ASSESSMENT REPORT:
LEHIGH VALLEY LOCAL FOOD ECONOMY

Written and Edited by Lynn Prior
with Guest Authors

Buy Fresh Buy Local — Greater Lehigh Valley
a program of the
Nurture Nature Center

THE NURTURE NATURE CENTER

Scholl Orchards, Bethlehem
Photo Credit: BFBL-GLV

Acknowledgments

This report was made possible with the assistance of many people. The author appreciates the valuable input and guidance provided throughout the project by the following individuals and organizations, listed in alphabetical order:

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Layout & Design:
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November 7, 2013.

Funding support for this project was provided in part by the Lehigh Valley Economic Development Corporation under an award with the U.S. Department of Housing and Urban Development, and the Farmers' Market Promotion Program (FMPP) Grant Program, Agricultural Marketing Service, USDA, under Award No. PA-240-12-25-G-1628. The substance and findings of the work are dedicated to the public. The authors are solely responsible for the accuracy of the statements and interpretations contained in this publication. Such interpretations do not necessarily reflect the view of the Government.

Executive Summary

This report is an objective assessment of the Lehigh Valley's local food economy, including the resources, production, infrastructure, stakeholders, and economics involved in this system. It identifies a number of challenges and opportunities facing the food system.

The biggest challenge facing the Lehigh Valley local food economy is the loss of farmland: since 1930, the Valley has lost 80 percent of its farms and 53 percent of its farmland. As of 2007, there were only 1002 farms and 153,000 acres of farmland remaining. According to the Lehigh Valley Planning Commission, land is being converted to housing, commercial and industrial uses at a rate of 3.5 square miles per year, and housing accounts for the majority of this land conversion. The expected arrival of 146,000 more people in the Lehigh Valley over the next twenty years will place yet more development pressure on this remaining farmland. The Planning Commission predicts that the nature of our municipalities is going to change: ten of the 17 rural municipalities will become suburban by the year 2040.

Both Lehigh and Northampton Counties have been working to preserve farmland since the early 1990s. As of January 2013, 33,000 acres (368 farms) had been preserved with conservation easements. In 2012, Northampton County allocated $3.9 million for farmland preservation; however, Lehigh County made no contribution.

The report also highlights opportunities for the Lehigh Valley. The local food economy generates $17 million in economic activity for the Lehigh Valley annually and has the potential to contribute much more. If residents spent just $10/week on locally grown food, nearly $100 million in economic activity would be generated annually, providing jobs, business incubation and expansion, and economic growth for our local farms, businesses and service providers.

The infrastructure critical to moving food from our local farms to wholesale buyers is lacking in the Lehigh Valley. With a significant number of wholesale buyers in the Valley, there exists a great potential for growth in this sector, such as food hubs and food business incubators, which could provide positive impacts on local economic development and job creation.

The local food economy also presents an opportunity to improve access to affordable, nutritious fresh foods. Eating healthy foods, particularly fresh fruits and vegetables, can help reduce the risk of chronic diseases, including heart disease, diabetes, and cancer. At present, there are eight areas in the Lehigh Valley experiencing limited access to fresh food; conventional food retail resources are not available in these neighborhoods. A vibrant local food economy comprised of farmers' markets, farm share programs, food cooperatives, mobile markets, urban farms, and community gardens can help improve fresh food access in these neighborhoods.

Finally, this assessment report presents a number of successful policies and programs that have been implemented by both local governments and private entities in various parts of the country in order to build other local food economies. These examples are meant to inspire stakeholders to create policy and system changes to build the Lehigh Valley local food economy and ensure that fresh, healthy, affordable food is available for all residents of the Lehigh Valley, now and in the future.

The biggest challenge facing the Lehigh Valley local food economy is the loss of farmland: since 1930, the Valley has lost 80 percent of its farms and 53 percent of its farmland.

Contents

Sofia Scholl, Scholl Orchards, Bethlehem
Photo Credit: VFBL-GLV

Introduction

In 2012, the Lehigh Valley received a Regional Planning Grant from the U.S. Department of Housing and Urban Development to create a sustainable community plan for the Lehigh Valley. This plan will outline how the region can grow to accommodate a large influx of new residents without compromising quality of life. A consortium of several Lehigh Valley organizations are working together to develop the plan, including:

- Lehigh Valley Economic Development Corporation
- Lehigh Valley Planning Commission
- Renew Lehigh Valley
- Community Action Committee of the Lehigh Valley
- Lehigh and Northampton Transit Authority
- Lehigh Valley Research Consortium
- Greater Lehigh Valley chapter of Buy Fresh Buy Local, a program of the Nurture Nature Center
- Wildlands Conservancy
- Lehigh County Department of Community and Economic Development
- Northampton County Department of Community and Economic Development
- City of Allentown
- City of Easton
- City of Bethlehem

A portion of this grant is being used for a public outreach effort entitled *Envision Lehigh Valley* to gather input from Lehigh Valley residents on their values, local goals, and regional identity. This public input will be used to inform six key plans:

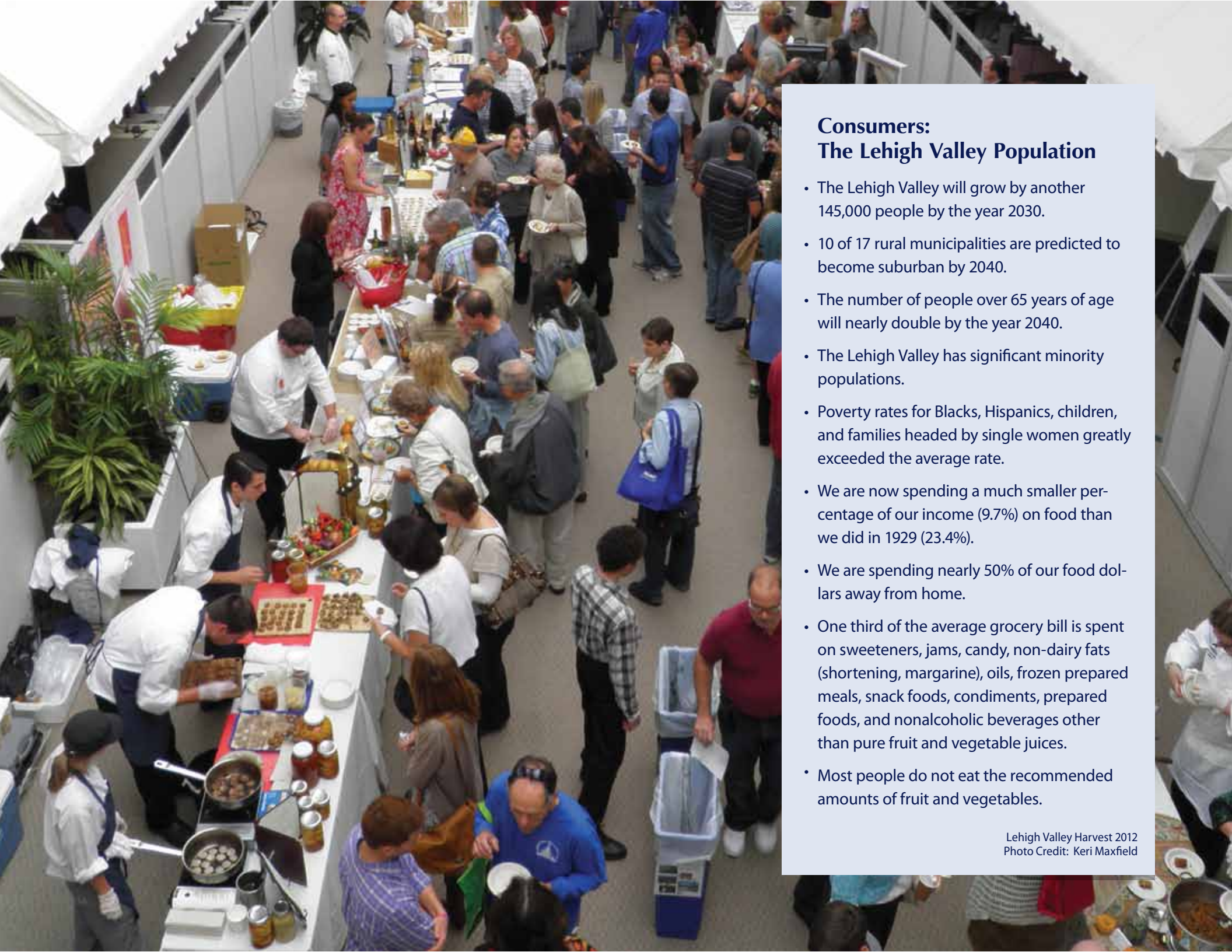
- Lehigh Valley Regional Sustainable Economic Development Plan;
- Lehigh Valley Regional Affordable Housing Plan;
- Jobs/Housing Balance Study;
- Climate and Energy Conservation Plan;
- Fresh Food Access Plan; and
- Regional Transit Plan

Each plan will include a study of the topic and will outline goals, recommendations for implementation, and possible policy changes. The plans will then be used to update the Lehigh Valley Planning Commission's *Comprehensive Plan The Lehigh Valley … 2030.*

The **Fresh Food Access Plan will present ideas and possibilities for policy and system changes to ensure that fresh, healthy, affordable, culturally appropriate food is available for all residents of the Lehigh Valley.** At present, parts of our two counties lack access to nutritious foods, putting residents of these areas at risk for nutrition-related health problems. The issue of fresh food access is examined in the broader context of the Lehigh Valley local food economy. This systems approach was chosen because strategies involving local food production offer solutions to address fresh food access issues.

The goal of the Fresh Food Access Plan is to help the Lehigh Valley create a healthier, more sustainable food environment in which fresh food is available to all residents, now and in the future.

This **Assessment Report of the Lehigh Valley Local Food Economy is intended to provide a research base in order to guide discussion during upcoming public outreach sessions for the Fresh Food Access Plan.** In this report, we look at the demographics of Lehigh Valley residents, local food production, available food resources and fresh food access issues, available local food infrastructure, foodwaste, the economics of our local food system, and the issue of climate change as it affects food production. Policies and system changes that have been used to address local food production and food access in other parts of the nation are presented to provide ideas for moving forward. At the end of each chapter, possible topics for discussion are listed. This research, as well as information gathered in the public outreach sessions, will be used to create the Fresh Food Access Plan.



Consumers: The Lehigh Valley Population

- The Lehigh Valley will grow by another 145,000 people by the year 2030.
- 10 of 17 rural municipalities are predicted to become suburban by 2040.
- The number of people over 65 years of age will nearly double by the year 2040.
- The Lehigh Valley has significant minority populations.
- Poverty rates for Blacks, Hispanics, children, and families headed by single women greatly exceeded the average rate.
- We are now spending a much smaller percentage of our income (9.7%) on food than we did in 1929 (23.4%).
- We are spending nearly 50% of our food dollars away from home.
- One third of the average grocery bill is spent on sweeteners, jams, candy, non-dairy fats (shortening, margarine), oils, frozen prepared meals, snack foods, condiments, prepared foods, and nonalcoholic beverages other than pure fruit and vegetable juices.
- Most people do not eat the recommended amounts of fruit and vegetables.

Lehigh Valley Harvest 2012
Photo Credit: Keri Maxfield

1. Consumers: The Lehigh Valley Population

This chapter outlines the demographics of the Lehigh Valley population, such as age, cultural background, and income level, all of which must be considered in order to provide healthy, affordable, culturally appropriate food options to residents. It also considers residents' current food consumption habits with the goal of creating strategies to improve diets and health.

The Planning Commission predicts that this rapid growth will change the nature of Lehigh Valley...

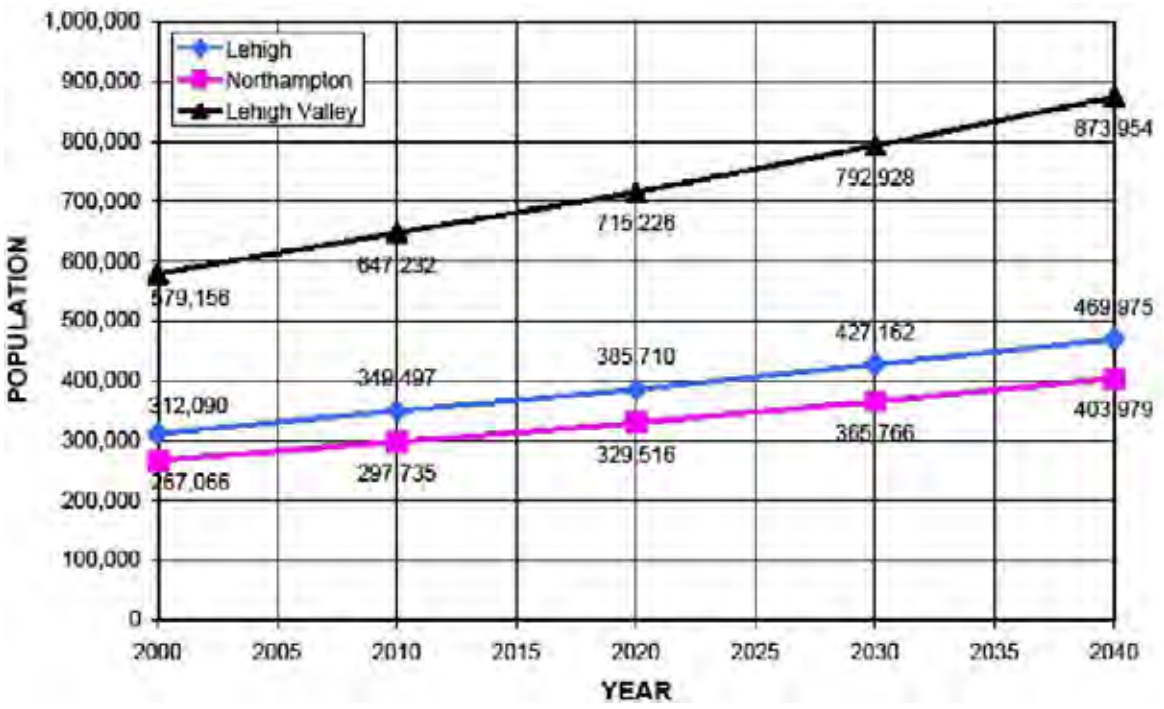
1.1 Who We Are

The Lehigh Valley is comprised of Lehigh and Northampton Counties. Within these counties are three cities, 27 boroughs, and 32 townships covering 730 square miles. There were 647,232 people living in 247,548 households within these 62 municipalities in 2010, and the average household size was 2.5 persons.[1]

The Lehigh Valley Planning Commission projects that the Valley will grow by another 145,000 people to a total of 792,928 by the year 2030, and to a total of 873,954 by the year 2040: a 35 percent increase over three decades (See Figure 1.1).[2]

The Planning Commission predicts that this rapid growth will change the nature of Lehigh Valley municipalities, shifting many from rural to suburban and from suburban to urban. A comparison of Figure 1.2a to Figure 1.2b shows that ten of the 17 rural municipalities currently in the Lehigh Valley are predicted to become classified as suburban over the next thirty years, leaving only seven rural municipalities remaining (five in Lehigh County and two in Northampton County).[3]

Figure 1.1 Population Growth Projections for the Lehigh Valley



Source: Lehigh Valley Planning Commission

[1] United States Census Bureau. (2010). *American Community Survey 1-Year Estimates* [Data file]. Retrieved from http://factfinder2.census.gov/

[2] Lehigh Valley Planning Commission. (2005). *Comprehensive Plan The Lehigh Valley … 2030.* Retrieved from http://www.lvpc.org/pdf/lv2030/compPlan01.pdf

[3] Lehigh Valley Planning Commission. (2013). Maps of Lehigh Valley municipalities according to Community Development Categories.

Figure 1.2a **Community Development Categories**

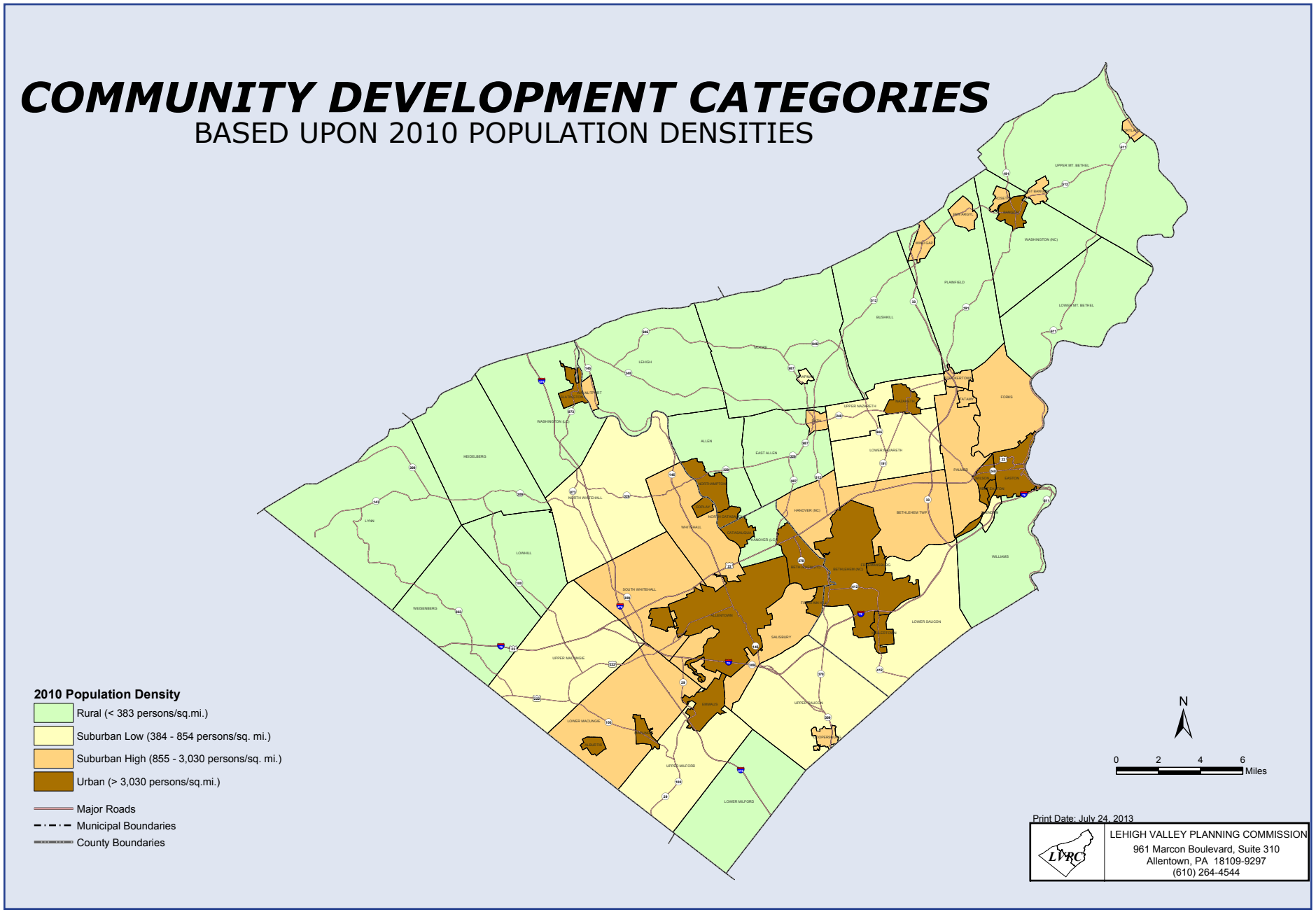


Figure 1.2b Community Development Categories

COMMUNITY DEVELOPMENT CATEGORIES 2010 - 2040

County Community Development Category Population Change by 30-Year Period Comparison

Lehigh County Comparisons

1980 - 2010 Population Change

	Absolute Change	% share of total change
L. County Rural Municipalities	6,599	9%
L. County Suburban Low Municipalities	3,099	4%
L. County Suburban High Municipalities	52,055	67%
L. County Urban Municipalities	15,395	20%
	77,148	100%

2010 - 2040 Population Change

	Absolute Change	% share of total change
L. County Rural Municipalities	9,417	8%
L. County Suburban Low Municipalities	7,144	6%
L. County Suburban High Municipalities	73,171	61%
L. County Urban Municipalities	30,746	26%
	120,478	100%

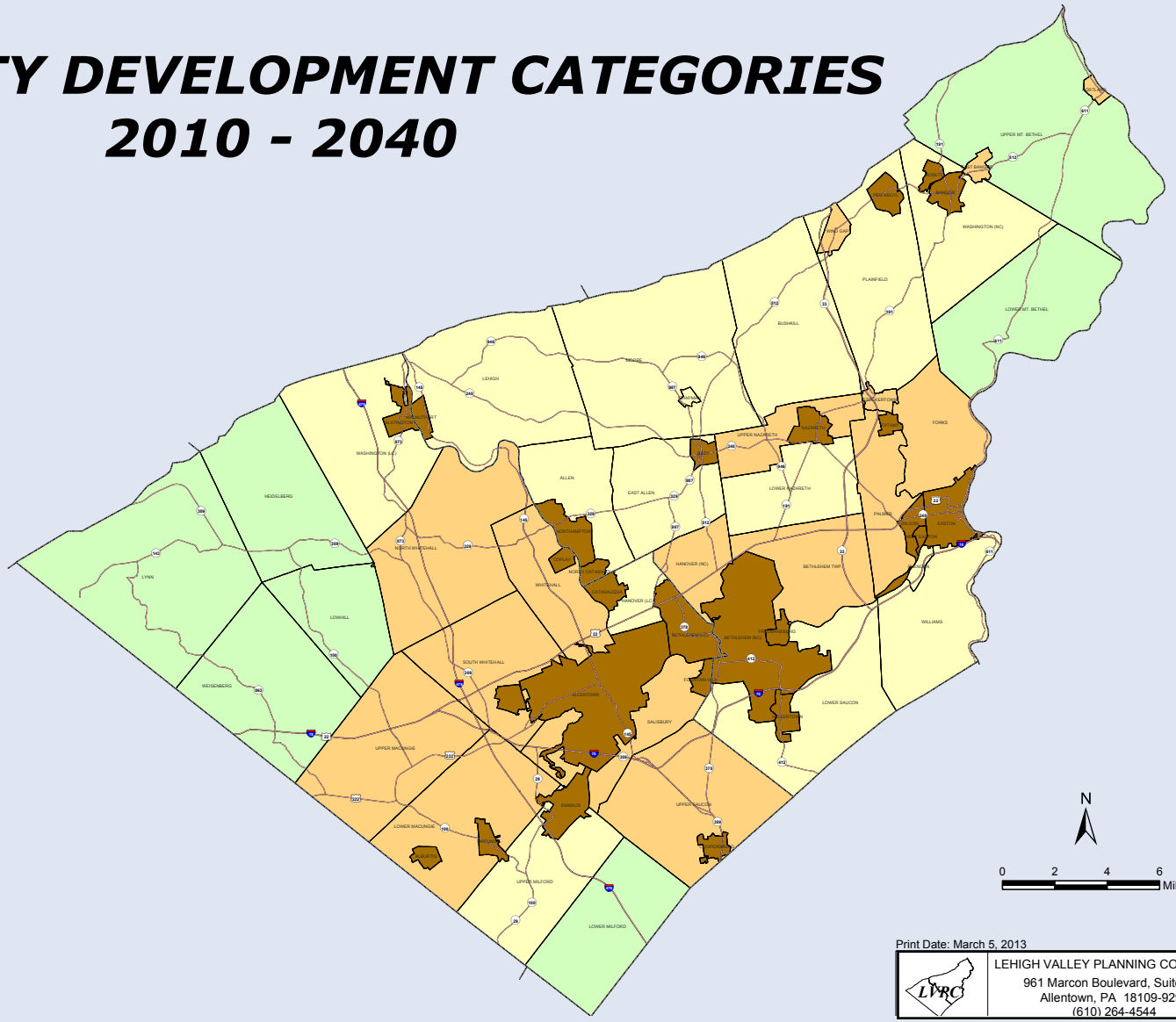
Northampton County Comparisons

1980 - 2010 Population Change

	Absolute Change	% share of total change
N. County Rural Municipalities	2,815	4%
N. County Suburban Low Municipalities	26,656	37%
N. County Suburban High Municipalities	31,865	44%
N. County Urban Municipalities	10,981	15%
	72,317	100%

2010 - 2040 Population Change

	Absolute Change	% share of total change
N. County Rural Municipalities	7,180	7%
N. County Suburban Low Municipalities	42,961	40%
N. County Suburban High Municipalities	28,460	27%
N. County Urban Municipalities	27,644	26%
	106,244	100%



Print Date: March 5, 2013

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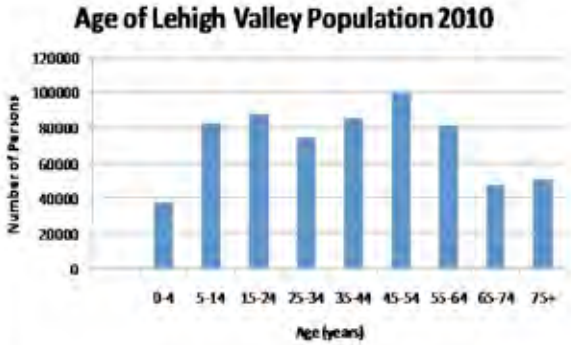
Students at March Elementary School
Photo Credit: BFB-GLV

The Lehigh Valley has significant minority populations. As of 2010, 15 percent of our population was Hispanic or Latino, 5.6 percent was Black or African American, and 2.7 percent was Asian.[5] Diverse populations have varied eating and dietary patterns. As the region plans for the local food economy of 2030, this factor will take on increasing relevance, as planners must consider not only how much food will be required but what types will be preferred and sought by the population.

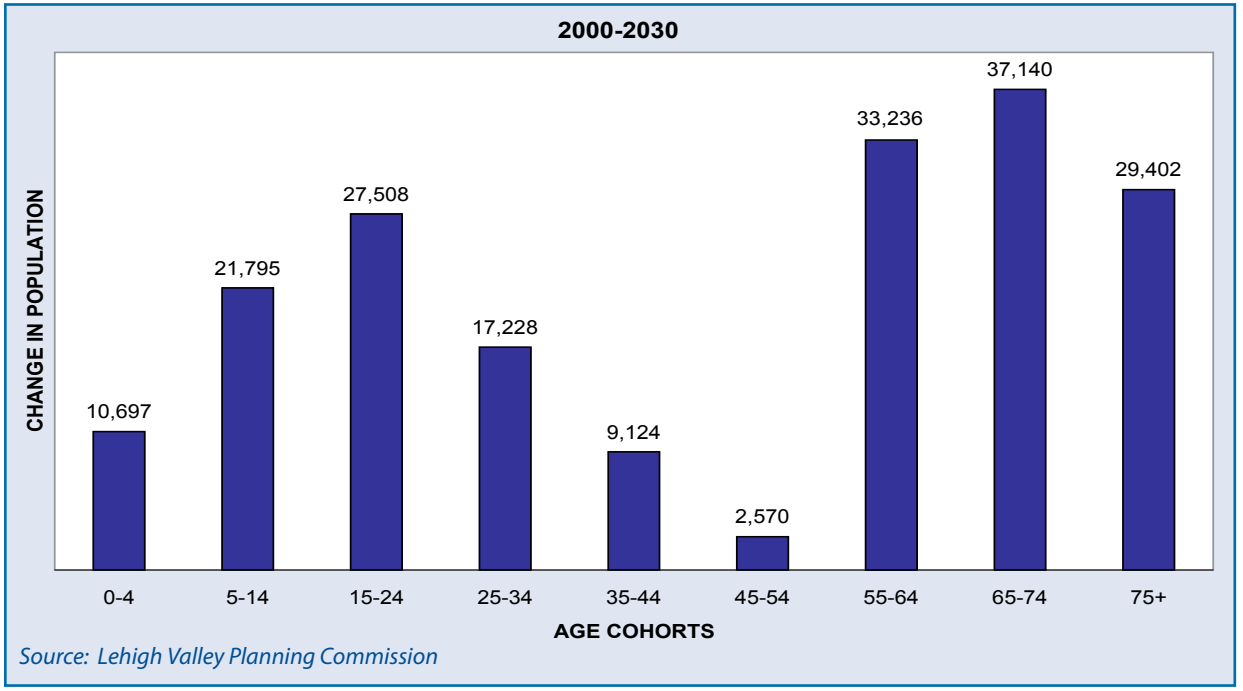
Figure 1.3a
Age Distribution of the Lehigh Valley Population



Sources: US Census Bureau 2010, BFBL-GLV 2013

Age distribution is also expected to shift in the Lehigh Valley over the next 30 years. The Lehigh Valley Planning Commission predicts that the number of people over 65 years of age will nearly double by the year 2040[4] (See Figures 1.3a, 1.3b). An aging population brings the need for fresh food into sharp focus. According to Elaine Reynolds, Associate Professor, Developmental Neurobiology and Molecular Genetics, Lafayette College, older populations generally have lower caloric intake, but face all the same nutritional needs as younger populations, and therefore require nutritionally dense foods to maintain health. Fruits and vegetables are primary sources of antioxidants (important for preventing cancer and other age-related diseases) and minerals (important for bone density and blood and immune systems) needed to meet these health needs. Ensuring convenient access to nutritious food for an increasingly aged population will be a critical public health issue in the Lehigh Valley in coming years. (personal communication, July 9, 2013).

Figure 1.3b **Population Change by Age Group**



Source: Lehigh Valley Planning Commission

[4] *Comprehensive Plan The Lehigh Valley … 2030.*

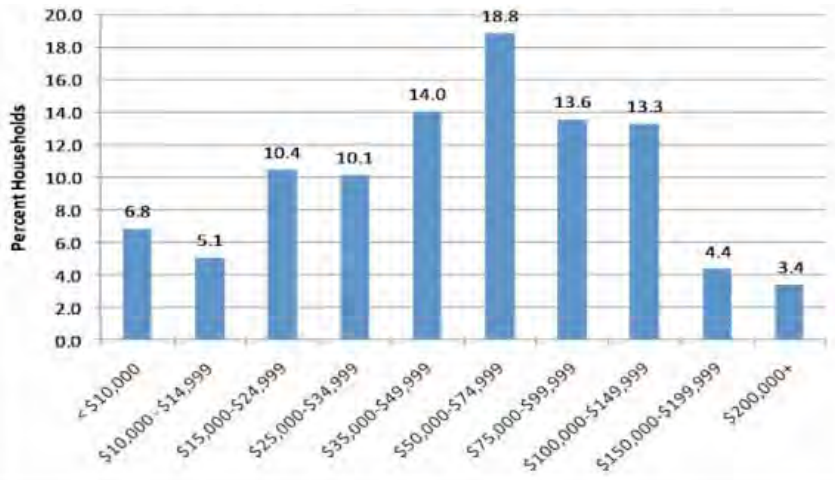
[5] (2010). *American Community Survey 1-Year Estimates.*

Socio-economics

The average Lehigh Valley household income was $69,157 in 2010[6], higher than both the Northeast average of $68,409[7] and the national average of $68,259.[8] The median household income, however, was $54,008[9], suggesting that a small number of wealthy households skewed the mean (See Figure 4). This is still higher than the national median household income of $50,046.[10]

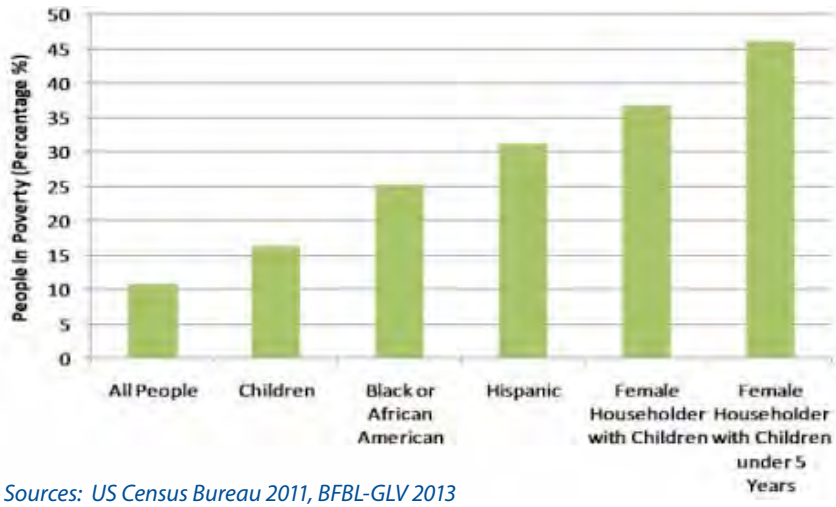
Despite having higher average incomes in the Lehigh Valley, there is still considerable poverty. National poverty thresholds lie between $14,218 for two adults and $17,568 for one adult and two children.[11] The poverty rate of all people in the Lehigh Valley was 12.6 percent in 2011[12] (lower than the national average of 15.9 percent[13]). This poverty rate, however, masks considerable variation between age groups, racial/ethnic subgroups, and different geographic areas *(See Figure 1.5*). Five-year estimates from 2007-2011[14] indicated that poverty rates for Blacks and Hispanics greatly exceeded the average rate: 25.3 percent of blacks and 31.2 percent of Hispanics in the Lehigh Valley were poor. Poverty rates during this period were also highest for families headed by single women.

Figure 1.4 Income Distributions in the Lehigh Valley



Sources: US Census Bureau 2010, BFBL-GLV 2013

Figure 1.5 People Living in Poverty in the Lehigh Valley (2007-2011)



Sources: US Census Bureau 2011, BFBL-GLV 2013

[6] *Ibid.*

[7] United States Department of Labor; Bureau of Labor Statistics. (2010). *Consumer Expenditure Survey* [Data file]. Retrieved from http://www.bls.gov/data/

[8] (2010). *American Community Survey 1-Year Estimates.*

[9] (2010). *Consumer Expenditure Survey.*

[10] (2010). *American Community Survey 1-Year Estimates.*

[11] The United States determines the official poverty rate using poverty thresholds that represent the annual amount of cash income minimally required to support families of various sizes. (National Poverty Center http://www.npc.umich.edu/poverty/) The Census Bureau uses a set of money income thresholds that vary by family size and composition to determine who is in poverty. If a family's total income is less than the family's threshold, then that family and every individual in it is considered in poverty. http://www.census.gov/hhes/www/poverty/methods/measure.html

[12] (2011). *American Community Survey 1-Year Estimates.*

[13] *Ibid.*

[14] (2011). *American Community Survey 5-Year Estimates.*

People living in the three urban centers of Allentown, Bethlehem, and Easton represent a disproportionate share of the poor in the Lehigh Valley. Children in these areas are particularly vulnerable (See Figure1.6). In 2011, 23,660 of our children in the Lehigh Valley, or 16.3 percent, lived below the poverty line. In the Cities of Allentown and Easton, one out of every three children was living below the poverty line.[7]

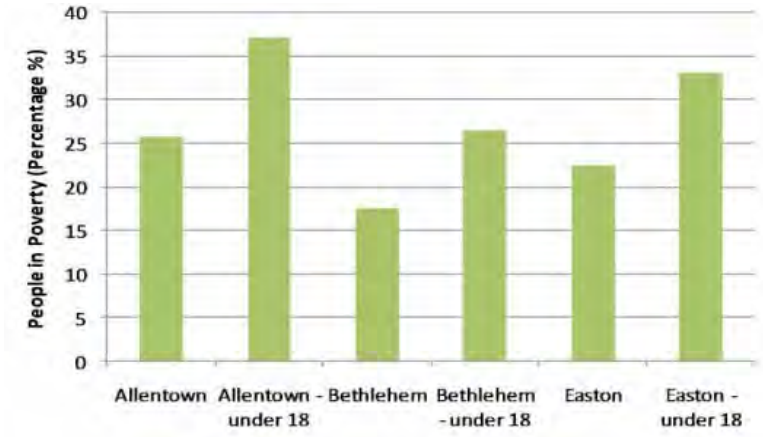
Poverty continues to increase at the national level. In 2011, 15.9 percent of all persons in the United States were living in poverty, up from 15.3 percent in 2010[15]. This was the fourth consecutive annual increase in the poverty rate, which was 13.0 percent in 2007.[16] Since poverty plays a major role in limiting access to fresh foods (*see Chapter 3*), the food access issue is going to increase in importance in the coming years.

1.2 What We Eat

The **Consumer Expenditure (CE) Survey** provides annual information on the buying habits of American consumers, including data on our food expenditures. The data are collected for the Bureau of Labor Statistics (BLS) by the US Census Bureau. Expenditures are calculated for the four US Census regions, of which the Lehigh Valley is in the Northeast.

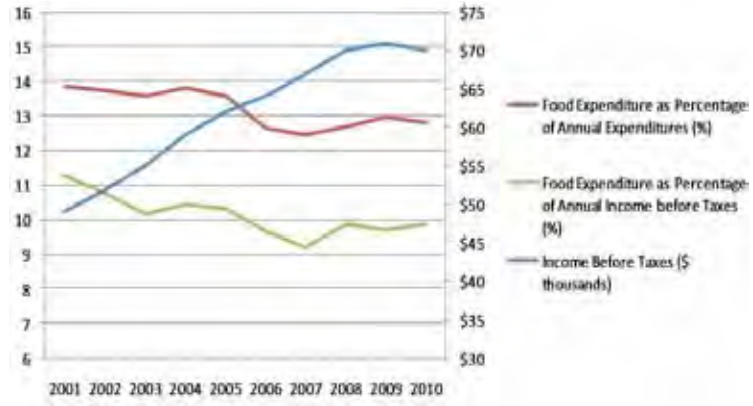
According to the CE Survey, in the Northeast, the average household (made up of 2.5 consumer units[17]) spent $6,755 on food in 2010.[18] Looking at the Northeast food expenditures over the past decade, we are spending a smaller percentage of our total annual expenditures on food now (12.8%) than we did a decade ago (13.8%).[19] We are also spending a smaller percentage of our income (9.95% in 2010 versus 11.2% in 2001) as shown in Figure 1.7.

Fig 1.6 People Living in Poverty in Lehigh Valley Cities (2007-2011)



Sources: US Census Bureau 2011, BFBL-GLV 2013

Fig 1.7 Food Expenditures in the Northeast as a Percentage of Annual Expenditures and Income



Sources: US Census Bureau, BLS 2001-2010, BFBL-GLV 2013

[15] (2010). *American Community Survey 1-Year Estimates.*

[16] *(2007). American Community Survey 1-Year Estimates.*

[17] The average household size in the Lehigh Valley was 2.54 in Lehigh County and 2.53 in Northampton County in 2010. For our purposes, however, the annual food expenditure was not adjusted to reflect the slightly larger household size since the extra 0.03 or 0.04 household member is likely a fraction of a child, which would involve less additional spending than an adult.

[18] (2010). *Consumer Expenditure Survey.*

[19] (2001-2010). *Consumer Expenditure Survey, Region of Residence.*

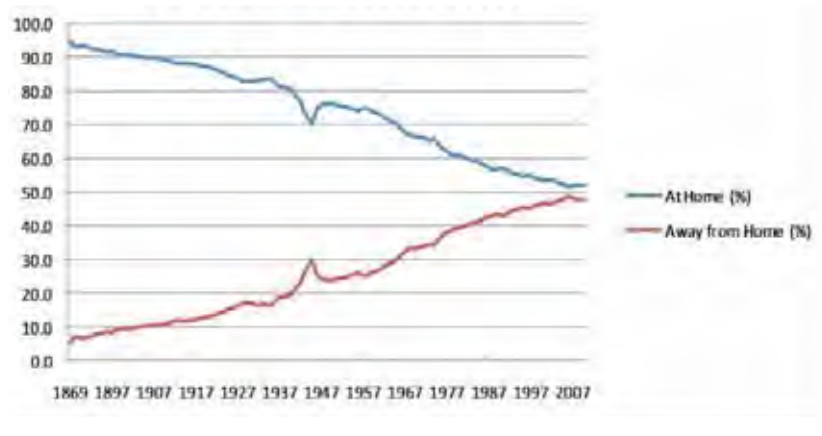
This is a national trend: over the last century, Americans have been gradually spending less of their disposable personal money income on food. In 1929, US consumers spent 23.4 percent of their income on food. while in 2010, that figure was 9.7 percent (See Figure 1.8).[20]

The amount spent on food includes both food consumed at home and food consumed away from home (food purchased at eating and drinking places, as well as food purchased at hotels, recreational places, vending machines, and schools and colleges). At the national level, the share of food dollars spent away from home has increased steadily over time from 17.2% in 1929 to 47.9% in 2010, as shown in Figure 1.9.[21] Eating outside the home has transitioned from being an occasional luxury to encompassing half of our food purchases. This shift in eating patterns has consequences for public health. Studies have shown that increased away-from-home food expenditures are associated with poor diet quality, higher intakes of fat, and lower intakes of fiber.[22, 23, 24]

Fig 1.8 U.S. Food Expenditures as a Share of Disposable Income

Sources: USDA ERS 2010, BFBL-GLV 2013

Figure 1.9 Percentage of Food Expenditures At and Away from Home



Sources: USDA ERS 2010, BFBL-GLV 2013

[20] United States Department of Agriculture (USDA), Economic Research Service (ERS). (2010). *Food Expenditures: Table 7 - Food expenditures by families and individuals as a share of disposable personal income* [Data file]. Retrieved from http://ers.usda.gov/data-products/food-expenditures.aspx#26636
Note: Disposable personal money income is equal to disposable personal income minus food produced and consumed on farms, government transfer payments to persons (including food stamps and medical care), and supplements to wages and salaries (including employers' contributions for social security, Medicare and medical insurance, and retirement, and meals furnished to employees).

