway, 2007). Buckwalter (2011) concluded that an increase in the number of years of FTS programming results in a significant increase in the probability that a student met the dietary guidelines recommendations. Conversely, Evans et al. (2012) found increases in fruit and vegetable consumption to be minimal.

Studies have looked at an increase in fruit and vegetable consumption by children beyond the context of FTS program. Kipping et al., 2014 found no significant differences between a control group and an intervention to promote physical activity and fruit and vegetable consumption, whereas significant changes were found in secondary outcomes, such as less screen time and consumption of fewer snacks and high-energy drinks. Fung et al. (2012) found higher intakes of fruits and vegetables, lower total caloric intakes, and increased physical activity. Epstein et al. (2001) examined the effect of parent-focused interventions on families with at least one obese parent by comparing the results of two types of interventions: 1.) promoting increased fruit and vegetable consumption and, 2.) decreasing consumption of foods high in fat and sugar. The study found that the intervention promoting more fruit and vegetables consumption led to significantly greater reductions in percent overweight, and that parents also consumed fewer high fat and sugar calories as a result of switching to more fruits and vegetables. Qian et al. (2013) made the first attempt to evaluate the impact of Fresh Fruit and Vegetable Program (FFVP) on obesity and they concluded that, holding all other conditions constant,, FFVPs can reduce BMI percentile by 4 percent. FFVP could be a cost efficient measure to reduce obesity, as the cost for participation per student is between $50 and $75 per year.

Overall, very little research has been published connecting FTS to increased fruit and vegetable consumption or childhood obesity. However, many suggest that FTS programming could increase the amount of fruits and vegetables consumed by school children, which would have a significant impact on children's health. It could also have economic implications, primarily in the form of reduced healthcare expenditures.

Impact of FTS on Education and Student Engagement

Another area that Vermont stakeholders have described as an important outcome of FTS is student education. Some studies have looked at the impact of FTS programs and education and student engagement. Snelling (2013) studied the impact of elective health courses on students in 6th through 8th grade and found that it led to an increase in knowledge of fruit and vegetable consumption, an increase in physical activity, and an increase in academic scores. Along similar lines, Ozer (2007) developed a framework to assess the direct and indirect effects of school gardens. School gardens have been seen as a relatively low cost strategy for improving health and educational outcomes for schools that struggle with obesity, low educational achievement, and limited parental involvement. Ozer (2007) frames the direct effects as the garden lessons that can be directly tied to the curriculum, such as science, math, social studies classes, etc. He suggests that indirect effects include school engagement, student bonding, nutrition, and parental engagement. Additionally Ozer (2007) notes that garden learning provides an opportunity for students who struggle in conventional classroom settings to "shine" in light of the different skill sets required to be successful.

Additionally, extensive research has been performed to assess the outcomes of sustainability curricula. Based on a meta-analysis of 48 articles that assessed sustainability curricula, 83% of the studies found positive impacts on direct academic outcomes, 15% showed no impact, and 2% negative impact. Eighty percent of the studies found positive impact on nutrition attitudes and 83% on healthy eating behavior. Other positive impacts were found relating to self concept, motivation, life skills, and environmental attitudes. Other sustainability curricula includes increased student engagement, awareness of environmental impact, enthusiasm about recycling, composting, and gardening (Aitken, 2011; Bamford, 2015; Block et al., 2012; Ganswindt, 2008).

Impact of FTS on School Food Service Programs

Some studies have looked on the impact of FTS programs on the school food service programs. For food service professionals, benefits of local food procurement include supporting the local economy, supporting farmers, increased food quality and freshness, increased consumer demand, and the ability to purchase small quantities (Becot, et al. 2014; Schmidt and Matts, 2010; Vogt, 2008). These benefits indicate a strong commitment to social values, which, despite being unable to always overcome economic barriers, provides strong motivation to seek solutions. Despite these attitudes, FTS in K-12 face barriers, such as seasonal availability, storage and processing needs, staff training, and prices (Becot et al., 2014; George et al., 2010). Schools and their local producer partners face price pressure, as Becot et al. (2014) estimated the school meal budget to be a mere $1.17 to $1.38 per meal per student. Jensen et al. (2013) asserted that temporary subsidies could help build a foundation for long term partnerships.

Kane et al. (2010) found no significant change in school lunch participation due to FTS programs. On the other hand, Joshi, Azuma & Feenstra (2008) examined seven studies on FTS and school lunch participation and reported a significant increase of 1.3% - 16% in school lunch participation when local foods were served. The average increase in participation over all studies was 9.3%.

The perceptions, attitudes and level of support offered by school food service professionals can be significant in determining the success of FTS and F2I programs. Deblieck, et al. (2010) found that building staff awareness of farm-to-cafeteria endeavors was critical to achieving successful programs.