[21] (2010) *Food Expenditures: Table 1 - Food and alcoholic beverages: Total.*

[22] Beydoun M. A., Powell L. M., & Wang Y. (2009) Reduced Away-from-home Food Expenditure and Better Nutrition Knowledge and Belief Can Improve Quality of Dietary Intake among U.S. Adults [Abstract]. *Public Health Nutrition, 12*(3):369-81. doi: 10.1017/S1368980008002140 or http://www.ncbi.nlm.nih.gov/pubmed/18426638

[23] USDA,ERS. (2010). *The Impact of Food Away From Home on Adult Diet Quality*. Retrieved from http://uhs.berkeley.edu/Facstaff/pdf/healthmatters/FoodAwayFromHome.pdf

[24] Guthrie J. F., Lin B. H., & Frazao E. (2002). Role of Food Prepared Away from Home in the American Diet, 1977-78 Versus 1994-96: Changes and Consequences [Abstract]. *Journal of Nutrition Education and Behavior 34*(3):140-50. Retreived from http://www.ncbi.nlm.nih.gov/pubmed/12047838

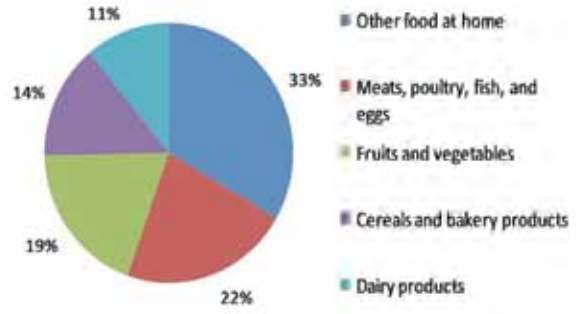
CSA Share, Shooting Star Farms, Easton
Photo Credit: Tianna Dupont

Food Categories

Figure 1.10 shows the specific categories of food that consumers are purchasing here in the Northeast.[25] It illustrates that the amount spent in each category has remained somewhat constant over the past decade except in the category "Other food at home". The amount spent in this category has increased significantly in recent years and has become larger than any other category.

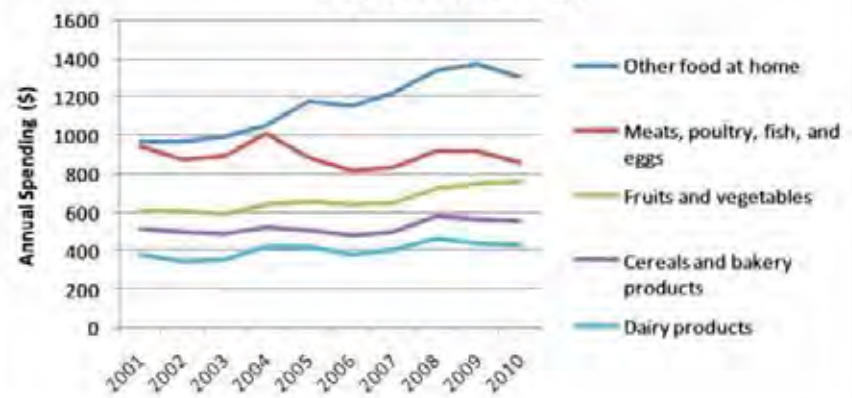
Figure 1.11 clarifies that the amount consumers in the Northeast spent on "Other food at home" was one third of the average grocery bill.[26] This category includes sweeteners, jams, candy, non-dairy fats (shortening, margarine), oils, frozen prepared meals, snack foods, condiments, prepared foods, and nonalcoholic beverages other than pure fruit and vegetable juices.

Figure 1.11 Percentage of At Home Food Dollars Spent by Category (2010)



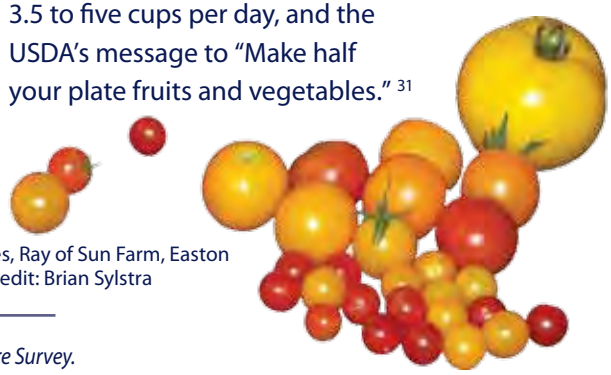
Source: US Census Bureau 2010, BFBL-GLV 2013

Figure 1.10 Annual Spending on Food at Home in the Northeast



Source: US Census Bureau, BLS 2010, BFBL-GLV 2013

What we eat can have a significant effect on our health. In 2005, the Centers for Disease Control and Prevention (CDC) estimated that 365,000 US deaths annually are attributable to poor diet and lack of physical activity.[27] Eating healthy foods, particularly fresh fruits and vegetables, can help reduce the risk of chronic diseases, including heart disease, diabetes, and cancer;[28] however, most people do not eat the recommended amounts of fruit and vegetables.[29] In Pennsylvania, adults consume vegetables about 1.5 times per day, slightly below the national median of 1.6 times per day, and fruit about 1.1 times per day, similarly to the national average.[30] These consumption rates are far below the recommended intake of 3.5 to five cups per day, and the USDA's message to "Make half your plate fruits and vegetables." [31]



Tomatoes, Ray of Sun Farm, Easton
Photo Credit: Brian Sylstra

[25] (2001-2010). *Consumer Expenditure Survey.*

[26] (2010). *Consumer Expenditure Survey.*

[27] Mokdad A. H., Marks J. S., Stroup D. F., & Gerberding J.L. (2005). Correction: Actual Causes of Death in the United States, 2000. *JAMA* 293(3):293-298. doi:10.1001/jama.293.3.293. Retrieved from http://jama.jamanetwork.com/article.aspx?articleid=200177

[28] Ness A. R. & Powles J.W. (1997). Fruit and vegetables, and cardiovascular disease: a review [Abstract]. *Int J Epidemiol 26*(1):1–13. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/9126498

[29] Centers for Disease Control and Prevention. (2013). *State Indicator Report on Fruits and Vegetables 2013.* Retrieved from: http://www.cdc.gov/nutrition/downloads/State-Indicator-Report-Fruits-Vegetables-2013.pdf

[30] *Ibid.*

[31] United State Department of Agriculture. *My Plate.* Retrieved from http://www.choosemyplate.gov/food-groups/

A recent study[32] found that federal commodity subsidies have contributed to the obesity epidemic in this country by making unhealthy processed food readily available at low cost as compared to healthy alternatives. The authors argue that subsidies create strong economic incentives to overproduce commodity crops, particularly corn and soy beans, which result in the propagation of cheap sugars and oils inherent in cheap, processed food options. They conclude that agricultural policy reform must occur in order to fight obesity issues.

It is the goal of the Fresh Food Access Plan to present strategies to improve both fresh food access and the Lehigh Valley's local food economy in order to increase consumption of fruits and vegetables and improve residents' dietary practices and health.

Gogle Farm Peaches, Coplay
Photo Credit: Julia Gogle

Valley View Farm, Northampton
Photo Credit: BFBL-GLV

Questions to Consider

How do we feel about the Lehigh Valley shifting towards becoming more urban/ suburban and losing much of its rural nature? What are the potential impacts of such a transition? What role does farmland play in the character of our region?

Is the issue of improving access to nutritious foods for the aging population important enough to warrant the use of limited Lehigh Valley resources, such as time and money?

What steps can be taken to include minority populations in fresh food access issues?

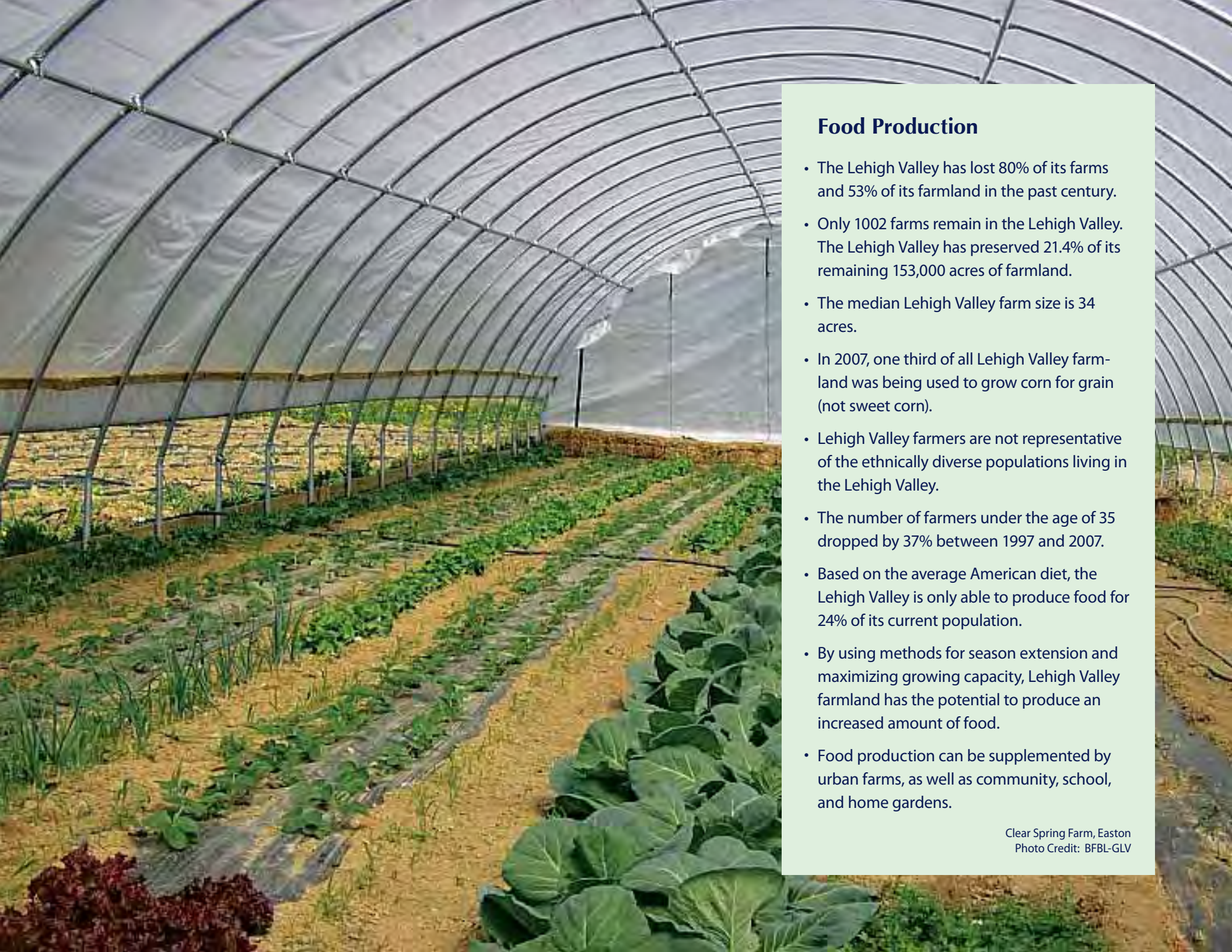
How does limited fresh food access for households living in poverty affect the Lehigh Valley as a whole?

Should we as a community spend a greater percentage of our income on food? Are we willing and/or able to do so?

What can we do as a community to make healthy food choices easier?

What steps should our community take to understand how federal agricultural subsidies are affecting our local food supply?

[32] Franck C., Grandi S. M., & Eisenberg M.J. (2013). Agricultural Subsidies and the American Obesity Epidemic. *American Journal of Preventive Medicine* 45(3). doi 10.1016/j.amepre.2013.04.010 or http://www.ajpmonline.org/webfiles/images/journals/amepre/3834-stamped-070913.pdf



Food Production

- The Lehigh Valley has lost 80% of its farms and 53% of its farmland in the past century.
- Only 1002 farms remain in the Lehigh Valley. The Lehigh Valley has preserved 21.4% of its remaining 153,000 acres of farmland.
- The median Lehigh Valley farm size is 34 acres.
- In 2007, one third of all Lehigh Valley farmland was being used to grow corn for grain (not sweet corn).
- Lehigh Valley farmers are not representative of the ethnically diverse populations living in the Lehigh Valley.
- The number of farmers under the age of 35 dropped by 37% between 1997 and 2007.
- Based on the average American diet, the Lehigh Valley is only able to produce food for 24% of its current population.
- By using methods for season extension and maximizing growing capacity, Lehigh Valley farmland has the potential to produce an increased amount of food.
- Food production can be supplemented by urban farms, as well as community, school, and home gardens.

Clear Spring Farm, Easton
Photo Credit: BFBL-GLV

2. Food Production

2.1 The Fresh Food Access Plan as Part of the History of the Local Food Movement

Benjamin Cohen, Ph.D., Assistant Professor, Engineering Studies, Lafayette College

Thinking toward a future for fresh food in the Lehigh Valley is properly a subject of public policy, urban planning, community food security, agricultural and food studies, environmental health, and economic development. It is also a project contributing to food and environmental history. In that manner it is part of a long historical trajectory that charts changes in the ways people come to plan and define their food systems. The Lehigh Valley has specific geographic and cultural features that make its history unique—including the population demographics, a specific economic and business sector, and the farming lands of our particular soils and geology noted in other parts of this report. It is also a subset of larger national and global trends in food and the environment. At that general level, the FFAP's efforts to plan the next generation of food access track along with national trends usually summarized as the local food movement.

Advocates generally understand that movement as a response to the public health and ecological problems of an industrialized food system. That industrial model of food production, distribution, and consumption began in the later nineteenth century as a way to aggregate and streamline agricultural activity. It was fostered throughout the twentieth century by a productionist paradigm, one where policy makers defined the core goals of agriculture as maximizing production and increasing commodity specialization. To achieve those goals, they cast yield and output as essential values and technologies of large-scale production as underlying mechanical necessities.

One impetus for production-centered agriculture has been a long demographic shift away from the country and into the city. The 1920 census was the first to record a tilt away from rural to urban dominance in the United States, when the population was then 51% urban, 49% rural. (The 2010 census found the U.S. 81% urban and 19% rural.)[1] This meant that fewer people were working the land to produce food and, in turn, each farm had to provide more. In other words, fewer people were producers who made their lives as part of the agricultural world while more were consumers who purchased food in stores like any other consumer product. In the eyes of prominent policy-makers, the demographic changes necessitated that farmland produce more food with less land and labor.

Indeed, since 1900 farms have been fewer but their sizes larger: since that time, "the number of farms has fallen by 63 percent, while the average farm size has risen 67 percent." With that decrease in farm number came a well-documented drop in the farm labor force, from 41% in 1900 to 1.7% in 2000. And to aid the gains in productivity, farms decreased the number of crops they grew and aimed instead to meet new demands of commodity specialization. The average number of crops per farm dropped from 5 to 2 between 1900 and 2000 (USDA, 2005, p. 2).

The push for production-focused and commodity-specialized farming certainly led to changes in the character of American agriculture: larger farms, more chemicals, more efficient use of land and labor and, as planned, greater productivity. Not surprisingly, the productionist paradigm has also had clear environmental and cultural problems. Farmers needed those larger farms to gain the benefits of mechanization and they needed larger harvesters, tractors, and assorted farming machinery to make those farming techniques possible. (Thus they were eventually told to "get big or get out," to use Secretary of Agriculture Earl Butz's famous phrase from the 1970s.) These greater scales encouraged the trend for less diversified planting, which furthered dependence on chemicals for the crops and increased reliance on fuels for tractors and equipment (away from animal-based power and energy). Put another way, increasing commodity specialization led to decreasing ecological biodiversity. The chemical and fuel dependencies that made such productivity goals possible also damaged the soil, drank up water reserves at problematic levels, changed the nutrition of food, and tied farmers to industries that undermined their chances at self-sufficiency.

[1] United States Census Bureau. (1995). *Urban and Rural Population.* Retrieved from http://www.census.gov/population/censusdata/urpop0090.txt and (2013). *2010 Census: Urban and Rural Classification and Urban Area Criteria.* Retrieved from http://www.census.gov/geo/reference/ua/urban-rural-2010.html

Many of these consequences weren't trumpeted widely until the rise of an environmental movement of the 1960s and 1970s that sought to overcome the downsides to industrial lifestyles. J.I. Rodale, to use a prominent local example, had moved to the Lehigh Valley from Manhattan before World War II where he soon sought to promote the organic living that Rodale Farms became known for after the War. Advocating the integrated values of human health and ecological integrity, Rodale foreshadowed what many would later call the back-to-the-land movement of the 1970s.

The back-to-the-land movement and other related organic efforts were in many ways intended to reverse the urban-rural shift. There, people wanted to recover the rural virtues and grounded lifestyles that urbanism had undermined. As the Rodale example shows, the response to industrial agriculture in the second half of the twentieth century was not just a response to the human and ecological health damages wrought by industrial models. It was also a move to reconfigure the consumer-producer relationship between farm and fork.

As with the environmental movement writ large, though, the organic and back-to-the-land efforts slowed down in the face of political changes by the 1980s. This was at the same time that a new Farm Crisis arose, to which Willie Nelson's Farm Aid concerts were a response. As part of the post-War drive for ever-greater production, farmers had indeed been getting big, rather than getting out. They did this with the help of loan-bought equipment, land, and assorted inputs (like fertilizers and fuel). But with bank loans called in, interest rates soaring and property values falling, many farmers lost the farm. Before the Great Recession of 2008, this was the last major agricultural crisis. It served mostly to continue the century-long decline in rural population and the farm labor rolls.

By the last decade of the twentieth century, a new movement coalesced around the same principles of environmental health as the decades before, but under the new banners of sustainability and the local food movement. While it's not possible (or sensible) to lump several decades of activity together in one broad description—there's been too much diversity and variety in efforts to re-localize food—it's worth noting one basic difference between the local food movement of the past two decades and the back-to-the-land ethos of the 1970s: the recent movement has been more dedicated to regionalizing our food with urban living and cities in mind. Rather than leaving the city, efforts to re-localize have sought to integrate urban living into the ways we think about, produce, and consume food. Advocates have been reconstituting markets rather than abandoning them.

The Fresh Food Access Plan is one outcome of and contributor to that set of efforts. The Lehigh Valley continues to reconfigure its food system in ways that rethink relationships between and amongst producers, consumers, and markets. Farmers' markets, Community Supported Agriculture (CSAs), food hubs, organic grocery stores, community gardens, and urban farms all have a place in this future foodshed. Each effort works to bring consumers and producers closer together, to redefine consumers as producers (as with gardens, CSAs, and urban farms, for example), or to collapse the abundance of links in the chain from farm to fork. This is not because they echo back to a pre-industrial world—one with different demographic, policy-based, economic, and environmental features—but because they work to craft a post-industrial one. The efforts as a whole strive to balance the cultural and ecological benefits of regional farming with the demands for accessible and reliable food supplies.

Rather than leaving the city, efforts to re-localize have sought to integrate urban living into the ways we think about, produce, and consume food.

For further reading on some of the historical themes above, see:

Beslasco, Warren. (1989). A*ppetite for Change: How the Counterculture Took on the Food Industry.* Ithaca, NY: Cornell University Press.

Brown, Dona. (2011). *Back to the Land: The Enduring Dream of Self-Sufficiency in Modern America.* Madison: University of Wisconsin Press.

Guthman, Julie. (2004). *Agrarian Paradox: The Para dox of Organic Farming in California*. Berkeley: University of California Press.

Stoll, Steven. (1998). *The Fruits of Natural Advantage: Making the Industrial Countryside in California.* Berkeley: University of California Press.

United Stated Department of Agriculture, Economic Research Service. (2005). *The 20th Century Transformation of U.S. Agriculture and Farm Policy.* (Economic Information Bulletin No. EIB-3). Retrieved from http://www.ers.usda.gov/media/259572/eib3_1_.pdf

2.2 Farms in the Lehigh Valley

Number of Farms, Acres of Farmland

The USDA defines a farm as any place that produces and sells at least $1,000 of agricultural products during a given year.[2] Based on this definition, the number of farms in the Lehigh Valley has declined drastically over the last eighty years: while there were 5032 farms here in 1930, by the year 2007, there were only 1002 remaining.[3,4] As a result of this 80 percent loss in farms, the Lehigh Valley does not produce food to the extent that it once did.

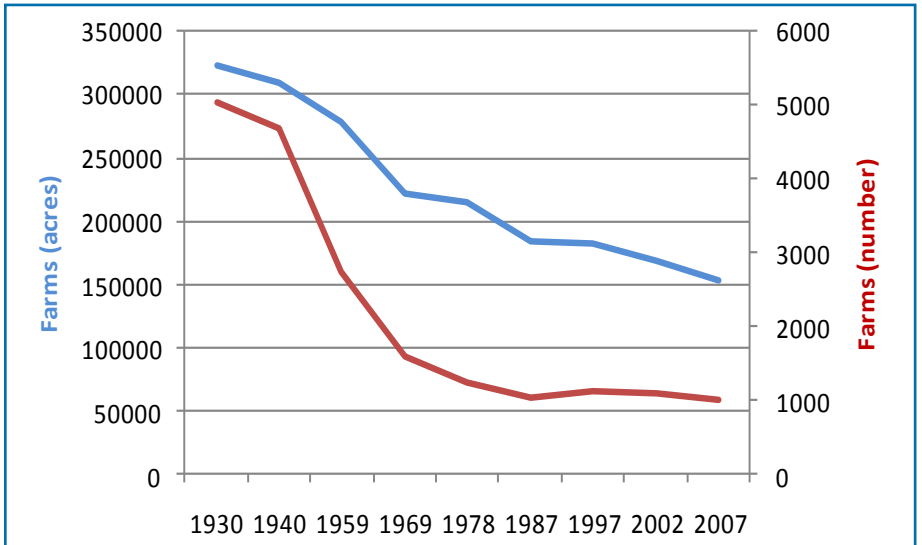
Along with this century-long decline in the number of farms dedicated to producing food, the Lehigh Valley has seen a corresponding 53 percent loss in the number of acres of "Land in Farms" during this period, declining from 323,000 acres in 1930 to 153,000 acres in 2007 (See Figure 2.1).[5,6]

Forks Township
Photo Credit: BFBL-GLV

In the United States as a whole, the number of farms has also been on a decline since the 1940s; however, recent figures indicate a leveling of this trend. There was a four percent increase in the number of farms nationwide between 2002 and 2007.[7] Unfortunately, this was not the case in the Lehigh Valley where 103 farms (nine percent) were lost during this period.

There are many reasons for this decline in the amount of farmland under cultivation. According to the Lehigh Valley Planning Commission's Comprehensive Plan,[8] "land is being converted to housing, commercial and industrial uses at a rate of 3.5 square miles per year. Housing accounts for about 80% of this land conversion." The expected arrival of 146,000 more people in the Lehigh Valley over the next twenty years will place yet more pressure on this remaining farmland.

Figure 2.1 **Farms in the Lehigh Valley**



Sources: USDA, Census of Agriculture 1930-2007, BFBL-GLV 2013

[2] United States Department of Agriculture. (2007). *Census of Agriculture* [Data file]. Retrieved from http://www.agcensus.usda.gov/Publications/index.php

[3] (1930-2007). *Census of Agriculture.*

[4] The Census of Agriculture measures activities of the farm sector by gathering data from a list of known agricultural operators; the list is compiled from past census records, federal agencies and trade associations. Some farms are not included in the list. This is known as list coverage error. Additionally, nonresponse error can occur when farms included on the list fail to complete and mail back the survey. To account for nonresponse error, sample tracts of land are chosen randomly, and every agricultural operation and all agricultural land is counted and compared to the census list. Adjustments are then made in the totals based on the information obtained from these samples. Before 1997, census estimates were not adjusted, exposing the Census of Agriculture's estimates to a considerable amount of error. Since 1997, only adjusted estimates have been published.

[5] (1930-2007). *Census of Agriculture.*

[6] According to the USDA, the acreage designated as "land in farms" consists primarily of agricultural land used for crops, pasture, or grazing. It also includes woodland and wasteland not actually under cultivation or used for pasture or grazing, provided it was part of the farm operator's total operation.

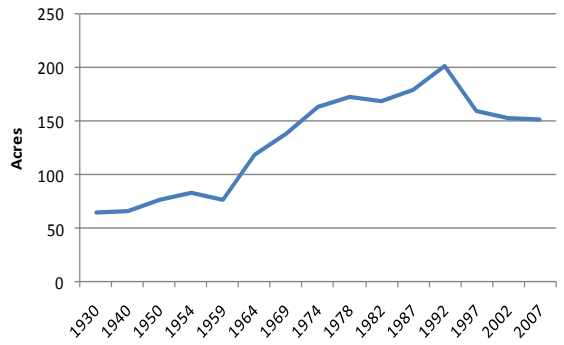
[7] (2002-2007). *Census of Agriculture: (USDA).*

[8] Lehigh Valley Planning Commission. (2005). *Comprehensive Plan The Lehigh Valley …* 2030. Retrieved from http://www.lvpc.org/pdf/lv2030/compPlan01.pdf

Farm Size

When discussing farm size, farms can be classified either by acreage or by farm sales. The average Lehigh Valley farm grew considerably in acreage during the mid to late twentieth century: in 1954, the average farm was 84 acres, but by 1992, it had grown to 201 acres as shown in Figure 2.2.[9] A similar trend occurred nationwide as agricultural production became concentrated in large agricultural enterprises.[10]

Figure 2.2
Average Farm Acreage in the Lehigh Valley

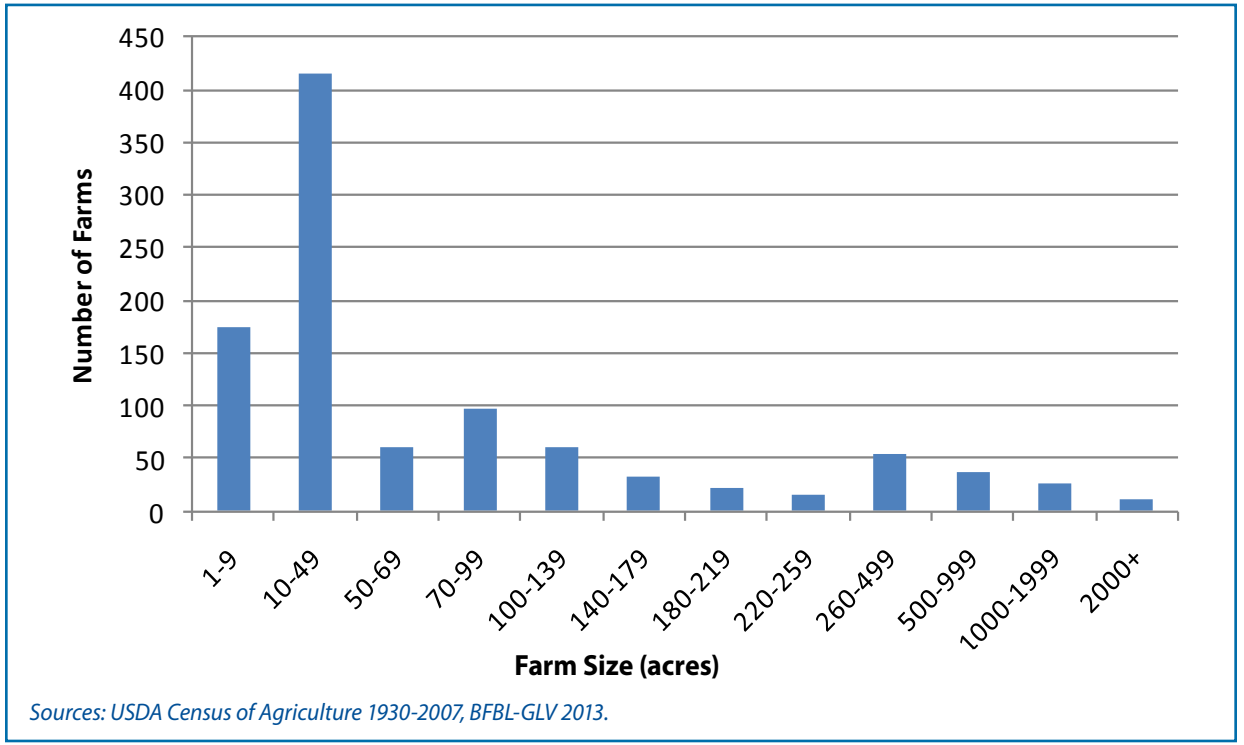


Sources: USDA Census of Agriculture 1930-2007, BFBL-GLV 2013.

In the past twenty years, however, there has been a general trend across the United States towards decreasing farm acreage: farms that began operation between 2003 and 2007 tended to be smaller in acreage than the average farm.[11] Following this trend, the average farm size in the Lehigh Valley had decreased down to 152 acres by 2007.[12]

Interestingly, the median Lehigh Valley farm size in 2007 was 34 acres, much lower than the average farm acreage of 152 acres.[13] The average is skewed to the right by the handful of large farms over 1000 acres (See Figure 2.3).

Figure 2.3 **Number of Lehigh Valley Farms According to Acreage (2007)**



Sources: USDA Census of Agriculture 1930-2007, BFBL-GLV 2013.

Meadow Mountain Farm, Robesonia
Photo Credit: BFBL-GLV

[9] (1930-2007). *Census of Agriculture.*

[10] United States Department of Agriculture. (2003). American Farms. *In Agriculture Fact Book 2001-2002* (Chapter 3. p. 24). http://www.usda.gov/factbook/2002factbook.pdf

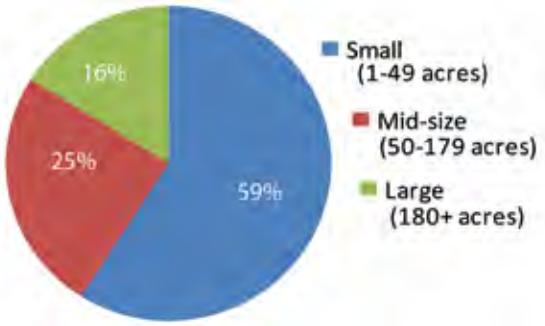
[11] US Department of Agriculture, National Agricultural Statistics Service. (2007) *Census of Agriculture Farm Numbers*. http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/Fact_Sheets/Farm_Numbers/farm_numbers.pdf

[12] (2007). *Census of Agriculture.*

[13] *Ibid.*

While the overall number of farms in the Lehigh Valley has continued to decline, the percentage of small acreage farms[14] in the Lehigh Valley has remained relatively stable: in 1949, 62 percent of farms in the Lehigh Valley were less than 49 acres in size, and in 2007, small farms still represented the majority of total farms (59 percent) (See Figure 2.4).[15] Recent growth in the number of small acreage farms (See Figure 2.5) is attributable to a number of national trends, including increased demand for organic and locally grown foods and heightened concern for food safety.[16]

Figure 2.4
Percentage of Total Lehigh Valley Farms by Acreage (2007)

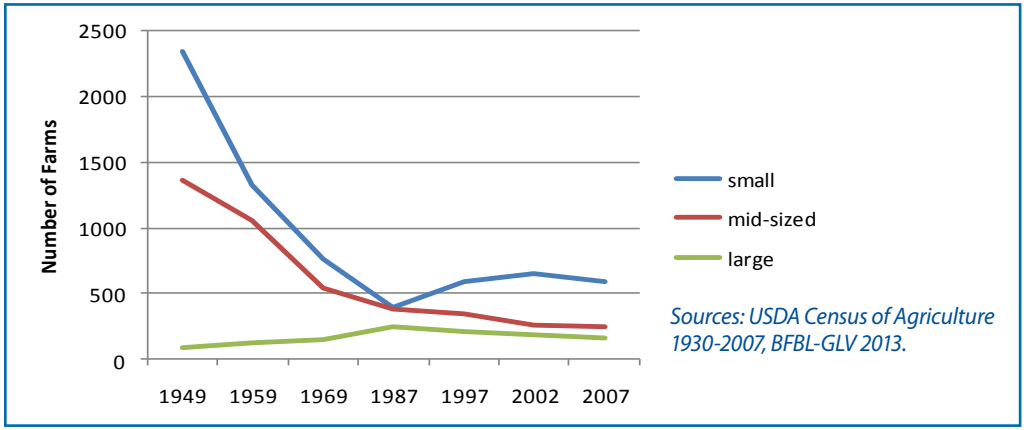


Sources: USDA Census of Agriculture 1930-2007, BFBL-GLV 2013.

What has changed from 1949 is the number of mid-sized acreage farms, from 36 percent to 25 percent with a corresponding increase in the number of large acreage farms from 2 percent to 16 percent (See Figure 2.5).[17] Larger farms enjoy economies of scale and the use of costly advanced farm machinery that enable the efficient cultivation of bigger tracts of land. Often, small- and mid-sized farms are at a competitive disadvantage.[18]

A second indicator of farm size is economic activity measured by the level of sales of farm products. The number of acres of land needed to produce a given dollar amount of farm products varies with the type of product and with the characteristics of the land; for example, pastured cattle operations may use large acreages but have a low volume of sales. The USDA's Economic Research Service (ERS) established a farm classification based on the annual gross sales of the farm, major occupation of the operator, and family/nonfamily ownership. There are three major categories: small family farms, where the majority of the business is owned by the operator and relatives and has sales of less than $250,000; large-scale family farms, which include large family farms (gross sales between $250,000 and $499,999) and very large family farms (gross sales of $500,000 or more); and nonfamily farms.[19]

Figure 2.5 Number of Lehigh Valley Farms by Acreage (1949-2007)



Sources: USDA Census of Agriculture 1930-2007, BFBL-GLV 2013.

[14] For the purposes of this report, small acreage farms are up to 49 acres, mid-sized acreage farms are 50-179 acres, and large acreage farms are 180 acres or more for recent data. For data from 1969 and earlier, the USDA Census of Agriculture classified farms as being "100 to 199 acres" and "200 to 499 acres". For these years, it is possible that some of large farms (those in the range of 180 to 199 acres) are counted as mid-sized farms.

[15] (1949, 2007). *Census of Agriculture.*

[16] King, S. (2009). The Growth of Small Farms. *US News & World Report.* http://money.usnews.com/money/blogs/outside-voices-small-business/2009/02/25/the-growth-of-small-farms

[17] (1949, 2007). *Census of Agriculture.*

[18] Council for Agricultural Science and Technology. (1988). *Long-Term Viability of U.S. Agriculture.* Task Force Report 114. "The future viability of the adequate size, well-managed commercial farms, and the part-time smaller farms is not in doubt. The future is much in doubt, however, for full-time family farms lacking a strong financial or managerial base, too small to realize economies of size, and too demanding of labor and management for the operator and family to earn substantial off-farm income."

[19] USDA, Economic Research Service. (2010). *America's Diverse Family Farms 2010 Edition.* Economic Information Bulletin Number 67. Retrieved from http://www.ers.usda.gov/media/138996/eib67_1_.pdf The $250,000 cutoff for small farms was suggested by the National Commission on Small Farms. (1998) *A Time To Act: A Report of the USDA National Commission on Small Farms.* Retrieved from http://www.csrees.usda.gov/nea/ag_systems/pdfs/time_to_act_1998.pdf

A 2010 report stated that 91 percent of farms in the United States are small, having a gross income of less than $250,000, and that of these farms, about 60 percent are very small, generating less than $10,000 in annual sales.[20] These very small farms tend to be non-commercial and include retirement farms (operators are retired but continue to farm on a small scale) and residential/lifestyle farms (operators report a major occupation other than farming). The 2007 Census of Agriculture reported that the two largest groups of farms in the United States are residential/lifestyle farms (36 percent) and retirement farms (21 percent).[21]

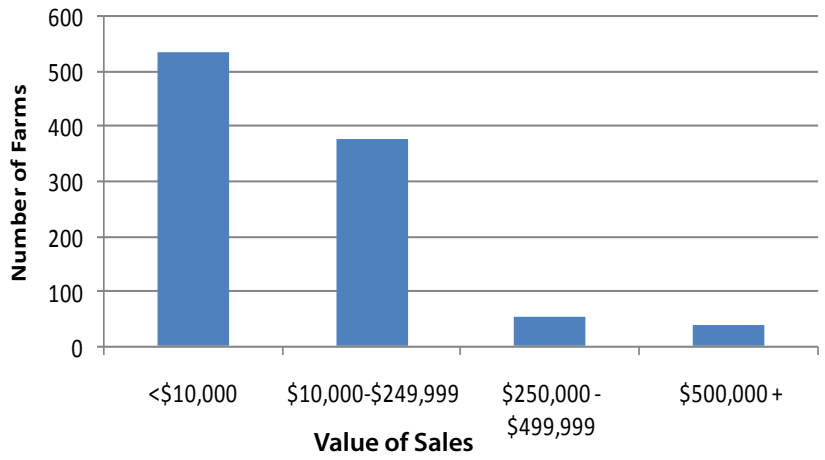
The situation is similar here in the Lehigh Valley: in 2007, 91 percent of farms had less than $250,000 in sales while 54 percent generated less than $10,000 in annual sales (See Figure 2.6).[22]

Since the very small farms tend to be noncommercial, statistics based on their numbers tend to misrepresent the performance of small commercial farms. Removing these very small farms from the calculations, 81 percent of Lehigh Valley commercial farms were small farms that produced 20 percent of total sales.[23] Nationally, the number of small commercial farms and their share of sales have been in decline.[24] Similarly, the number of small commercial farms in the Lehigh Valley dropped from 86 percent of all farms in 2002 down to 81 percent in 2007.[25] During the same period, their share of sales dropped from 33 percent to 20 percent.[26]

From 2002 to 2007, overall farm production in the Lehigh Valley continued to shift to larger operations as it did nationally. The number of very large family farms rose from 17 to 37. While making up only 8.0 percent of all commercial farms in the Lehigh Valley, these farms produced 62 percent of the value of all agricultural products sold, up from 50 percent in 2002 (See Figure 2.7).[27]

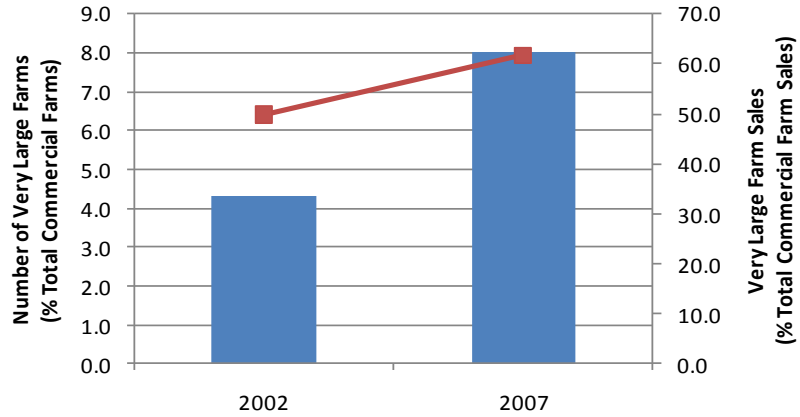
Fairman Farm, Nazareth
Photo Credit: BFBL-GLV

Figure 2.6 Number of Lehigh Valley Farms According to Annual Sales (2007)



Sources: USDA Census of Agriculture 2007, BFBL-GLV 2013.

Figure 2.7 Number and Sales of Very Large Farms in the Lehigh Valley



Sources: USDA, Census of Agriculture 2002, 2007, BFBL-GLV 2013.

[20] United States Department of Agriculture, Economic Research Service. (2010). *Small Farms in the United States - Persistence Under Pressure*. Economic Information Bulletin Number 63. Retrieved from http://www.ers.usda.gov/media/147007/eib63_1_.pdf

[21] (2007). *Census of Agriculture Farm Numbers.*

[22] (2007). *Census of Agriculture.*

[23] (2007). *Census of Agriculture.*

[24] *Small Farms in the United States - Persistence Under Pressure.*

[25] (2002, 2007). *Census of Agriculture.*

[26] *Ibid.*

[27] *Ibid.*

2.3 Farmland Preservation in the Lehigh Valley

Jeff Zehr, Director of Farmland Preservation, Lehigh County
and Maria Bentzoni, Farmland Preservation Administrator, Northampton County

People must fully understand the irreplaceable value of prime farmlands, and the ominous meaning of the war between the bulldozer and the plow. When farmland goes, food goes. Asphalt is the land's last crop.

~ M. Rupert Cutler

The foundation of a strong local food system is a region with well cared-for farms and farmland. Without farmland in the Lehigh Valley, there can be no locally produced food.

In the early 1990s, both Lehigh County and Northampton County began preserving and protecting farmland with their agricultural conservation easement programs. An agricultural conservation easement is a legal agreement between a landowner and a government body or non-profit organization that protects farmland in perpetuity from non-agricultural development. Farms subject to conservation easements remain in private ownership, but the protective land use restrictions stay with the land as ownership changes over time. Landowners are financially compensated for the decrease in land values that may occur when preservation restrictions are placed on their farms.

Some Lehigh Valley municipalities also use agricultural protection zoning (APZ) ordinances to protect farmland from development, but zoning does not provide permanent protection for farmland. Some APZ ordinances have been challenged and weakened in the Lehigh Valley.

The Pennsylvania Farmland and Forest Land Assessment Act (Act 319 of 1974), also known as the "Clean & Green Act", helps to preserve land by taxing owners of farmland and forest land at lower rates. This program provides landowners with a strong financial incentive to not develop their farmland.