Impact of FTS on Food Access

The National School Lunch Program, and other school-based nutrition programs, help to ensure access to healthy food for schoolchildren, as they are provided for free or at a reduced price to income-qualified students. In an effort to address increasing childhood obesity and increase consumption of fruits and vegetables, the 2010 Healthy Hunger-free Kids Act (HHFKA) made a variety of changes to the National School Lunch Program and other school-based nutrition programs. Not all of the changes were popular and early outcomes were not positive. Hong, I. (2015) indicated that in the school year following the implementation of the HHFKA, school lunch participation dropped by 1.2 million students (3.7%). Attributed in part to children's reactions to new lunch content and nutritional standards, participation has decreased primarily due to the departure of large numbers of "full price" students from the program and the large variety of vending machine, a la carte, and off-site food options. In addition, Amin et al., (2015) found that plate waste increased in the first year of the new fruit and vegetable requirements, suggesting that students, when forced to take a vegetable, often discarded it.

Ralston and Newman (2015) also examined downturns in school lunch participation. They also found that requirements for food and nutrients in school meals likely drove decreases in paid meal participation. Additionally, increases in the amount of federal free and reduced meal reimbursement rates may have played a role in reduction of paid participation, because schools are required to charge the same rate for paid meals as they are reimbursed for free meals. This means that families paying full-priced lunches were reimbursing free lunches on their own dime. This Paid Lunch Equity provision requires districts to work towards making the revenue from paid lunches to equal the difference between the reimbursement rates for free lunches and paid lunches and from free and reduced lunch subsidies being used to off-set paid lunch costs.

Another aspect of the HHFKA established the Community Eligibility program, which was designed to help schools with a very high concentration of students in poverty provide free meals for all of its students, without having to demonstrate eligibility. In a three-state pilot, lunch participation increased by 13% and breakfast by 25% (Levin & Neuberger, 2013). According to Levin & Neuberger (2013) "Community eligibility increases school meal participation, which can reduce food insecurity for many of the nearly 16 million American children living in households that have trouble affording enough nutritious food. This in turn helps low-income families stretch their limited food resources."

The community eligibility provision-by directly qualifying all students- minimized the paperwork that has previously stood as a barrier to low-income children's participation in school meal programs, and as an expensive administrative burden to school districts (Hong, 2015). This provision of the HHFKA support the broad participation by students of all incomes by reducing the perceived stigma for students receiving free meals (Ralston & Newman, 2015).

Hunger and food access advocates have called for providing these "universal school meals" to all students at all schools, not just schools whose students almost entirely qualify for free school meals. FTS programs also seek to address food security and equity; by increasing the volume of meals provided, universal meals may provide school food service with economies of scale, enabling them to offer higher quality, more locally produced food to its students. Truly universal meals would require a large investment, however, estimated in 2010 to cost an additional $13.2 billion (Poppendieck, 2010).

The economic scenarios developed in this research seek to build on this body of research by first establishing the current economic contribution of local food purchasing by Vermont schools, and then considering the possible economic effects of increased food local purchasing by schools, as well as increasing the number of schools participating in "universal school meals".

ECONOMIC CONTRIBUTION AND POTENTIAL IMPACT OF FTS PROGRAMS IN VERMONT

This section presents the scenarios developed, the methods used and the results of these scenarios. The baseline estimate describes the current contribution of school purchases of local food to the Vermont economy. This scenario provides the first real quantification of local food purchasing made by schools in Vermont and how it fits into the overall economy. Since the FTS Network has set a goal for 75% of schools to buy 50% of their food from a socially just, sustainable, regional food system by 2025, developing an estimate of the current local purchasing (i.e., baseline) is a necessary starting point for measuring progress.

Scenario 1 is a first step at estimating the impact of an increase in local food procurement. The scenario assumed that 75% of the Vermont schools double their local food purchases. Scenarios 2a and 2b model two potential impacts based on creating a universal meals pilot project that would supplement the federal Community Eligibility Provision (CEP) program. There is interest in Vermont in promoting or adopting universal school meals, especially within the FTS Network. Scenario 3 is a counterpoint to the other scenarios, where we model the economic impact if Vermont schools ceased to purchase local food. The scenarios are summarized in Table 2.

Methods

This section provides a primer on economic impact studies and the type of model used for economic impact analysis (IMPLAN). All of the economic impact studies that we identified used IMPLAN to assess the effect of local food purchases associated with FTS programs. IMPLAN is an input-output analysis model that can be used to assess the size of an economy or economic sector, as well as estimate the impact of a proposed change in the economy. This section also describes the data sources and methods of analysis used to estimate the economic contribution of local purchasing on the Vermont economy and the impact of several scenarios on the Vermont economy.