Good Work Farm, Emmaus
Photo Credit: Sarah Edmonds

Funding and Public Support

Pennsylvania voters passed a referendum approving the sale of $100 million in bonds in November of 1987 to provide the first Commonwealth funding for the preservation of farmland. This referendum passed by a margin of more than 2 to 1. Following the passage of the bond referendum, the Pennsylvania legislature amended the Agricultural Area Security Law (Act 43 of 1981) to create the Pennsylvania Agricultural Conservation Easement Program.

Since the sale of the first $100 million in bonds, the Commonwealth has generated additional funding for farmland preservation through the Growing Greener I and Growing Greener II programs as well as other sources. Currently most of the Commonwealth Farmland Preservation funding comes from a tax on cigarette purchases and from the Pennsylvania Environmental Stewardship Fund. The federal government has also provided funding for farmland preservation through the Farm and Ranch Lands Protection Program (FRPP) since 1996.

Table 2.1 Lehigh Valley Farmland Preserved with Agricultural Conservation Easements (as of 1/1/13)

	Farms (number)	Acreage (acres)	Acres Preserved as Percent of Total Acres* (%)
Lehigh	250	20,692	24.4%
NH	118	12,103	17.5%
LV	368	32,795	21.4%

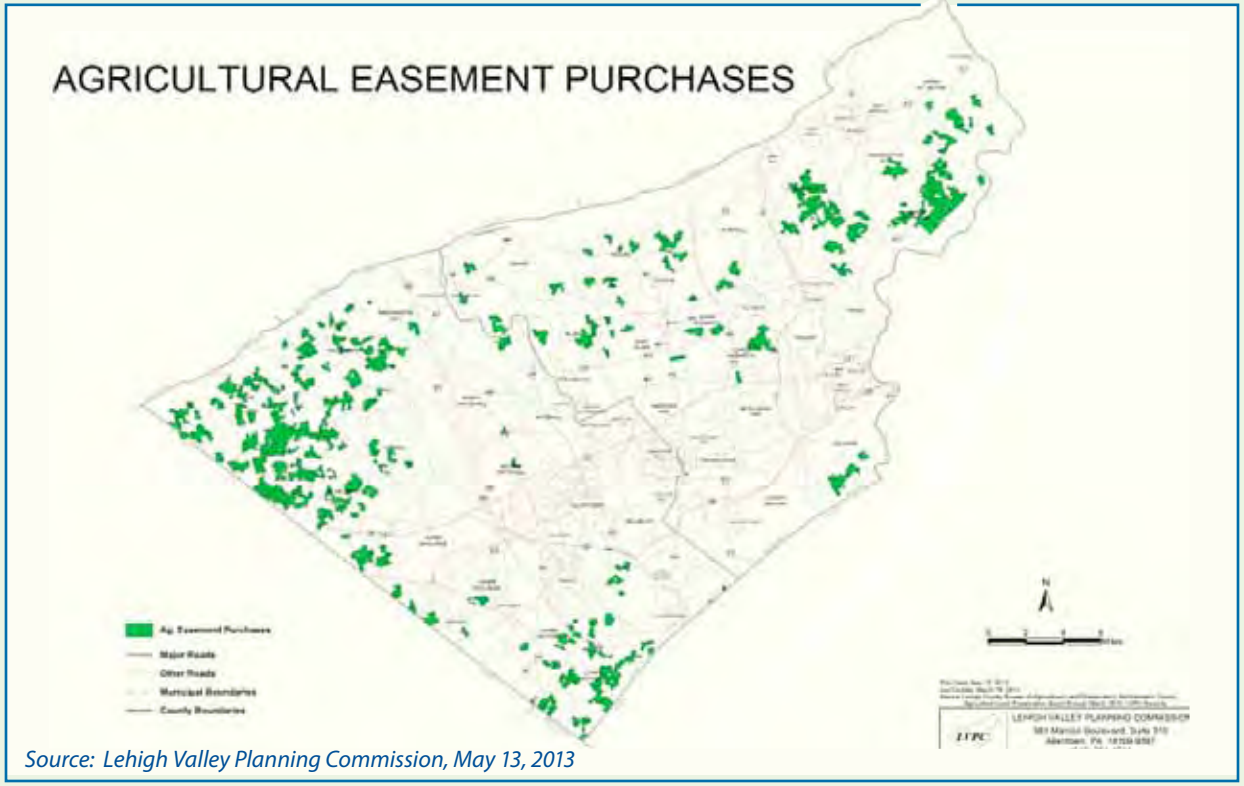
*as compared to total Land in Farms (2007) *Census of Agriculture*

Lehigh Valley voters have demonstrated their strong support for both counties' farmland preservation programs. In May of 2002, 71 percent of Lehigh County voters approved a $30 million open space bond referendum with $10 million of this dedicated for farmland preservation. In November of the same year, Northampton County voters approved a $37 million open space bond referendum with 65 percent in favor.

Even in challenging economic times, residents of the Lehigh Valley are strongly supportive of their farmland preservation programs. A 2010 Lehigh Valley Land Use Public Opinion Survey conducted by the Lehigh Valley Planning Commission showed that 92 percent of the Lehigh Valley residents surveyed favored the preservation of farmland. When asked "what do you think are the most important planning issues that need to be addressed within the next 10 years?" the number one answer was "preserving farmland."

As of January 2013, the Lehigh Valley has preserved 32,795 acres of farmland (368 farms), representing 21.4 percent of total land in farms (See Table 2.1). The locations of these preserved farms are shown in Figure 2.8. The total funds spent in each County on Farmland Preservation are shown in Table 2.2 (opposite page.)

Figure 2.8 Map of Lehigh Valley Farmland Preserved with Agricultural Conservation Easements



Source: Lehigh Valley Planning Commission, May 13, 2013

Preserved Betty Loch Farm in Loch Valley, Weisenberg Township, Lehigh County Photo Credit: Jeff Zehr

Current Farmland Preservation Trends in the Lehigh Valley

Northampton County has funded their farmland program generously in recent years and has creatively leveraged local municipal funds to obtain additional match funds from the Commonwealth. To date, Northampton County townships have contributed $3,590,000 to the program. In 2012, Northampton County allocated $3.9 million for farmland preservation, which was the largest county contribution in Pennsylvania for that year. As a result of the County's significant investment in the program that year, it received $2,273,725 in Commonwealth funds. In 2013, Northampton County allocated $1.2 million in matching funds for the program.

Although Lehigh County got off to a strong start with their farmland preservation program, the county program has stalled in the last few years. Lehigh County did not provide any match funding in 2011 and 2012 for their farmland preservation program; thus, Lehigh County's program has relied solely on a limited amount of Commonwealth funding for the past two years. As a consequence, there are now 70 farms on Lehigh County's farmland preservation program waiting list. Lehigh County has allocated $200,000 in matching funds for the program in 2013.

Table 2.2 Total Funds Spent on Farmland Preservation by County (as of 1/1/13)

	Commonwealth Funds	County Funds	Municipal Funds	Federal Funds	Total Funds	Average Price/Acre
Lehigh County	$47,387,104	$19,465,305	$152,421	$283,000	$67,287,830	$3,146
Northampton County	$36,391,593	$15,593,873	$3,590,000	$800,184	$56,375,650	$4,573
Totals	**$83,778,697**	**$35,059,178**	**$3,742,421**	**$1,083,184**	**$123,663,480**	**$3,771**

Benefits of Farmland Preservation

The Lehigh Valley's two farmland preservation programs provide many important benefits to the community:

- Lehigh Valley farms produce fresh, nutritious and locally produced food for its residents;
- Local farm businesses provide jobs and contribute to the Lehigh Valley's economy. Agriculture is one of Pennsylvania's leading industries; [28]
- Protecting farmland helps to keep property taxes down because farms require less municipal and school district services than residential developments require;
- Well managed farmland provides important environmental services, such as surface water protection, wildlife habitat, ground water recharge, and air quality; and
- Agricultural landscapes contribute to the beauty of the region and make the Lehigh Valley an attractive place to live and conduct business.

The Lehigh Valley is fortunate to have some of the best agricultural soils in Pennsylvania and enthusiastic citizen support for farmland preservation. The Valley has all the key ingredients for growing a vibrant local food system: preserved farmland, new farmer training programs, and high consumer demand for locally produced foods.

[28] Pennsylvania Department of Agriculture. (2009). Pennsylvania Agriculture: PA's Leading Economic Enterprise. Retrieved from http://www.agriculture.state.pa.us/portal/server.pt/gateway/PTARGS_0_2_24476_10297_0_43/AgWebsite/Page.aspx?pageid=22

2.4 Production on Lehigh Valley Farms

When considering a local food economy and food access issues, it is important to look at which products are being grown on existing Lehigh Valley farmland.

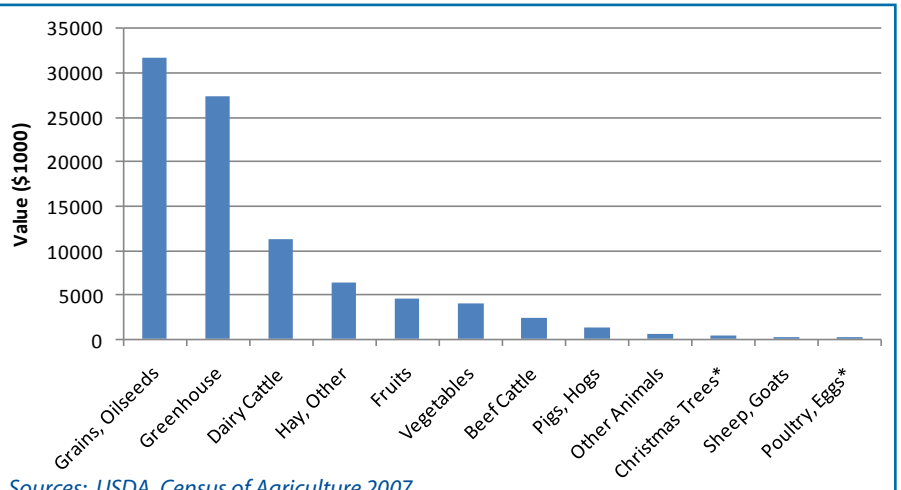
The Lehigh Valley produces a variety of agricultural products, including field crops (such as corn, small grains, soybeans and hay), nursery and greenhouse products, dairy and livestock, hay and silage, fresh produce, Christmas trees, and poultry. The 2007 value of sales for several agricultural groups is shown in Figure 2.9.

Crops, including nursery and greenhouse products, comprise 72.1 percent of the market value of agricultural products sold in the Lehigh Valley, while livestock, poultry, and their associated products make up 27.9 percent.[29]

In 2007, the most commonly grown food/feed crop items in the Lehigh Valley were corn for grain, soybeans, forage (hay and silage), and wheat (See Figure 2.10). Nearly 55,000 acres of farmland were used to grow corn for grain in the two counties. In comparison, just over 2,000 acres were used to grow vegetables.[30] Figure 2.11, a color-coded map of crops grown in the Lehigh Valley, shows a prevalence of corn (yellow) and soybeans (dark green).[31]

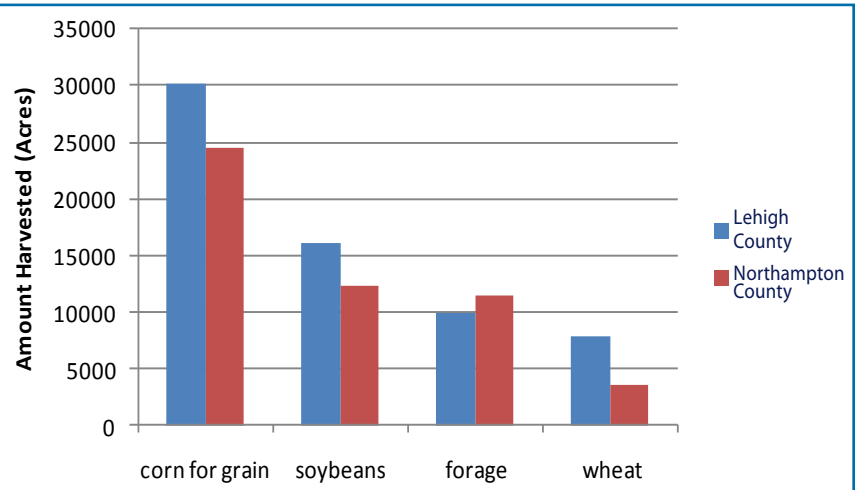
Steve Schoeniger, Rainbow Farm, New Tripoli
Photo Credit: BFBL-GLV

Figure 2.9 Value of Lehigh Valley Sales by Agricultural Commodity or Group (2007)



Sources: USDA, Census of Agriculture 2007, BFBL-GLV 2013.

Figure 2.10 Top Crops Harvested in the Lehigh Valley (2007)



Sources: USDA, Census of Agriculture 2007, BFBL-GLV 2013.

[29] (2007). *Census of Agriculture.*

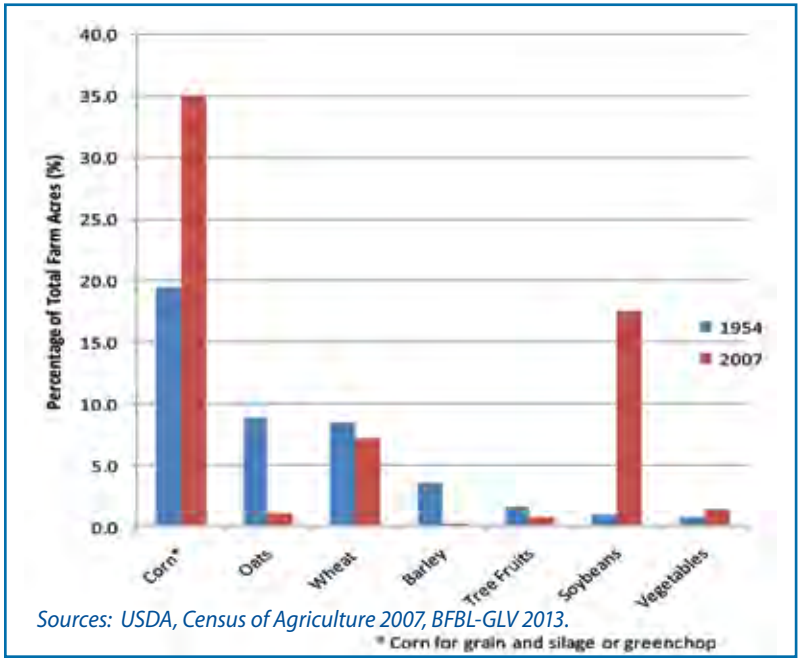
[30] *Ibid.*

[31] United States Department of Agriculture, National Agricultural Statistics Service. (2012). [Color-coded map of crops planted across the United States] *CropScape – Cropland Data Layer.* Retrieved from http://nassgeodata.gmu.edu/CropScape/. See website for legend.

The Lehigh Valley once supported a greater diversity of food crops. In 1954, 19 percent of farmland was used to grow corn for grain or silage (not sweet corn). By 2007, however, one third (35.1 percent) of all Lehigh Valley farmland was being used to grow corn for grain, nearly double the acreage of 1954 (See Figure 2.12). There has been an even greater increase (from 1 percent to 18 percent) in the amount of land being used to grow soybeans. During this same period, there was a significant decrease in the growing of oats and barley, and over half of Lehigh Valley orchards have disappeared. Although the percentage of land being used to grow vegetables doubled, it is still a very small amount (1.7 percent).[32]

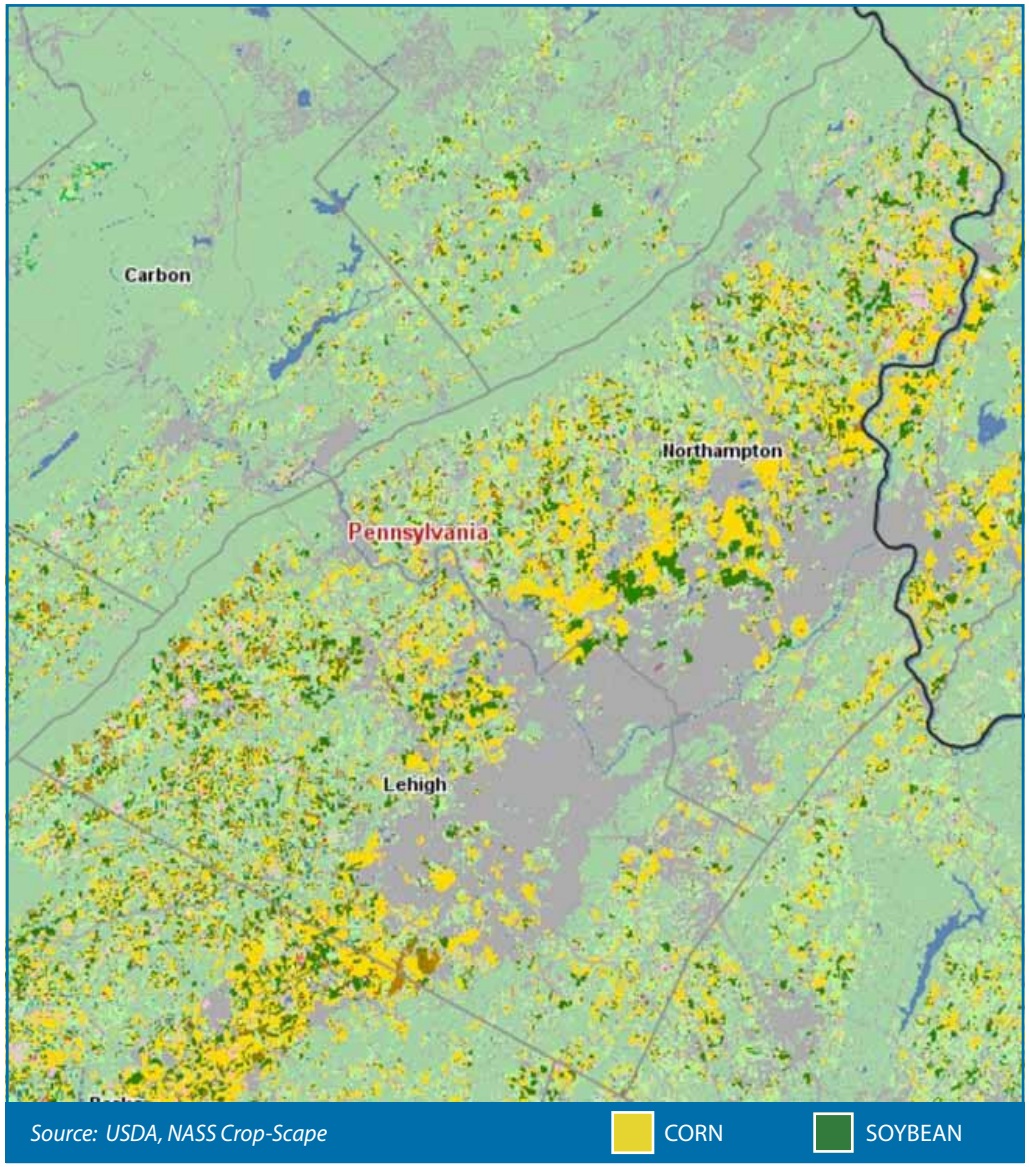
During this same period (between the years 1954 and 2007), the number of farms with cattle dropped from 2091 to 195 farms, a 91 percent loss.[33]

Figure 2.12 Selected Crops Grown in the Lehigh Valley 1954, 2007



Sources: USDA, Census of Agriculture 2007, BFBL-GLV 2013.

Figure 2.11 Crops Grown in the Lehigh Valley (2012)



...over half of Lehigh Valley orchards have disappeared.

[32] (1954, 2007). *Census of Agriculture.*

[33] *Ibid.*

County Line Orchard, Kempton
Photo Credit: BFBL-GLV

Organic Production

The organic agriculture sector[34] has experienced consistent growth in the preceding decade.[35] In 2009, sales of organic food products reached $23.8 billion, an increase of 5.1 percent from 2008.[36]

In the United States, organic farms tend to be more profitable than other farms: in 2008, the average organic producer had sales of $217,675 with average expenses of $171,978 (a $45,697 profit)[37], while in 2007, the average value of sales for all farmers was $134,807 with average expenses of $109,359 (a $25,448 profit)[38].

The increasing demand for organic foods has led a number of conventional small and mid-sized farms to convert to organic production to capture the price premiums that consumers are willing to pay. In 2011, there were 446 certified organic farms in Pennsylvania.[38] Here in the Lehigh Valley, there were 25 farms and 298 acres certified for organic production in 2007. In addition, there were another 14 farms and 474 acres of land being converted to organic production.[40]

Consumer demand for organic foods is rooted in both environmental concerns and health considerations. As the local food movement has grown, consumers have acquired an increased ability to know their farm neighbors and understand their methods of operation without the need for an official organic seal. The growth of direct sales has allowed farmers to communicate their use of National Organic Standards without the cost and time commitment of certification. The actual number of farms following organic standards may therefore be considerably higher than accounted for in the USDA surveys.

Several farms in the Lehigh Valley are Certified Naturally Grown (CNG). CNG is a non-profit organization that employs a peer-review inspection process based on the USDA National Organic Program standards, although it is neither accredited by nor affiliated with the National Organic Program. CNG minimizes paperwork and certification fees and is often a better fit for small-scale producers who sell locally.

Certified Naturally Grown Offerings at Willow Haven Farm, New Tripoli
Photo Credit: Willow Haven Farm

[34] In 2000, the National Organic Standards Board of the USDA established a national standard for the term "organic." Organic food must be produced without the use of conventional pesticides, petroleum-based fertilizers, sewage sludge-based fertilizers, herbicides, pesticides, genetic engineering (biotechnology), antibiotics, growth hormones, or irradiation. Animals raised on an organic operation must be fed organic feed and given access to the outdoors. Land must have no prohibited substances applied to it for at least 3 years before the harvest of an organic crop. The National Organic Standard became law on October 21, 2002. The law states that all farms and handling operations that display the "USDA Organic" seal must be certified by a State or private agency that ensures the National Organics Standards are followed. Certifying agents are accredited by the USDA. Farms that follow the National Organic Standards and have less than $5,000 in annual sales can be exempt from certification. These exempt farms can use the term "organic" but cannot use the "USDA Organic" seal.

[35] The Organic Trade Association. Highlights from the *2010 Organic Industry Survey*. Retrieved from http://www.ota.com/pics/documents/2010OrganicIndustrySurveySummary.pdf

[36] *Ibid.*

[37] United States Department of Agriculture. (2012). *2008 Organic Survey* [Data file]. Retrieved from http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/Organics/index.php

[38] (2007). *Census of Agriculture.*

[39] The 2008 Organic Survey collected data from USDA-certified organic farmers, farmers transitioning to organic production, and farmers exempt from certification because of sales totaling less than $5,000. Information from farmers who followed National Organic Program standards, but were not certified or exempt, was not included in the report. The 2011 USDA (NASS) Certified Organic Production Survey collected data only from certified organic operations while the 2008 survey collected data from both certified and exempt organic operations. In addition, the 2008 survey collected data for floriculture, Christmas trees, and mushrooms, while those commodities were excluded from the 2011 survey.

[40] (2007). *Census of Agriculture*. Respondents were instructed to report organic production as defined by the National Organic Standards. This item was self reported by respondents, and no attempt was made to verify reports with certifying organic organizations.

2.5 Lehigh Valley Farmers

A very diverse group of farmers reside in the Lehigh Valley with respect to age and experience. Some come from generations of family farmers, while others are completely new to farming. Nearly half (48 percent) of farm operators consider farming to be their principal occupation.

Lehigh Valley farmers, however, are not representative of the ethnically diverse populations living in the Lehigh Valley. In 2007, most Lehigh Valley farmers were white males: only 15 percent were women, there were no Black or African American operators, and only 10 operators were of Spanish, Hispanic, or Latino Origin.[41]

It is often difficult to keep family farms in the family since many children of farming families choose to leave the farm for other opportunities. The average age of our farmers continues to rise: as of the 2007 census, the average age of farmers in the Lehigh Valley was 57.4 years, up from 55.7 years in 1997.[42] This increase in average age (1.7 years) is in line with the increase in average life expectancy of the American white male population (1.6 years).[43] The number of farmers under the age of 35, however, dropped by 37 percent during this same period.[44] There is a continued need to help young and beginning farmers establish operations and gain access to farming resources.

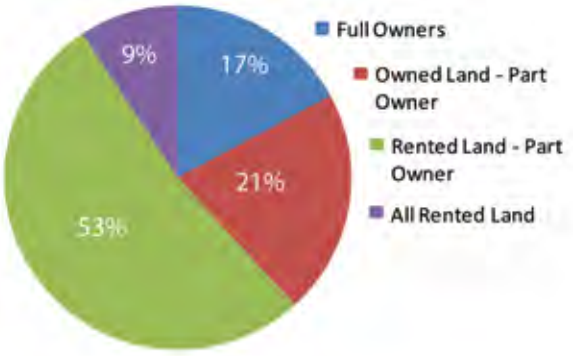
The barriers to farm entry are significant: new farmers must access land, acquire capital, develop markets for their products, and become educated in farming practices in order to succeed. Owning land is a major challenge due to high land prices. (See 2.6 New Farmer Training for details on one program in the Lehigh Valley working to address this problem.)

Keepsake Farm Cows, Nazareth
Photo Credit: BFBL-GLV

As shown in Figure 2.13, 38 percent of the land being farmed in the Lehigh Valley is owned by the farmers, and 62 percent is being rented. While 17 percent of farmers own all the land on which they farm, nearly three quarters of Lehigh Valley farmers are farming on lands that they rent in addition to the lands that they own. Nine percent of farmers are tenant farmers who do not own any farmland.[45]

As residential land development pressures have driven up land values and property taxes, purchasing farmland remains prohibitive for most farmers.

Figure 2.13 Percentage of Farmers Owning and Renting Lands (2007)



Sources: USDA, Census of Agriculture 2007, BFBL-GLV 2013.

Alternative tenure models such as conservation easements, stewardship standards, long-term leases, nontraditional partners (land trusts, farm neighbors, CSA shareholders, and schools) may provide possible solutions.

The Lehigh Valley also had 1,244 hired farm laborers working on 215 farms in the Lehigh Valley in 2007, with 35 percent of them working more than 150 days. Only 0.6 percent were migrant farm laborers.[46] Agriculture continues to provide jobs in the Lehigh Valley.

[41] (2007). *Census of Agriculture.*

[42] (1997, 2007). *Census of Agriculture.*

[43] Centers for Disease Control and Prevention, National Center for Health Statistics. (2012). United States Life Tables, 2008. *National Vital Statistics Reports 61*(3), Table 19. Retrieved from http://www.cdc.gov/nchs/data/nvsr/nvsr61/nvsr61_03.pdf

[44] (1997, 2007). *Census of Agriculture.*

[45] (2007). *Census of Agriculture.*

[46] *Ibid.*

2.6 New Farmer Training

Lindsey Parks, Executive Director,
The Seed Farm

The future of agriculture in the Lehigh Valley faces several challenges. There are currently five times more farmers over the age of 65 than under the age of 35. And for the growing number of young people who are inspired to enter the farming profession, lack of access to land, capital and training are significant obstacles to overcome. More than three-quarters of aspiring farmers in this area did not grow up on a farm. Without that experience and access to land, it is extremely difficult to succeed in farming, especially with land prices in the Northeast being among the highest in the nation.

The Seed Farm, situated on 45 acres of Lehigh County-owned land in Emmaus, is confronting these challenges head-on by training a new generation of farmers and assisting them in starting new farm businesses. Apprentices receive over 600 hours of coursework and hands-on training in their first year at The Seed Farm. This training covers all aspects of running a small organic vegetable farm, including business planning, crop planning, equipment use, production techniques and marketing. Once the training has been successfully completed, apprentices can apply to the stewardship program, where they gain access to land, equipment, infrastructure and mentorship during the first three years of their new farm businesses. Up to six apprentices participate in the training program each year.

"All of the things that capital lenders are looking for are things the Seed Farm is helping us achieve..." - Anton Shannon

The Seed Farm, Emmaus
Photo Credit: Allison Czapp

The Seed Farm, Emmaus
Photo Credit: Allison Czapp

The Seed Farm approach is working. Anton Shannon and Sarah Edmonds graduated from the Seed Farm apprenticeship program in 2009. After successfully completing their farm plan, they were accepted to the Seed Farm Business Incubator. They operated Good Work Farm together for two years on four acres of land at the Seed Farm, providing vegetables for 75 subscription (CSA) members. Anton says, "All of the things that capital lenders are looking for are things the Seed Farm is helping us achieve: a proven business history, paying bills, marketing our crops, tracking our yields and our sales, exploring market potential, managing labor and time, coming up with production plans and production contingencies. The Seed Farm is providing Good Work Farm with a living laboratory for us to test our production and sales techniques with scalable resource access. Our farm made a net profit in a year that included a drought, a hurricane, prolonged flooding and October snowfall. That very may well have finished off our new farm, if not for the Seed Farm." Sarah is now the Manager of LaFarm, the Lafayette College Community Garden & Working Farm in Easton, where she shares her farming knowledge and experience with both college-age aspiring farmers and community gardeners. Anton, now in his final year as a Seed Farm Steward, is working as The Seed Farm's Assistant Farm Manager in addition to owning and operating Good Work Farm. He is working diligently to secure a lease from a local landowner in order to transition his farm off the Seed Farm site and make room for new Seed Farm Stewards.

The Seed Farm accepts applications in November to their New Farmer Training Program and Agricultural Incubator for the following season. For more information, visit www.theseedfarm.org.

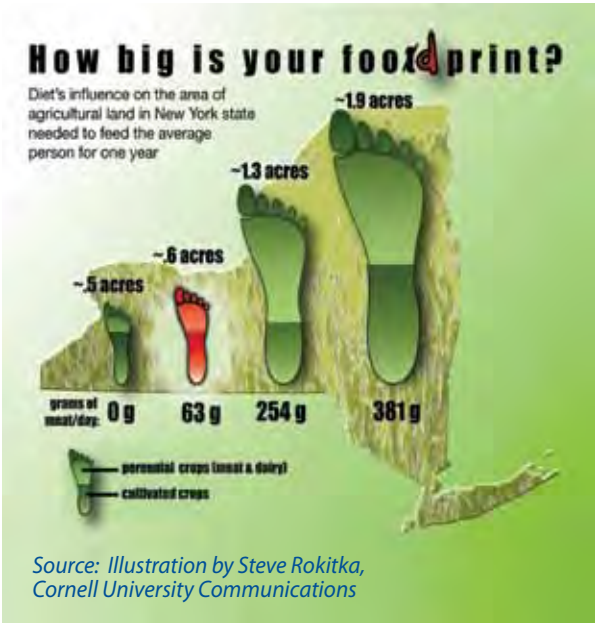
2.7 Lehigh Valley Food Production Capacity

In 2010, there were 647,232 people living in the Lehigh Valley, and it is expected that this will increase by 145,000 more in the next twenty years.[47] In order to determine whether the Lehigh Valley is able to produce enough food to feed itself, one must consider how much farmland is available, the soil types of this land, and the makeup of American diets.

A study from Cornell University[48] investigated how 42 diets varying in meat quantities and percent of total energy from fat influence per capita land resource requirements in New York State. Results indicated a low-fat vegetarian diet required the least amount of land, and that, in general, lower meat diets supported more people than higher meat diets. "Overall, meat is the primary driver of increasing land use in the range of diets observed." [49] The study, however, also pointed out that grains, vegetables, and fruits must be grown on prime cropland. By including small amounts of ruminant meat and milk in the diet, lower quality land limited to pasture and perennial forages can be included and the number of people fed increased. The results of the study were summarized as shown in Figure 2.14.[50]

In this diagram, the red footprint representing the most efficient diet in terms of land use, which limits meat and egg intake to about two ounces per day, requires about .6 acres of land per person. The average American, however, eats approximately 5.8 ounces (164 g) of meat and eggs per day; thus, it would require about an acre of farmland per person to provide this diet.

Figure 2.14 Area of Land Needed to Feed the Average Person



Source: Illustration by Steve Rokitka, Cornell University Communications

The Lehigh Valley has a similar climate and land resources to New York State. It is thus fair to use the New York per capita land requirements as a reasonable metric for determining the Valley's potential carrying capacity. As of 2007, there were only 153,000 acres of farmland remaining in the Lehigh Valley.[51] Based on the average American diet, the Lehigh Valley is only able to feed 153,000 people, or 24 percent of the Valley's current population. Even if Lehigh Valley residents were all to switch to the most land-efficient diet, the Lehigh Valley would still only be able to feed at most 255,000 people, or 39 percent of its population of 647,232. The Lehigh Valley is unable to fully support its resident population, and its ability to feed its residents will only decrease as 145,000 more people move to the Valley in the next 20 years. The Lehigh Valley will remain a net food importer.

Based on the average American diet, the Lehigh Valley is only able to feed 153,000 people, or 24 percent of the Valley's current population.

[47] *Comprehensive Plan The Lehigh Valley* … 2030.

[48] Peters, C. J., Wilkins, J. L. and Fick, G. W. (2007). Testing a complete-diet model for estimating the land resource requirements of food consumption and agricultural carrying capacity: The New York State example. *Renewable Agriculture and Food Systems*, 22(2), 145-153.

[49] *Ibid.*, 152.

[50] Illustration by Steve Rokitka, University Communications in Lang, Susan. "Cornell Chronicle: Diets and New York's Ag Footprint." 4 Oct. 2007. Retrieved from http://www.news.cornell.edu/stories/2007/10/diet-little-meat-more-efficient-many-vegetarian-diets

[51] (2007). *Census of Agriculture*. The "Land in Farms" acreage includes land that is not being used currently for food production on farms, such as forests, farmstead areas, ponds, roads, and wildlife habitats. The amount of farmland available for food production would thus be less than 153,000 acres.

2.8 Opportunities for Increasing Food Production

As stated previously, there is only enough remaining farmland here in the Lehigh Valley to feed a fraction of residents using current production methods. There are, however, a number of opportunities to increase food production. By using methods for season extension and maximizing growing capacity, this same amount of farmland has the potential to produce an increased amount of food. In addition, food production in the Lehigh Valley can be supplemented by urban farms, as well as community, school, and home gardens.

Season Extension

In agriculture, season extension refers to anything that allows a crop to be cultivated beyond its normal outdoor growing season. It may involve using greenhouses, unheated high tunnels (also known as hoop houses), row covers, or alternate varieties to push fruit and vegetable crops earlier into the spring or later into the fall.

There are many advantages to lengthening the production season:

- Possible year-round income;
- Maintained relationships with customers;
- Increased farm income; and
- Extended employment for workers.

Many Lehigh Valley farmers have added high tunnels to their operations in recent years, due in large part to the USDA's Natural Resources Conservation Service program providing financial and technical assistance. A high tunnel is a structure at least 6 feet in height, made of ribs of plastic or metal pipe and covered with a layer or two of plastic sheeting. The structure is passively heated by the sun and modifies the climate inside to create more favorable growing conditions for crops. This extends the growing season at both the start and end of the season so that more food is produced.

Suyundalla Farm's Winter Greenhouse, Coplay
Photo Credit: Heather Skorinko

As more Lehigh Valley farmers are using high tunnels in their operations, they are providing more fresh food during the winter months. This increase in winter supply is evident in the success of the Easton and Emmaus Winter Farmers' Markets.

Above: Steve and Gayle Ganser, Eagle Point Farm Market, Trexlertown
Photo Credit: Monica Ganser

Below: High Tunnel, Gottschell Farm, Coopersburg
Photo Credit: Steve Shelley

Increasing Growing Capacity on Farms

Tianna Dupont, Sustainable Agriculture Educator, Penn State Extension

Although the Lehigh Valley cannot currently feed itself solely with its own locally grown foods, Lehigh Valley farmland has the potential to produce more than it does. Steps can be taken to help farmers produce more food on the land they steward by providing them with training and community support.

Tianna Dupont, Sustainable Agriculture Educator, Penn State Extension teaching a course on cover crops. Photo credit: Scott Guiser, Penn State Extension

Currently, not all farmland is producing up to its maximum potential. Calculations to determine the food-producing capacity of Lehigh Valley farmland are based on yield averages. These averages, however, ignore the broad range of production capability. Highly skilled farmers using best management practices are able to surpass average production, producing more food for the Lehigh Valley on the same amount of land. For example, according to Robert Leiby, Retired Penn State Extension, Potato Specialist, a typical "average" potato yield in PA is 26,000 pounds per acre. With best management practices and cooperative weather conditions, it is possible to routinely hit 45,000 pounds per acre.

There are many well-skilled farmers working with high quality land in this region who produce much more than the average yields. For example, every year there is a competition among corn producers in the state called the "Five Acre Corn Club" where producers track the yields on their best acreage. In 2007, the most recent year with census data, one Corn Club winner in Northampton County yielded 254 bushels of corn per acre[52] compared to the 135 bushel per acre average for the County.[53] The top winner, a farmer in Berks County, yielded 279 bushels per acre. In another example, a Berks County farm was yielding about 15,000 pounds of tomatoes per acre in 2013 (farmer estimates for twelve acres of heirloom tomatoes) as compared to the average 11,300 pounds per acre.[54] Closing the gap between land capability and actual food production will result in more local food.

In order to efficiently and effectively produce more food on the land available, farmers require continued training in best practices, access to innovative research, and support. In 1914, Congress created just such a support system for farmers called the Cooperative Extension Service, which provides research-based information from the land grant universities to the public. Working directly with farmers, Extension provides consultations, trainings, and timely research-based information to keep farms productive and profitable. A recent analysis of 40 studies showed that Extension training has a positive impact on farmer adoption of best management practices.[55] In 2012, Penn State Extension in Northampton and Lehigh Counties provided 400 consultations and 65 trainings to over 2,891 farmer participants. In 2012, 360 Pennsylvania vegetable producers said they learned something from Penn State Extension that would make their operations more profitable. Currently, Lehigh and Northampton Counties contribute $562,000, and Penn State University contributes $713,000 annually to Extension in the Lehigh Valley in order to provide this critical research, education and support of farmers.[56]

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[52] Penn State College of Agricultural Sciences, Extension. (2013) *Five Acre Corn Club 2007 County Summary*. Available at http://extension.psu.edu/plants/crops/grains/corn/club/past-results/2007/2007-county-summary

[53] USDA, National Agricultural Statistics Service. (2007) *Quick Stats* [Data file]. Retrieved from http://quickstats.nass.usda.gov/results/25A92BCF-E6BC-3B49-9A59-AE362D846EC9

[54] National Agricultural Statistics Service. (2013). *Pennsylvania Statistics, Pennsylvania Agricultural Overview* [Data file]. Retrieved from http://www.nass.usda.gov/Statistics_by_State/Pennsylvania/index.asp

[55] Baumgart-Getz, A., Prokopy, L. S., and Floress, K. (2012). Why farmers adopt best management practice in the United States: A meta-analysis of the adoption literature. *Journal of Environmental Management 96* (1), 17-25.

[56] 2012 County budgets.

To increase local food availability for Valley residents over the long-term, master farmers are not only increasing short-term yields, but also incorporating sustainable practices in order to maintain production over the long-term. Best management practices such as no-till production, integrated pest management, organic production, and the use of cover crops are important ways for farmers to build and maintain ecological capital on the farm. Often farmers who currently grow more than the average per acre are benefiting from long-term investments in best management practices. For example, Berks County Corn Club winner David Wolfskill focuses on building soil (personal communication, August 2, 2012). A 100-percent no-till farm since the 1980s, crops are planted directly into cover crops in the spring to prevent soil erosion. The results of soil health are apparent: a healthy population of earthworms improves soil structure, aeration, water infiltration and fertility.[57] Wolfskill Farm also uses cutting edge technology such as a well calibrated drill and row cleaners on the planter for uniform seeding depth. Fertile, healthy soil is important for many farmers. Jeff Frank of Liberty Gardens in Coopersburg stated, "Soil is the most important capital on your farm. Investing in the soil will always yield a good return." (personal communication, July 28, 2013). With over fourteen years of organic management with cover crops and compost, Liberty Gardens has increased their soil organic matter to 7.5 percent. This organic material in the soil acts like a sponge absorbing and slowly releasing water and nutrients over time, giving crops the resources they need. In addition to trainings provided by Cooperative Extension Services, sustainable management practices are also supported by National Resource Conservation and Conservation District programs.

Scholl Orchards at Bath Farmer's Market
Photo Credit: BFBL-GLV

Food production in the Lehigh Valley could also be increased through policy changes that support the actual farming of farmland. Forty-four percent of farms in the Lehigh Valley are hobby farms (producing less than $5,000 per year in annual sales).[58] These farms are managed by individuals who have off-farm income and as such are likely not focusing their full attention on optimizing food production. Zoning that favors large lots and even farmland preservation without a requirement for 'active production of food and fiber' may favor under-farmed farmland.[59] Thoughtful community efforts to keep the most productive land in the stewardship of professional farmers who use progressive growing practices may help increase local food availability.

Increased consumer demand for locally grown foods helps to create a better market for local farmers as long as consumers are willing to pay a fair price. Often, local food is produced on smaller farms where the cost of production is higher. As a result, local food may sell at a higher price than conventionally grown food. Inadequate prices are likely to result in a loss of producers and food production capacity. This was seen recently on Valley dairy farms. Consumers have been paying less for milk while the costs to produce milk remain high. In 2001, the average price Pennsylvania farmers received for a hundred pounds of milk was $16.60. By 2009, the price had dropped to $14.40, yet costs were up. At times, farmers are paid less than it costs to produce the milk, and a significant number of dairies have gone out of business.[60] As a result, milk production has decreased: in 2009, 467 million pounds of milk were produced on Berks, Lehigh, and Northampton dairy farms, down from 525 million pounds in 2001.[61]

Farmers are working hard to produce and sell more local food. There are many ways that the community can help. Some may be as simple as politely sharing the road with the tractor or learning to enjoy the smell of fertility-giving manure. Residents and local government can also provide tax dollars to support research, education, and training. Finally, consumers can support local farmers by requesting locally grown foods and paying an equitable price for their products.