Table 2. List of Scenarios

Baseline Estimate	Contribution of the 2014 local food purchases by Vermont schools on the Vermont economy
Scenario 1	75% of Vermont schools double their local food purchases from the baseline estimate
Scenario 2a	5 schools who meet the criteria of the VT universal meal program participate in the pilot and increase their purchase of local food by 10 percentage points
Scenario 2b	All schools who meet the criteria of the VT universal meal program participate and increase their purchase of local food by 10 percentage points
Scenario 3	Vermont schools no longer purchase local food

WHAT IS AN ECONOMIC IMPACT STUDY?

An economic impact study measures the changes in spending in a geographic area due to a hypothetical change in economic activity, such as a plant closing or opening, a festival, or a natural disaster. In other words, an economic impact study measures "what would happen in the economy if ..... happened." Specifically, an economic impact study calculates the cumulative amount of money that cycles through the economy of the geographic area between industries, households and government agencies as a result of the changes in the industry or events (Day, n.d.). Several studies described below measure the increase in local food procurement by schools when real or hypothetical scenarios are modeled.

Economic impact studies should not be confused with economic contribution studies. From a theoretical perspective, economic contribution and economic impact studies are distinctly different. **An economic contribution study measures the economic activity of existing businesses and industries and estimates their contribution to the local economy.**

While the analytical procedure is slightly different, results for economic impact and economic contribution studies are reported and interpreted the same way.

The economic impact or contribution of an activity or event accounts for three effects on the economy: direct, indirect and induced effects. Taking FTS programs as an example:

- The **direct effect** results from purchase of local food by the school.
- The **indirect effect** results from the food suppliers purchasing goods and services and hiring workers to fill the school's order. For instance, a yogurt maker purchases milk to producer the additional yogurt purchased by the school.

- The **induced effect** results from the effects of the changes in household income due to the economic activity from the direct and indirect effects. For example, employees of farms, food manufacturers and wholesalers spend their paycheck buying food at the grocery store or paying the mortgage on their house.

The sum of the direct, indirect and induced effects is the total economic impact (Figure 1). In an economic impact study, only economic transactions that takes place in the area under study are counted; other transactions are considered a linkage. For instance, the purchase of Vermont carrots is included in the analysis but the purchase of carrots from New York State is *not* included in the analysis.

For each of the effects (direct, indirect and induced), results include the output-(also referred to as total sales) value added, labor income, and employment.

Output/total sales: The output/total sales are usually the largest numerically. However, they do not represent the best measure because double counting typically occurs. That is, the output number includes the total amount of sales revenue from all industries. For example,milk used to make yogurt or cheese can be counted as sold multiple times:when the dairy farmer sells the milk to the cheese or yogurt maker, when the food manufacturer sells the finished product to a wholesaler, and last when the wholesaler sells the milk or yogurt to a school.

Value added: The value added number is considered to be a more conservative and accurate measure of economic activity. It is a similar measure to the gross domestic product (GDP). It includes wages paid to employees, profit accrued by the business owner, dividends paid to investors, interests, or rents, and indirect excise tax, as well the sales and excise tax paid by individuals to the government.