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[57] Jenner, A. (February 16, 2013). To Till Vertically or Not at All? *Lancaster Farming*. Retrieved from http://lancasterfarming.com/news/southeedition/To-Till-Vertically-or-Notat-All--#.Ug41YtlY7Sg

[58] (2007). *Census of Agriculture*. 441 farms with less than $5,000 sales. 560 farms with greater than $5,000 in sales.

[59] Johnson, K. (2008). *Preserving Farmland, But For Whom?* Master's Thesis, UC Davis Community Development Graduate Group.

[60] Youker, D. (August 2, 2009). Berks County dairy farmers struggle with low milk prices, high production costs. *The Reading Eagle*. Retrieved from http://readingeagle.com/article.aspx?id=150736

[61] *Pennsylvania Statistics, Pennsylvania Agricultural Overview.*

Urban Farms

As the ability to access farmland decreases and the need for more fresh foods in urban centers increases, a movement has begun to grow food within towns and cities. Differing from community gardens and homesteading, urban agriculture assumes a level of commerce: product grown at an urban farm is intended to be sold as opposed to being grown for personal consumption.

Small urban farms are growing food on empty city lots, rooftops, corporate acreage, and municipal or state-owned properties in order to provide fresh vegetables, fruits, and possibly eggs, honey, and animal products to urban dwellers. These farms have the potential to engage and educate communities about how food is grown and address issues of food security.

The West Ward Neighborhood Partnership established the Easton Urban Farm (EUF) in 2012 on a quarter of an acre of land belonging to the City of Easton. Its mission is to provide locally grown produce to residents of Easton's neighborhoods at a low cost. During its first year of operations, the EUF was run by Penn State Master Gardeners. It harvested over 3,000 pounds of produce, which was donated to clients at the Easton Area Neighborhood Center's food bank and senior citizen housing centers. The long-range goal is to employ a farm manager and make the EUF sustainable through the sale of plants, produce, and CSA shares.

The EUF's mission also includes an education component. A portion of the EUF consists of community garden lots, and workshops are held to teach neighborhood children and their families how to grow their own vegetables.

These farms have the potential to engage and educate communities about how food is grown and address issues of food security.

Lexy Rodriguez and Sophia Feller, Easton Urban Farm
Photo Credit: BFBL-GLV

The EUF project has several invaluable community partners. It is sponsored by the West Ward Neighborhood Partnership. In addition to providing the land, the City of Easton's Public Works Department has provided soil amendments (composted leaf mulch), trash clean-up, labor, equipment, and access to water. The Easton Area Neighborhood Center (EANC) provides a kitchen area to clean vegetables and hold cooking classes, a space for community meetings, and bathroom facilities for workers and volunteers. In addition, it houses a food bank used by neighborhood families and seniors, to which surplus produce is donated.

There is great potential to provide fresh food to Lehigh Valley city residents and create new entrepreneurial businesses by establishing other urban farms on vacant lots in valley cities and municipalities.

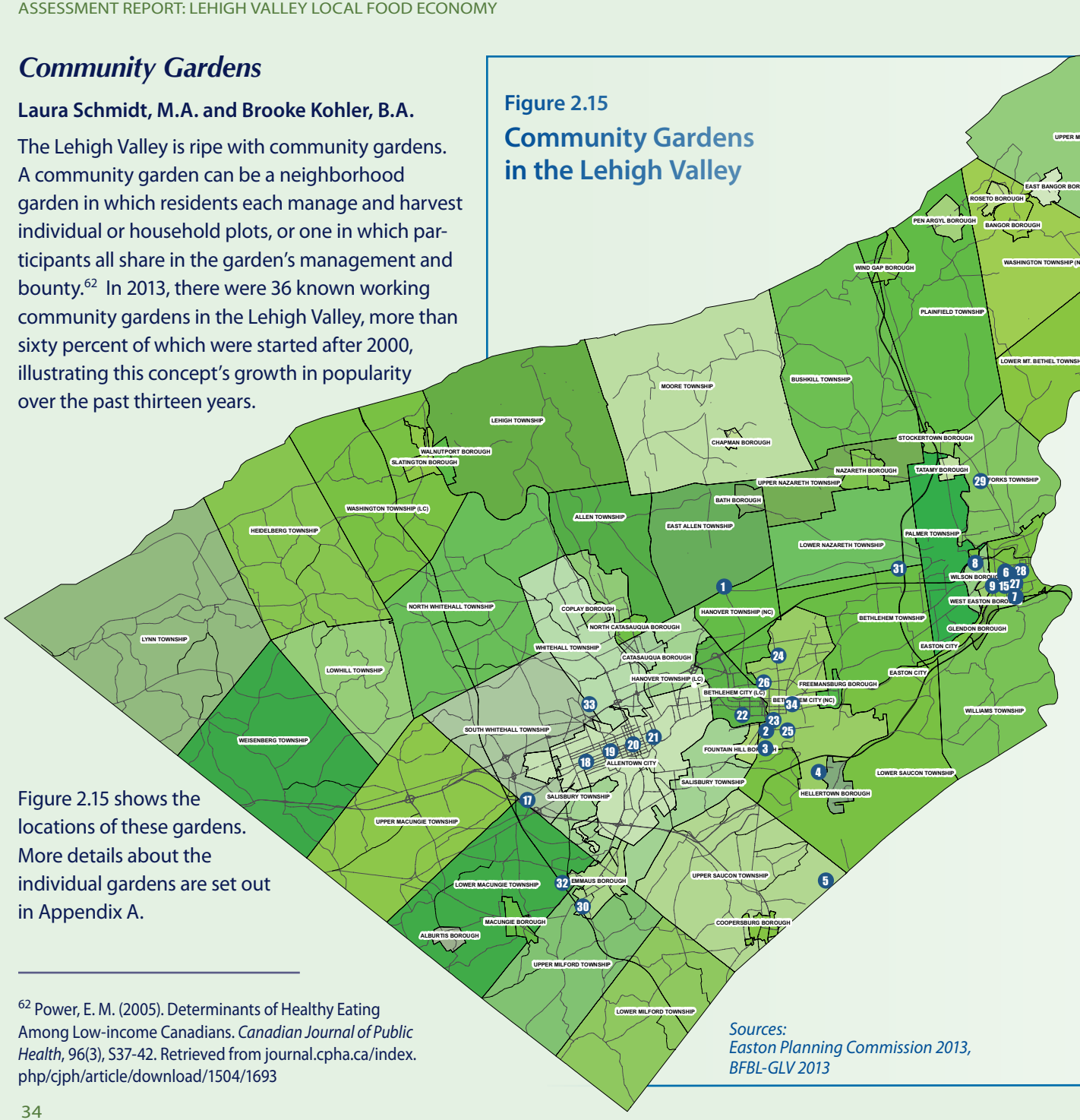
Community Gardens

Laura Schmidt, M.A. and Brooke Kohler, B.A.

The Lehigh Valley is ripe with community gardens. A community garden can be a neighborhood garden in which residents each manage and harvest individual or household plots, or one in which participants all share in the garden's management and bounty.[62] In 2013, there were 36 known working community gardens in the Lehigh Valley, more than sixty percent of which were started after 2000, illustrating this concept's growth in popularity over the past thirteen years.

Figure 2.15 shows the locations of these gardens. More details about the individual gardens are set out in Appendix A.

Figure 2.15
Community Gardens in the Lehigh Valley



1. Northampton County Parks: Diefenderfer Garden
2. Martin Luther King Park Community Garden
3. Ullman Park Community Garden
4. Lehigh University Community Garden
5. Sunrise Community Garden at Flint Hill Farm
6. Easton Community Garden Center
7. Easton Area Neighborhood Center/ Easton Urban Farm
8. City of Easton Recreation Bureau Garden
9. Lynn Street Garden
10. 1075 Lehigh Drive
11. 823 Walnut Avenue
12. 203 North Seventh Street
13. Ferry Street Apartments Garden
14. Walter House Garden
15. Bushkill House Garden
16. Chestnut Street Community Garden
17. Cedarbrook Community Garden
18. Muhlenberg College Community Garden
19. Franklin Park Playground Community Garden
20. Garden of New Beginnings
21. Casa Guadalupe
22. West Side Park
23. The Maze Garden
24. Wesley Church Community Garden
25. Hispanic Center Garden
26. Historic Bethlehem Partnership: Burnside Plantation Gardens
27. Fifth and Ferry Streets Garden
28. Tenth and Pine Streets Garden
29. Lafayette College Community Garden
30. Emmaus Community Garden
31. Louise W. Moore County Park Garden
32. Lower Macungie Twnshp Community Garden
33. Jordan Creek Parkway Community Garden
34. Friendship Park Community Garden
35. Community Gardens of the Lehigh Valley

Sources:
Easton Planning Commission 2013,
BFBL-GLV 2013

[62] Power, E. M. (2005). Determinants of Healthy Eating Among Low-income Canadians. *Canadian Journal of Public Health*, 96(3), S37-42. Retrieved from journal.cpha.ca/index.php/cjph/article/download/1504/1693

10th and Pine Streets Community Garden (WWNP)
Photo Credit: Sophia Feller

This section will explore the potential benefits of community gardens for the Lehigh Valley.

Variety

Because community gardens are built by and for specific communities, they vary widely in their size, organization, and yield.[63] Community gardens usually allow participants to select what they want to plant; as such, the crops planted in community gardens often reflect the diversity that comes from participants' family, culture, or personal interests.[64] This freedom to plant a variety of crops often results in diverse and variable food production.

Yield

In addition to offering a variety of foods to communities, community gardens are popular because of their food production capacity. Community gardens, which provide opportunities for people without personal land to grow their own food, are capable of providing very high yields. For instance, a New York City 2010 study revealed that 67 community gardens (a total of 1.7 acres) produced an average of 1.2 pounds of food per square foot with an approximate value of three dollars per square foot.[65] Assuming that yields are similar here in the Lehigh Valley, each plot (20 by 30 feet; 600 square feet) at the Cedarbrook Garden Plots in Allentown (as an example) has the potential to produce 720 pounds of food per season with an approximate value of $1,800.[66]

Access

Many community gardeners participate in order to have better access to fresh, wholesome, nutritional food.[67] Access is improved in two ways. Firstly, the community gardens may be in closer proximity to residents than retail stores, which may make them more easily accessible. Secondly, it is usually more cost-effective for participants to grow their own food as opposed to purchasing it. One report showed that every dollar invested in a community garden plot yields approximately six dollars' worth of vegetables.[68] Another demonstrated that community gardeners can save between $50 and $250 per season in food costs.[69] As a result of increased access, participants tend to grow and consume more fruits and vegetables.[70] In fact, when gardeners "save food dollars" by growing their own food, they positively impact their overall dietary knowledge and food consumption.[71] Studies have shown that gardeners have a higher fruit and vegetable intake and tend to eat healthier, more nutrient-rich diets than both non-gardeners and the average U.S. consumer.[72]

Nutrition

In addition, produce from gardens may be of higher food quality. Food quality is preserved by decreasing the time needed to transport food from provider to consumer. It has been demonstrated that a "5-10 day transportation and storage lag between production and consumption leads to losses of 30-50% in some nutritional constituents."[73] In general, food grown in community gardens reaches the table much quicker than food grown further away. By eating food fresh from their own gardens, participants may also severely reduce their exposure to fruits and vegetables with pesticide residues, improving their overall health.[74]

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[63] Wakefield, S., Yeudall, F., Taron C., Reynolds, J., & Skinner, A. (2007). Growing Urban Health: Community Gardening in South-East Toronto. *Health Promotion International* 22(2): 92. Retrieved from http://heapro.oxfordjournals.org/content/22/2/92.short

[64] Community Food Security Coalition's North American Initiative on Urban Agriculture (Publisher). (2004). *Health Benefits of Urban Agriculture*. Portland, Oregon: Bellows, A. C., Brown, K., and Smit J. Retrieved from http://community-wealth.org/content/health-benefits-urban-agriculture

[65] Gittleman, M., Jordan, K., and Brelsford, E. (2012). Using Citizen Science to Quantify Community Garden Crop Yields. *Cities and the Environment: The Electronic Journal Dedicated to the Ecology of Urban Communities, 5*(1), Article 4. Retrieved from http://digitalcommons.lmu.edu/cate/vol5/iss1/4

[66] Although some well-managed community gardens may produce three to five times the amount of produce per acre compared to the average vegetable farm, the Lehigh Valley would need 306 acres of community gardens to increase the food production capacity of the Lehigh Valley by just one percent. [153,000 acres of farmland producing 113 CWT/acre* is 17,289,000 CWT. A one percent increase is 172,890 CWT. At a five times yield, community gardens would need one acre to produce 565 CWT; thus, 306 acres of gardens would be required. (*National Agriculture Statistics Service 2012 – Quick Stats – Pennsylvania Yield per Acre for 34 vegetable crops equals 113 CWT.)]

[67] *Growing Urban Health.*

[68] *Health Benefits of Urban Agriculture*. p.4.

[69] Armstrong, D. (2000). A survey of community gardens in upstate New York: implications for health promotion and community development. Health and Place, 6, 319-327. Retrieved from http://nccommunitygarden.ncsu.edu/researchArmstrongSurveyNY-HealthCommunityDevelopment.pdf

[70] *Growing Urban Health.*

[71] *Health Benefits of Urban Agriculture*, 2.

[72] *Ibid.*

[73] *Ibid.*, 4.

[74] *Growing Urban Health.*

Health and Community Infrastructure Benefits

Other benefits associated with community gardens are an increase in physical activity and improved mental health.[74] Providing people with an outdoor space and associated tasks can increase the amount they exercise. Some research suggests that community gardening is good for physical health as well as mental health by providing a green space in the midst of what might otherwise be a complete concrete jungle: "Exposure to green space reduces stress and increases a sense of wellness and belonging."[76]

Community gardens are also beneficial to the communities in which they are located by providing places for people to come together and socialize. Community gardens have the potential to foster a strong sense of belonging within a community. A recent study of eight community gardens managed by the West Ward Neighborhood Partnership in Easton, for instance, showed that these gardens could be used to build community in this neighborhood.[77] Study participants viewed the gardens as "a great focal point for hosting community events and bringing people together… a good place to build comfort zones and get to know neighbors, while offering the community a place to spend time outside." [78] The gardens provided a gathering place not just for the gardeners, but for all members of the community.

Gardeners at Ferry Street Apartments Community Garden
Photo Source: West Ward Neighborhood Partnership 2013

Community gardens can also provide a space for intercultural and intergenerational exchange that may not happen otherwise because of physical and social barriers. Community gardens promote an area of "sharing not only vegetables and tools, but also ideas, across cultures and other social differences … a particularly potent form of social engagement within the gardens."[79]

Establishing and maintaining community gardens is less expensive for municipalities than establishing and maintaining parks, and has also been shown to increase property values in the garden vicinity. These gardens also increase a sense of community identity, and have been credited by some studies as aiding in crime prevention. "In Philadelphia, burglaries and thefts in one precinct dropped by 90 percent after police helped residents clean up vacant lots and plant gardens."[80] In cases such as these, community gardens enhance overall community connection.

For urban areas, community gardens have unique considerations. Community gardens have been found to have the added benefits of enriching the urban ecosystem by reducing soil erosion and runoff, sequestering carbon and releasing oxygen, and reducing the need for air conditioning by lowering the higher temperatures common in many cities relative to their surrounding areas.[81]

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[75] *Ibid.*

[76] *Ibid.*

[77] Grover, H., Taylor, A., Fortwangler, C., and Ruebeck, C. (2012). *Gardening in Easton's West Ward Neighborhood: Local Perceptions of the Value and Operation of Community Gardens*. Report prepared for West Ward Neighborhood Partnership, Easton, Pennsylvania,.1-65.

[78] *Gardening in Easton's West Ward Neighborhood.* 44.

[79] *Growing Urban Health*, 98.

[80] The Trust for Public Land . (1995). Healing America's Cities: How Urban Parks Can Make Cities Safe and Healthy. *Children's Environments 12*(1), 65-70. Retrieved from http://www.jstor.org/discover/10.2307/41514966?uid=3739864&uid=2&uid=4&uid=3739256&sid=21102554525253

[81] *Ibid.*

Challenges for Community Gardens

Along with the potential benefits of community gardens come certain concerns communities must consider before initiating a garden. In urban areas, it is especially vital to test soils for heavy metals such as lead, mercury, nickel, cadmium, and copper before growing a community garden. A known carcinogen, polycyclic aromatic hydrocarbons (PAHs), can be prevalent in urban soils due to pollution from incomplete combustion in vehicles. Gardeners may absorb toxic chemicals through direct means when working in the soils, or through indirect means, such as ingesting foods grown in these soils. That being said, soil risks are reducible in various ways, such as improving soil stability, planting more crops that do not readily absorb heavy metals (fruits instead of leafy green vegetables), adding compost and calcium to the soil to lower soil acidity, growing more ornamental plants rather than edible plants, or using raised beds. Similar to home gardening, community gardens run the risk of containing still-water that can attract insects, such as disease-ridden mosquitoes. Additionally, common gardening safety measures should be taken into account at community gardens, particularly where children are present, especially in dealing with heavy or sharp garden tools.[82]

Some community gardeners express worry over the permanence of their community gardens: if a space is rented each season, gardeners are unsure whether they will be able to continue to rent or share the garden space on a seasonal basis. In many cases, these spaces are threatened by building development, which contributes to gardeners feeling under-appreciated by policy-makers who initiate the development.

10th and Pine Streets Community Garden (WWNP)
Photo Credit: Patti Hammond Berger

The upkeep of the garden can also be financially challenging for some garden participants, which impedes the garden's ability to flourish (without funding for proper tools, seeds, etc.). This can be especially difficult for low-income gardeners who heavily rely on donated resources for the garden.[83]

There may be challenges regarding organization and oversight within a community garden. If the garden is voluntary, without designated tasks or work times, garden expectations and responsibilities become vague.[84] Without the presence of an active garden coordinator, participants may be unsure of what needs to be done. A lack of communication can negate the community garden feel.[85]

A successful community garden requires interest and participation from neighborhood residents. It may be a hurdle to educate neighbors about the existence and locations of community gardens, as well as how to participate. For older or physically disabled community members, the idea of gardening may prove too strenuous an activity and dishearten their efforts. The idea of committing time and "sweat equity" daunts individuals, especially those who may not have a good knowledge of what goes on within a community garden.[86] Participants might also feel intimidated to participate due to a lack of educational understanding about gardening. The opportunity to attend classes or workshops may remedy this issue.[87]

Despite these challenges, community gardens are a positive way for community members to interact with one another and reap positive physical and mental benefits in addition to receiving healthy fruits, vegetables, herbs, and flowers. These efforts also supplement the Lehigh Valley's overall food production and add to its efforts to become more sustainable.

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[82] *Health Benefits of Urban Agriculture.*

[83] *Growing Urban Health.* 95, 98, 99-100.

[84] *Gardening in Easton's West Ward Neighborhood.* 42.

[85] *Ibid.* 55.

[86] *Ibid.* 50.

[87] *Ibid.* 50.

School Gardens

A number of colleges and schools in the Lehigh Valley are turning portions of their properties into school gardens. These gardens serve to increase food production in the Valley and educate more residents, particularly students, about growing healthy food. Students who participate in school garden programs are more likely to eat fruits and vegetables.[87]

Several of the schools in the Lehigh Valley have encountered opposition to actually incorporating produce from the school gardens into the cafeteria meals. Most school cafeterias are subject to regulations under the National School Lunch Program (NSLP). Nothing in the NSLP or its regulations expressly prohibits the use of school-grown produce by school cafeterias; rather, the USDA, which administers the NSLP, has stated that schools can serve school garden produce as part of reimbursable school lunch programs, provided that school cafeterias comply with any state or local health and sanitation requirements.

Health and sanitation requirements imposed on food establishments in Pennsylvania, including school cafeterias, are governed by the Food Code, which is based on the United States Food and Drug Administration's Model Food Code (MFC). The MFC sets standards for the storage, handling, and preparation of food, including produce. Provided that school-grown produce is treated with the same care as produce from other sources, the MFC does not prohibit a school cafeteria from using school garden produce. Often, the policies that prevent the serving of produce from the school gardens in the cafeteria are imposed by the food service provider.

LaFarm, Easton
Photo Credit: Rachel Roizin-Prior

Students who participate in school garden programs are more likely to eat fruits and vegetables.

Lafayette College created LaFarm in 2008. This 1.75-acre space consists of both community gardens for faculty, staff, and students, and a 0.5-acre working farm, both of which are operated by full-time farm manager Sarah Edmonds. LaFarm uses only organic growing methods. In past years, produce from the farm portion was sold to individuals on campus or donated to food banks. With a recent change in the college's food service provider, LaFarm produce will now be sold to and served in the campus dining hall. LaFarm also incorporates a number of sustainable practices into its operations: food waste from the dining hall is turned into compost, which is used in the community gardens; pathways at the farm are being planted with perennial cover crops; and two 1,100-gallon tanks that collect rainwater run-off and a solar-powered well provide water for the farm.

Other college campuses in the Lehigh Valley, including Lehigh University, Muhlenberg College, and Northampton Community College, also offer community gardens.

[88] California Department of Education, Nutrition Services Division. (2007). *A Healthy Nutrition Environment: Linking Education, Activity, and Food through School Gardens*. Retrieved from http://www.cde.ca.gov/ls/nu/he/gardenoverview.asp

Broughal Middle School students at the Maze Garden in Bethlehem
Photo Credit: South Side Initiative

Kellyn Foundation building garden beds at Tracy Elementary, Easton
Photo Credit: Kellyn Foundation

Raised bed garden at private residence, Lower Saucon Township
Photo Credit: Keri Maxfield

There are also a number of school gardens at primary schools throughout the Lehigh Valley. At Broughal Middle School in Bethlehem, students grow healthy foods in the school greenhouse and in nearby community gardens. Through the South Side Initiative, a collaboration of Lehigh University faculty, students, and staff with residents of Bethlehem, Broughal students learn about community-based agriculture by raising seedlings to be used in community gardens throughout the south side of Bethlehem. Sixth grade students also use composters designed by Lehigh students to run their own daily lunch composting program. The compost is used to enrich soils in both the greenhouse and the community gardens.

Calypso Elementary School, with its school garden, is the first school in Bethlehem to become certified as a National Wildlife Federation wildlife habitat. Kellyn Foundation,[89] in partnership with the Easton Area and Bethlehem Area School Districts, the Community Schools programs at Lehigh University and Northampton Community College, and local PTAs, has built school gardens at Tracy, Forks, March, and Fountain Hill Elementary Schools, as well as at the Easton Academy. Gardens are also planned for at Cheston and Donegan Elementary Schools. It is the intention to continue building school gardens in all the elementary schools in these school districts.

Home Gardens

Home gardens offer great potential as a means of fresh food production for Lehigh Valley residents. A well-developed home garden has the potential to supply a good portion of the nutritious foods that a family needs, including vegetables, fruits, legumes, herbs, honey, and eggs. Since the bounty is often shared with friends and family, home gardens are ideal for improving access to fresh foods, particularly in low-income urban neighborhoods. In addition, families can stretch their food budgets with home gardens while creating beautiful spaces. Studies have also shown that gardeners are likely to consume more fruits and vegetables than the general population.[90]

A well-developed home garden has the potential to supply a good portion of the nutritious foods that a family needs, including vegetables, fruits, legumes, herbs, honey, and eggs.

[89] http://kellyn.org

[90] Alaimo, K., Packnett, E., Miles R. A., and Kruger D. J. (2008). Fruit and vegetable intake among urban community gardeners [Abstract]. *J. Nutr. Educ. Behav.* 40(2), 94-101. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/18314085

Growing food in gardens on suburban lots is not uncommon. A large number of Lehigh Valley residents, however, live in urban settings, with no yards to speak of and only small outdoor spaces that are not often considered places for growing food. With a little creativity and guidance, these places may still be a source of fresh produce.

In order to help urban residents grow their own food and improve access to fresh food, the Nurture Nature Center in Easton is creating a new exhibit, the Urban Recycle Garden, to demonstrate techniques that require little space and incorporate timesaving, practical growing methods suitable for the busy city dweller. This demonstration garden will incorporate recycled and found materials to demonstrate growing techniques for urban spaces, such as walls, balconies, fire escapes, window boxes, and small paved spaces, so that people can learn how to grow their own food and/or beautify their urban area. The techniques demonstrated will be low cost and easy to replicate for city residents. Demonstrations will include capturing rain for watering, building self-watering growing containers and trellis systems for walls, growing vegetables on straw bales, and gardening in sustainable containers. Potential crops include peppers, potatoes, herbs, cucumbers, squash, greens, eggplant, strawberries, asparagus, and tomatoes, as well as flowers.

Several opportunities exist to increase food production in the Lehigh Valley. Those that pertain directly to farmers will have the greatest ability to increase growing capacity. At the same time, urban farms and community, school, and home gardens, can supplement farm production while providing many benefits to their participants, including an appreciation for fresh, healthy foods.

Planting Garlic at Good Work Farm
Photo Credit: Sarah Edmonds

Questions to Consider:

How can we encourage and support the growth of new farmers and farms in the Lehigh Valley?

Is it important that the Lehigh Valley be able to feed itself, at least in part? Is food security an issue?

Should the Lehigh Valley focus on producing more foods that can directly feed Lehigh Valley residents?

What can we do to create a more ethnically diverse food production system in the Lehigh Valley?

As consumers, do we want to support farmers by providing tax dollars for farmland preservation, Cooperative Extension services, and conservation programs?

Are we willing to pay a fair price for locally grown foods?

How can we produce more healthy food in the Lehigh Valley using non-traditional land resources, such as residential yards, institutional grounds, vacant lots, and parks?

What is the appropriate role of schools and other institutions in addressing the issues laid out in this report?

Food Access

- There are 8 Lehigh Valley locations experiencing limited food access.
- Alternative food sources, such as farmers' markets, online markets, Farm Share programs, food cooperatives, and mobile grocers, can play an important role in the availability of fresh, healthy food resources in our Lehigh Valley communities.
- There are currently 10 producer-only farmers' markets and two winter markets in the Lehigh Valley.
- Numerous studies have found that prices for produce at the height of season are often cheaper at farmers' markets.
- The percentage of SNAP benefits spent at farmers' markets is very low.
- SNAP Incentive programs are effective at increasing the consumption of fruits and vegetables in underserved communities.
- In 2008, Farmers' Market Nutrition Program vouchers worth $229,365 were issued in the Lehigh Valley, yet only 65% of these were redeemed.

Tomatoes, Sunrise Sunflower Farm, Harleysville
Photo Credit: Mary Landis

3. Food Access

Hannah Kane, M.A. and Lynn Prior, M.Sc., LL.B.

Food Access is the availability and affordability of healthy, high-quality, culturally appropriate food options within a reasonable distance from where people live. The availability of healthy food resources affects the food choices that families and individuals make, and may play a significant role in the health of a community.

It is difficult to establish a strict causal relationship between food environments and health-related disease as there are many factors that contribute to an individual's health, including both individual characteristics (demographics, socioeconomic status, family characteristics, food preferences, genetic makeup, and exercise habits) and physical environments (food access, availability of parks, sidewalks, and public transport, air pollution, and working conditions).[1] Although diet is a major determinant of BMI and obesity status, the presence of these many other factors makes this a complicated relationship. Access to fresh, healthy foods alone cannot ensure good health, particularly when access to and consumption of highly processed and less healthy foods are an easily accessible option; nonetheless, fresh food access is important in helping individuals make healthy food choices.

The American Planning Association has identified a number of factors that drive the availability of healthy foods in a community, including the proximity of food outlets to schools and residential areas, the prevalence and types of food outlets available in neighborhoods, and the presence of food and nutrition programs in a community.[2]

This chapter looks at the areas of the Lehigh Valley that have limited food access. It also discusses traditional and alternative food resources, as well as federal assistance programs and emergency resources, with the goal of providing possible opportunities to improve fresh food access.

3.1 Limited Food Access in the Lehigh Valley

In 2006, the Economic Research Service (ERS) began identifying census tracts in the United States with limited food access. A census tract was labeled as a "food desert" if it met two criteria: low-income (a poverty rate of 20 percent or greater, or a median family income at or below 80 percent of the statewide or metropolitan area median family income); and low access to conventional full-service food retail resources (at least 33 percent of the urban population living more than 1 mile from a supermarket or large grocery store).[3] The ERS presented this information in the Food Desert Locator,[4] an online mapping tool that provided a spatial overview of where food deserts were located.

According to the Food Desert Locator, four census tracts in the Lehigh Valley were identified as food deserts: one in Allentown, one in Hanover Township, and two in Bethlehem (See Figure 3.1).

Food resources for each of these four areas are presented in Figures 3.2 to 3.5. The food resources are comprised of full service stores (red dots), limited service stores (yellow dots), and farmers' markets (green "FM" circles) located in each area. Research compiled by The Reinvestment Fund (TRF) on supermarket access was used for the store designations and locations.[5] TRF uses the term "full-service" to describe any store with total annual food sales over $2 million. Limited-service stores are defined as those with less than $2 million in annual food sales and include conventional drug stores.

[1] United State Department of Agriculture (USDA), Economic Research Service (ERS). (2009). Food Access and Its Relationship to Diet and Health Outcomes. In *Access to Affordable and Nutritious Food—Measuring and Understanding Food Deserts and Their Consequence* (Chapter 4). Administrative Publication No. (AP-036), 160 pp. Retrieved from http://www.ers.usda.gov/publications/ap-administrative-publication/ap-036.aspx#.UiycFtIY6So

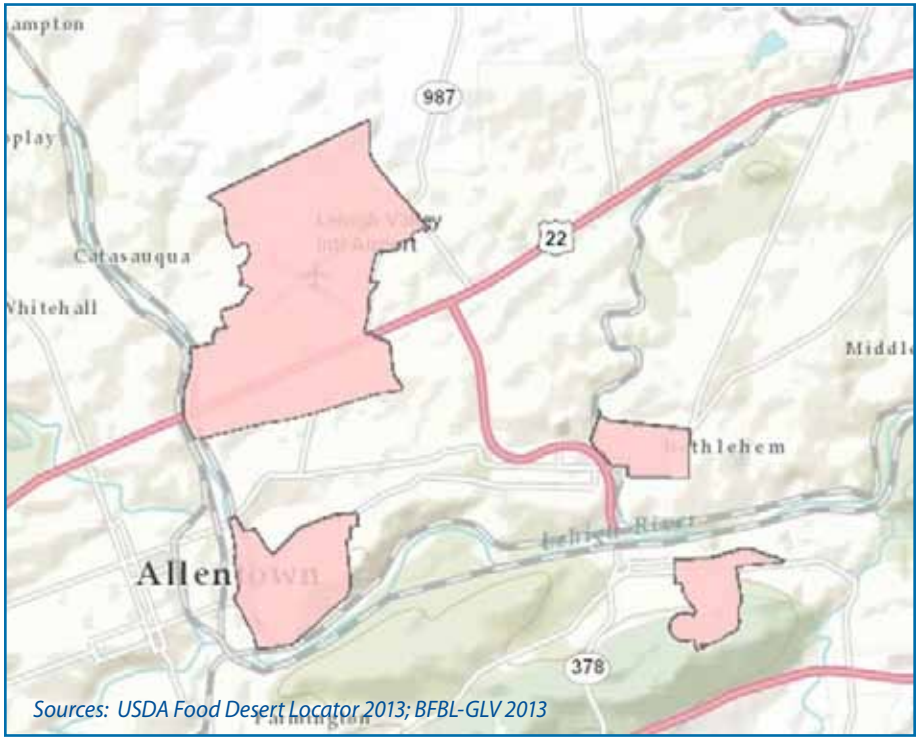
[2] American Planning Association. (2013). *Access to Healthy Food*. Retrieved from http://www.planning.org/nationalcenters/health/food.htm

[3] USDA, Agricultural Marketing Services (AMS). (2013). *Food Deserts*. Retrieved from http://apps.ams.usda.gov/fooddeserts/foodDeserts.aspx

[4] USDA, ERS. (2013). *Food Desert Locator* [Data file]. Retrieved from http://www.ers.usda.gov/data/fooddesert

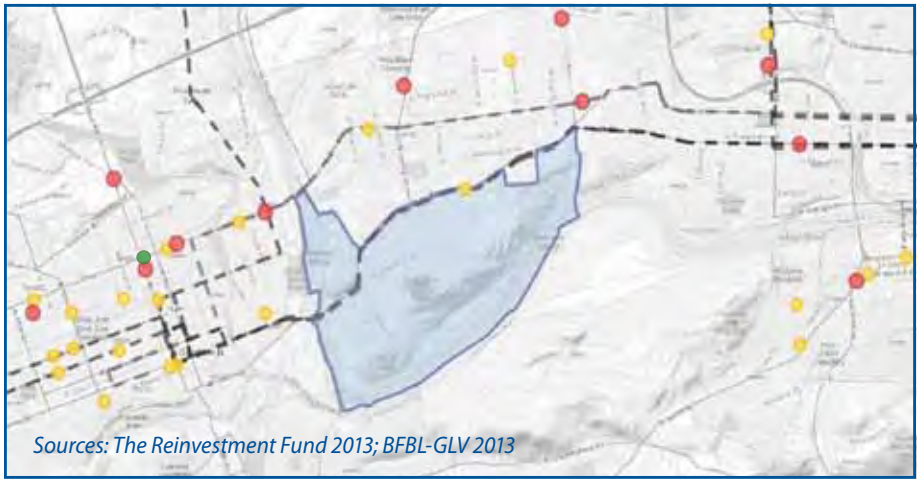
[5] The Reinvestment Fund. (2013). *Limited Supermarket Access (LSA) Analysis Mapping Tool* [Mapping Tool]. Retrieved from http://www.trfund.com/limited-supermarket-access-lsa-analysis-mapping-tool/

Figure 3.1 Food Deserts in the Lehigh Valley (January, 2013)



Sources: USDA Food Desert Locator 2013; BFBL-GLV 2013

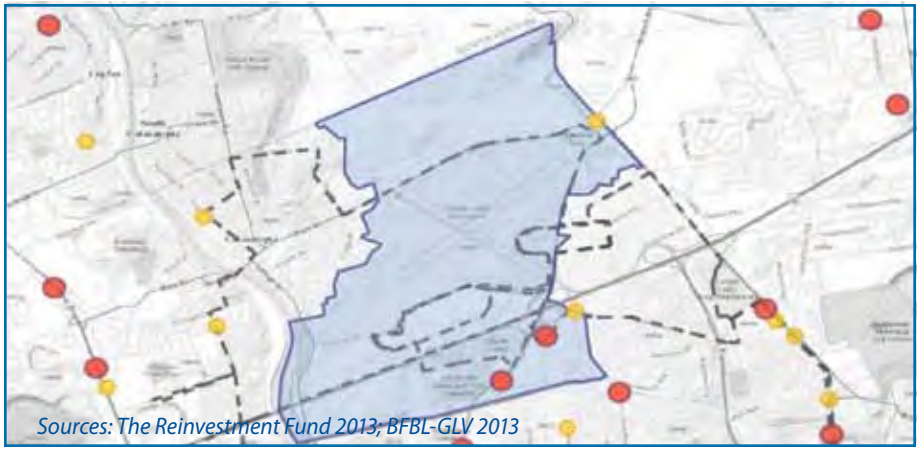
Figure 3.2 Food Resources in the Allentown Food Desert



Sources: The Reinvestment Fund 2013; BFBL-GLV 2013

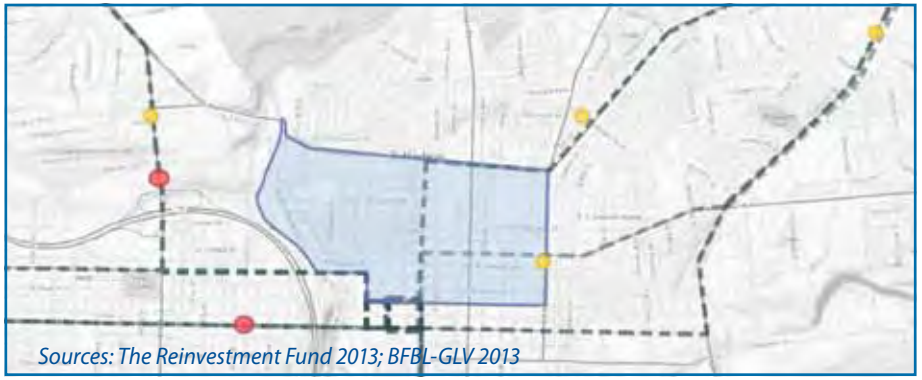
Full Service Stores Limited Service Stores Farmers' Markets Bus Routes

Figure 3.3 Food Resources in the Hanover Township Food Desert



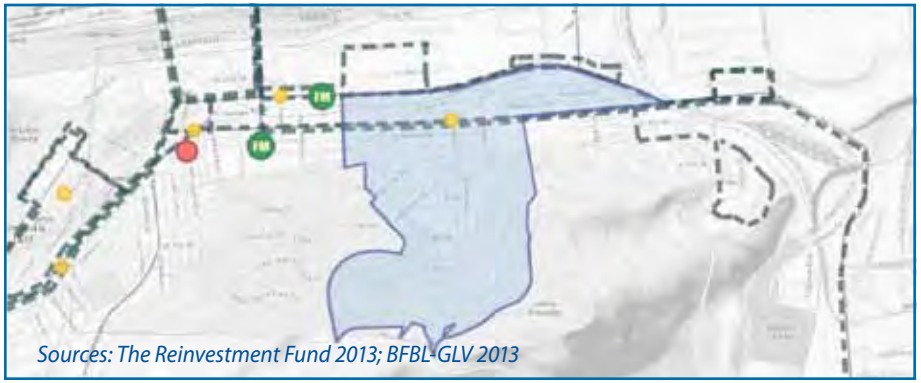
Sources: The Reinvestment Fund 2013; BFBL-GLV 2013

Figure 3.4 Food Resources in the North Side Bethlehem Food Desert



Sources: The Reinvestment Fund 2013; BFBL-GLV 2013

Figure 3.5 Food Resources in the South Side Bethlehem Food Desert



Sources: The Reinvestment Fund 2013; BFBL-GLV 2013

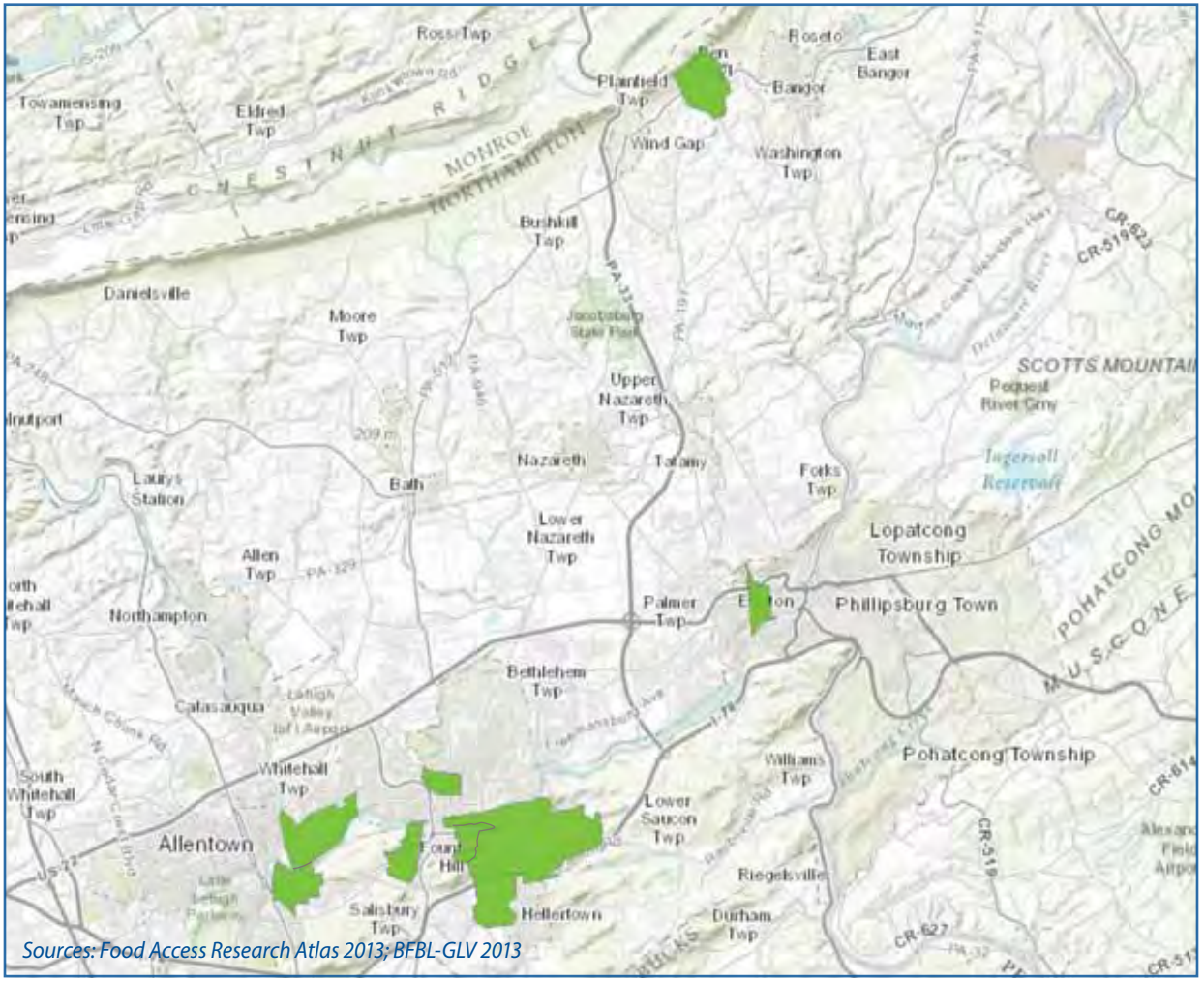
The maps reveal a dearth of food resources in the blue census tracts, as indicated by the small number of full service stores (red dots), limited service stores (yellow dots), and farmers' markets (green circles) located in these areas. An important consideration in analyzing these areas is mobility. Since there are limited resources within the bounds of the specified census tracts, the ease of traveling to resources outside the tract must be considered. For this reason, bus routes from these census tracts to food resources are shown. There are still areas where people would have to walk several blocks to return home from a bus stop, which could be difficult if carrying grocery bags, and so they are considered areas of low food access.

The ERS recently released a new mapping tool, the Food Access Research Atlas[6], updating the former Food Desert Locator's population, store location, and income statistics. In addition, this newly published research recognizes that there are many variables involved in defining food deserts. While low-income and access are still the main indicators considered, the Food Access Research Atlas includes additional measures, such as the percentage of the population with access to a motor vehicle. Since a vast majority of Americans rely on personal transportation for food shopping, this measure is very useful in analyzing the ability of specific populations to travel to outside retail food resources.

According to the ERS updated mapping tool, the number of locations experiencing limited access to food in the Lehigh Valley has doubled to eight (See Figure 3.6). In order to reverse this growth trend, a Lehigh Valley Sustainability Plan will require coordinated policies and planning by local and county organizations.

While low-income and access are still the main indicators considered, the Food Access Research Atlas includes additional measures, such as the percentage of the population with access to a motor vehicle.

Figure 3.6 Areas of Limited Food Access in the Lehigh Valley (July, 2013)



[6] USDA, ERS. (2013). *Food Access Research Atlas* [Data file]. Retrieved from http://www.ers.usda.gov/data-products/food-access-research-atlas.aspx

The following sections look at various resources for accessing fresh food in the Lehigh Valley.

3.2 Traditional Retail Markets

There are a number of different types of retail options for purchasing food in the Lehigh Valley. Traditional resources comprise grocery stores, specialty food stores, supercenters or club stores, and convenience stores.

Grocery stores or supermarkets are considered one of the most important resources for food, especially in underserved communities, as they provide an all-inclusive retail experience. Because they offer fresh produce, meat, dairy, processed food, household products and personal care products of all types in one location, proximity to a grocery store is an especially critical planning consideration for a community that has limited access to varied resources and means of transportation.

Specialty food stores consist of stores that sell a small range of specific foods, such as fish and seafood, fruit and vegetables, baked goods, and specialty health foods.

Supercenters or club stores provide a retail food option for bulk buying, providing low and bargain prices on many items, including the range from staple goods to processed foods. Shopping at these stores frequently requires access to personal transportation because the volume of product purchased is more than at a conventional supermarket.

Convenience stores and bodegas are also a relevant consideration for an assessment of retail food resources. Convenience stores offer a limited selection but have quick, consumption-ready options. Consequently, many people take advantage of convenience stores when they are short on time to cook. These stores are also a popular food source for school-age children. In addition, these options are often less expensive, require less space, and can be quicker to access than supermarkets.

Snack aisle of convenient store.
Photo Credit: Chris Waits

Table 3.1 provides statistics on the number of specific types of retail food resources throughout Lehigh and Northampton Counties and gives an overview of retail options in the Lehigh Valley. At first glance, it would appear that the Lehigh Valley has sufficient food resources: there is approximately one grocery store for every 5,140 residents and numerous specialized food stores, supercenters, and club stores. These resources, however, are not distributed evenly throughout the Valley, as seen in the previous section.

Table 3.1 Retail Food Resources in the Lehigh Valley 2009

	Population	Grocery Stores	Specialized Food Stores	Supercenters and Club Stores	Convenience Stores
Lehigh County	343,519	71	33	3	121
Northampton County	298,990	54	21	2	107
Lehigh Valley	642,509	125	54	5	228

Sources: Census Bureau 2009[7]; Food Environment Atlas 2009[8]; BFBL-GLV 2013

[7] United States Census Bureau. (2010). *American Community Survey 1-Year Estimates* [Data file]. Retrieved from http://factfinder2.census.gov/

[8] USDA, ERS. (2009). *Food Environment Atlas*. Retrieved from http://www.ers.usda.gov/data-products/food-environment-atlas.aspx

3.3 Alternative Food Resources

As is suggested by the preceding research, conventional food retail resources (e.g. supermarkets, grocery stores, supercenters) may not be available in a community or neighborhood as a food resource. Low-income areas often do not amass enough demand or potential profit for supermarkets and grocery store chains to locate in these areas. Alternative food sources, such as farmers' markets and online shopping sites, can play an important role in the availability of fresh, healthy food resources in our Lehigh Valley communities. A number of these alternative food resources are discussed below.

Nazareth Farmers' Market
Photo Credit: BFBL-GLV

Farmers' Markets

Farmers' markets are defined by the USDA as a common facility or area where multiple farmers gather on a regular, recurring basis to sell a variety of fresh fruits and vegetables and other locally grown farm produce directly to consumers.[9] A variety of fresh produce, baked goods, dairy products, and meats can all be among the offerings at any given farmers' market, which serve as a source of fresh, seasonal foods, mostly from local farms and producers. In addition, farmers' markets are an opportunity for consumers to get to know their farmers and vice versa: consumers can talk to farmers and producers about the products offered, ask them questions, and learn more about the agricultural benefits, issues, and concerns that affect their community.

A variety of fresh produce, baked goods, dairy products, and meats can all be among the offerings at any given farmers' market...

Bath Farmers' Market
Photo Credit: BFBL-GLV

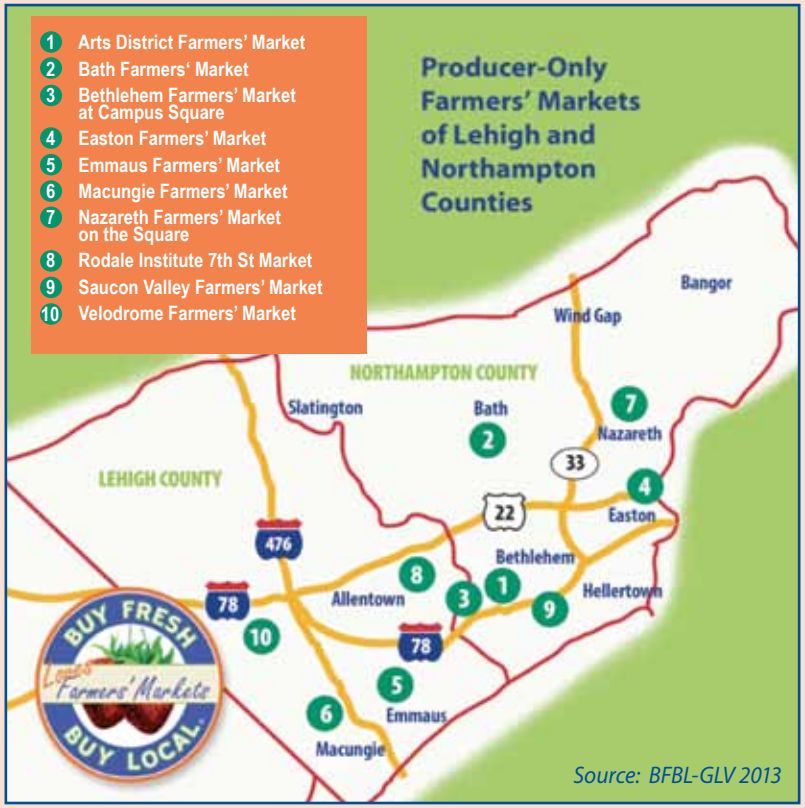
[9] USDA, Food and Nutrition Service (FNS) (2013). *Nutrition Assistance in Farmers Markets: Understanding Current Operations.* Nutrition Assistance Program Report Series, Office of Research and Analysis. Retrieved from http://www.fns.usda.gov/research-and-analysis

There is no governance of the use of the term "farmers' market," and, because of the recent popularity of local foods, the term is often used in a misleading way. There are several examples of public markets and retail operations in the Lehigh Valley region that include the words "Farmers Market" in their name, although there are few or no actual farmers at these venues. The vendors may resell goods that they purchased from other producers, and the items may be locally produced or imported, such as bananas and pineapples. In fact, the same produce may be sold in these operations as in other grocery stores. For this reason, a distinction has been made between these markets and producer-only farmers' markets.

Producer-only farmers' markets are those at which the vendors are the actual producers of the goods that they are selling, although the USDA does allow vendors to supplement their products with purchased goods. The specific limits on supplementation, however, vary from market to market. Some markets have strict rules banning the sale of any items not grown by the farmer, while others allow vendors to sell products from neighboring farms. When supplementation does occur, market by-laws may require clear labeling of the farm source.

There are currently ten producer-only farmers' markets in the Lehigh Valley (See Figure 3.7). These markets' seasons generally run from May or June through October or November. In addition, Easton and Emmaus Farmers' Markets provide winter markets, making them year-round resources of fresh food.

Figure 3.7 Farmers' Markets of the Lehigh Valley 2013



Pappy's Orchard and Lisa's Kitchen, Saucon Valley Farmers' Market
Photo Credit: Josh Popichak

Emmaus Farmers' Market
Photo Credit: BFBL-GLV

Bethlehem Farmers' Market
Photo Credit: BFBL-GLV

Macungie Farmers' Market
Photo Credit: BFBL-GLV

Saucon Valley Farmers' Market
Photo Credit: BFBL-GLV

In considering farmers' markets as viable alternative food retail resources, it is beneficial to consider how accessible they might be for low-income and underserved populations. The first issue of accessibility deals with location. Looking at the above maps of the four food deserts, there are no farmers' markets within the designated food deserts. While not directly in food deserts, the Rodale Institute 7th St. Market, Arts District Farmers' Market, Bethlehem Farmers' Market, and Easton Farmers' Market are located in urban centers and are accessible, either by walking or transit, to neighboring food deserts.

The second issue of accessibility is the perception that prices at farmers' markets are more expensive than those at grocery stores. Numerous studies, however, have found that prices for produce at the height of season are often cheaper at farmers' markets.[10] For example, in a recent study of eight different farmers' markets across the country, almost 60% of low-income farmers' market shoppers thought that their local farmers' market had better prices than the local grocery store or supermarket alternative.[11] Here in the Lehigh Valley, a BFBL-GLV study in autumn 2012 compared the prices of food at four producer-only farmers' markets to two grocery stores in the Lehigh Valley (See Appendix B), and no significant price difference was found between the two venues. Because of the wide price range for produce at the farmers' markets, it was always possible to find less expensive produce there as compared to the grocery stores.

The ability to use Supplemental Nutrition Assistance Program (SNAP) benefits at farmers' markets has improved accessibility for low-income populations. (For more information on SNAP benefits, see section 5.4 below.) The Easton Farmers' Market has implemented a market-wide EBT (Electronic Benefits Transfer) program in order to accept SNAP benefits at all of its eligible vendors. At other markets, individual farmers have been approved by the USDA to accept SNAP benefits.

One study found that the most frequent reason why low-income consumers did not shop at farmers' markets was that they were unaware of the hours and locations of the markets.[12] Due to the temporal nature of farmers' markets, information about their location, and days and hours of operation is crucial to ensuring that people can take advantage of this additional food resource.

Online Markets

New models of food delivery are being created and may be useful resources in areas with low food access. For example, online or virtual farmers' markets offer a good alternative for customers who do not have the time to go to a traditional farmers' market, or for whom the hours of the farmers' market do not fit into their schedule. In addition, the online markets provide an opportunity for smaller farming operations that are unable to attend multiple farmers' markets. There is one online market in the Lehigh Valley that offers locally grown products: Pure Sprouts Organic Delivery delivers directly to people's homes in Northeast Pennsylvania, including Northampton and Lehigh Counties.[13]

Farm Share Programs

Farm Shares are another alternative food resource for low-income neighborhoods by assisting limited-income residents in obtaining fresh, healthy, local foods at an affordable price. As in a Community Supported Agriculture (CSA) program, a farmer provides a wide variety of fresh-picked, seasonal vegetables weekly. Unlike a CSA, however, members do not have to pre-pay the full subscription fee at the start of the season, a requirement that could be prohibitive to low-income families. Instead, members are able to pay for their weekly shares at pick-up, and often are able to use their SNAP benefits. In addition, the weekly shares are delivered to a site within the neighborhood, making it more easily accessible to the community.

For the 2013 season, BFBL-GLV organized three new Farm Share programs with distribution points in the heart of low-income urban areas to improve fresh food access. These sites were:

Site	Community Partner	Farm
Sacred Heart Hospital, Allentown	Sacred Heart Hospital Jordan Heights, CACLV	Rodale Institute ASC
Hispanic Center, South Side Bethlehem	Hispanic Center	Willow Haven Farm
First Moravian Church of Easton	West Ward Neighborhood Partnership	Clear Spring Farm

[10] Estabrook, Barry. (May 10, 2011). The Farmers' Market Myth. *The Atlantic*. Retrieved from http://www.theatlantic.com/health/archive/2011/05/the-farmers-market-myth/238661/

[11] Project for Public Spaces. (2013) *Farmers' Markets as a Strategy to Improve Access to Healthy Food for Low-Income Families and Communities*. Retrieved from http://www.pps.org/reference/farmers-markets-as-a-strategy-to-improve-access-to-healthy-food-for-low-income-families-and-communities/

[12] *Ibid.*

[13] http://www.puresprouts.com/

Jordan Heights Neighborhood Association
Intern Rachel Lang assisting with Farm Share deliveries.
Photo Credit: Cynthia James

The combined sites had over 70 participants receiving fresh vegetables each week. The Rodale Institute ASC program also offered deliveries to the Lehigh Valley Academy in Bethlehem. Community and farm response to the programs has been strongly positive. A survey of participants in the West Ward Farm Share Program indicated that 77 percent would participate again in 2014, with another 18 percent indicating that they would possibly sign up depending on circumstances. The program was given an overall rating of 9.2 out of 10. More Farm Share sites are expected next year.

Food Cooperatives

Another type of alternative food retail resource is a food cooperative. The main principle that sets cooperatives apart from supermarkets is that in a cooperative, the members own the store. This arrangement allows the store to adapt to the needs of the community; members vote on how the co-op is run, from what foods are stocked to the recycling policies that the store upholds. In addition, cooperatives often source more of their products locally.[14]

The Bethlehem Food Co-Op will be making its debut in the Lehigh Valley in April 2014. The planning for this non-profit organization, including feasibility studies and community partnership building, has been underway since November 2011. The current plan by Co-op board members is to locate the store in one of the Bethlehem food deserts and to have the store accept SNAP benefits. The co-op will serve as an additional source of fresh, affordable food as well as a community gathering place.

Mobile Grocers

Mobile markets are another retail food resource that can have a positive impact on fresh food access. These resources, as implied by their name, move their location from day to day and are most often located in one place for a few hours or half of a day. Mobile markets can vary from offering only fruits and vegetables to offering a wide range of groceries. They can serve as a distribution point for farm produce in areas that are underserved by other retail food resources or as a supplementary food resource providing an alternative to supermarket options and prices.

MoGro is an example of a successful mobile market operation. This Santa Fe-based organization features a temperature-controlled truck that houses fresh produce, canned goods, frozen foods, processed grains (flour, cornmeal, etc), and other basic groceries, and visits eight different locations throughout the city during the week.[15] In order to maximize its impact on the community, this "mobile grocer" offers nutrition education, cooking classes, and fitness events with the help of other partners in the community.

There are many other examples of mobile markets around the country from Chicago (Fresh Moves) to Nashville (Nashville Mobile Market) and the Washington, D.C metro area (Arcadia). This type of food retail resource, like the other aforementioned alternative food retail resources, can offer a viable and often more affordable alternative to supermarkets.

In 2011, as part of its Fruits and Veggies on the Move program, the Allentown Health Bureau adapted a city-owned pick-up truck to deliver individual servings of fresh produce at no charge to youth at Allentown's playgrounds and special events. The fruit and vegetables were purchased from local retailers, who also assisted with its washing and cutting. During the summer of 2011, the truck, decorated with magnetic decals of carrots, broccoli, apples, and other produce, delivered large cups of fruits and vegetables to 20 playground program sites and several local events. A total of $2,000 worth of produce was served to 1,200 Allentown youths attending the summer playground program and 600 children and adults at special events. A large variety of fruits and vegetables, including apricots, cherries, pears, nectarines, plums, watermelon, peaches, broccoli, carrots, peppers, cucumbers, and green and yellow beans, was offered, and many children (and families) were able to sample items that they had not tasted before.

[14] ICA Group. Commissioned by National Cooperative Grocers Association. (2012). *Healthy Foods Healthy Communities - Measuring the Social and Economic Impact of Food Co-ops.* Retrieved from http://strongertogether.coop/food-coops/food-co-op-impact-study/

[15] http://www.mogro.net/

The Allentown Veggie Van
Photo Credit: Allentown Health Bureau

In 2012, the City of Allentown was awarded $120,000 from The U.S. Conference of Mayors as the 1st place medium-sized city winner of a 2012 Childhood Obesity Prevention Award for its Fruits and Veggies on the Move program. According to Tina Amato, Nutrition and Physical Activity Manager at the Allentown Health Bureau, a portion of these funds was used to enhance the delivery truck with permanent decals of colorful produce, a speaker system to announce the arrival of the truck (similar to an ice cream truck) and broadcast messages to the crowds, and a metal tray that can be pulled out from the back of the truck to act as a serving table. In 2012, the program was able to serve the 1200 playground attendees multiple times, as well as an additional 600 attendees at special events. In total, 3500 cups of produce were served at a cost of $5,000. Organizers report that not only did children take and consume the variety of fruits and vegetables offered, but that they responded with excitement to the sight and sounds of the colorful, fun truck approaching their playgrounds, creating a positive association with fresh produce. While the award continues to fund this program, the City of Allentown plans to seek additional funding from corporate or community entities to support the program in future years (personal communication).

Deliveries of Fresh Produce to the West Ward Neighborhood Partnership by the Lafayette Tech Clinic
Photo Credit: Esther Guzman

During the summer of 2013, the Technology Clinic, an interdisciplinary course at Lafayette College, worked with the West Ward Neighborhood Partnership in Easton to provide fresh vegetables from the Easton Urban Farm, Easton Community Gardens, and La Farm to residents of the West Ward. Vegetables were delivered to a pick-up site each week, and, in return for a small donation, neighborhood residents were invited to help themselves to the fresh produce.

Below: CSA share, Terra Fauna Farm, Northampton
Photo Credit: Terra Fauna Farm

3.4 Federal Assistance Programs

The USDA Food and Nutrition Service (FNS) administers fifteen federal nutrition programs that seek to provide children and families in need with access to food and, in particular, a more healthful diet.[16] These include the Supplemental Nutrition Assistance Program (SNAP), formerly known as the food stamp program; the Special Supplemental Assistance Program for Women, Infants, and Children (WIC); and the Farmers' Market Nutrition Program (FMNP) for both WIC participants and eligible seniors. All of these programs offer income-based food purchasing assistance.

A recent report states that the prevalence of food insecurity has been essentially unchanged since 2008, with 14.5 percent of households experiencing food insecurity at least some time during the year.[17] Food insecurity means that the food intake of one or more household members was reduced and their eating patterns were disrupted because the household lacked money and other resources for food. Fifty-nine percent of the food-insecure households surveyed reported that they had participated in one or more of the three largest Federal food and nutrition assistance (SNAP, WIC, and National School Lunch Program) in the previous month.[18]

Table 3.2 provides a glimpse of the percentage of the Lehigh Valley population participating in federal food assistance programs. It shows 27 percent growth in the percentage of the population using SNAP benefits. The SNAP and FMNP programs are described in more detail below.

Table 3.2 Food Assistance in the Lehigh Valley 2011

Poverty Rate, 2011 (Percentage of Population)	12.60%
SNAP Participants (Percentage of Population)	13.49%
Change in Percentage of SNAP Participants, 2009-2011	27%
Market-wide EBT Programs to accept SNAP at Farmers' Markets	1

Sources: Census Bureau 2011; Food Environment Atlas 2012; BFBL-GLV 2013

SNAP

SNAP is the largest of the nutrition assistance programs, accounting for 73 percent of all federal food and nutrition assistance spending.[19] It was designed to improve food security among Americans by increasing their purchasing power. SNAP offers assistance to low-income citizens and legal immigrants from ages 16 to 60. Eligibility is based on financial factors, including the participant's household income and expenses. Participation in the program requires that the individual apply for benefits, and some are required to work or look for a job as a condition of receiving the aid.

Prior to 1996, SNAP benefits were in the form of paper coupons that were used as cash. The 1996 Farm Bill required states to replace the paper coupon system with an Electronic Benefit Transfer (EBT) system. The conversions were done over a number of years and completed in 2004. The new EBT system created a number of challenges for using SNAP at farmers' markets, including the cost of EBT equipment and the requirements for electricity and phone lines, which were often lacking at outdoor farmers' markets. As the EBT conversion progressed, there was a marked decline in the ability to redeem SNAP benefits at farmers' markets. In 1994, 482 farmers' markets (27.5 percent) were authorized to accept food stamp (SNAP) benefits; however, by 2004, this had fallen to only 289 markets (7.8 percent).[20] This decrease occurred despite the fact that SNAP usage increased during this period and the number of farmers' markets in the US more than doubled.[21]

[16] *Nutrition Assistance in Farmers Markets.*

[17] USDA, ERS. (2013). *Household Food Security in the United States in 2012.* Economic Research Report No. 155. Retrieved from http://www.ers.usda.gov/publications/err-economic-research-report/err155.aspx#.Ui-GlNIY6So

[18] *Ibid.*

[19] Nutrition Assistance in Farmers Markets.

[20] Community Food Security Coalition & Farmers Market Coalition. (2010). *Real food, real choice: Connecting SNAP recipients with farmers markets.* Briggs, S., Fisher, A., Lott, M., Miller, S., & Tessman, N. Retrieved from http://farmersmarketcoalition.org/real-food-real-choice

[21] *Ibid.*

To improve SNAP participants' access to farmers' markets, the USDA has been providing funding to assist with the expansion of wireless technology and the implementation of EBT programs at farmers' markets, with encouraging results. The number of farmers' markets accepting SNAP benefits has increased significantly since 2007 and farmers' market redemptions have increased 624 percent. In 2011, 2,445 (34 percent) of the 7,175 farmers' markets in the US were authorized to accept SNAP benefits.[22]

Along with this increase in the number of markets authorized to accept SNAP payments, there has been a corresponding increase in the number of SNAP redemptions at farmers' markets (See Figure 3.8). In the 2011 fiscal year, SNAP benefits redeemed at farmers' markets increased more than $4 million to total $11,725,316.[23]

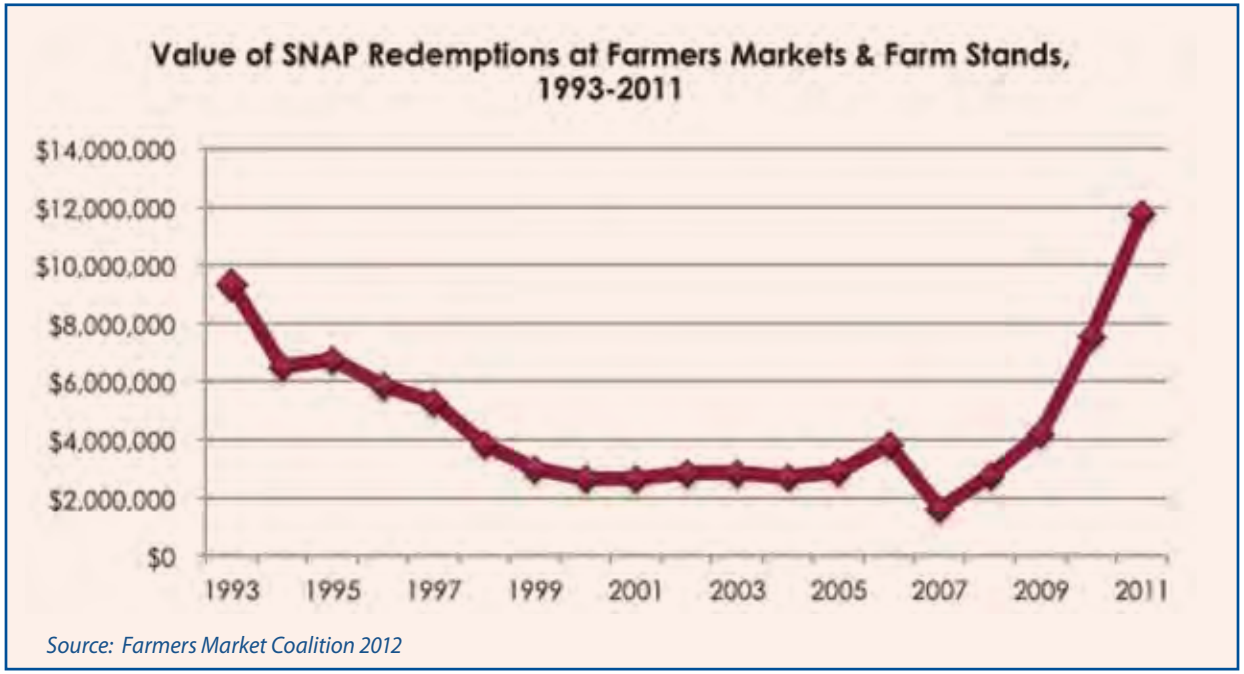
Despite these increases, the overall percentage of SNAP benefits spent at farmers' markets is still very low. In 2011, the value of farmers' market SNAP redemptions was just 0.016 percent of total SNAP redemptions.[24]

In 2010, BFBL-GLV implemented an EBT program at the Easton Farmers' Market with the assistance of a USDA Farmers' Market Promotion Program grant. In the program's first year of operation, there was an average of six SNAP transactions per week, and an annual total of $3,768 in SNAP redemptions. These numbers increased steadily over the next two years, and in 2012, an average of nine transactions per week resulted in a yearly total of $5,374 in SNAP redemptions. In 2013, an additional $1,048 in SNAP benefits was used at the new Wednesday afternoon market. These numbers show that EBT usage is increasing at the Easton Farmers' Market.

Jill Piperata and Emily Zangla offering EBT at the Easton Farmers' Market
Photo Credit: BFBL-GLV

Along with this increase in the number of markets authorized to accept SNAP payments, there has been a corresponding increase in the number of SNAP redemptions at farmers' markets...

Figure 3.8 Value of SNAP Redemptions at US Farmers' Markets and Farm Stands (1993-2011)



Source: Farmers Market Coalition 2012

[22] USDA, FNS, Benefit Redemption Division. (2011) *Annual Report*. Retrieved from http://www.fns.usda.gov/snap/retailers/pdfs/2011-annual-report-revised.pdf

[23] Farmers Market Coalition. (2012). *SNAP Redemptions at Farmers Markets Exceed $11 Million in 2011*. Charlottesville, VA: Roper, N. Retrieved from http://farmersmarketcoalition.org/snap-redemptions-at-farmers-markets-exceed-11m-in-2011

[24] *FNS Annual Report.*

Market-wide EBT programs are quite expensive to operate since the market has to pay for transaction and service fees as well as staff to operate the EBT machine, to perform bookkeeping, and to reimburse vendors. These costs can be prohibitive for community markets, which often run on very tight budgets. In a recent report, it was found that the majority of farmers' markets authorized to accept SNAP in 2011 had annual operating budgets in excess of $25,000.[25] Easton is the only producer-only farmers' market in the Lehigh Valley with a market-wide EBT program. Supported by the City of Easton, sponsorships, fundraising, grants, and vendor fees, the Easton Farmers' Market budget is well above $25,000 and includes salaries for two full-time staff. The three other producer-only markets located in low-income urban areas in the Lehigh Valley that are without market-wide EBT programs all have operating budgets falling well below this amount.

Markets that are not authorized to accept SNAP may still host SNAP-authorized farm vendors. For example, the Rodale Institute and Bechdolt Orchards operate their own EBT machines at the farmers' markets in which they participate. Individual farm stands, such as Clear Spring Farm and Willow Haven Farm, also accept EBT at their farms.

Programs designed to incentivize the use of SNAP benefits at farmers' markets have been shown to boost the purchasing and consumption of fruits and vegetables in underserved communities, while providing measurable economic impacts to farmers, farmers' markets, and surrounding neighborhoods.[26] The incentives vary according to the different programs, but generally a coupon is given when SNAP funds are spent at a farmers' market, such as a $2 coupon for every $5 spent, or a dollar match up to a certain amount. In Massachusetts, an incentive program increased average SNAP sales per season from $867 at markets with no incentive program to $2,587 (excluding incentive dollars) at markets with incentives.[27] There is no question that these incentive programs are effective at increasing SNAP redemption at markets; however, market organizers face the ongoing issue of finding funding for the incentive programs themselves.

One such incentive program ran during the summer of 2013 as a partnership among Kellyn Foundation, Easton Farmers' Market, West Ward's Weed and Seed, and the YMCA, and was funded through a grant from Wal-Mart. Each Thursday evening during Weed and Seed's Summer Nights program, Kellyn Foundation provided a healthy cooking demonstration using ingredients purchased at the Market and identified by farm name. Participants received both a taste of the prepared food and a $10 voucher to spend at the Easton Farmers' Market. A total of 275 vouchers were redeemed, resulting in new customers visiting the market. According to Megan McBride, Easton Farmers' Market Manager, there was a noticeable increase in the use of SNAP benefits, particularly during the new Wednesday evening market (personal communication, September 27, 2013).

Kellyn Foundation Cooking Demonstration during Summer Nights
Source: Kellyn Foundation

[25] *Nutrition Assistance in Farmers Markets*.

[26] Community Science Evaluation Group. (2011). *Healthy Food Incentives Cluster Evaluation*. Study. Commissioned by Wholesome Wave, Fair Food Network, marketumbrella.org & Roots of Change. Retrieved from http://www.healthyfoodincentives.org/

[27] Massachusetts Department of Agriculture Resources. (2011). *Supplemental Nutrition Assistance Program Benefits at Massachusetts Farmers Market: Program Evaluation*. Boston, MA: Author. Available at http://www.mass.gov/eea/agencies/agr/

FMNP Vouchers

The Farmers' Market Nutrition Program (FMNP) is designed to help increase the consumption of fresh, local, unprepared foods by low-income participants. FMNP is administered through a Federal/State partnership in which the Food and Nutrition Service (FNS) provides cash grants to State agencies. In Pennsylvania, the Bureau of Food Distribution at the PA Department of Agriculture (PDA) administers FMNP.

Two groups of recipients are served by this program. Participants in the WIC program are eligible to receive FMNP vouchers in addition to regular WIC benefits. WIC helps increase access to food, health referrals, and nutrition education for low-income, nutritionally at risk pregnant women and mothers of young children. The Senior Farmers' Market Nutrition Program (SFMNP) supplies vouchers to seniors that are 60 years of age or older by December 31st of the program year and meet the income eligibility guidelines (based on 185 percent of the federal poverty income guidelines).

Eligible WIC and Senior participants are issued four $5 FMNP vouchers per year (a total of $20 per year). These vouchers are redeemable for a variety of fresh fruits, vegetables, and herbs grown (or growable) in Pennsylvania at farmers' markets, roadside stands, and CSAs from farmers authorized by the PDA to accept FMNP coupons. Individuals who exclusively sell produce grown by someone else, such as wholesale distributors, cannot be authorized to participate in the FMNP. The farmers then submit the redeemed FMNP vouchers to the PDA for reimbursement.

There are 46 farmers in the Lehigh Valley who have been authorized to accept FMNP vouchers.[28] In 2008, Senior and WIC FMNP vouchers worth $229,365 were issued in the Lehigh Valley.[29] Of these, $150,000 were redeemed: Seniors redeemed 87 percent of vouchers issued, while WIC recipients redeemed only 53 percent.[30]

SHFBLV allocates over six million pounds of food annually to area non-profit organizations, such as food pantries, soup kitchens, homeless shelters, and childcare centers...

3.5 Emergency Food Resources

Second Harvest Food Bank of Lehigh Valley and Northeast Pennsylvania (SHFBLV), a program of Community Action Committee of the Lehigh Valley (CACLV) and a member of Feeding America, the nation's Food Bank network, serves six counties, including Lehigh and Northampton Counties. It acts as a food aggregation center, acquiring resources through food drives, state grants, and donations from national and local food industries. Second Harvest recently acquired a large cooler provided by sponsoring agencies, allowing it to carry perishable foods, and is continually working to increase the supply of fresh produce that is distributed throughout their network (personal communication, February 2013). SHFBLV allocates over six million pounds of food annually to area non-profit organizations,[31] such as food pantries, soup kitchens, homeless shelters, and childcare centers, who distribute the food to those people facing hunger and food insecurity at little or no cost. Table 3.3 provides data on the available emergency food resources in the Lehigh Valley, providing evidence of the prevalence of this issue in the region.

Table 3.3 Emergency Food Resources in the Lehigh Valley

County	Population	Poverty Rate (%)	Emergency Food Pantries	Shelters	Soup Kitchens
Lehigh County	349,497	13.2 %	42	4	5
Northampton County	297,735	10.6 %	29	1	7

Sources: Census Bureau 2010; USDA Food Environment Atlas; and Second Harvest, personal communication.

[28] The list of authorized farmers can be found at http://pameals.com/MealsPublic/FarmMarkets/MarketSearch.aspx?pc=fmnp.

[29] Pennsylvania Department of Agriculture, Bureau of Food Distribution. (2009). *2008 FMNP Senior Redemption Report and 2008 WIC FMNP Redemption Report*. Retrieved from http://www.agriculture.state.pa.us/portal/server.pt/gateway/PTARGS_6_2_75292_10297_0_43/Ag-Website/ProgramDetail.aspx?-Senior-Farmers-Market-Nutrition-Program-(SFMNP)&palid=17&

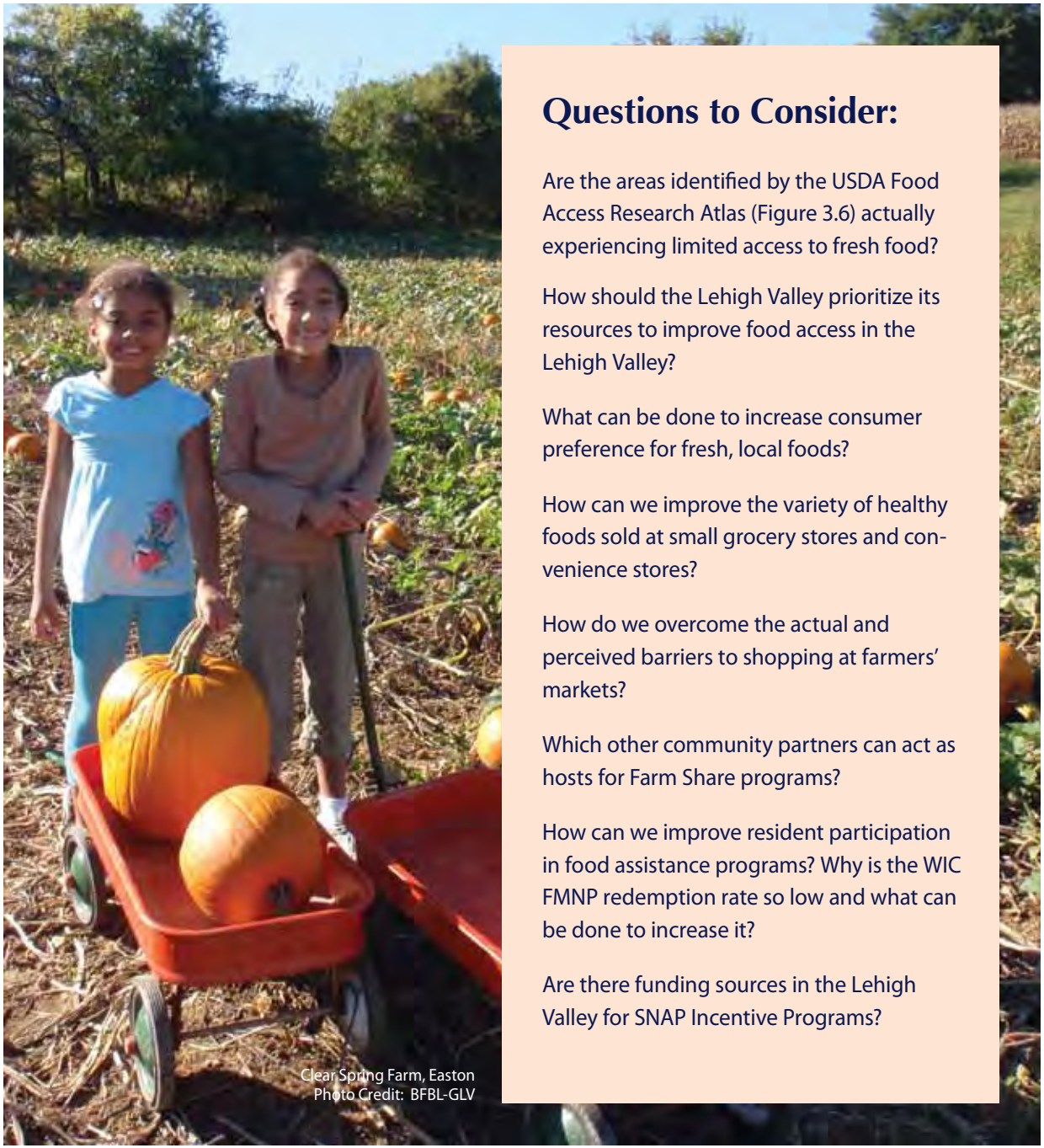
[30] *Ibid.*

[31] Feeding America. *Food Bank Locator* [Data file]. Retrieved from http://feedingamerica.org/foodbank-results.aspx?state=PA

3.6 Looking Forward

The unequal distribution of food resources in the Lehigh Valley have left some of its communities without access to fresh, healthy foods. By identifying these areas, plans for future development and improvement in the local food economy can be made to address these needs. Numerous opportunities exist to alleviate limited food access in the area, and with national concern about the undernourished in this country, there are also funding opportunities at both the state and federal level that can be used to improve food access. The issues of fresh food access and health involve many different topics, such as community planning, food retail, public health, and local agriculture, and the collaboration of all community stakeholders is needed to alleviate underserved areas and improve the health of the community. A comprehensive strategy and sustainable policies could be formed and implemented in order to make healthy, fresh food access a reality in the Lehigh Valley.

Terra Fauna Farm, Northampton
Photo Credit: BFBL-GLV



Clear Spring Farm, Easton
Photo Credit: BFBL-GLV

Questions to Consider:

Are the areas identified by the USDA Food Access Research Atlas (Figure 3.6) actually experiencing limited access to fresh food?

How should the Lehigh Valley prioritize its resources to improve food access in the Lehigh Valley?

What can be done to increase consumer preference for fresh, local foods?

How can we improve the variety of healthy foods sold at small grocery stores and convenience stores?

How do we overcome the actual and perceived barriers to shopping at farmers' markets?

Which other community partners can act as hosts for Farm Share programs?

How can we improve resident participation in food assistance programs? Why is the WIC FMNP redemption rate so low and what can be done to increase it?

Are there funding sources in the Lehigh Valley for SNAP Incentive Programs?

Food Infrastructure

- There are a significant number of wholesale buyers in the Lehigh Valley, including restaurants, schools, colleges, hospitals, and corporations. Moving locally grown foods into these venues involves a more intricate pathway through the food supply chain comprised of intermediated sales and more extensive infrastructure.
- The Lehigh Valley is lacking in infrastructure (processors, aggregators, and distributors) of appropriate size for locally grown foods.
- There are no co-packers situated within the Lehigh Valley; however, a few exist in the surrounding regions.
- Food business incubator kitchens are key in expanding food and agricultural businesses. Currently, there is only one operating in the Lehigh Valley.
- There are no facilities available for freezing local produce on a commercial scale in the Lehigh Valley or surrounding areas.
- There are no grain mills currently available for custom milling within the Lehigh Valley; however, there are a few in neighboring counties.
- There are no federally inspected slaughterhouses in the Lehigh Valley.
- There are no food hubs in the Lehigh Valley.

Valley View Farm, Northampton
Photo Credit: BFBL-GLV

4. Food Infrastructure

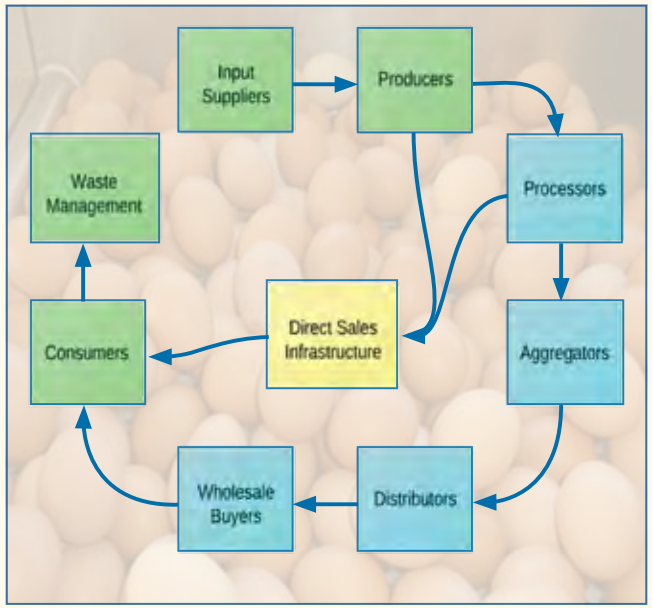
Food travels from farm to plate through an assortment of businesses, relationships, and many steps known as the food supply chain (See Figure 4.1). This chapter will look at the various components involved in the Lehigh Valley local food supply chain.