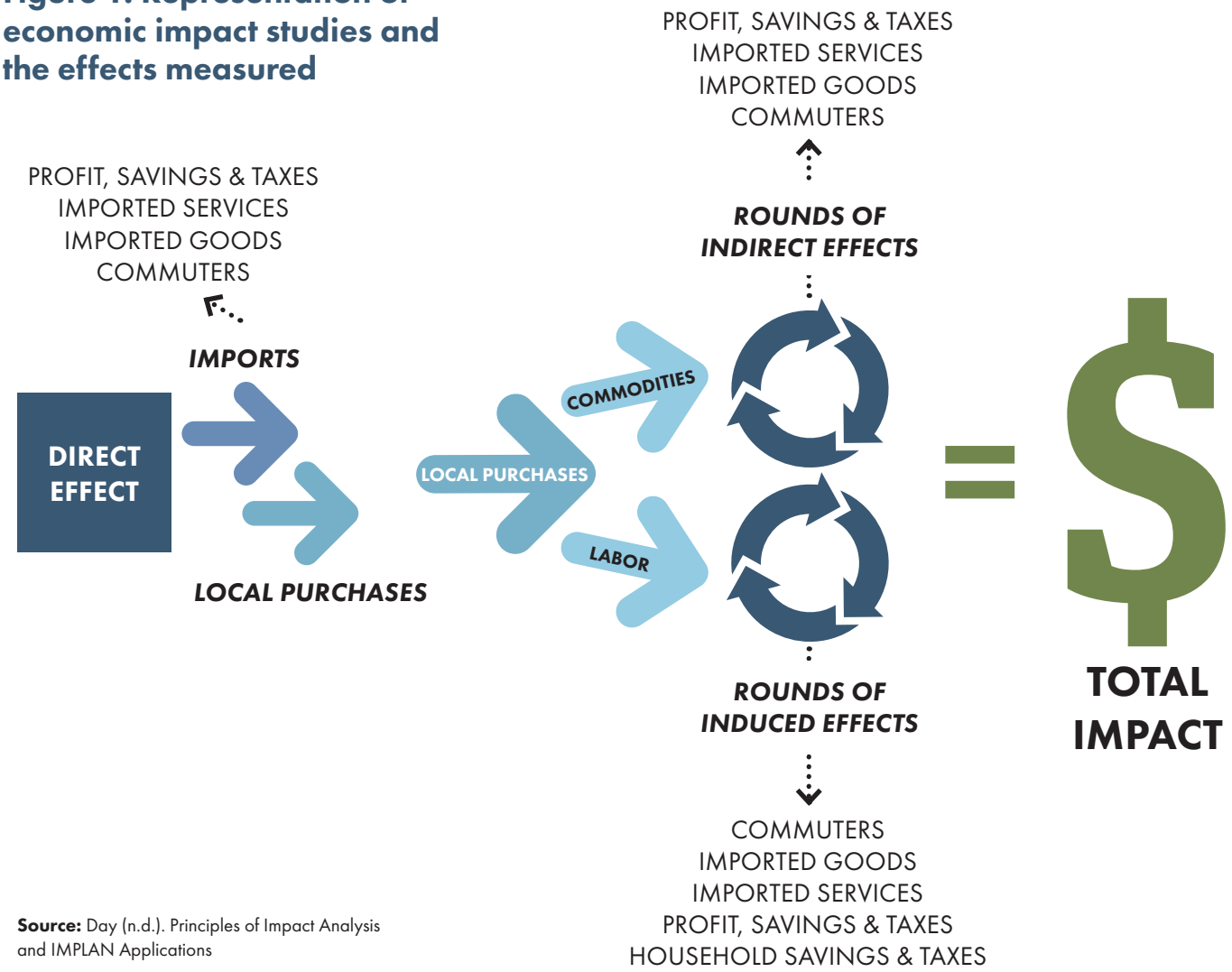
Labor income: Labor income measures the value added produced by the labor component. It includes employee wages and the owner profits.

Employment: Employment: The employment number represents the number of jobs needed to support the economic activity, not the number of people employed (a person can have more than one job), and is measured in annual average jobs. It includes salaried employees and self-employed, and a job can either be full time or part time. The employement number is derived from industry average output per employee.

MODEL FOR ECONOMIC IMPACT STUDIES

Economic impact studies are conducted using input-output (IO) and Social Accounting Matrix (SAM) models, which model the whole economy under study, including inter-industry linkages. The SAM model adds non-industrial financial flows in addition to the typical input-output elements including industry-institution transfers and inter-institution transfers. The software package and database, IMPLAN (IMpact Analysis for PLANing), is commonly used to conduct economic contribution studies. Data for the IMPLAN database are supplied by the US Department of Commerce, US Department of Labor Statistics, US Department of Agriculture, and other Federal and State government agencies. The benefits to using IMPLAN include a simplified process to create regional models and analyze the impacts, consistent methodology for calculating effects, and reproducible results (Day, n.d.). An important benefit of IMPLAN is the ability for users to alter the underlying structure of the data, the

Figure 1. Representation of economic impact studies and the effects measured



Source: Day (n.d.). Principles of Impact Analysis and IMPLAN Applications

model, and the means of assessing impact (Deller, 2009). The limitations of IMPLAN stem from the fact that IMPLAN is a static model that does not take into account price elasticities and changes in consumer or industry behavior. The time required for all effects to be completed is also unspecified.

In the IMPLAN version used for this study, the economy, including transactions between industries, institutions and households, is represented by 536 sectors that are based on the North American Industry Classification System (NAICS) codes. For instance, the agricultural sector is represented by 19 sectors, including vegetable and melon farming, fruit farming, and cattle ranching and farming.

DATA SOURCES

The data needed to conduct the analysis included total food purchases, number of meals, and local food purchases. Since total food purchases (local and non-local) made by all schools in Vermont were not available, total food purchases were estimated using data provided by the Vermont Agency of Education, including the number of lunches served and an estimate of $2.01 spent on food per lunch. Based on these estimates from the Agency of Education and institutional purchase data provided by

Vermont Farm to Plate Network, extrapolations were made for scenarios 1 through 3 using local and total food sales, number of meals, and amount spend on food.