Discussions of local food economies often bring to mind farmers' markets, CSAs, and other examples of direct-to-consumer market venues. The Lehigh Valley has seen incredible growth in the demand for locally grown foods in recent years due to increased consumer awareness about local food and expanded farm-direct markets. In 2007, there were 167 farmers in the Lehigh Valley selling directly to consumers, a 61 percent increase since 1992.[1] There has also been a corresponding increase in sales of locally grown foods as our ten producer-only farmers' markets and numerous farm stands and CSAs continue to grow and thrive. This farm-direct pathway through the food supply chain is fairly simple and requires minimal infrastructure.

The demand for local foods, however, is occurring not only at home, but also in restaurants, schools, colleges, hospitals, corporations, and other venues where food is consumed. Consumers in the Lehigh Valley spent $1.5 billion on food in 2007. Of this, nearly half ($660 million) was spent on food eaten away from home (food purchased at eating and drinking places, as well as food purchased at hotels, recreational places, vending machines, and schools and colleges).[2] Unlike farm-direct sales to consumers, moving locally grown foods into these markets involves a more intricate pathway through the food supply chain comprised of intermediated sales and more extensive infrastructure. As the national food system has shifted away from local production toward global sourcing, the infrastructure (buildings, equipment, and services) required to connect local farms with wholesale markets has eroded.

The pathway from farm to wholesale buyer involves processors, aggregators, and distributors of appropriate size for locally grown foods, as well as new cooking skills and purchasing systems. This infrastructure allows small and mid-sized farmers to access larger volume, wholesale markets, produce high-value products, and reach customers year round. The Lehigh Valley is lacking in this infrastructure.

Figure 4.1 The Food Supply Chain



Source: Central Appalachian Network 2011

The demand for local foods, however, is occurring not only at home, but also in restaurants, schools, colleges, hospitals, corporations, and other venues where food is consumed.

Good Work Farm Skillet, Emmaus
Photo Credit: Sarah Edmonds

[1] United States Department of Agriculture. (1992, 2007). *Census of Agriculture* [Data file]. Retrieved from http://www.agcensus.usda.gov/Publications/index.php

[2] United States Department of Labor, Bureau of Labor Statistics (2010). *Consumer Expenditure Survey, Region of Residence* [Data file]. Retrieved from http://www.bls.gov/cex/#tables; United States Census Bureau (2010) *American Community Survey 1-Year Estimates* [Data file]. Retrieved from http://factfinder2.census.gov/

4.1 Processing Facilities

For the most part, the Lehigh Valley's supply of fresh, locally grown foods is only available during the harvest season; local procurement of these foods is much more limited during the winter months. In order to expand the local supply chain beyond fresh food products, infrastructure is needed to provide extended season market opportunities. Processing facilities allow producers to convert whole food products from their raw state through cooking, baking, or preservation techniques such as canning, freezing, pickling, and curing; for example, apples can be made into apple sauce, apple cake, or dried apples. These processed products can then be sold out of season, generating new revenue streams for the farmers.

In addition, local products can be processed by methods such as chopping, grating, or pureeing to change their form into a more-readily usable product; for example, various greens could be washed, trimmed, and packaged into salad mixes. All of these processes add value to the raw product.

Local food system processors and processing facilities include packing sheds, co-packing facilities, multi-use commercial kitchens, grain mills, and meat/poultry processing facilities, all of which are described below.

Packing Sheds

Packing sheds are facilities where raw agricultural commodities are washed, trimmed, sorted, graded and/or packaged for sale. This handling of whole fresh foods does not involve any real processing and is often done by the grower on the farm. Aggregation operations may contain their own grading and packaging operations.

Co-Packing Facilities

A co-packing facility is one that manufactures and packages value-added food products for clients, using provided ingredients, recipes, and packaging materials; the final product is then returned to the client to market. This relationship allows farmers and food entrepreneurs to offer value-added products to their customers even if they lack processing infrastructure or culinary skills. Examples of products that are commonly manufactured at co-packing facilities include sauces, pickles, and jams. The co-packer may be a food manufacturer that markets its own product under its own brand, but that has excess capacity to produce other products.

The variety of products that a single co-packing facility can manufacture is often limited since different types of equipment are needed for different products. In addition, co-packers tend to be small specialized facilities processing local seasonal foods, and as such, client's needs for co-packing services are likely to coincide with the facility's own production peak. These issues may limit production capacity.

There are no co-packers situated within the Lehigh Valley; however, a few exist in the surrounding regions. A number of Lehigh Valley farmers use Bauman's Apple Butter facility in Sassamansville, Montgomery County. The family-run facility has been making its own line of apple butter and apple cider since 1892, and has expanded the line to include other fruit butters, tomato sauces, and ketchup.[3] Bauman's processes produce for farmers in small batches using just the farmer's produce, provided the minimum batch sizes are met. According to Jeff Frank of Liberty Gardens, this is about 300 lbs for tomato sauce (personal communication, July 2013).

Sorting apples at Bechdolt Orchards, Hellertown
Photo Credit: BFBL-GLV

Eagle Point Farm Market in Trexlertown uses Bauman's facility to prepare their tomato sauces and salsa.
Photo Credit: Eagle Point Farm

Grouse Hunt Farms, located north of Tamaqua, Schuylkill County, operates a 28,000 square foot processing and canning facility on the 80-acre farm. The family-owned business markets eighty-two varieties of Pennsylvania Dutch Foods, including chow-chow, corn relish, dressings, and preserves, under the label WOS WIT.[4] The facility is also available for processing value-added products from regional farmers.

Other co-packers in Pennsylvania can be found at http://extension.psu.edu/food/entrepreneurs/co-packers/pennsylvania-co-packers.

[3] http://www.baumanfamily.com/
[4] http://www.wos-wit.com/

Multi-Use Kitchen Facilities

Multi-use kitchen facilities can accommodate a wide range of food processing activities, such as cold storage, washing, cutting, freezing, and canning. They may offer work space as well as processing equipment (preparation tables, peeling and cutting equipment tailored to specific crops (ex. corn strippers) or for particular cuts (slicing, dicing, cubing, grating), mixers, cooking equipment (steam kettles, ovens, blanchers) conveyer belts for moving product between stations, centrifuges to remove excess water after washing or blanching, dry storage space, refrigerators, freezers, and packing equipment. These facilities are important in the value food chain because they add value to produce and allow farms to market products throughout the year. Additionally, they can utilize produce seconds: produce that is fit to eat but that may be cosmetically flawed or of an abnormal size.

Anyone intending to operate a food manufacturing, warehousing, processing, storage, or any other type of wholesale food operation must register with the Pennsylvania Department of Agriculture prior to operation. Food establishments are regulated under Act 106 of 2010 (3 C.S §§5721 - 5737), which by reference incorporates all regulations in the Code of Federal Regulations (CFR) relating to food. This requires that facilities also register with the FDA and follow FDA labeling regulations.

Cold Storage

As demand for local food grows, consumers are looking to source these foods year round. This has led to an increased need for cold storage for crops harvested in the fall that can be stored and sold throughout the winter months, such as potatoes, onions, garlic, carrots, beets, apples, and pears. Under the right conditions, produce can be stored for many months. Proper storage temperature and humidity vary by crop.

Richard Rowe with pears in storage, Bechdolt Orchards, Hellertown
Photo Credit: BFBL-GLV

These establishments ...allow food entrepreneurs to develop a market for their value-added food items without investing any capital in a kitchen site and equipment.

Many farmers have their own cold storage facilities on the farm. According to Rich Rowe, Bechdolt Orchards in Hellertown maintains several separate coolers to store their fruit. One cooler used mainly for apples holds 9000 bushels. Another, which holds about 1400 bushels, is used mainly for pears. A third with a holding-capacity of 1600 bushels stores peaches and vegetables. In years where the apple harvest exceeds storage capacity, the orchard will rent cooler space from another local grower (personal communication, July 2013).

Community Kitchens

Many community-based organizations, such as churches or community centers, have kitchens that are available to the public, often for use at an hourly rate. Local businesses, such as restaurants or banquet halls, may also rent out space for caterers, bakers, or prepared-food entrepreneurs. These establishments offer areas for preparing, catering, baking, and packaging, and allow food entrepreneurs to develop a market for their value-added food items without investing any capital in a kitchen site and equipment. They offer a relatively inexpensive way to comply with current food safety regulations. There are numerous such establishments in the Lehigh Valley; however, they are usually suitable for preparation of small batches of food that do not require specialized equipment.

Food Business Incubator Kitchens

Food Business Incubator Kitchens are key in expanding food and agricultural businesses as they provide food entrepreneurs with the use of an approved food production space, as well as specialized commercial kitchen equipment, packaging and labeling equipment, and storage. They may also provide access to technical training, business planning, marketing assistance, and a collaborative network to gain economies of scale. Generally, a rental fee is charged. These incubators help food entrepreneurs develop a new product line and grow their food business until they are large enough to open their own processing facility.

An example of such a facility is The Central Kitchen at ACEnet's Food Ventures Center in Athens, Ohio. In their experience, kitchen incubators have the potential to be a promising economic development tool for urban neighborhoods while also helping to stabilize local farms and expand a manufacturing base. They must, however, address the following:

- target start-up underserved food and farm entrepreneurs who are transitioning from home-based operations;
- expand opportunities for both farmers and entrepreneurs to process or add value to raw products;
- locate in low-wealth urban neighborhoods to provide jobs to residents who most need them; and
- use productive equipment over all four seasons.[5]

Other examples of successful food business incubator kitchens are the Northeast Center for Food Entrepreneurship (NECFE)[6] and the Western Massachusetts Food Processing Center[7]. All of these projects are dedicated to developing regional value chains for value-added products. They provide food businesses with commercial kitchen space as well as consulting and business planning resources.

Anna's Commercial Kitchen, Allentown
Photo Credit: Mary Ellen Griffin

Currently, there is only one food business incubator kitchen operating in the Lehigh Valley. Anna's Commercial Kitchen at The Caring Place in Allentown operates both a commercial incubator kitchen and a food truck to assist food-based businesses.[8] The kitchen includes areas for producing sauces (salsa, salad dressings, jams, jellies, etc.), bulk items, and bakery/baked goods, as well as space for caterers and food cart vendors. The kitchen provides space for up to two producers using the facility simultaneously. Space is rented on an hourly basis.

...kitchen incubators have the potential to be a promising economic development tool for urban neighborhoods while also helping to stabilize local farms and expand a manufacturing base.

[5] Masi, B., Schaller, L., & Shuman, M. (2010). *The 25% Shift: The benefits of food localization for northeast Ohio & how to realize them.* Retrieved from www.neofoodweb.org/sites/default/files/resources/the25shift-foodlocalizationintheNEOregion.pdf

[6] http://necfe.foodscience.cornell.edu/

[7] http://www.fccdc.org/food-processing

[8] http://www.thecaringplace.org/annascommercialkitchen.html

In 1998, the Community Action Development Corporation of the Lehigh Valley (CADCLV) commissioned a report on the feasibility of a shared-use commercial kitchen in Allentown.[9] According to Julie Thomases, member of the CACDLV kitchen facility team, the mission of the proposed kitchen was to stimulate successful, small food-related business development, generate new community ownership opportunities, produce new jobs, open markets for locally made products and produce, and demonstrate the power of a community working together. The report assessed the strength of the market to support a shared-used commercial kitchen and found it to be feasible. The project evoked a high level of interest from the Allentown community, and 28 individuals were identified as potential candidates for using the facility. Market research showed that specialty food producers and bakers were the most likely users. It was estimated that the facility had the potential to generate more than 100 direct and indirect jobs, likely filled by local residents within walking distance of the kitchen. It was recommended that three distinct production spaces be created and equipped: a bakery, a larger wet kitchen with steam kettles and possibly a bottling line, and a small production and catering kitchen. It also identified anchor businesses that were likely to use the kitchen for 60 hours or more a month, which would balance small entrepreneurial development. The facility was also intended to provide effective programs to support and grow its small business users and their workforce. Following receipt of this positive feasibility report, CADCLV raised $3.5 million dollars to implement this project. Unfortunately, due to circumstances beyond the control of the team, in 2001 construction costs rose significantly above original values and the project was unable to proceed (personal communication, June 10, 2013). It is reasonable to assume that the level of interest and feasibility of a shared-use commercial kitchen have only increased over time, considering the growing interest in locally grown foods.

Freezing Facilities

Freezing locally grown produce during the growing season is a logical way to make these products available for consumption in winter months. There are, however, significant barriers to overcome.[10] Although the standard commercial kitchen equipment available in a multi-use kitchen facility can be used to freeze local produce, additional costly processing equipment, such as an Individual Quick Frozen (IQF) machine, may be required in order to increase processing efficiency. Frozen storage options must also be considered. Relationships with growers and aggregators must be developed in order to assure a sufficient supply of products at a price that provides an adequate return to growers, aggregators, and processors, while achieving a price point that works for the buyer. It has been suggested that producers (or aggregators) in a frozen value chain have the capacity to deliver 2000 pounds of fresh produce in a single day at least once per season in order to be profitable.[11]

A recent study[12] noted the scarcity of operations involved in freezing locally and regionally grown produce, but it did identify a number of small and mid-scale freezing ventures in operation across the country. Different strategies were employed to varying degrees of success, including the use of equipment available in schools, mobile produce freezing units, multi-use kitchen facilities and small freezing enterprises, and co-pack relationships with existing freezing companies.

One example of a successful freezing facility is Northern Girl, a for-profit fresh and frozen cut vegetable processing plant in Van Buren, Maine.[13] The company aggregates root crops such as potatoes, carrots, rutabagas, and beets from 12 local farms. It washes, peels, dices, steams, freezes, and packages the vegetables, which are generally seconds (produce that falls below Grade A standards due to cosmetic issues, such as blemishes, bruises, or insect damage). In April, 2013, this business expanded operations and moved into a new 5,000-square-foot facility with the capacity to process 10,000 pounds per day. In full operation, the facility will process 1 million pounds of frozen vegetables per year.

There are no facilities available for freezing local produce on a commercial scale in the Lehigh Valley or surrounding areas.

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[9] (1998). *Shared-Use Commercial Kitchen of Lehigh Valley Feasibility Study*. Prepared by La Vanche and Associates for Community Action Development Corporation of the Lehigh Valley.

[10] Community Involved in Sustaining Agricutlture (CISA). (2010). *Evaluation of Options for Freezing Produce in Western Massachusetts*. Final Report for Federal-State Marketing Improvement Program. Retrieved from http://www.ams.usda.gov/AMSv1.0/getfile?dDocName=STELPRDC5090275

[11] Franklin County Community Development Corporation and Community Involved in Sustaining Agriculture (CISA). (2010). *Freezing Regional Produce for Western New England: A Report on the Extended Season Farm-to-Institution Pilot Project*. Fitzsimmons, J. Retrieved from http://www.buylocalfood.org/upload/resource/FreezingRegionalProduceforWesternNewEngland2.pdf

[12] Institute for Agriculture and Trade Policy. (2012). *Frozen Local: Strategies for Freezing Locally Grown Produce for the K-12 Marketplace*. Berkenkamp, J. Mader, L. & Kastler, M. Retrieved from http://www.iatp.org/files/2012_12_11_FreezingReport_JB_web.pdf

[13] Pullano, G. (Thursday, Jun. 6, 2013). A Local Focus: Maine plant processes root crops for nearby customers. *freshCUT*. Retrieved from http://freshcut.com/index.php/magazine/article/a-local-focus

Grain Mills

There are no grain mills currently available for custom milling within the Lehigh Valley; however, there are a few in neighboring counties.

Castle Valley Mill, owned by Mark Fischer, is located in Doylestown, Bucks County. It produces stone-ground flours, meals, and grain mixes, using local Bucks County grains whenever possible.[14] The grains are processed slowly and at cool temperatures on antique buhr mills in order to preserve the vitamins and nutrients. This is in contrast to most commercial grinders who use roller milling, a process that heats up the grains.

F.M. Brown's Sons, Inc., located in Fleetwood, Berks County, produces soft winter wheat flour for the snack food industry, particularly pretzels. The majority of the wheat comes from the eastern shore of southern New Jersey, Delaware and Maryland. The remaining wheat comes locally from eastern Pennsylvania.[15] According to Mena Hautau, Educator, Berks County, Penn State Cooperative and Robert Leiby, retired Lehigh County Extension Director, Penn State Cooperative Extension, there are numerous farmers in Berks County who sell wheat for flour (personal communication, June 2013).

Albright's Mill in Kempton, Berks County, buys and sells corn, wheat, soybeans, oats and barley. It offers grain drying & storage facilities, which have grown to a storage capacity of nearly 1 million bushels, as well as custom milling. A feed mill uses grain purchased from local farmers to manufacture Albright's own line of animal feeds, concentrates, and custom feeds for livestock, pets, exotic animals and wildlife.[16]

In addition, farmers have the option to sell wheat to ConAgra Mills in Martin's Creek, Northampton

Teena Bailey, Red Cat Farm, Germansville
Photo Credit: Teena Bailey

County. This wheat is blended with that from other locations and milled into various flour products.

Red Cat Farm, a farm in Germansville growing on five acres of a combination of owned and rented land, is the only farm in the Lehigh Valley currently growing wheat and milling it into flour for sale directly to consumers and local businesses. According to Teena and Michael Barley, Red Cat Farm is growing small plots of a variety of heritage wheats to test for suitability to the Lehigh Valley climate. Those that thrive are saved for seed and used to grow a supply for flour milling. The open-pollinated grain is grown using sustainable methods, stored in a cool, dry location, then milled in small batches at Castle Valley Mill in Bucks County. The freshly ground 100% whole wheat flour is sold at the Mill in Germansville and at the Macungie Farmers' Market. Yields from two acres could supply up to 80 bushels or 4,800 pounds of grain or flour in 2013. In 2014, the owners hope to harvest their first small crop of a Hungarian landrace wheat. In addition to wheat, the farm is also growing emmer and possibly einkorn. According to Teena, "These grains make flours with delicious flavor and great baking qualities" (personal communication, June 5, 2013).

Red Cat Farm, a farm in Germansville growing on five acres of a combination of owned and rented land, is the only farm in the Lehigh Valley currently growing wheat and milling it into flour for sale directly to consumers and local businesses.

Wheat and Flour at Red Cat Farm, Germansville
Photo Credit: Teena Bailey

[14] http://castlevalleymill.com/

[15] http://www.fmbrown.com/Flour_GrainReceivingStep1_Page.htm

[16] http://www.albrightsmill.net

Valley View Farm, Northampton
Photo Credit: BFBL-GLV

Meat and Poultry Processing

In recent years, there has been growing public concern about the industrial food chain, particularly with regard to meat and poultry. Public concern about the conditions of factory-farms are rising in response to recent movies and publications.[17] There are numerous recalls of meat and meat products each year[18]. In 2008, 143 million pounds of tainted meat was recalled from one meatpacking facility, the largest meat recall in the United States, because the meatpacker was introducing sick animals into the food supply.[19]

These concerns have led some consumers to consider production methods when choosing animal products. More value is being placed on animal welfare, environmental implications, organic and pastured production methods, and nutrition. This has led to an increased demand for locally raised animal products. This heightened demand, however, is not at the same level as the increase in demand for locally grown foods in general: only seven percent of all livestock producers engage in direct sales as compared to forty-four percent of all vegetable and melon producers.[20]

One reason for this is the significant price difference between local, pastured animal products and those produced in an industrial factory setting. The increase in price is due in part to the increased price of using small-scale slaughter houses as well as the extensive regulatory requirements to which all livestock producers must adhere, such as creating nutrient management plans, obtaining retail food facility and warehouse licenses, and labeling product with USDA-approved labels, but which cost more per animal for small operations. Although some consumers are willing to pay a premium for local pastured animal products, others are either unwilling or unable.

Meat Processing

Often, limited slaughter and processing facilities are cited as the key barrier to local meat production.[21] There are different types of facilities for slaughtering and processing animals, which dictate where the products may be legally sold. Anyone wishing to sell meat products in retail markets in Pennsylvania is required to use federally inspected facilities. The Food Safety Inspection Service (FSIS) is the public health agency in the United States Department of Agriculture (USDA) responsible for inspecting federal slaughter and processing establishments. Every animal is inspected before and after slaughter.

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[17] See Kenner, R. (Director). (2008). *Food, Inc.* [Motion Picture]. USA: Magnolia Pictures; Pollan, M. (2006). *The Omnivore's Dilemma: A Natural History of Four Meals*. New York: The Penguin Press; and Conover, T. (May 2013). The Way of All Flesh: Undercover in an Industrial Slaughterhouse. *Harper's*. Retrieved from http://harpers.org/archive/2013/05/the-way-of-all-flesh/

[18] United States Department of Agriculture, Food Safety and Inspection Service. (2013). *Recall Case Archive* [Data file]. Retrieved from http://www.fsis.usda.gov/wps/portal/fsis/topics/recalls-and-public-health-alerts/recall-case-archive

[19] Brown, D. (February 18, 2008). USDA Orders Largest Meat Recall in U.S. History. *Washington Post*. Retrieved from http://www.washingtonpost.com/wp-dyn/content/article/2008/02/17/AR2008021701530.html

[20] USDA, Economic Research Service. (2010). *Local Food Systems: Concepts, Impacts, and Issues* Economic Research Report No. (ERR-97). Retrieved from http://www.ers.usda.gov/publications/err-economic-research-report/err97.aspx#.UcXCPjsY7Sg

[21] USDA, Economic Research Service. (2012). *Slaughter and Processing Options and Issues for Locally Sourced Meat* Economic Research Service Outlook No. (LDPM-216-01). Retrieved from http://www.ers.usda.gov/publications/ldpm-livestock,-dairy,-and-poultry-outlook/ldpm216-01.aspx#.UcXEKzsY7Sg

Some states also have state-inspected facilities, which follow the same food safety procedures and guidelines as the federally inspected facilities. The primary difference is that state-inspected meats are restricted to intrastate commerce. Many of the states in the U.S., including Pennsylvania, have dropped their state inspection programs due to cost savings, thus reducing the number of available processing facilities.[22]

When slaughtered and processed under federal inspection, local meats can be packaged as retail cuts and sold to individuals at farmers' markets or farm stands, and as retail cuts or subprimal cuts (intermediate-sized cuts) to restaurants, retailers, and food service.

Pastured Meats at Keepsake Farm & Dairy, Nazareth
Photo Credit: BFBL-GLV

One exception to the federal inspection requirement is the "custom exemption". Animals that are slaughtered and processed for the household use of the owner, his or her family, employees, and nonpaying guests are exempted from inspection. Producers can use this exemption to sell a whole, half, or quarter share of a live animal to the consumer before slaughter ("on the hoof"), and then the animal can be slaughtered and processed for the new owner at a custom-exempt facility. The customer pays the custom processor directly. In this case, an inspector is not required to examine the animal or the carcass; rather, the facility is inspected at least annually for compliance with sanitation and labeling requirements. The finished meat is to be consumed by the new owners. It is marked "not for sale" and is not to be resold.

Although USDA-inspected meat processors are more common in the Northeast than other parts of the country[23], many of these processors are large-scale facilities that are unavailable to local meat processors due to mismatches in scale, service, and business models. Local farmers must rely on small-scale facilities. Unfortunately, there has been a decline in the number of small-scale USDA-inspected slaughterhouses due to industry consolidation, low profit margins, and complicated federal regulations written with large, corporate facilities in mind.[24]

Cows at Rainbow Farm, New Tripoli
Photo Credit: BFBL-GLV

In comparison to other states in the Northeast, Pennsylvania is seen as having "a wealth of great processing resources for niche meat producers."[25] Yet many farmers in the Lehigh Valley still view access to slaughter and processing services as a constraint. There are no federally inspected slaughterhouses in the Lehigh Valley. Like most Lehigh Valley farmers, Steve Schoeniger of Rainbow Farm in New Tripoli uses Springfield Meat Company in Richlandtown, Bucks County. Steve encounters long waits and must schedule the slaughter of his 20-head of pastured cows three months in advance. Transporting animals the 35-mile drive to the slaughterhouse is inconvenient and, with rising fuel prices, costly.

Other federally inspected facilities are available at even greater distances, such as Smuckers Meats in Mount Joy, Lancaster County and Leona Meat Plant in Troy, Bradford County.

The Lehigh Valley lacks sufficient slaughter and meat processing options to offer farmers choices in quality services, location, and price. Yet a study from New England showed that the number of slaughterhouses and processing facilities has not increased due to small profit margins, a shortage of skilled labor, the seasonality of inputs, and challenging regulatory compliance.[26]

[22] *Ibid.*

[23] Community Involved in Sustaining Agriculture (CISA) (2008). *Demand and Options for Local Meat Processing: Finding the way from pasture to market in the CT River Valley.* Final Report for USDA Rural Development Rural Business Enterprise Grant Program. Coleman, K. Retrieved from http://www.extension.org/mediawiki/files/6/64/CISA_feasibility_study_2008.pdf

[24] Food & Water Watch (June, 2009). *Where's the Local Beef? Rebuilding Small-Scale Meat Processing Infrastructure.* Retrieved from http://www.foodandwaterwatch.org/reports/wheres-the-local-beef/

[25] Miltner, K . (June 27, 2010). Slaughterhouse Options Shrink for Small Farmers. *USA Today.* Retrieved from http://usatoday30.usatoday.com/money/industries/food/2010-05-27-slaughterhouses27_ST_N.htm

[26] CISA, *Finding the way from pasture to marke*t.

Small-scale facilities process approximately 1200 animals per year as compared to large scale facilities that can process thousands of animals per day. As such, the small facilities are unable to benefit from economies of scale and must charge increased processing fees.

Smaller facilities require dependable, highly skilled workers that understand the entire process; however, qualified people are difficult to find and retain. Both skilled workers and training to develop them have diminished in recent years.[27] Many of the smaller facilities are family run, but younger family members may not be eager to continue a business where the work is hard and dirty, the hours are long, and the profit margin is extremely slim.

Despite long wait periods at smaller facilities, many processors have an inconsistent supply of animals due to the seasonality of the livestock industry. The last quarter of the year is the peak harvest season for all animals except chickens and goats, following which slaughterhouses face a decline in demand. The high season for beef cattle slaughter (October through December) sees a 68 percent higher volume than July through September.[28] A 2011 study of New England's large animal slaughter facilities found that only a relatively small percentage of existing capacity was being utilized due to seasonality.[29] In order to be economically viable, processing facilities require a predictable, year-round demand. One option is for farmers to adjust production cycles to fit low volume slaughter periods, although this is counter to seasonal pasturing practices.

Access to slaughter and processing facilities is critical to a growing local meat industry. Its continuation and growth will depend on the availability of a skilled work force, a steady supply of animals from local producers, and the willingness of consumers to value local meat enough to pay price premiums to absorb the costs associated with its production and processing. A recent study by the USDA concludes that a solution to local meat processing problems requires "a shift in the relationship between farmers and their processors away from a series of independent transactions, conducted at arm's length, to a long-term interdependence."[30] It suggests that farmers commit to providing the processor with a sufficient, steady stream of livestock, and that processors commit to processing the animals to farmer specifications, consistently and on time. Supporting existing processors and helping them enhance and expand their businesses profitably was viewed as being more efficient and effective than building new facilities.

Poultry Processing

Like meat, poultry intended for retail markets must be slaughtered in a federally inspected facility, yet the U.S. Northeast is particularly deficient in poultry slaughter facilities. Exemptions to the requirement of federal, bird-by-bird inspection, however, do exist.

The USDA's Producer/Grower 20,000 Bird Exemption allows producers who raise and slaughter no more than 20,000 poultry on their premises in a calendar year to sell within Pennsylvania to customers through the following venues: farmers' markets, farm stands, CSA members, buying clubs, hotels and restaurants, schools, hospitals, wholesale distributors (sales within the state), and retail stores.[31] Farms must follow state requirements for building and sanitation rules, and be inspected annually by the Pennsylvania Department of Agriculture (PDA). All poultry producers in the Lehigh Valley selling at farmers' markets fall under this exemption.

To fall within this exemption, producers must process the poultry on their farm. Rather than build their own on-farm processing facility, some producers are using a Mobile Poultry Processing Unit (MPPU) as an alternative, which the USDA has declared will not disqualify a producer from the exemption. The producer must still follow the sanitary standards for on-farm slaughter of poultry and be under inspection by PDA. There are two such MPPUs available for rent to poultry producers in the Lehigh Valley, one owned by Happy Farm in Kintnersville, Bucks County and a second owned by Country Lane Poultry in Leola, Lancaster County.

Producers may also use a custom state-inspected facility if the birds are slaughtered for the household use of the owner, his or her family, employees, and nonpaying guests. If birds are pre-sold before slaughter, the poultry may then be picked up at the farm, at farmers' markets, or at CSA and buying club drop-off sites.

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[27] Miltner, K, *Slaughterhouse Options Shrink for Small Farmers*.

[28] CISA, *Finding the way from pasture to market*.

[29] Lewis, C.V. & Peters, C.J. (2011). A Capacity Assessment of New England's Large Animal Slaughter Facilities as Relative to Meat Production for the Regional Food System [Abstract]. *Renewable Agriculture and Food Systems,* pp. 1-8. Retrieved from http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=8656715

[30] USDA, Economic Research Service. (2013). *Local Meat and Poultry Processing - The Importance of Business Commitments for Long-Term Viability*. Economic Research Report Number 150. Retrieved from http://www.ers.usda.gov/publications/err-economic-research-report/err150.aspx

[31] Penn State College of Agricultural Sciences, Extension. *Marketing Poultry Slaughtered Under USDA Exemption*. Retrieved from http://extension.psu.edu/business/start-farming/livestock/chickens/marketing-poultry-slaughtered-under-usda-exemption

4.2 Aggregation & Distribution Facilities

Small and mid-sized growers face a number of challenges in supplying wholesale buyers, such as food service providers at schools, colleges, hospitals, corporations, and prisons. The quantity and consistency of produce grown on a single farm may be insufficient to supply a wholesale account. A farm may need to make extensive investments in certifications, cooling, and storage infrastructure, liability insurance, and safety protocols in order to sell to wholesale markets. In addition, many growers do not have the time, interest, or skill set to successfully manage wholesale accounts.[32]

Although some growers may supply wholesale buyers directly, aggregation and distribution facilities are often required. Aggregation centers consolidate product from multiple producers in order to generate the volumes needed to supply wholesale buyers. Distribution includes transportation, storage and handling (refrigeration), and logistics. Delivery to customers from the aggregation center can be much more efficient than point-to-point distribution from farms to buyers.

Aggregation and distribution facilities may offer a variety of services, including temperature and humidity controlled storage facilities, a packing house, marketing and sales of products, distribution, and logistics to coordinate ordering, delivery, and invoicing. These services may be offered by one company or by a number of different companies.

Since many growers grade and pack produce on the farm, produce delivered to an aggregation center may already be packed and labeled with farm-specific branding. In other cases, the center may include a packing house, which would receive unpacked fruits and vegetables from local growers to be sorted, graded, packaged, and labeled for sale. The produce may be hand-sorted by a team of graders, or if large volumes are involved, mechanical grading and packing equipment may be used. The USDA's Agricultural marketing Service provides a complete list of grading standards for produce both for fresh market and for processing.[33] Produce is categorized based on color, weight, size, damage, quality, and general appearance.

From the aggregation center, products are delivered by a distributor to wholesale buyers. Most wholesale distribution is conducted by very large players with significant buying power. These businesses include self-distributing grocery stores, national distributors such as Sysco and US Foods, and food service suppliers. In these cases, transportation and packaging costs are minimized due to economies of scale.

It is challenging for small and mid-sized farms to interact with these large food distribution industries. There are a number of mid-sized regional distributors that purchase and deliver local farm products; however, farm source identification, which is important in local food systems, is often lacking. As a result, an increasing number of new enterprises called "food hubs" are being created to address the need for local or regional food distribution of appropriate scale that preserves farm identity throughout the process.

Klein Farms, Easton
Photo Credit: BFBL-GLV

A farm may need to make extensive investments in certifications, cooling, and storage infrastructure, liability insurance, and safety protocols in order to sell to wholesale markets.

[32] Illinois Department of Commerce and Economic Opportunity, University of Illinois Business Innovation Services, and Illinois Department of Agriculture. (2012). *Building Successful Food Hubs - A Business Planning Guide for Aggregating and Processing Local Food in Illinois*. Retrieved from http://www.familyfarmed.org/our-reports-2/

[33] USDA, Agricultural Marketing Service. (2012). *Fresh Fruit, Vegetable, Nut and Specialty Crop Grade Standards*. Retrieved from http://www.ams.usda.gov/AMSv1.0/ams.fetchTemplateData.do?template=TemplateN&navID=U.S.GradeStandards&rightNav1=U.S.GradeStandards&topNav=&leftNav=&page=FreshGradeStandardsIndex&resultType=

According to the USDA, a food hub is "a business or organization that actively manages the aggregation, distribution, and marketing of source-identified food products primarily from local and regional producers to strengthen their ability to satisfy wholesale, retail, and institutional demand."[34]

Food hubs fill a gap in the supply chain for small and mid-sized farmers by offering a combination of aggregation, distribution, and marketing services, allowing these farmers to gain entry into new and additional markets that would be difficult or impossible to access on their own.

Marketing locally grown products is an active function of food hubs. Hub staff is involved in creating market access for growers while cultivating new buyers for high value local food products. The primary factor that distinguishes these food hubs from conventional distribution systems is differentiation of locally grown foods from the conventional, commodity supply chain. Product differentiation strategies include farm traceability, production methods such as reduced use of pesticides or pasture-raised livestock, group branding, or the highlighting of particular product attributes such as heirloom or unusual varieties.

Through food hubs, farmers can benefit from a higher return on products as well as access to new wholesale markets where demand for local and regional foods continues to rise. Farmers are seen as valued business partners rather than interchangeable suppliers.

According to a recent report[35], food hubs also bring "shared value" to local communities. They create a symbiosis between businesses and their communities, building relationships throughout the local food supply chain and strengthening the local food economy. Communities benefit from new businesses paying local taxes, job creation, the purchase of local inputs and services, and the availability of fresh, local foods at more venues. Food hubs may also be involved in distribution to neighborhoods with low access to fresh foods. For these reasons, regional food hubs are having significant economic, social, and environmental impacts within their communities.[36]

Garry Hunsicker of Twin Maple Farms, Bath, delivering produce to Lafayette College Dining Services through the Lehigh Valley Food Hub.
Photo Credit: BFBL-GLV

The USDA provides a working list of food hubs.[37] The list dated July 31, 2013 reports over 200 food hubs in the United States, and ten in Pennsylvania, though there are none in the Lehigh Valley. The closest hubs are Common Market of Philadelphia[38], Zone 7 of Ringoes, New Jersey[39], and Lancaster Farm Fresh Cooperative[40].

The Greater Lehigh Valley chapter of Buy Fresh Buy Local is currently conducting a pilot project to study the feasibility of a food hub in the Lehigh Valley. The Lehigh Valley Food Hub[41] has been created to increase wholesale purchases of locally grown foods by area restaurants, retail stores, and institutions. The pilot Hub involves an online ordering system, an aggregation site in Trexlertown, and weekly deliveries of locally grown foods to wholesale buyers. BFBL-GLV staff are conducting an assessment to determine potential farm-to-institution demand for local foods and institutional buying needs, as well as the ability and willingness of farmers to conduct intermediated sales.

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[34] USDA, Agricultural Marketing Service. (2012). *Regional Food Hub Resource Guide.* Retrieved from http://www.ams.usda.gov/AMSv1.0/getfile?dDocName=STELPRDC5097957

[35] Hudson Valley Pattern for Progress & Urban Design Lab at the Earth Institute, Columbia University. (2013). *Hudson Valley Food Hubs Initiative*. Research funded by the Local Economies Project of the New World Foundation. Retrieved from http://www.localeconomies-hv.org/food-system/food-hub/

[36] *Regional Food Hub Resource Guide.*

[37] USDA, AMS. (2013). *Working List of Food Hubs* [Data File]. Updated July 31, 2013. Retrieved from http://www.ams.usda.gov/AMSv1.0/getfile?dDocName=STELPRDC5091437

[38] http://www.commonmarketphila.org/

[39] http://www.freshfromzone7.com/

[40] http://www.lancasterfarmfresh.com

[41] https://lehighvalley.localorb.it

4.3 Wholesale Buyers

There are a significant number of wholesale buyers in the Lehigh Valley. The largest of these are the food service providers, who supply meals for large institutions such as public school districts, colleges, hospitals, and other healthcare facilities. Other large buyers include corporate dining services, retirement communities, and prisons.

A number of these providers have begun to seek out foods grown and raised in the Lehigh Valley for their college facilities. According to Joel Blice, General Manager at Lafayette College Dining Services (Bon Appétit), the college is sourcing ingredients from a number of Lehigh Valley farmers through farm-direct sales, the Lehigh Valley Food Hub, and regional distributors. For their Eat Local Challenge on September 24th, 2013, all food items served, with the exception of salt, were sourced from within 150 miles of the College, including many Lehigh Valley farms (personal communication, September 2013). Cedar Crest College has been sourcing 16 ½ percent of their food purchases locally (local is defined as within 150 miles for produce and a three hour drive for meat), including one Lehigh Valley farm , according to Jamie Moore, Director of Sourcing and Sustainability, Parkhurst Dining Services (personal communication, September 9, 2013). And according to Daniel Lieber, Director of Sustainability, Grow LV by Sodexo, Moravian College Dining Services organized Food Talks in the fall of 2013 to educate the students, staff, and faculty, and Sodexo employees about seasonal, local foods. Presentations were given by local farmers and industry professionals (chefs, educators, distributers), and local food samples were provided (personal communication, September 19, 2013).

Table 4.1 Food Supply Chain Infrastructure Available in the Lehigh Valley

Food Chain Infrastructure	Number of Facilities in the Lehigh Valley	Number of Facilities proximate to the Lehigh Valley
Packing Facilities	varies	
Co-Packers	0	2
Cold Storage	varies	
Certified Kitchens	many	
Food Incubator Kitchens	1	0
Freezing Facilities	0	0
Grain Mills	0	2
USDA-Inspected Meat Processing	0	3
On-farm Poultry Processing	varies	
Mobile Poulty Processing Unit	0	2
Food Hub	1 pilot project	3

Source: BFBL-GLV 2013

There are a number of issues that may arise when attempting to incorporate raw, fresh foods into institutions. Kitchen facilities, particularly in elementary schools, may contain only "heat and serve" equipment and so may not be equipped to store, wash, cut, and cook fresh, whole produce. In addition, there are greater labor costs associated with and skill sets needed for cooking and serving fresh food.

There exists a great potential to build the Lehigh Valley local food economy by supplying these wholesale buyers with locally grown foods. Yet the Lehigh Valley has a scarcity of the infrastructure needed to move food from farms to wholesale buyers (See Table 4.1). Improving this infrastructure would allow small and mid-sized farmers to access larger volume, wholesale markets, produce high-value products, and reach customers year round.

Questions to Consider:

As a community, should we invest in infrastructure to improve our local food economy? How can we support infrastructure for local food processing, aggregation, and distribution?

What do you think about the following options?

- using local funding to develop infrastructure
- expanding or modernizing kitchen facilities in schools or senior centers
- using vacant or under-utilized buildings for infrastructure
- creating kitchen incubation and other facilities to offer business development and marketing resources

How should these investments be funded?

What role does consumer demand play in these decisions?

Food Waste

- It is estimated that 36 million tons of food are wasted in the U.S. each year.
- 25 percent of our fresh water supply is used for food that ends up in landfills.
- Food recovery initiatives, such as gleaning and food rescue, can be used to reduce food waste and improve fresh food access.
- Food composting at both municipal and institutional levels can be used to divert uneaten food from the landfill.

Beets and Radishes
Photo Credit: Gabby Salazar

5. Food Waste

Erica Reisman, B.Sc.

While many people are food insecure in the United States, forty percent of food goes uneaten.[1] This "food waste" can consist of any food that is grown, produced, or prepared in the U.S., but that is never consumed, including both whole foods, such as fruits and vegetables, and processed foods, such as loaves of bread or meals prepared at restaurants. Much of this food waste ends up in landfills with negative consequences for the environment. Strategies to reduce food waste, which will be discussed in this chapter, can save money and resources, alleviate the negative effects food waste has on the environment, and improve local food access by diverting edible food headed to landfills back into communities.

When food is thrown away, it wastes more than just the food itself; it also wastes those nutrients that could have been composted and returned to the soil, and it wastes the water and energy needed to grow, harvest, transport, store, and prepare the food for consumption.