To calculate the current amount of local food purchased by schools, data were obtained from several sources: one school food management company, the school food director association, two distributors, and three food hubs. These data included information on the type of food purchased and the amount of food purchased. NOFA Vermont and the Vermont Sustainable Jobs Fund provided guidance to ensure adequate coverage of local food purchases made by schools. The data were reviewed to ensure that there was no double counting. The data source and information on the type of local food purchased allowed us to categorize how the purchases were made (directly from farmers, directly from food processors, or directly from wholesalers), which is important information to include in the analysis. The data on food type from the wholesalers were further categorized between farm products and processed food (for example, whole fruits and vegetables versus yogurt, a processed milk product.) Based on these data, we found that in 2014, 5.6% of the food purchased by Vermont schools was local. In comparison, a recent study found that in 2014 local sales represented 6.9% of the $189 million of the Vermont food bill (Becot and Conner, 2015).

DATA ANALYSIS

The economic impact analysis was conducted using the input-output model IMPLAN. In the IMPLAN version used for this study, the economy- including transactions between industries, institutions, and households- is represented by 536 sectors based on the North American Industry Classification System (NAICS) codes. For example, the agricultural sector is represented by 19 sectors including vegetable and melon farming, fruit farming, and cattle ranching and farming. For this study, industries in the farm and food processing sectors were aggregated to allow for easier manipulation of the model, and also because detailed data were not available for all purchases. In IMPLAN, food products such as milk, cheese, or meat are included in the processed food sector. Also, for the purpose of this study, purchases from food hubs were included in the wholesale sector because there is no food hub sector in IMPLAN. The allocations of purchases in IMPLAN for each scenario are available in Table 3.

Table 3. Allocation of Local Food Purchases by Vermont Schools for Data Analysis

	Baseline Estimate	Scenario 1	Scenario 2a	Scenario 2b	Scenario 3
Food purchased directly from the farm sector	$135,175	$202,762	$5,352	$37,713	-$135,175
Food purchased directly from the food processing sector	$165,050	$247,575	$6,535	$46,048	-$165,050
Farm products purchased from wholesalers or food hubs	$146,610	$219,915*	$5,805*	$40,903*	-$132,535
Processed food purchased from wholesalers or food hubs	$468,108	$702,162*	$18,535*	$130,601*	-$424,574
Wholesale sector margins	N/A	-$21,458	-$1,756	-$5,092	$87,194
Truck transportation sector margins	N/A	-$9,321	-$763	-$2,212	$37,878
TOTAL	$914,943	$1,341,635	$33,708	$247,961	-$732,262

* These purchases were margined. That is, a share of these purchases was allocated to the sector of production and a share of the expenses were allocated to the wholesale and truck transportation sectors.

Scenarios 1 through 3 accounted for the wholesaler and transportation opportunity costs in order to account for the substitution effect. The substitution effect takes place when purchases are shifted from one sector to another, rather than additional purchases being made. In the case of the FTS program, it is likely that schools are not buying more food, but are buying more Vermont food and less non-Vermont food. While the purchase of local food directly from farmers and processors most likely represents a positive economic impact for the farmers and the state economy, it is important to consider the opportunity cost for the wholesale and transportation sectors. That is, the sales that they did not make because food was purchased directly from producers and processors instead. The loss of business for the wholesale and transportation sectors was calculated using the margins of these sectors (9.53% and 4.14% respectively). The margins for these sectors are from the IMPLAN data are based on national averages.

To summarize, several assumptions were made:

- The scenarios presented in this report considered local food purchased by Vermont schools.
- The scenarios primarily represent small incremental changes in procurement where the additional food procurement could likely be met with current local food supply.
- These scenarios assume that the school generates additional sales for Vermont farmers and food producers and thus leads to a proportional loss of sales by the wholesaler sector.
- These scenarios assume that the price of local food remains constant though schools purchasing a greater amount of local food might be faced with higher cost of food and/or higher transactional costs. We did not have adequate information to estimate the impact on prices.
- The scenarios assume that local food purchased by schools are *not* taken away from other direct to consumer channels, such as retail grocers or restaurants.
- The scenarios further assume that any increases in local food purchased is done within the school food budget and do not represent an additional cost.

Results

Baseline estimate - Contribution of the 2014 local food purchases by Vermont schools on the Vermont economy

In 2014, local food purchases by schools generated a total of $1.4 million in economic activity, including $915,000 in sales in the farm and food processing sectors and $374,000 in sectors related to the farm and food processing sectors (Table 4). A more conservative, accurate measure of the economic contribution of an activity is the total value added measure, which includes wages, profits, dividends, interests, rents, and excise taxes (from the indirect and induced effects). The purchase of local food by schools contributed $485,000 in total value added, with $219,000 of that in the farm and food processing sectors. Lastly, local school food purchases supported 7.3 jobs in the local economy, with 3.2 of those jobs in the farm and food processing sectors. It is important to note that in the model that we used,the job number does not represent a full-time equivalent (FTE) position and thatat one person can have more than one job. While it is possible to convert the number of job to FTE positions, we choose not as FTS sales are most likely part of a larger portfolio of markets for farmers and food processors.

Another measure of the contribution of an activity is the multiplier effect. The total multiplier effect is calculated by dividing the total effect from the direct effect. The multiplier shows how much a dollar or a job in the initial industry adds to the economy. For the baseline estimate, every dollar contributed in value added in the farm and food processing sectors, such as wages, profit adds an additional $1.20 is added to in the economy. Similarly, for every job in the farm and food processing sectors, 1.3 jobs are supported in the Vermont economy.

Scenario 1 – 75% of Vermont schools double their local food purchases

If 75% of Vermont schools doubled their local food purchases from 5.6% to 11.2%, $2.1 million in sales would be generated in the Vermont economy including $1.3 million in the farm and food processing sectors and $560,000 in sectors related to the farm and food processing sectors (Table 4). $693,000 would be generated in value added, with $335,000 of that in the farm and food processing sectors. 10.5 jobs would be supported in the Vermont economy, with 4.5 of those jobs in the farm and food processing sectors. These results are net of any changes in the wholesale and transportation sectors.

The multiplier values is similar to the multiplier values of the baseline estimate as this increase would not structurally impact the economy. For Scenario 1, every dollar contributed in value added in the farm and food processing sectors, such as wages, profit adds an additional $1.20 is added to in the economy. Similarly, for every job in the farm and food processing sectors, 1.3 jobs are supported in the Vermont economy.

While this effect can be considered modest, it should be noted that the scenario assumes that the increased local purchasing is accomplished using the existing school food budget, and not through a programmatic investment, such as state funds. For this reason, no additional costs are associated with the increase in local purchasing.

Scenario 2a - 5 schools who meet the criteria of the VT universal meal program participate in the pilot and increase their purchase of local food by 10 percentage points

This scenario, as well as scenario 2b models the potential impacts of a potential legislationto create a universal meals pilot project. Scenario 2a models the impact of 5 schools participating in the pilot project. This law would target schools that have a direct certification rate of 40 to 45%. These schools while eligible for the federal universal meal program, Community Eligibility Provision (CEP), may not see the same cost savings as those with higher direct certification rates, and therefore may be less likely to participate in the program without support. In return, schools that participate in the universal meals pilot project would commit to increasing their local food purchases by 10 percentage points. Because the number of Vermont schools that would meet the CEP criteria was not made available at the time of this report, scenarios 2a and 2b represent low and high estimates of eligible Vermont schools.

The $36,200 spent on local food by five schools participating in the pilot would generate $53,800 in sales in the Vermont economy and it would generate a total of $19,600 in value added, with $11,300 of this in the farm and food processing sectors. Additionally, t would support 0.3 jobs in the Vermont economy with 0.1 of these jobs in the farm and food processing sectors (Table 4). Because the economic activity represented by this scenario is low, the impact on the employment multiplier would be lower than in other scenarios where for every job in the farm and food processing sectors 0.5 jobs are supported in the Vermont economy.

Scenario 2b: 40 schools who meet the criteria of the VT universal meal program participate and increase their purchase of local food by 10 percentage points

While possible pilot project would cover up to five schools, Scenario 2b models the impact of an increased by 10 percentage points for 40 schools that meet the criteria of the project. Based on the 2014-2015 school year data from the Vermont Agency of Education, 40 schools would represent $255,000 in local food purchases and generating $390,000 in total sales in the Vermont (Table 4). The purchases in local food would generate a total of $125,000 in value added, with $62,000 of this in the farm and food processing sectors. Last, it would support 1.9 jobs in the Vermont economy with 0.8 of these jobs in the farm and food processing sectors.

Scenario 3: Vermont schools no longer purchase local food

Scenario 3 is a counterpoint to the other scenarios where we model the impact of Vermont schools no longer purchasing local food. Under such a scenario, all food purchases would be made through wholesale distributors and local farmers and processors would lose these sales. For the purpose of this exercise we only modeled the current level of local food (5.6%) shifting to non-local food.

Vermont schools no longer purchasing local food would represent a total loss of $1.2 million in sales including a loss of $856,000 in the farm and food processing sectors. Additionally, $357,000 would be lost in value added with $280K of the total loss in the farm and food processing sectors. 6.3 jobs would be lost in the total economy with 4.7 of these jobs in the farm and food processing sectors.