Food waste occurs at every stage of the food supply chain. Food is lost during production, processing, distribution, and storage, as well as in retail stores, food service operations, and households. The reasons for food loss are varied. Some produce is grown but never harvested because of labor shortages, low market prices, a surplus of crops, or low demand. After harvest, produce is culled, meaning that any food that does not reach a certain quality or aesthetic standard is discarded, even though it may be perfectly edible and could be processed into value-added foods or brought into low food access areas to combat hunger. Food can also be damaged during packing, storage, and handling on its way to the market. Unsold food in retail operations often ends up in the landfill, although some food retailers have started utilizing new technology and software to better manage inventory and reduce the amount of food that is thrown out. Once consumers have purchased food, it may still be wasted: it can spoil before being eaten, or be thrown out due to confusion over "sell by" dates, which are not regulated legally but instead are dictated by manufacturers. Even if food makes it to the stage of processing and is turned into a meal, there is no guarantee that it will not still turn into food waste; unfinished food and leftovers often go straight into the trash. Aggregated over the entire supply chain, it is estimated that 36 million tons of food are wasted in the U.S. each year.[2]

Much of this food waste ends up in landfills. When food is thrown away, it wastes more than just the food itself; it also wastes those nutrients that could have been composted and returned to the soil, and it wastes the water and energy needed to grow, harvest, transport, store, and prepare the food for consumption. It is estimated that 25 percent of our fresh water supply is used for food that ends up in landfills.[3] There is also economic loss. Farmers have paid for inputs to grow the food, which are not recovered if the food is not sold. Farmers and retailers alike lose income in wasted food. Consumers would save money if they did not throw out food for which they had paid. It is estimated that the average consumer throws out $1,365 to $2,275 annually.[4] In 2008 alone, a combined $165 billion worth of food was lost at the retail and consumer levels.[5] Finally, in addition to the money lost to food waste, both retailers and consumers must pay for food waste removal costs.

Individuals, businesses, nonprofits, and governments across the country are turning their attention to the issue of food waste. In June 2013, the EPA and the USDA collaborated to launch the Food Waste Challenge with the aim of changing how our country talks about and manages food and food waste.[6]

Two strategies being used to reduce food waste and improve food access are food recovery initiatives and composting.

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[1] Natural Resources Defense Council. (2012). *Wasted: How America is losing up to 40% of its food from farm to fork to landfill.* NRDC Issue Paper. Retrieved from http://www.nrdc.org/food/files/wasted-food-ip.pdf

[2] Environmental Protection Agency. (2013). *Municipal Solid Waste in the United States: Facts and Figures 2011.* (EPA530-R-13-001). Retrieved from http://www.epa.gov/wastes/nonhaz/municipal/pubs/MSWcharacterization_fnl_060713_2_rpt.pdf

[3] Chow, C.C., Dore, M., Guo, J. & Hall, K.D. (2009). *The Progressive Increase of Food Waste in America and Its Environmental Impact.* National Institute of Diabetes and Digestive and Kidney Diseases. PLoS ONE 4(11): e7940.doi:10.1371/journal/pone.0007940

[4] Bloom, J. (2010). *American Wasteland*. Cambridge, MA: Da Capo Lifelong Books.

[5] Buzby, J.C. & Hyman, J. (2012). Total and per capita value of food loss in the United States. *Food Policy,* 37(5). Retrieved from http://ucce.ucdavis.edu/files/datastore/234-2425.pdf

[6] U.S. Department of Agriculture (USDA), Office of Communications. (2013). *USDA and EPA Launch U.S. Food Waste Challenge* [Press release]. Retrieved from http://www.usda.gov/wps/portal/usda/usdahome?contentid=2013/06/0112.xml&navid=NEWS_RELEASE&navtype=RT&parentnav=LATEST_RELEASES&edeployment_action=retrievecontent

5.1 Food Recovery

Food recovery refers to any action throughout the food chain that recoups edible food from the waste stream, either in the fields, after harvest, or after processing. This section focuses on two main methods of food recovery: field gleaning, which occurs at farms; and food rescue, which occurs at retailers or distributors.

Field Gleaning

Farmers can choose to open their fields up for field gleaning post-harvest. In this arrangement, laborers or volunteers enter the fields and pick produce that was not selected for harvest, ensuring that as little as possible of the grown food is wasted. There are various reasons why produce may be left in the fields; for example, if prices are too low, a farmer may choose to not harvest a field because the crop is not worth the cost of labor for picking and packing, or some produce may be left after the demand has been filled.

The Society of St. Andrew is a nonprofit organization that promotes awareness about hunger and organizes groups of volunteers to glean produce from farms after harvest. They have chapters all over the country, including one in Lebanon County, Pennsylvania. Records are kept and published monthly or bi-monthly, showing how much produce was gleaned and the agency that received it. For example, on August 14, 2013 the log reports that four volunteers harvested 393 pounds of peaches, which were donated to the Caring Cupboard, a food pantry in Palmyra, PA.[7] The produce is transported in volunteers' private vehicles or the pantry's food truck, depending on volume. According to J. Sykes, Caring Cupboard, Pennsylvania Area Coordinator, the limiting factor for the Caring Cupboard is adequate refrigeration space for perishable food: household-sized refrigerators are not sufficient to hold all of the produce acquired from the gleaning (personal communication, October 13, 2013).

There is no large-scale field-gleaning operation in the Lehigh Valley at present. This may be an option for both reducing food waste and improving fresh food access, although infrastructure to organize gleaners, and transportation and storage of the gleaned produce would be needed.

Food Rescue

Food can be also recovered after harvest; in fact, these "food rescue" efforts yield much more produce than field gleaning by volunteers.[8] Food rescue can either be at the wholesale or retail level. Wholesale distributors can have entire shipments of food that are rejected if a buyer inadvertently orders too much or anticipated demand that never materialized. If the distributor cannot find another buyer, the food may be thrown away, adding more food waste to landfills. Food rescue organizations, however, can step in and bring the produce to food pantries to be made available to those in need.

Food can also be rescued from food retail outlets, including farmers' markets. The USDA has estimated that supermarkets lose $15 billion worth of fruits and vegetables every year.[9] There are several reasons for food waste at the retail level, including overstocking, expired sell-by dates, and blemished produce that cannot be sold. Much of this food waste, however, is perfectly edible and could be used to improve fresh food access. In addition, markets are able to claim tax deductions on the donated food.[10]

The USDA has estimated that supermarkets lose $15 billion worth of fruits and vegetables every year.

Laini Abraham collecting food donations for ProJeCt from Jessica Salvaterra of Salvaterra's Gardens at the Easton Farmers' Market
Photo Credit: Marishka Titus Michener

[7] Society of St. Andrew. (2013). *Gleaning in Lebanon County PA: Detail Harvest Results for August 2013*. Retrieved from http://www.endhunger.org/PDFs/2013/PA-August-2013.pdf

[8] Bloom, J. (2010). *American Wasteland*. Cambridge, MA: Da Capo Lifelong Books.

[9] Natural Resources Defense Council. (2012). *Wasted: How America is losing up to 40% of its food from farm to fork to landfill*. NRDC Issue Paper. Retrieved from http://www.nrdc.org/food/files/wasted-food-ip.pdf

[10] Bloom, J. (2010). *American Wasteland*. Cambridge, MA: Da Capo Lifelong Books.

The main issues that arise with food recovery efforts are logistical in nature. Getting large quantities of produce to the food pantries can be difficult if organizations do not have trucks to use. In addition, many donated items are perishable and need to be transported in refrigerated trucks to ensure that the food remains fresh and safe. The food pantries themselves may not have sufficient space, particularly refrigeration, to store the donated items.

Even if all the logistics for transporting and storing donated food are addressed, it can still be difficult to have food retailers and restaurants agree to donate food. Redirecting food from the food waste stream requires a change in mindset for these organizations, and many cite liability issues as a top reason for not donating. Their worries, however, are unfounded, as the Bill Emerson Good Samaritan Act for food donations (signed into law in 1996) protects organizations that donate food from liability, as long as the food was donated in good faith. [11]

The Campus Kitchens Project[12] is one example of an organization that is working to connect those in hunger with excess food through its mission is to recycle food, provide meals, educate and engage with the community, and provide leadership opportunities for students. Currently operating in 33 high schools, colleges, and universities across the country, student volunteers are trained to prepare and deliver meals to hunger relief organizations and individuals or families in need. The food used in the meals is recovered from campus dining providers, local grocery stores, food banks, farms, and farmers' markets. Currently, Gettsyburg College is the only participating school in Pennsylvania.

There is the potential to implement food recovery programs to a greater degree in the Lehigh Valley; however, infrastructure and organization would be needed.

There are successful food rescue initiatives underway in the Lehigh Valley. Second Harvest Food Bank of Lehigh Valley and Northeast Pennsylvania is one food rescue organization that not only accepts food donations from individuals, but also receives donations from larger food retailers, including surplus inventory, products with cosmetic flaws, products that are near the "sell by" or "best by" dates, or products with damaged packaging. In 2012, Second Harvest distributed 6.38 million pounds of food to those in need.[13] Because Second Harvest is equipped with trucks, refrigerators, and freezers, it is able to recover not only dry goods, but perishable foods as well. More transportation vehicles (including refrigerated vehicles) and refrigerated storage, however, are needed in order for Second Harvest to expand its operations (Second Harvest Food Bank representative, personal communication, October 18, 2013).

Another example of food recovery involves collaboration between volunteers at the Easton Farmers' Market and ProJeCt of Easton's Interfaith Food Pantry, the largest food pantry in Northampton County, providing two- to three-day supplies of food to more than 400 households each month. According to Danny Cohen, who organizes the recovery program, during the 2013 season, market volunteers collected unsold produce and bread at the end of each market day and delivered it to the Pantry (personal communication, September 10, 2013).The perishable food items were diverted from the waste stream and the Food Pantry was able to offer its clients more fresh food.

There is the potential to implement food recovery programs to a greater degree in the Lehigh Valley; however, infrastructure and organization would be needed. Trucks and storage units for gleaned and recovered produce, online exchanges for finding buyers or donation centers, and a changed attitude that puts saving food above the convenience of disposal are just a few of the items that would need consideration in expanding food recovery in the Lehigh Valley. The resulting benefits could include reduced food waste, improved fresh food access, and economic savings for farmers, retailers, and consumers.

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[11] U.S. Congress. (1996). *Bill Emerson Good Samaritan Act. H.R. 2428*. Retrieved from http://www.campuskitchens.org/wp-content/uploads/2012/12/Good_Samaritan_Federal_Law_text.pdf

[12] *The Campus Kitchens Project*. Retrieved from http://www.campuskitchens.org/

[13] McManus, A. (2013). *Food for Thought*. Second Harvest Food Bank's Annual Report (FY 2011 – 2012). Retrieved from http://shfb.launchpage.com/upload/File/Food-For-Thought---Spring-2013.pdf

5.2 Composting

In addition to food recovery efforts, composting can be used to divert uneaten food from landfills. Food is full of nutrients that, if composted, can be returned to the soil. Food waste in landfills, however, rots and releases the greenhouse gas methane. In fact, 16 percent of all U.S. methane emissions are from food rotting in landfills.[14] In addition, fees are incurred to haul food waste to landfills. Reducing food waste can save money: in 2009, the city of Seattle saved more than $250,000 through its food waste composting program.[15]

Municipal Composting

Food scraps account for more than 20 percent of municipal solid waste.[16] Many cities across the country have instituted citywide, and even mandatory, composting. In 2005, Seattle instituted a voluntary curbside compost program.[17] In 2009, they began requiring that households rent a composting bin for $5 or $7 dollars a month in order to encourage more people to actually use the bin to compost. San Francisco implemented an even stricter policy, in which households are required to compost all food scraps. The bins and pickup, however, are provided by the city. These large-scale city composting programs could be used as models in the Lehigh Valley. While several municipalities in the Lehigh Valley compost yard waste, there are none that are currently composting food scraps from residences or businesses.

Some individual households with extra yard space have started composting food scraps, and mobile composting organizations, such as D.C.'s Compost Cab,[18] have sprung up in urban environments so that apartment-dwellers can avoid sending their foods scraps to the landfill.

Earth Tubs for compost at Lafayette College
Source: http://facilitiesplanning.lafayette.edu/2012/10/16/composting/

Institutional Composting

Lafayette College in Easton runs a successful composting program that generates up to three cubic yards of compost weekly. All of the food scraps from the College's two sit-down dining halls (about 150 to 200 pounds daily) are pulped and de-watered, then composted using two Earth Tub composting units. Once removed from the Earth Tubs, the finished compost is cooled, and then spread on Lafayette's campus grounds. In the future, the program plans to utilize the compost at LaFarm, Lafayette's community farm and garden. According to student Andrew Goldberg, the funds to purchase the Earth Tubs were provided by a national Student Design Competition for Sustainability Focusing on People, Prosperity and the Planet Award (P3 Award) in 2010; however, the current operating costs are paid for by the College (personal communication, October 15, 2013.)

Compost Pile
Photo Credit: Cougle's Recycling, Inc

[14] Natural Resources Defense Council. (2012). *Wasted: How America is losing up to 40% of its food from farm to fork to landfill.* NRDC Issue Paper. Retrieved from http://www.nrdc.org/food/files/wasted-food-ip.pdf

[15] Bloom, J. (2010). American Wasteland. Cambridge, MA: Da Capo Lifelong Books.

[16] Anderson, P. Liss, G., & Sherman, S. Beyond Recycling: Composting food scraps and soiled paper. Retrieved from http://www.epa.gov/region9/organics/compost/2-pager_final.pdf

[17] Baker, L. (2009). Compost: The Next Step in City Recycling Programs. Governing: The States and Localities. Retrieved from http://www.governing.com/topics/energy-env/Compost-the-Next-Step.html

[18] Compost Cab. (2013). Retrieved from http://compostcab.com/

Restaurant Composting

In 2011, under a grant from the Sustainable Agriculture Research & Education Program (SARE), the Lehigh County Conservation District established a pilot food waste composting model for the Lehigh Valley. One participant, Fegley's Brew Works, began diverting over 1,120 gallons of pre- and post-consumer food scraps and compostable material each week from the waste stream at their two restaurants. The food scraps were picked up by Cougle's Recycling and taken to the Rodale Institute outside Kutztown for composting. The restaurants saved nearly $10,000 dollars in trash disposal fees in the first year.[19] According to Rich Fegley, by 2013, the amount of food waste diverted from the waste stream each week had increased to nearly 1,400 gallons (personal communication, October 20, 2013).

Dan MaCauley of Cougle's Recycling adds that the composting pilot has also expanded to include larger-volume producers, such as the Lehigh Valley Hospital and the Southern Lehigh School District (personal communication, October 22, 2013).

There is an opportunity to reduce food waste in the Lehigh Valley. Organizations such as the Society of St. Andrew and Second Harvest have shown that, with investment in infrastructure and organization, food recovery efforts can redirect food from farms, distributors, and retailers to food banks in order to help alleviate hunger and improve food access. Food composting programs can reduce the amount of food waste being sent to landfills, conserve resources, save money in trash removal costs, and help the environment.

Lehigh County Conservation District's Pilot Food Waste Composting Program - Restaurant Card
Credit: Erin Frederick/Maxfield Design

Compost Pile at the Rodale Institute
Photo Credit: Fegley's Brew Works

Questions to Consider:

What are the most reasonable options for reducing food waste in the Lehigh Valley?

How can food rescue efforts be expanded in the Lehigh Valley?

Would gleaning be feasible on Lehigh Valley farms?

Should curbside food composting be pursued in the Lehigh Valley?

Who should and could fund the management and resources needed for food recovery and composting efforts? Is this the responsibility of government, of private business, or of independent, mission-driven organizations?

[19] Sustainable Agriculture Research & Education. (2011). *Lehigh Valley Composting Initiative*. Retrieved from http://mysare.sare.org/mySARE/ProjectReport.aspx?do=viewRept&pn=CNE10-075&y=2011&t=1

The Economics of Local Food

- Lehigh Valley households spent nearly 1.5 billion dollars on food in 2007, the majority of which left the region through the purchase of food imports.
- In 2007, individuals spent, on average, only $4.85 on food purchased directly from Lehigh Valley farmers, less than 1% of the dollars spent on food to be eaten at home.
- A rough estimate of the Lehigh Valley's total local food sales through both direct and intermediate channels is about **$12 million**.
- Every dollar received by food-related farms in the two counties generates, on average, an additional 45 cents in economic activity within the Lehigh Valley.
- Locally grown foods create about **$17 million** of economic activity in the Lehigh Valley each year.
- The Easton Farmers' Market is estimated to have a total annual economic impact of **$2.6 million**.
- If each of the 241,047 households in the Valley were to spend just $10 per week on locally grown foods during the growing season, would result in the annual generation of **$97 million in economic activity**.

Farmer's Market
Photo Credit: Gabby Salazar

6. The Economics of Local Food

Healthy local food systems can have significant impacts on local economies, improving the economic viability of our local farms and also that of local businesses and service providers. By supporting local food systems, food dollars can be reinvested in the community.

Food expenditures in the Lehigh Valley add up to more than a billion dollars each year. According to the Consumer Expenditure Survey, the average Northeast household spent 9.18 percent of their income before taxes on food in 2007.[1] In the Lehigh Valley, the average household income was $67,471 during this year.[2] Putting these two statistics together indicates that the average Lehigh Valley household spent $6,194 annually on food. In total, the 241,047 Lehigh Valley households[3] spent nearly **1.5 billion dollars** on food in 2007. The following section includes statistics for the Lehigh Valley, Pennsylvania, and the nation.

Klein Farms, Easton
Photo Credit: BFBL-GLV

6.1 Farm-Direct Sales

It is difficult to calculate the exact amount of food dollars spent on locally grown foods because these foods are sold to many different buyers, including both consumers and local wholesale buyers such as restaurants, retail stores, and institutions. One opportunity to quantify local sales involves farm-direct sales: food sales directly to consumers through farmers' markets, on-farm stores, CSAs, and roadside stands. This data excludes wholesale data and represents only a portion of the local food sales; nonetheless, farm-direct sales data provide an important indicator of the health of a local food economy.

The USDA has been tracking data about farm-direct sales in the Census of Agriculture.[4] The 2007 Census asked, "During 2007, did you produce, raise, or grow any crops, livestock, poultry, or agricultural products that were sold directly to individual consumers for human consumption? Include sales from roadside stands, farmers markets, pick your own, door to door, etc. Exclude craft items and processed products such as jellies, sausages, and hams."[5] Only products grown or raised on the particular farm were to be included, while products that were bought and resold within 30 days were to be excluded. The amounts recorded for farm-direct sales likely underestimate actual sales since they rely on accurate record-keeping and farmer willingness to share sales data.[6] There is also evidence of a systemic underreporting of farm-direct sales.[7]

The Lehigh Valley local food economy accounts for a very small but quickly growing share of food expenditures. The number of Lehigh Valley farms selling directly to consumers rose from 104 in 1992 to 167 in 2007, a 61 percent increase. The dollar value of farm-direct sales is growing even more quickly: from $738 thousand in 1992 to over $3 million in 2007, a 314 percent increase.[8] (See Figure 6.1) The following data are from the *Census of Agriculture*.

[1] United States Department of Labor, Bureau of Labor Statistics. (2007). *Consumer Expenditure Survey, Region of Residence* [Data file]. Retrieved from http://www.bls.gov/cex/#tables

[2] United States Census Bureau. (2007). *American Community Survey 1-Year Estimates* [Data file]. Retrieved from http://factfinder2.census.gov/

[3] *Ibid.*

[4] United States Department of Agriculture. (2007). *Census of Agriculture* [Data file]. Retrieved from http://www.agcensus.usda.gov/Publications/index.php

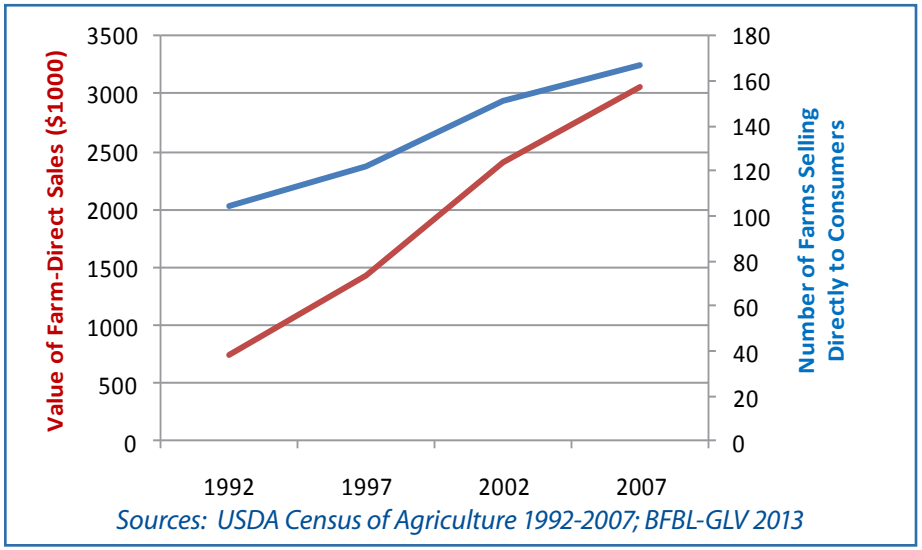
[5] *Ibid.*

[6] Brown, A. (2002). Farmers' market research 1940-2000: an inventory and review. *American Journal of Alternative Agriculture* 17(4), 167. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.199.3976&rep=rep1&type=pdf

[7] Timmons, D. S. (2006). *Measuring and Understanding Local Foods: The Case of Vermont*. A Thesis Presented to the University of Vermont. Retrieved from http://www.uvm.edu/~susagctr/Documents/SAC%20timmons%20thesis-local%20food.pdf

[8] (1992-2007). *Census of Agriculture*. Although another Census was conducted in 2012, the results will not be released until late 2013 or early 2014; as such, the 2007 data is the latest available. It is expected that there has been considerable growth in the local food economy over the past six years.

Figure 6.1 Farm-Direct Sales in the Lehigh Valley (1992-2007)



Sources: USDA Census of Agriculture 1992-2007; BFBL-GLV 2013

Clear Spring Farm, Easton
Photo Credit: BFBL-GLV

The Lehigh Valley's local food economy is developing faster than most. From 1992 to 2007, growth in farm-direct sales increased by 314 percent in the Valley as compared to 200 percent nationally. In Pennsylvania, farm-direct sales rose by only 112 percent during this same time period, yet Pennsylvania placed third in the country in 2007 total farm-direct sales ($76 million) behind California ($162 million) and New York ($77 million).

The Lehigh Valley is exemplary in other statistics as well. Nationally, in 2007, farm-direct sales were on average 0.41 percent of total farm sales. The ratio of farm-direct sales to total farm sales was much higher in Pennsylvania (1.31 percent), ranking Pennsylvania as the second highest state in the country behind New York (1.75 percent). In comparison, in the Lehigh Valley, farm-direct sales were 2.95 percent of total farm sales, higher than Pennsylvania's average, and again suggesting that the Lehigh Valley is ahead of the curve in creating a local food economy.

A comparison of the number of farms selling directly to consumers also provides evidence of a significant Lehigh Valley local food economy. With 7537 farms selling direct to consumers in 2007, Pennsylvania ranked second nationally, only behind Texas (8619 farms). When the number of farms involved in direct sales is compared to the total number of farms in the state, Pennsylvania again ranked second, with 11.9 percent of its farms involved in direct sales. New York had the largest percentage (14.7) of farms selling directly to consumers, while Texas had only 3.5 percent. In comparison, the Lehigh Valley had 16.7 percent of farms (167 of 1002 farms) participating in farm-direct sales.

The Lehigh Valley also had a greater number of farms involved in direct sales per capita than the U.S. average in 2007. Nationally, there were 0.45 farms selling directly to consumers for every 1000 residents during this year. This number was 0.63 in Pennsylvania, ranking it third nationally behind Oregon (1.67) and Wisconsin (1.11). In the Lehigh Valley, there were 1.59 farms involved in farm-direct sales per 1000 residents.

One area where the Lehigh Valley falls below Pennsylvania rankings is the average amount individuals are spending on farm-direct sales. In 2007, the average for farm-direct sales was $6.10 per consumer in Pennsylvania and $4.02 per consumer nationally. Pennsylvania ranked fourth in the country behind Oregon ($15.04), Wisconsin ($7.76), and Washington ($6.10). In the Lehigh Valley, individuals spent an average of only $4.85 on farm-direct purchases in 2007. This figure, however, was still higher than the national average.[9]

[9] Census of Agriculture data combined with population data from United States Census Bureau. (2007). *Annual Population Estimates* [Data file]. Retrieved from http://www.census.gov/popest/data/historical/2000s/vintage_2007/state.html

There is an incredible opportunity to increase the local food economy in the Lehigh Valley.

In addition, although the Lehigh Valley had more farms involved in farm-direct sales and a higher percentage of sales from farm-direct sales, farms selling directly to consumers received an average of only $3,052 from these sales in 2007, far below the national average of $8,853 and the Pennsylvania average of $10,069. This data suggests that the farms involved in farm-direct sales in the Lehigh Valley are smaller on average as compared to both the state and the nation.

Although farm-direct sales continue to climb, they still represent but a fraction of the total amount of food dollars being spent in the Lehigh Valley. As stated previously, $1.5 billion was spent on food in the Lehigh Valley in 2007. Of this, 56 percent ($840 million) was spent on food eaten at home.[10] The $3 million in food purchased directly from Lehigh Valley farmers represents just 0.4 percent of the dollars spent on food to be eaten at home. As such, there is an incredible opportunity to increase the local food economy in the Lehigh Valley.

6.2 Total Local Food Sales

The farm-direct sales data from the Census of Agriculture do not take into account local food sales through intermediated channels. Marketing channels are classified as intermediated when local food products pass through one or more additional steps in the local food supply chain before reaching the consumer. These include farm sales to restaurants, retail stores, and regional distributors. A 2011 report, *Marketing of Foods in the United States*, determined that the marketing of local foods, via both direct-to-consumer and intermediated channels, grossed $4.8 billion in 2008 and was expected to exceed $7 billion by the year 2011.[11]

The USDA report also found that the total sales of local foods, including sales through intermediated channels, is about four times higher than figures based solely on farm-direct sales. As mentioned above, Lehigh Valley households spend about 1.5 billion dollars on food each year, and $3 million of this is purchased directly from Lehigh Valley farmers. Based on the USDA report that total local food sales are four times that of farm-direct sales alone, a rough estimate of the Lehigh Valley's total local food sales through both direct and intermediate channels is about **$12 million**.

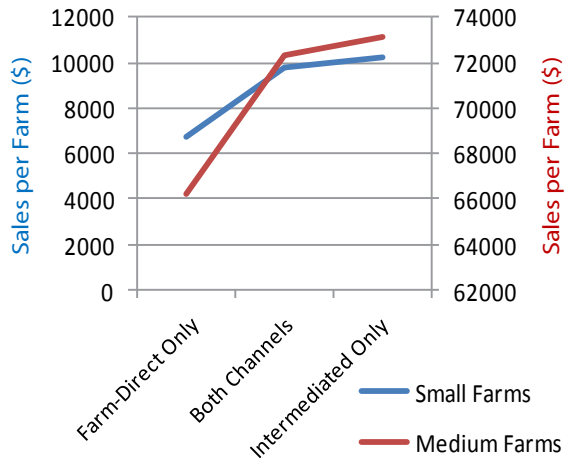
It is interesting to consider which farms are involved in local food sales. Although 81 percent of U.S. farms selling locally are small farms (gross annual farm sales less than $50,000), the USDA reports that these farms account for just 11 percent of total local food sales. Large farms (sales of $250,000 or more) produce 70 percent of these sales, and medium farms (sales of $50,000 to $249,000) account for 19 percent. The large farms are more likely to be located on the West Coast than in the Northeast, where farms involved in local food sales tend to be smaller and located closer to densely populated urban markets.

Small farms are more likely to use farm-direct sales as opposed to intermediated sales, possibly because they cannot generate enough volume to be appealing partners for distributors and institutions. Yet the *Marketing of Foods in the United States* report shows that more than 50 percent of all local food sales are conducted through intermediated channels, and that the average local food sales per farm increases significantly when intermediated marketing channels are used. Where small farms use either both channels or intermediated marketing channels alone, local food sales are on average 45 and 52 percent higher, respectively. Likewise, when medium farms move from strictly farm-direct sales to either the addition of intermediated channels or solely intermediated channels, the average local food sales rises by 9.2 and 10 percent, respectively (See Figure 6.2). In other words, farms involved in intermediated marketing channels for local food sales tend to be more profitable than those that are not. This rise in sales for farms using intermediated sales may simply reflect the farm's acreage and ability to produce larger volumes necessary for intermediated sales; however, the increased production could also be a result of more hours spent producing crops rather than on labor- and time-intensive farm-direct sales. The report states that reducing the use of direct-to-consumer channels is likely to reduce overall farm costs by requiring less farm labor to sell at direct-to-consumer outlets, reducing marketing costs, and shifting the labor-intensive distribution of foods to intermediaries. It concludes that combining marketing channels may be the appropriate strategy for medium farms to thrive.

[10] (2007). *Consumer Expenditure Survey.*

[11] USDA, Economic Research Service (ERS). (2011). *Direct and Intermediated Marketing of Local Foods in the United States*. Economic Research Report No. 128. Retrieved from http://www.ers.usda.gov/publications/err-economic-research-report/err128.aspx#.Uh4NutlY6So

Figure 6.2 Average Local Farm Sales per Farm in United States



Sources: Marketing of Local Foods in the United States 2011; BFBL-GLV 2013

The report also revealed that farms engaged in local food sales reached profitability at a lower gross sales point than farms that were not, due in part to the household members of farms with local sales devoting more time to their farming operations and lowering operating expense ratios (total cash expenses divided by gross cash income).

In effect, purchasing from local, independent businesses provides 3.5 times more benefit to the local community.

6.3 Economic Impacts of a Local Food System

Direct and Multiplier Effects

Local food sales can have a notable impact on local economies. The most direct impact is through import substitution: consumers purchasing food produced within a local area instead of buying imports from outside the area. The **direct effect** is that food dollars are retained by local farmers, businesses, and employees rather than being sent to distant food operations. As stated previously, the estimated value of the direct effect of Lehigh Valley local food sales was $12 million in 2007.

Additional economic benefits accrue when these direct effect food dollars earned by the farmers, businesses, and employees are also spent locally, creating both an indirect and an induced effect of these local food sales. **Indirect effects** are dollars spent locally when the farm or local food business purchases inputs to produce its goods. For example, farmers require seed, farm equipment, fuel, other supplies, and services (utilities, banking services, accountants, sign makers, etc.) to run their operations. If these items are purchased locally, it stimulates more local economic activity. **Induced effects** occur when the workers from both the farm and suppliers spend their income for household consumption, such as food, housing, clothing, and entertainment. This creates another round of local economic activity, the size of which depends on whether the purchases involve local products and businesses. This ripple effect of spending is known as the multiplier effect. A **multiplier** is the number of times a dollar circulates in a locale before leaving through the purchase of an import. These effects are not infinite: they reduce in size with each movement further from the local producer.

Seed Farm, Emmaus
Photo Credit: Allison Czapp

Multiplier effects are specific to a particular geographical region and sector, and will depend on the inputs that the region offers. For instance, if a consumer were to purchase vegetables from a local farmer in a remote area that offered limited farm inputs and household goods, the multiplier would be very low since the farmer and farm workers would have to purchase supplies, services, and household goods from outside the region. Although multipliers are specific to geographical locations, several studies from various regions around the country have compared the particular multiplier effect of purchasing from locally owned independent businesses to that of purchasing at chain stores for their locale and found similar results: national chain retailers recirculate an average of 13.6 percent of revenue within their local markets (multiplier = 1.136) while independent retailers return an average of 48 percent of revenue (multiplier = 1.48) to local economies.[12] In effect, purchasing from local, independent businesses provides 3.5 times more benefit to the local community.

[12] American Independent Business Alliance. (2012). *Ten New Studies of the "Local Economic Premium"*. Retrieved from http://www.amiba.net/resources/studies-recommended-reading/local-premium

A recent study commissioned for this report determined the multiplier effect of purchasing locally grown foods in the Lehigh Valley for twelve specific Lehigh Valley agricultural sectors (See Table 6.1 and Appendix C).[13]

According to Tim Kelsey at Penn State University, the overall multiplier for food-related farming activities in the Lehigh Valley is 1.449 (IMPLAN calculation of the appropriately weighted average of the eleven food categories, personal communication, September 6, 2013). In other words, every dollar received by food-related farms in the two counties generates on average an additional 45 cents in economic activity within the Lehigh Valley. This multiplier effect is greatest for locally grown fruits, tree nuts, and vegetables (see Table 6.1). When a dollar is spent on Lehigh Valley fruit in particular, that dollar then multiplies to $1.66 for the Lehigh Valley economy.

With approximately $12 million in local food sales each year in the Lehigh Valley and an overall multiplier for Lehigh Valley food-related farming activities of 1.449, locally grown foods create about $17 million of economic activity in the Lehigh Valley each year.

Table 6.1 Estimated Economic Multipliers in the Lehigh Valley by Agricultural Sector

Food Farming Sector	Multiplier
Fruit farming	1.663
Tree nut farming	1.661
Vegetable and melon farming	1.647
Greenhouse, nursery, and floriculture production	1.632
All other crop farming (including hay)	1.573
Grain farming	1.459
Poultry and egg production	1.416
Animal production, except cattle, poultry, eggs	1.411
Cattle ranching and farming	1.410
Oilseed farming (e.g. soybeans)	1.405
Dairy cattle and milk production	1.327

Sources: Economic Multiplier Effects of Farming 2013; BFBL-GLV 2013

Below: Locally Grown Radishes
Photo Credit: Gabby Salazar

Locally grown foods create about $17 million of economic activity in the Lehigh Valley each year.

[13] Hardy, K. & Kelsey, T. W. (2013). *The Economic Multiplier Effects of Farming in Lehigh and Northampton Counties*. Available at http://aese.psu.edu/research/centers/cecd

Economic Benefits of Farmers' Markets

There are many different marketing venues for locally grown foods, yet likely the most well-known is the farmers' market, which has additional economic benefits for communities. As with other local distribution channels, the dollars spent at a farmers' market tend to be re-spent locally rather than being sent to distant parent companies or other stakeholders.[14] According to Richard McCarthy, Executive Director, Market Umbrella, "the sight of tents and umbrellas gives the impression of an informal and therefore insignificant economic activity, whereas in fact it is highly efficient, enterprising, and democratic."[15] In addition to creating direct benefits for local farmers, farmers' markets have also been found to have positive impacts on local economies by generating significant benefits for nearby businesses and the surrounding community.[16] The multiplier effect associated with farmers' markets has been shown to range from 1.41 to 1.78.[17] Farmers' markets can spur consumer spending at neighboring businesses in the area by drawing consumers to places where they might not have otherwise visited. A recent study showed that the drawing power of farmers' markets was the overwhelming reason for people being downtown at two weekend markets and also drew people downtown, to a lesser extent, for midweek markets.[18]

The economic benefits of farmers' markets have been estimated for the Easton Farmers' Market. On Opening Day in 2008, while in only its fourth year of operation as a producer-only farmers' market, 71 percent of market shoppers surveyed stated that their primary reason for visiting Downtown Easton was the farmers' market. Over 1900 people visited the market that day (1,267 households) and spent an average of $12.80 for a total of over $16,000.[19] Now in its ninth year as a producer-only market, the Easton Farmers' Market

Easton Farmers' Market
Photo Credit: Elizabeth Judge Wyant

is thriving, attracting approximately 3,000 visitors to its Saturday morning market each week (more during special events).[20] With the average household spending $31.75 at market each week, the projected weekly gross combined receipts have climbed to $63,000, and the seasonal gross combined receipts for the 29-week market are $1.8 million. Using the Lehigh Valley multiplier of 1.449, the Easton Farmers' Market can thus be estimated to have a total annual economic impact of $2.6 million.

In addition, the 2013 survey showed that approximately 69 percent of visitors spend an average of $25.60 per household at nearby businesses when they visit the neighborhood, resulting in $35,000 projected weekly gross receipts at those businesses. Multiplying this as an average throughout the 29 week season, the Easton Farmers' Market brings $1.0 million in additional sales into Downtown Easton.

Other Benefits:

A local food system can also foster business innovation and entrepreneurship.[21] Farmers' markets can operate as relatively low-risk incubators for new and small businesses to develop and expand product lines while improving business skills and opportunities.[22] Strong local food economies lead to job creation, small business development, increased tax revenues, and new market opportunities for farmers and entrepreneurs.

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[14] MartketUmbrella.org. (2012). *Farmers Markets contribute Millions to Local, Regional Economies*. Retrieved from http://www.marketumbrella.org/index.php?mact=News,cntnt01,detail,0&cntnt01articleid=163&cntnt01returnid=83

[15] *Ibid*. Richard McCarthy, Executive Director, Market Umbrella

[16] *Ibid.;* Leopold Center for Sustainable Agriculture. (2005). *Consumers, Vendors, and the Economic Importance of Iowa Farmers' Markets: An Economic Impact Survey Analysis*. Otto, D. & Varner, T. Retrieved from http://www.leopold.iastate.edu/pubs-and-papers/2005-05-farmers-markets; American Agricultural Economics Association. (2007). *An Evaluation of the Economic Impacts of Oklahoma Farmers Markets*. Selected Paper 172970 at 2007 Annual Meeting. Henneberry, S. R., Whitacre, B. & Agustini, H. N. Retrieved from http://purl.umn.edu/9976

[17] USDA, ERS. (2010). *Local Food Systems - Concepts, Impacts, and Issues. Economic Research Report No 97.* Retrieved from http://www.ers.usda.gov/media/122868/err97_1_.pdf

[18] Oregon State University. (2003). *How do Farmers' Markets Affect Neighboring Businesses?* Oregon Small Farms Technical Report No. 16. Lev, L., Brewer, L., and Stephenson, G. Retrieved from http://smallfarms.oregonstate.edu/sites/default/files/publications/techreports/TechReport16.pdf

[19] BFBL-GLV Survey of Easton Farmers' Market Shoppers. (May 3, 2008). It was assumed that an average of 1.5 persons from each household attended market.

[20] Easton Farmers' Market Survey. (August 31, 2013).

[21] *Local Food Systems - Concepts, Impacts, and Issues.*

[22] Feenstra, G.W., Lewis, C.C., Hinrichs, C.C., Gillespie, G.W. Jr., & Hilchey, D. (2003). Entrepreneurial Outcomes and Enterprise Size in U.S. Retail Farmers Markets. *American Journal of Alternative Agriculture 18*(1), 46-55.

6.4 Potential for Economic Growth

The analysis estimates that the local food economy in the Lehigh Valley generates more than $12 million in direct economic activity and accounts for a total of $17 million in total economic activity annually. There are opportunities, however, for continued significant growth.

As discussed above, in 2007, Lehigh Valley households spent nearly $1.5 billion on food; of this, only $12 million was spent on locally grown foods (See Figure 6.3). Lehigh Valley residents spent on average just $4.85 per person or about $12 per household on farm-direct purchases for the whole year. This represents less than one percent of their annual food expenses. The majority of Lehigh Valley food dollars left the region through the purchase of food imports. Even if some of that food is best grown outside the area, there still exists an incredible opportunity to capture additional food dollars productively in Lehigh Valley businesses and jobs.

A recently published *Locavore Index* ranked the 50 states in terms of their commitment to local foods based on the number of farmers' markets, CSAs, and food hubs per capita.[23] Pennsylvania ranked thirty-second with a score of 1.94. The top states were Vermont (16.94), Maine (6.96), and New Hampshire (6.37). Clearly, there is room for improvement.

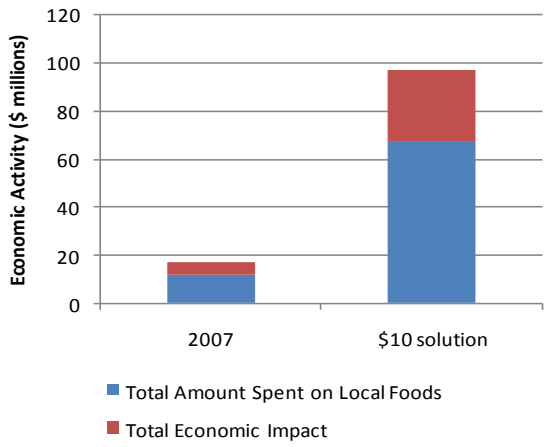
In order to increase the percentage of annual food budgets spent on locally grown foods, an increased commitment to improving the local food economy would be needed. In various regions in the United States, "Buy Local" campaigns have been implemented that encourage residents to choose more locally grown foods, such as with commitments to spend $10 a week,[24] 10 percent of food dollars,[25] or

If each of the 241,047 households in the Valley were to spend just $10 per week on locally grown foods during the growing season… [it] would result in the annual generation of $97 million in economic activity.

even 25% of food dollars on locally grown food.[26] If each of the 241,047 households in the Valley were to spend just $10 per week on locally grown foods during the growing season (May through November, 28 weeks), **$67 million** food dollars could be kept within the Lehigh Valley (See Figure 6.3). This small change would result in the annual generation of $97 million in economic activity in the Lehigh Valley once the multiplier of 1.449 is applied. This economic impact could be increased further by the localization of food infrastructure facilities (See Chapter 4).