Table 4. Results of the Scenarios

	Employment	Labor Income	Value Added	Sales
Baseline scenario: Contribution of the current local food purchases by Vermont schools on the Vermont economy				
Direct Effect	3.2	$111,410	$218,843	$914,943
Indirect Effect	2.8	$96,511	$177,046	$374,508
Induced Effect	1.3	$50,793	$89,587	$154,374
Total Effect	7.3	$258,714	$485,476	$1,443,825
Type II Multiplier*	2.3	2.3	2.2	1.6
Scenario 1: 75% of Vermont schools double their local food purchases				
Direct Effect	4.5	$150,898	$300,263	$1,351,545
Indirect Effect	4.2	$144,119	$265,430	$560,963
Induced Effect	1.8	$72,068	$127,108	$219,507
Total Effect	10.5	$367,085	$692,801	$2,132,015
Type II Multiplier*	2.3	2.4	2.3	1.6
Scenario 2a: 5 schools who meet the criteria of the VT universal meal program participate in the pilot and increase their purchase of local food by 10% point				
Direct Effect	0.2	$4,559	$9,321	$33,707
Indirect Effect	0.1	$3,540	$6,554	$14,084
Induced Effect	0	$1,978	$3,489	$6,012
Total Effect	0.3	$10,076	$19,363	$53,803
Type II Multiplier*	1.5	2.2	2.1	1.6
Scenario 2b: 40 schools who meet the criteria of the VT universal meal program participate and increase their purchase of local food by 10% point				
Direct Effect	0.8	$27,005	$53,920	$247,960
Indirect Effect	0.8	$26,124	$48,146	$102,680
Induced Effect	0.3	$12,978	$22,890	$39,444
Total Effect	1.9	$66,107	$124,956	$390,085
Type II Multiplier*	2.4	2.4	2.3	1.6
Scenario 3: Vermont schools no longer purchase local food				
Direct Effect	-2.9	-$63,960	-$147,481	-$756,416
Indirect Effect	-2.5	-$78,487	-$148,167	-$328,636
Induced Effect	-0.9	-$34,793	-$61,352	-$105,731
Total Effect	-6.3	-$177,241	-$356,999	-$1,190,784
Type II Multiplier*	-2.2	-2.8	-2.4	-1.6

* Type II Multiplier = total effect / direct effect

DISCUSSION & CONCLUSION

This research presents the first study of the economic contribution of school-based local purchasing to the Vermont economy. While the current local food purchase are modest (5.6%), school food services are self-sufficient and local purchasing are not supported by grants or deficit funding. Understanding that the current contribution of local spending is just 5.6% of total food spending by Vermont schools puts the VT FTS network goal of 50% regionally, sustainably sourced food in context, and makes clear what an ambitious target that will need to be reached by 2025. School food service operates on a fairly fixed budget, which even if participation rates increase (as is expected with stronger FTS programming), the goal will require systematic, structural changes to how local food is produced, processed and distributed to institutional markets and, will likely impact food and transactional costs.

The literature review suggests that researchers have found that farmers serving local and regional markets, as well as smaller scale farmers, tend to not only spend more money locally, but also differently than how it is assumed in IMPLAN and therefore actually have a higher multiplier and greater impact than is assumed. The data necessary to customize the agricultural sector in IMPLAN is complex and requires the use of secondary and primary data on spending and sales patterns of those farmers and the customization was outside the scope of this economic study. Therefore, the results presented are hypothesized to represent the lower-bound (conservative) impact.

While direct comparisons of our multipliers with other studies are not recommended, due to varying geographical scales, economic structures, and model customization, looking at the multipliers across studies allow for some comparison. The sales multiplier of 1.6 for most scenarios and employement multiplier of 2.3 are within the range of multipliers found in other studies (between 1.03 and 2.4 for sales multipliers and between 0.49 to 3.3 for employement multipliers). The assumptions that we made were in line with the studies from Minnesota and Colorado where we did not assume new purchases of food but a shift from non-local food to local food, resulting in a loss for the wholesale sector (Gunter, 2011; Haynes, 2009; Tuck et al., 2010). However, unlike the Minnesota and Colorado studies we did not customize the agricultural sector in IMPLAN due to unavaibility of appropriate data. We estimate that if we had been able to customize the IMPLAN agricultural sectors to reflect farms that participate in FTS programs, the sales and employement multipliers would have been higher since less money would have leaked out of the local economy and as these farms tend to have higher labor needs. However, due to the financial situation of these farms it is not likely that the value added multiplier would increase by a lot if any.

The Vermont FTS Network has the ambitious goal that by 2025, 75% of Vermont schools will purchase 50% of their food from a socially just, sustainable regional food system (Vermont Farm to School Network, 2015). A change of this magnitude brings up questions about the Vermont food supply chain and its ability to scale up, as well as the structural changes that required of the Vermont economy which cannot be modeled in IMPLAN as it assumes constant returns to scale, fixed prices, and fixed commodity input structures.

As a result, Scenario 1 presents a more modest and achievable short term goal of a 100% increase in local purchasing. Ambitious goals are not only challenging to account for in a model, they can mask

unintended consequences. The structural changes that will be required in the Vermont economy in order to achieve the large increases in local purchasing will likely include shifting jobs from the wholesale and transportation sectors to the farm and production sectors. However, wholesale and transportation jobs are typically higher paying and include benefits (and less risk) than farming jobs. Further, currently there is a shortage of supply of many local products and schools are very price constrained in their purchasing. If demand for local food increases, prices will likely increase in the short term, making it difficult for schools to sustain the increased purchasing. As the supply increases to meet demand, it is likely that the prices of local products will decrease, which would put additional pressure on farm and producer wages.

There are however, other benefits to FTS programming besides the direct economic effect. FTS advocates in Vermont and previous studies describe the economic effect as just one part of the total expected FTS contribution. Improved health and educational opportunities for students are seen as other important outcomes of FTS. However, these outcomes have not been measured as quantifiably as economic outcomes. In addition, these changes imply long term changes to the existing systems in order to effect behavior change. Longitudinal studies will be needed to determine the effects of FTS on health and education.

Improving access to healthy food for all Vermont students, and providing better quality food at Vermont schools, are both important outcomes for FTS. Providing school meals at no cost to all students, commonly referred to as universal meals, shares the goal of improving access to healthy food for all Vermont students and has been linked with FTS in proposed legislation. Scenarios 2a and 2b present the economic impact of some proposed Vermont state legislation, though it should be noted that this pilot program is intended to primarily pilot increased universal school meal adoption, not direct economic growth. It should be noted that while it is expected that universal meals reduces administrative costs for qualified schools, the proposed pilot program is to cover the costs that schools incur in providing school meals to all students. So while the program may result in some savings (or at least no additional cost) to the school, the taxpayer will need to absorb the cost of this program. At the time of this report, no estimate was available for the likely costs of the program.

Research in the fields of farm-to-school, economic modeling of small-scale agriculture, and the outcomes of improved nutrition on student health, engagement and educational performance has been building up over approximately the last decade. Several researchers within the last 2-4 years have compiled works within their respective fields to take steps forward in answering big picture questions relevant to the goals of this project including:

- What is the economic impact of FTS implementation on local communities?
- What is the impact of diets with more fruits and veggies on student health and educational performance?
- What are the costs of childhood obesity?

With regard to assessing the impact of increased fruit and veggie consumption of health and education, the vast majority of studies are anecdotal or non-generalizable quantitative studies. Despite this,

these studies should not be discounted as the findings are all pointed in the same direction: increasing local, healthy fruit and veggie consumption and connecting students with experiential education opportunities including farm visits and school gardening improves attitudes toward healthy food, environmental perspectives, and school experience in general.

Whether or not FTS leads to students eating more fruits and vegetables has not been resolved in the literature. Joshi, Azuma and Feenstra (2008) concluded that FTS programs consistently increase the amounts of fruit and vegetables consumed by children in the cafeteria, at school & at home. Aftosmes (2011), however, concluded that there is little reliable evidence linking FTS to healthy eating behaviors and that attitudes previously noted in children are due to the many anecdotal studies and there are limited peer reviewed studies on the topic. FTS programs can vary from once a school-year local meals that highlight FTS, to regular weekly purchases from local vendors with integration of local food into existing menus. With this variation in frequency and promotion of FTS, it is not surprising that measures of FTS outcomes often conflict. More research, especially a longitudinal approach, could provide needed insights to the contribution of FTS in promoting health and education behavior among schoolchildren.

This report presents the first statewide assessment of the economic contribution of FTS, as well as describes the statewide economic impact of several FTS scenarios. While the economic contribution is modest, as is the impact of a doubling of local spending, neither the contribution nor the impact of the Scenario 1 included any new or external source of funding. If it is desirable for schools to spend more on local food, then providing schools with resources toward this end could result in a bigger economic impact. While the resources allocated to schools would need to be accounted for when calculating the economic impact of the additional spending on local food, the multiplier effect would likely mean that the size of the total impact would be larger than the resources. As economic value is clearly just one value, along with health and education, promulgated by FTS, longitudinal research to consider the balance and effects of all three of these values will be needed before the real value of FTS can be understood.

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