A recent report indicates that the local food sector has the potential to act as a significant economic driver in terms of growth, job creation, and increasing access to healthy food.[27] In particular, the report states that investing in new ventures within food processing and retail/consumption, such as equipment, buildings, and related assets that expand the ability to produce, process and market farm-based commodities and products, would generate the greatest local economic benefits in terms of increased local revenues, jobs, wages, and access to healthy food.[28]

Figure 6.3 Comparison of Amounts Spent on Food in the Lehigh Valley (2007, $10 Solution)



Sources: USDA Census of Agriculture 2007; Consumer Expenditure Survey 2007; American Community Survey 2007; BFBL-GLV 2013

[23] Strolling of the Heifers. (2013). 2013 *Locavore Index*. Retrieved from http://www.strollingoftheheifers.com/wp-content/uploads/2013/04/Locavore-Index-2013-data.pdf

[24] Shenandoah Forum. (2013). *Campaign to Boost Local Food and Local Economy Set to Repeat!* Retrieved from http://www.shenandoahforum.org/10aweekchallenge.html

[25] Center for Environmental Farming Systems. (2013). *Join the 10% Campaign*. Retrieved from http://www.ncsu.edu/project/nc10percent/index.php

[26] Community Involved in Sustaining Agriculture. (2013). CISA's 20th Anniversary. Retrieved from http://www.buylocalfood.org/about/cisas-20th-anniversary/

[27] Wallace Center at Winrock International. (2013). *North American Food Sector, Part One: Program Scan and Literature Review.* Arlington, VA: Pansing, C., Fisk, J., Muldoon, M., Wasserman, A., Kiraly, S., & Benjamin, T. Retrieved from http://wallacecenter.org/our-work/Resource-Library/wallace-publications/Program%20Scan%20and%20Literature%20Review.pdf

[28] *Ibid.*

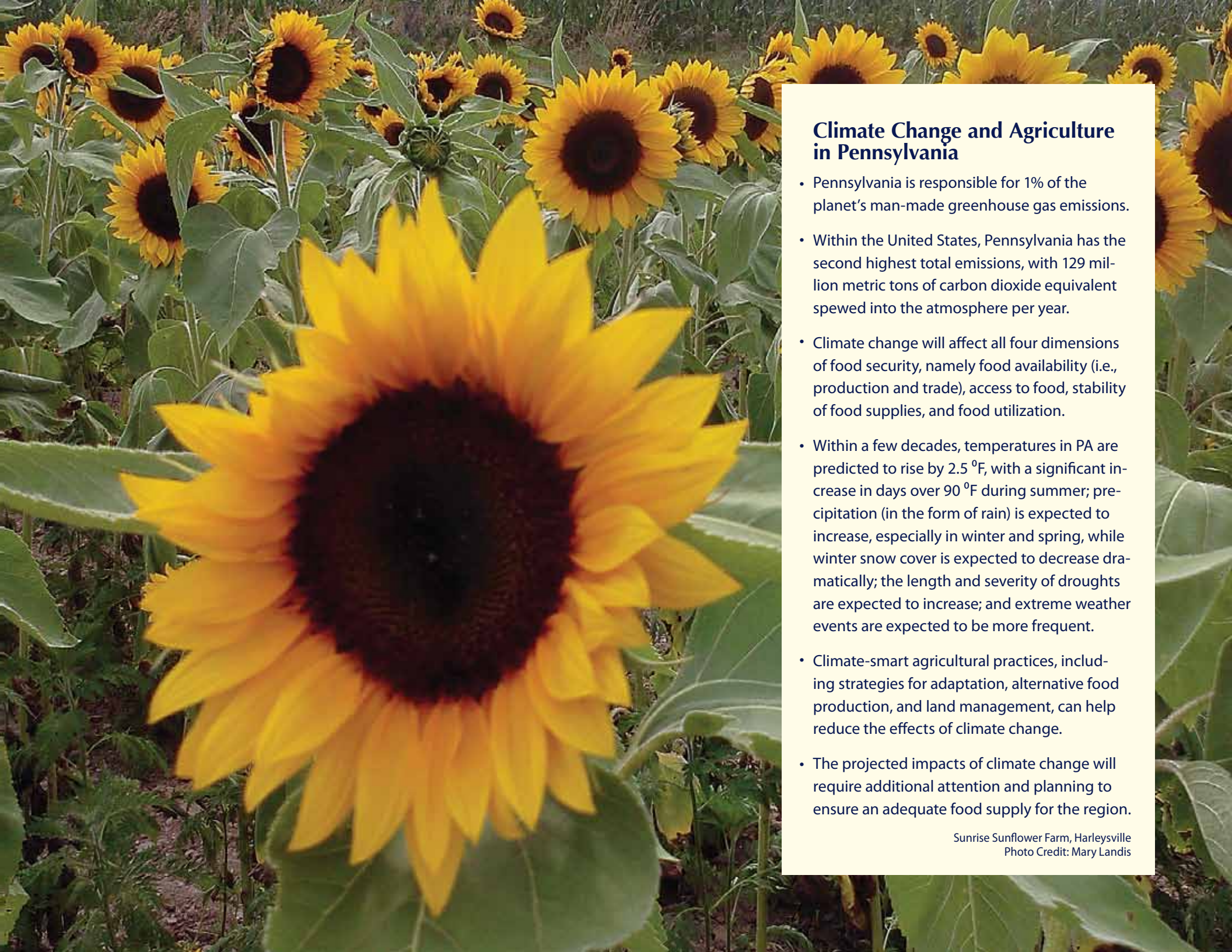
Swiss Chard
Photo Credit: Gabby Salazar

Questions to Consider:

Do we recognize our local food economy as a serious economic development opportunity for the Lehigh Valley?

Should we invest in our local food system? Are there any disadvantages?

How does economic development in our local food system compare to other opportunities for local development?



Climate Change and Agriculture in Pennsylvania

- Pennsylvania is responsible for 1% of the planet's man-made greenhouse gas emissions.
- Within the United States, Pennsylvania has the second highest total emissions, with 129 million metric tons of carbon dioxide equivalent spewed into the atmosphere per year.
- Climate change will affect all four dimensions of food security, namely food availability (i.e., production and trade), access to food, stability of food supplies, and food utilization.
- Within a few decades, temperatures in PA are predicted to rise by 2.5 ^{0}F, with a significant increase in days over 90 ^{0}F during summer; precipitation (in the form of rain) is expected to increase, especially in winter and spring, while winter snow cover is expected to decrease dramatically; the length and severity of droughts are expected to increase; and extreme weather events are expected to be more frequent.
- Climate-smart agricultural practices, including strategies for adaptation, alternative food production, and land management, can help reduce the effects of climate change.
- The projected impacts of climate change will require additional attention and planning to ensure an adequate food supply for the region.

Sunrise Sunflower Farm, Harleysville
Photo Credit: Mary Landis

7. Climate Change and Agriculture in Pennsylvania

Diane W. Husic, Ph.D., Professor, Department of Biological Sciences, Moravian College

As part of the Envision Lehigh Valley initiative, a Climate and Energy Conservation Plan is being prepared to address climate change issues from a comprehensive perspective. This chapter focuses specifically on the ways that predicted climate change impacts could affect local food production and fresh food access in the Lehigh Valley.

Globally, scientists overwhelmingly agree that anthropogenic climate change is occurring, due largely to the increasing concentration of atmospheric greenhouse gases, and that mitigation and adaptation actions need to be implemented. The United Nations, the World Bank, numerous prestigious scientific societies, and countless non-profit groups have reported on the extent of the problem and predicted impacts in the future. Pennsylvania is responsible for one percent of the planet's man-made greenhouse gas (GHG) emissions (ranking us 25th among all the nations in the world). Within the United States,

> *…Texas has by far the highest total emissions from power plants and refineries, with 294 million metric tons of carbon dioxide equivalent spewed into the atmosphere.* ***The next highest total comes from Pennsylvania, with 129 million metric tons.***[1]

Thus, Pennsylvania has an obligation to consider its contributions to global climate change and a responsibility to consider the impact this environmental change will have on the citizens and resources of the Commonwealth.

Many reports describe the impacts that climate change will have on ecosystems, human health, the economy, coastal regions, and traditional livelihoods. Of utmost concern is the impact of climate change on food security. Although food security has become an issue of great interest for researchers, social and environmental activists, and community-based organizations, climate change is seldom addressed in this work despite its potential to dramatically impact future food security.

The World Food Summit of 1996 defined food security as existing "when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life," and this definition has been adopted by major organizations like the World Health Organization and the Food and Agriculture Organization of the United Nations (FAO).[2] Authors of a review published in the Proceedings of the National Academy of Science several years ago noted that

> *Climate change will affect all four dimensions of food security, namely food availability (i.e., production and trade), access to food, stability of food supplies, and food utilization. The importance of the various dimensions and the overall impact of climate change on food security will differ across regions and over time and, most importantly, will depend on the overall socio-economic status that a country has accomplished as the effects of climate change set in.*[3]

Of utmost concern is the impact of climate change on food security.

For many regions of the world, climate change will worsen conditions of hunger and living conditions of those who depend directly on the land and oceans for their food supply and source of income including farmers, fishers, and forest-dependent people.[4] In Pennsylvania, we are likely to be more resilient to the impact of climate change on food production (i.e. compared to the Midwest and Southwest where droughts could be severe); however, projected impacts will require additional attention and planning to ensure an adequate food supply for the region.

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[1] Wald, M.L. (2012). Online Map Shows Biggest Greenhouse Gas Emitters. The New York Times (January 11, 2012 edition). Retrieved from http://www.nytimes.com/2012/01/12/science/earth/epa-unveils-map-of-major-greenhouse-gas-producers.html

[2] FAO. (2006). The Policy Brief. Retrieved from ftp://ftp.fao.org/es/ESA/policybriefs/pb_02.pdf; WH0. (2013). *Food Security*. Retrieved from http://www.who.int/trade/glossary/story028/en/

[3] Schmidhuber, J. & Tubiello, F.N. (2007). Global food security under climate change. *Proc. Natl. Acad. Sci. USA, 104*(50), 19703–19708.

[4] Food and Agricultural Organization of the United Nations. *Climate Change and Food Security*. Retrieved from http://www.fao.org/climatechange/16606-05afe43bd276dae0f7461e8b9003cb79.pdf

7.1 Climate Change and Agricultural Impacts in Pennsylvania

In 2008, the Union of Concerned Scientists published a report summarizing the predicted climate changes for Pennsylvania and how they would impact a range of industries including agriculture.[5] Within a few decades, temperatures are predicted to rise by 2.5 ^{0}F, with a significant increase in days over 90 ^{0}F during summer. Precipitation (in the form of rain) is expected to increase, especially in winter and spring, while winter snow cover is expected to decrease dramatically. It is not unusual to have a period of drought in a Pennsylvania summer; however, the length and severity of these could increase. By the end of the century, all of these changes are predicted to be even more dramatic with the possibility of the average temperature rising between 3.6 ^{0}F and 12.6 ^{0}F.[6] Extreme weather events are also expected to be more frequent. Flood-prone areas like the Lehigh Valley, which in recent years has suffered flooding from Hurricanes Ivan, Irene, and Sandy, and Tropical Storm Lee, can expect climate change to bring an increase in precipitation and flooding in the future. Since the 2008 reports, climate models have improved in accuracy and resolution; finer scale, more regional-relevant data (e.g. for the Lehigh Valley) should soon be available.

The advance of spring in northern latitude regions has been well-documented, and the USDA Hardiness Zone maps have been adjusted twice since 1990. While longer growing seasons due to increased atmospheric carbon dioxide can theoretically increase plant yield, such increased growth depends heavily on soil nutrients, especially nitrogen, and the availability of water. Lower snowpack in winter can impact water tables, and heavy rains in spring can delay planting,

John Place, Keepsake Farm, Nazareth
Photo Credit: BFBL-GLV

despite the milder temperatures. Certain crops in Pennsylvania may be threatened by either warmer winter temperatures (apples, Concord grapes) or by high summer heat (sweet corn), and milk production is likely to decrease with increasing summer temperatures.[7] From the 2008 National Conference of State Legislatures report:

> *Pennsylvania has annual agricultural sales of nearly $5 billion. One-third of sales are dairy products; the remainder is split among poultry, livestock, eggs and high-value nursery products. Predicted higher temperatures due to unmitigated climate change could negatively affect the dairy industry because cows subjected to prolonged heat stress decrease milk production. One study shows that, above a critical temperature threshold of 77° F, dairy cows produce up to 22 percent less milk. This would affect not only the state's dairy industry, but also related economic activities, such as processing and sale of dairy products that annually account for nearly $16 billion and more than 20,000 jobs. Decline in dairy production could create economic costs of approximately $480 million and as many as 5,300 lost jobs.*[8]

Certain crops in Pennsylvania may be threatened by either warmer winter temperatures (apples, Concord grapes) or by high summer heat (sweet corn), and milk production is likely to decrease with increasing summer temperatures.

Climate change can exacerbate other problems such as the decrease of plant productivity in the presence of damaging ozone pollution. Poor air quality in the Lehigh Valley – due to legacy industries, geography, and high volumes of transportation vehicles and diesel exhaust – not only causes health problems, but also negatively impacts crops. Ozone effects are worse on hot days, and the number of days in the 90's is expected to increase in the coming decades. The majority of the hottest summers on record have occurred since the late 1980s.

While some of this data is several years old, the message about the negative impact of climate change on agriculture in Pennsylvania, from both a food production and economic perspective, still holds true.

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[5] Union of Concerned Scientists. (2008). *Climate Change Impacts and Solutions for Pennsylvania.* Retrieved from http://www.ucsusa.org/global_warming/science_and_impacts/impacts/climate-change-pa.html

[6] National Conference of State Legislatures and the University of Maryland's Center for Integrative Environmental Research. (2008). *Pennsylvania: Assessing the Costs of Climate Change.* Retrieved from http://www.ncsl.org/print/environ/ClimateChangePA.pdf

[7] *Climate Change Impacts and Solutions for Pennsylvania.*

[8] *Pennsylvania: Assessing the Costs of Climate Change.*

7.2 Climate Change Policy in the Commonwealth

In 2008, the Commonwealth passed Act 70 known as the Pennsylvania Climate Change Act. In accordance with this legislation, the following year, Pennsylvania developed a climate action plan that included 52 recommendations on how Pennsylvania could reduce its greenhouse gas emission.[9] Chapter 9 of this report included many recommendations relating to food production. For example:

> *This work plan recommendation would start with an economic, demographic, and land-use analysis of all of Pennsylvania to determine a limited number of "foodsheds," where the utilization of locally produced and processed foods would be maximized, and where the use of fossil fuels in the procurement and delivery of the food would be minimized.*

The report called for regenerative farming practices and soil sequestration (of carbon) from continuous non-till agronomic systems, manure digester implementation support, and Management-Intensive Grazing (MiG) in which farmers would

> *…transition their livestock operations from grain-intensive practices (which usually require importing of grain/nutrients into the state) to continuous MiG, which by contrast takes advantage of more local resources and increases sequestered carbon in pasturelands.*

Most of these recommendations have not been acted upon. The 2008 law also required that the DEP update the plan in 2012, but to date no update has been issued.

Upon the recommendation of the Climate Change Advisory Committee (CCAC), but not mandated by Act 70, climate adaptation working groups were formed and developed a report and set of recommendations on adapting to climate change, which was published in 2010.[10] Key issues identified in that report under the agriculture section included a lot of "needs" (some of these recommendations are taken verbatim from the report):

- An increased need for water
- A need to learn about management strategies for invasive species (including pests and pathogens)
- A need for technical assistance programs to help farmers make decisions about sustainable crops and production practices
- The importance of preserving crop and livestock genetic diversity
- A need to assess sustainability of PA agriculture under climate change scenarios
- The importance of expanding regional planning initiatives, especially in agricultural areas, with a focus on agricultural security zones and to recognize local food security.

Most of the recommendations related to agriculture in the report are not specific to climate change, but the identified management practices and efforts to close some of the information gaps could likely help to enhance resilience against the impacts of climate change.

[9] PA Department of Environmental Protection. (2009). *Pennsylvania Final Climate Change Action Plan*. Retrieved from http://www.dcnr.state.pa.us/cs/groups/public/documents/document/dcnr_001957.pdf

[10] PA Department of Environmental Protection. (2010). *Pennsylvania Climate Adaptation Planning Report*. Retrieved from http://www.elibrary.dep.state.pa.us/dsweb/View/Collection-10796

Upon the recommendation of the CCAC, but not mandated by Act 70, climate adaptation working groups were formed and developed a report and set of recommendations on adapting to climate change, which was published in 2010.

Nurture Nature Center, Easton
Photo Credit: Nurture Nature Center

The Nurture Nature Center, Easton, features NOAA's Science on a Sphere® —a dynamic animated globe with projected displays of global patterns such as weather systems, ocean currents and land use.

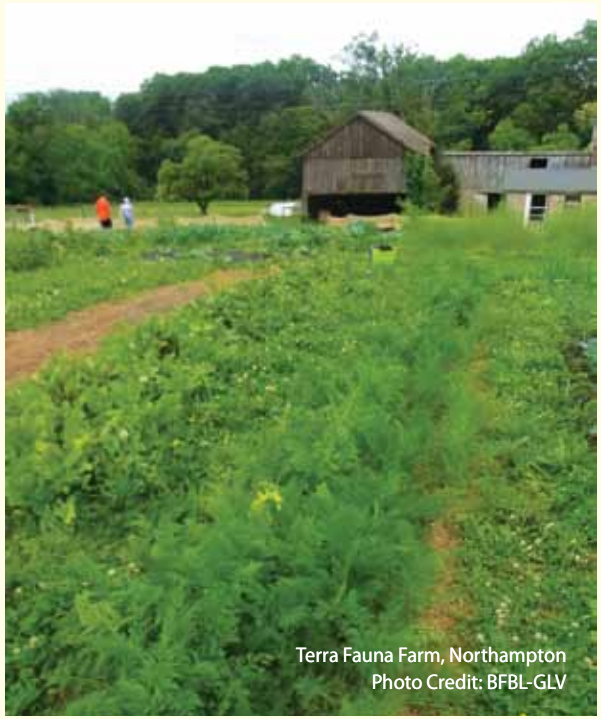
7.3 Considering Climate-Smart Agriculture for Pennsylvania

Climate-smart agriculture achieves sustainable agricultural development for food security under climate change and is composed of three main pillars:

1. sustainably increasing agricultural productivity and incomes;
2. adapting and building resilience to climate change; and
3. reducing and/or removing greenhouse gases emissions, where possible.[11]

There are many lessons to be learned from "climate-smart agriculture" practices that are emerging globally. As one example, South Africa has been experiencing both periods of extreme precipitation and drought, along with stronger than normal winds. Farmers have found that instead of large acreages of monoculture, it has proven beneficial to plant wide rows of the desired crop plant interspersed with rows of native plants. The soil erosion has been lessened, and problems from drought or flooding also seem to have decreased. It is likely that the inclusion of more diversity and of native plants may help sustain populations of pollinators. In the U.S., the practice of keeping hedge rows along the edges of fields has declined, but could be reconsidered for the same reasons as noted by the South African farmers. The Rodale Institute has long promoted composting practices that build quality soil; these same practices more recently have been shown to help with carbon sequestration.

Both the Food and Agriculture Organization of the U.N. and the World Bank have published resources on Climate-Smart Agriculture.[12, 13] Within the Lehigh Valley, there is a wealth of climate change expertise, including farmers, Cooperative Extension, non-profit organizations, and the many colleges and universities, that could be tapped to provide information on predictions of regional climate change and its impacts. These sources could also provide strategies for adaptation, alternative food production, and land management that reduce the effects of climate change.



Terra Fauna Farm, Northampton
Photo Credit: BFBL-GLV

Questions to Consider:

Are we interested in starting a conversation about what sustainable agriculture and local food security mean in the face of climate change? If so, how should we begin to engage in a dialogue about where vulnerabilities lie within our agriculture system? What resources do we have here in the Lehigh Valley to engage citizens and public officials in such dialogue?

Knowing that locally grown food and sustainable practices help to mitigate some of the causes of climate change and build resilience into agricultural systems, how do we as a community work to expand these practices and the local food economy?

Should climate change be a greater priority in planning and policy-setting within the Lehigh Valley?

How are our local farmers dealing with environmental changes and extreme weather? Are they managing soil, wind, or livestock differently as compared to years past?

What can we learn from other organizations addressing food security issues?

[11] Food and Agricultural Organization of the United Nations. (2013). *Climate-Smart Agriculture Sourcebook*. Retrieved from http://www.fao.org/climatechange/climatesmart/en/

[12] *Ibid.*

[13] World Bank. *Climate-Smart Agriculture brochure.* Retrieved from http://www.worldbank.org/content/dam/Worldbank/document/CSA_Brochure_web_WB.pdf

Food Policy

- Food Policy Councils (FPCs) are "the most effective method for initiating comprehensive food system policy enhancements with a focus on improving health."
- Local governments and businesses can play an integral role in building their local food systems, stimulating local business development, fostering economic growth, and improving food access by:
  - enacting food procurement policies that encourage or require the use of locally grown food for their cafeterias and food service needs;
  - protecting farmland from development by supporting agricultural conservation easement (farmland preservation) programs with both funding and political support;
  - making public and private land available to urban agricultural entrepreneurs for food production;
  - amending ordinances to create food-system friendly zoning that accommodates urban agriculture production and sales, and helps to improve food access by allowing for farmers' markets, urban farms, community gardens, poultry-raising, and beekeeping;
  - adopting policies that encourage sustainable farming methods;
  - helping young farmers overcome the challenges of land access and affordability, as well as access to capital and credit;
  - providing support for healthy food resources, not only to traditional retail outlets, but also to alternative food resources; and
  - encouraging healthier eating habits through policies directed towards both education and incentives.

Casa Bianca Farms CSA, Mount Bethel
Photo Credit: BFBL-GLV

8. Food Policy

Food policy is the set of laws and regulations that shape a region's food system, informing how, why, and when food is produced, transported, distributed, and consumed.[1] Because food systems are an interlinked network of various resources, actors, processes, and other systems (such as land, housing, transportation, and recreation), and involve decision-makers at various levels of government and the private sector, food policies must be considered broadly to include these diverse groups.

There are a variety of policies that can be developed to support a local food economy and improve access to affordable, healthy food. Strategies may include creating a food policy council, drafting procurement policies, establishing innovative land use strategies, modifying zoning regulations to accommodate urban agriculture, supporting farmers with funding or land use restrictions, encouraging healthy food choices, and developing infrastructure for the local food system. Each of these strategies is considered below.

It has been stated that FPCs are "the most effective method for initiating comprehensive food system policy enhancements with a focus on improving health.

8.1 Food Policy Councils

Issues of fresh food access and local agriculture affect many different areas, such as public health, land use, community culture, quality of life, the economy, and the environment. Since there is no single government body looking at how local food systems impact these different areas, many regions have begun establishing food policy councils.

A food policy council (FPC) is a group of stakeholders that provide support to both governments and communities in developing policy and programs related to the local food supply. It has been stated that FPCs are "the most effective method for initiating comprehensive food system policy enhancements with a focus on improving health."[2]

An FPC may take many forms; for example, it may be commissioned by a governmental body (state, county, or city) or organized as a grassroots effort. Regardless of form, a successful FPC requires the participation of a diverse group of stakeholders, typically having a strong knowledge of the local food economy and representing a diverse spectrum of community interests.

Members of an FPC should include representatives of the food sectors (production, processing, distribution, consumption, and waste recovery) and other sectors (urban planning, economic development, health, food security, agricultural preservation, energy, transportation, and the environment), including governmental employees, non-profit organizations, local businesses, farmers, educators, and community residents (See Figure 8.1). [3] By cultivating partnerships among the community's various stakeholders, an FPC can improve coordination and create policies that work towards a common vision for the local food system.[4]

FPCs often begin by researching and analyzing the existing local food system, determining its assets and shortfalls, and then sharing this information with elected officials and the community through public forums designed to discuss key issues. As part of this research process, FPCs review local legislation and regulations that affect the food system, identify barriers to public health and vibrant local food economies, and make recommendations for policy change to build the stability and resiliency of the local food system.

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[1] The Harvard Law School Food Law and Policy Clinic & Mark Winne Associates. (2012). *Good Laws, Good Food: Putting State Food Policy to Work for our Communities*. Retrieved from http://www.law.harvard.edu/academics/clinical/lsc/documents/FINAL_LOCAL_TOOLKIT2.pdf

[2] Muller, M., Tagtow, A., Roberts, S. L. and MacDougall, E. (2009). Aligning Food Systems Policies to Advance Public Health. *Journal of Hunger & Environmental Nutrition, 4*(3), 225-240, at 237. Retrieved from http://dx.doi.org/10.1080/19320240903321193

[3] American Planning Association's Planning and Community Health Research Center. (2013). *Food Policy Councils: Helping local, regional, and state governments address food system challenges*. K. Hodgson. Food System Planning Briefing Paper. Retrieved from http://www.planning.org/nationalcenters/health/briefingpapers/foodcouncils.htm

[4] Burgan, M. and Winne, M., Mark Winne Associates. (2012). *Doing Food Policy Councils Right: A Guide to Development and Action.* Retrieved from http://www.markwinne.com/wp-content/uploads/2012/09/FPC-manual.pdf

Although the primary function of FPCs is to address policy issues, they can also create or coordinate programs to address gaps in the local food system or assist in finding funding sources for these programs.

Food policy councils often face challenges due to a lack of funding and staff. Local governments can support FPCs in a number of ways. They can sponsor their creation; provide technical or in-kind support, funding, or staff assistance; have elected officials participate in the process in order to provide political legitimization; and incorporate recommendations into comprehensive and strategic plans.[5] As an example, Dane County, WI created an FPC in 2005. The County provides funding for a part-time staff person, in-kind assistance, political support, oversight of the budget, and appoints members to the FPC. To date, it has created a farmers' market alliance for the region in order to share resources, provide joint marketing and promotion, and implement EBT at all markets. It has also worked with the County Board to pass a resolution encouraging local sourcing of foods for the County jail, juvenile detention center, and senior centers, and organized a conference to focus on the social, environmental, and economic linkages within the county food system.[6]

There are many FPCs across the country.[7] In Pennsylvania, FPCs exist in Adams County, Philadelphia, Pittsburgh, and South Central Pennsylvania. Adams County's FPC, established by the County Commissioners in 2009, is working to increase low income families' access to nutritious food, support Farm to Institution initiatives, and further develop local food networks for education.[8]

An FPC could be a critical step in developing a comprehensive and coordinated approach to addressing issues of fresh food access and the local food system in the Lehigh Valley.

Pappy's Orchard, Coopersburg
Photo Credit: BFBL-GLV

Figure 8.1 **Sectors involved in Food Policy**

Source: Lane County, Oregon Food Policy Council [9]

[5] National Association of Counties. (2007). *Counties and Local Food Systems: Ensuring Healthy Foods, Nurturing Healthy Children*. Dillon, C., & Harris, M. (Editor). Retrieved from http://www.farmtoschool.org/files/publications_133.pdf

[6] Dane County Food Council. (2013). *Accomplishments*. Retrieved from http://www.countyofdane.com/foodcouncil/accomplishments.aspx; NACo Center for Sustainable Communities. (2007). *Counties and Local Food Systems: Ensuring Healthy Foods, Nurturing Healthy Children*. Dillon, C., & Harris, M. (Editor). Retrieved from http://www.farmtoschool.org/files/publications_133.pdf

[7] Community Food Security Coalition. (2012). *List of Food Policy Councils in North America*. Retrieved from http://www.jhsph.edu/research/centers-and-institutes/johns-hopkins-center-for-a-livable-future/_pdf/projects/FPN/fp-councils-may-2012.pdf

[8] *Ibid*.

[9] Lane County Food Policy Council. Overview. Retrieved from http://www.fpclanecounty.org/overview/

8.2 Procurement Policies

Local governments and businesses can play an integral role in building local food systems, stimulating local business development, and fostering economic growth by enacting food procurement policies that encourage or require the use of locally grown food for their cafeterias and food service needs. As larger wholesale buyers, they act as anchor institutions, providing large, stable sources of demand for locally grown foods and allowing local food producers and infrastructure to increase in scale. Local food procurement policies may also go beyond locality to take into account other food system issues, such as reducing waste, organic or sustainable production practices, animal welfare, and healthy eating.

Government procurement policies may cover such public facilities as schools, nursing homes, children's and senior nutrition programs, recreation and community centers, and jails and juvenile facilities. Private institutional policies may cover colleges, hospitals, other healthcare facilities, and workplaces.

Nationally, there have been several ordinances passed that encourage local food purchasing for city and county governments. In 2009, Albany County, New York passed a Local Food Purchasing Policy to support the purchase of locally grown food for the county's healthcare and correctional facilities.[10] In 2010, the City of Cleveland passed a "Buy Local" ordinance that offered a two percent bid discount for local producers, local food purchasers, and sustainable businesses that apply for city contracts.[11] Dane County, Wisconsin recently updated their Buy Local ordinance to offer preferences in county bidding to businesses that sell items manufactured, mined, produced, or grown in Dane County, the eight-county region, or the State of Wisconsin.[12] Under the law, local businesses have the opportunity to meet the lowest bid price for a contract if their bid is within a certain percentage of the lowest bid. There are many other examples of government procurement policies available;[13] however, there are none in the Lehigh Valley.

Non-government agencies have also begun to implement local procurement policies; for example, in Chicago, McCormick Place convention center committed to sourcing 15 percent of its food from local and sustainable sources, and up to 50 percent during peak production seasons, while Midway International Airport agreed to source 10 percent local and sustainable food.[14] Here in the Lehigh Valley, Parkhurst Dining Services at Cedar Crest College has had a local procurement program called FarmSource™ in place since 2002. According to Jamie Moore, Director of Sourcing and Sustainability, in 2012, the College sourced 14 percent of its food purchases locally and, during the 2013 growing season, this increased to 16 ½ percent. The FarmSource™ program defines local as produce and dairy grown or raised within 150 miles, and meats and artisanal products, such as hearth-baked breads and sausages, raised or produced within a three hour drive of the College (personal communication, September 9, 2013).

According to Joel Blice, General Manager at Lafayette College Dining Services, food service provider Bon Appétit has made a pledge to spend at least twenty percent of its total food spend on local foods, which are defined as foods grown or raised within 150 miles of the College (personal communication, October 7, 2013). An Eat Local Challenge was held in September, 2013, where one meal was made entirely of local ingredients (excluding salt).

According to John Soder, Executive Chef, Lehigh Valley Health Network, Sodexo Chefs and Managers in the Lehigh Valley are taking a pledge to showcase local foods as main ingredients in dishes (local foods are defined as coming from within the state or region), track their use of local food purchases, and increase these purchases annually (personal communication, October 11, 2013).

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[10] Albany County, New York. (2009). Establishing a Local Food Purchasing Policy for Albany County. *Resolution No. 496-a*. Retrieved from http://eatbettermovemore.org/sa/policies/pdftext/200903191727120.AlbanyLocalFood.pdf

[11] City of Cleveland. (2010). Local Producer, Local-Food Purchases, and Sustainable Business Preference Code. *Code of Ordinances, Chapter 187A*. Retrieved from http://www.amlegal.com/nxt/gateway.dll/Ohio/cleveland_oh/cityofclevelandohiocodeofordinances?f=templates$fn=default.htm$3.0$vid=amlegal:cleveland_oh

[12] Dane County, Wisconsin. (2013). Purchase of Goods and Services. *Ordinances, Chapter 25.11*. Retrieved from http://danedocs.countyofdane.com/webdocs/pdf/ordinances/ord025.pdf

[13] Denninga, B. P., Graffb, S., & Wootenc, H. (2010). Laws to require purchase of locally grown food and constitutional limits on state and local government: Suggestions for policymakers and advocates. *Journal of Agriculture, Food Systems, and Community Development, 1*(1), 139-148. Retrieved from http://www.agdevjournal.com/attachments/115_JAFSCD_Laws_on_Locally_Grown_Food_Corrected_10-10.pdf

[14] FamilyFarmed.Org. (March 15, 2013). Sustainable Food News. *Good Food Festival & Conference*. Retrieved from http://goodfoodfestivals.com/sustainable-food-news/

Eat Local Challenge 2013, Lafayette College
Photo Credit: Lafayette Dining Services

There may be a number of challenges associated with purchasing locally grown foods. Purchasers must have an awareness of and develop menus to reflect the seasonality of locally available foods. Kitchen staff needs culinary training in working with fresh, whole foods and adequate kitchen facilities.One study found that, kitchen staff is often not trained to cook; rather, the jobs consist of opening bags or cans and reheating the contents.[15] In addition, staff is often paid low wages, and turnover rates are high. Investments in kitchen facilities and staff have led to increased job satisfaction and decreased turnover rates, despite the increased workload associated with cooking whole foods.[16]

The process of sourcing local food can be more onerous than ordering from a large food distributor. To acquire a sufficient quantity of supply and selection, purchasers may have to order from multiple farms, yet deliveries from multiple locations are both inconvenient and less cost effective. The need for local food system aggregation and distribution networks was discussed in Chapter 4. Local food system facilitators are also useful in linking wholesale buyers with suppliers and helping to navigate challenges as they arise. Fair Food, a non-profit organization in Philadelphia, provides consultations with wholesale buyers in order to connect them with local farmers and producers.[17] The Greater Lehigh Valley chapter of Buy Fresh Buy Local (BFBL-GLV) has begun to offer this service in the Lehigh Valley.

Price may be another area of challenge as locally grown food often reflects the true cost of production and may, at times, be priced higher than other foods. It may be challenging to convince purchasers to buy a more fairly-priced product. Prices may also fluctuate greatly depending on season and availability.

Finally, in adopting procurement policies for locally grown foods, local governments need to be aware of the U.S. Constitution's "dormant Commerce Clause doctrine" (DCCD), which limits the ability of state and local governments to discriminate against out-of-state goods or services.[18] This restriction does not apply, however, if the state or local government is acting as a "market participant" as opposed to a "market regulator": the government is a market participant when it is directly buying or selling goods, but it is a market regulator when it employs its authority to tax or exempt entities from taxation. Any governmental policies about locally grown food should be drafted to avoid DCCD issues. To do this, policies in the Lehigh Valley could explicitly include out-of-state goods to avoid any claim of discrimination; for example, "Locally Grown Food" could be defined as "food grown in Northampton and Lehigh Counties, as well as adjacent counties, and may include areas outside the State of Pennsylvania." In addition, policies could be drafted with the market-participant exception in mind such that they merely set terms for how the government will engage in food purchasing rather than regulate the marketplace. Examples of policies that fall within the exception include those that mandate the purchase of locally grown foods, such as Woodbury County, IA's policy requiring the county to purchase any available supply of local organic food from a designated farmer-cooperative, and policies that grant bid preferences to local food providers, such as the City of Cleveland's two percent bid preference for local food. Policies offering tax credits would not come within the exception; thus, rather than use tax credits, cash subsidies could be awarded to private entities, such as grocery stores, for the purchase of locally grown foods.

[15] Nova Scotia Department of Energy, Ecology Action Centre. (2007). *Local Food Procurement Policies: A Literature Review.* MacLeod, M. & Scott, J. http://www.organicagcentre.ca/Docs/LocalFoodProcurementPolicies.pdf

[16] *Ibid.*

[17] Fair Food. (2013). *Consulting.* Retrieved from http://www.fairfoodphilly.org/our-work/consulting/

[18] *Laws to require purchase of locally grown food.*

8.3 Land Use

Policies that determine land use can also support a local food system. Examples of these include agricultural and conservation easements, land banks, and various land use policies and zoning ordinances.

Agricultural and Conservation Easements

Local government can protect farmland from development by supporting agricultural conservation easement programs with both funding and political support. As discussed in Chapter 2.3, both Lehigh County and Northampton County have been preserving farmland with their agricultural conservation easement programs since the early 1990s. As of January 2013, the Lehigh Valley has preserved 32,795 acres of farmland (368 farms), representing 21.4 percent of total land in farms. In 2013, Lehigh County allocated $200,000 in matching funds for farmland preservation (there were no matches in the preceding two years), as compared to Northampton County's $1.2 million allocation.

Northampton County's sizable contribution is due to partnerships forged among seven municipalities (Williams Township, Bushkill Township, Lower Mount Bethel Township, Moore Township, Lower Saucon Township, Upper Mount Bethel Township, and Plainfield Township), each of which approved a 0.25 percent earned income tax (EIT) directed to both farmland and recreational land preservation. Four conservancies (Heritage Conservancy, Natural Lands Trust, The Nature Conservancy, and Wildlands Conservancy) work with the municipalities to protect natural areas and open spaces through fee simple acquisition and conservation easements.

Rainbow Farm, New Tripoli
Photo Credit: BFBL-GLV

According to Bryan Cope, Open Space Coordinator for Northampton County, the County's 21st Century Open Space Initiative, which guides the County's grant programs for municipal parks, natural areas, and farmland preservation, is preparing for an overhaul in 2014. The County will be creating a new, strategic open space plan called *Livable Landscapes – A Strategic Open Space Plan* in order to allow for more flexibility in the restoration and preservation of lands, to study the relationships between urban, suburban and rural areas, and to promote healthy, livable landscapes. (personal communication, October 7, 2013).

Leasing Public and Private Land

Local governments and institutions can play an important role in integrating food production into places where people live, work, and play by granting long-term leases on land parcels to urban agricultural entrepreneurs. Vacant lots, fields, schoolyards, parks, utility rights-of-way, backyards, and rooftops can all be transformed into farming plots. In addition to overcoming the land access barrier for new farmers, growing food in these urban settings has been credited with supporting a range of outcomes, including healthy eating, community resilience, and food literacy.[19]

There is a growing trend for local governments to make public land available for food production. The City of Baltimore recently created a new Urban Agriculture Policy Plan, turning vacant city-owned land into new urban farms and expanding its urban agriculture sector.[20] Successful applicants have been awarded five-year leases with a provision requiring a two-year notice for requests to vacate the property.[21] There are currently 13 urban farms in Baltimore providing land for farmers and generating revenue through food production. Several of the farms are sharing an EBT machine to allow customers to use SNAP benefits for farm purchases. In addition to providing local fresh produce to residents, these farms are also transforming vacant lots into green spaces and centers for community gathering.[22]

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[19] ChangeLabSolutions. (2013). *Dig, Eat, and Be Healthy: A Guide to Growing Food on Public Property*. Retrieved from http://changelabsolutions.org/sites/default/files/Dig_Eat_and_Be_Happy_FINAL_20130610_0.pdf

[20] International Network for Urban Agriculture. (September 16, 2013). *Sneak Peek at Baltimore's New Urban Agriculture Policy Plan*. Retrieved from http://www.inuag.org/sneak-peek-baltimore%E2%80%99s-new-urban-agriculture-policy-plan

[21] Baltimore Office of Sustainability. (2012). *How To Be A Baltimore City Farmer: Regulations and Opportunities*. Retrieved from http://www.baltimorecity.gov/Government/AgenciesDepartments/Planning/BaltimoreFoodPolicyInitiative/HomegrownBaltimore.aspx

[22] *Sneak Peek at Baltimore's New Urban Agriculture Policy Plan.*

Cleveland is also turning city-owned vacant sites into productive use. The Reimagining Cleveland Initiative[23] (a partnership of Neighborhood Progress, Inc. (NPI) the City of Cleveland, Kent State University, Ohio State University Extension, and others) has created 14 community gardens, ten market gardens, two orchards, three vineyards, two side yard expansions, two native plantings, six pocket gardens, two rain gardens, three neighborhood pathways, and seven other greening projects on public land. In 2012, this project was recognized for its collaborative effort and non-traditional approach to greening Cleveland's neighborhoods with a National Planning Excellence Award for Innovation in Sustaining Places from the American Planning Association.

A recent report from Ohio State University suggested that the city of Cleveland could meet all of its fresh produce, poultry, and honey needs by an urban farming program using 80 percent of all vacant lots, 62 percent of industrial and commercial rooftops, and 9 percent of residential lots.[24] The analysis also revealed that the enhanced food production would result in $29 M to $115 M being retained in Cleveland annually. It concluded that such high levels of urban agriculture would require the active participation of city governments and planners, a public commitment, financial investment, and labor.

Privately-owned businesses are also leasing out their rooftops to urban farms. Brooklyn Grange,[25] an urban farm in New York City, has a 10-year lease from Acumen Capital Partners in Queens and a 20-year lease from the Brooklyn Navy Yard to farm on their rooftops. From the two acres of rooftops under cultivation, the Grange grows over 40,000 pounds of organically cultivated vegetables and herbs per year, which it sells to restaurants and the public through CSAs and farmstands. They also keep egg-laying hens and run a commercial apiary.

Zoning Ordinances to Encourage Urban Agriculture and Improve Fresh Food Access

Many municipalities, including Kansas City, MO, San Francisco, CA, Cleveland, OH, Seattle, WA, and Burlington, VT, are amending their zoning codes to create food-system friendly zoning that accommodates urban agriculture production and sales, and helps to improve food access.[26] These ordinances allow for farmers' markets, urban farms, and community gardens, as well as poultry-raising and beekeeping within the municipalities.

In Baltimore, the zoning and health codes were recently updated to permit urban agriculture in residential districts.[27] For urban farms, the new standards state that once a management plan is approved, greenhouses, permanent accessory structures, and farm stands are permitted on the site. Animal husbandry is also allowed for both community gardens and urban farms depending on lot sizes:

- lots smaller than 1,000 square feet: one breeding pair of rabbits and no more than 12 total rabbits, with one additional breeding pair and no more than 24 total rabbits for lots greater than 1,000 square feet;
- lots smaller than 2,000 square feet: no more than four chickens, with one additional chicken for every additional 1,000 square feet up to a maximum of ten each;
- lots smaller than 2,500 square feet: no more than two bee hives, with one additional hive for every additional 2,500 square feet; and
- lots smaller than 20,000 square feet: no more than two goats plus offspring under six months of age, with one additional goat for every additional 5,000 square feet.[28]

In 2011, the City of Pittsburgh passed its Urban Agriculture Ordinance to add urban agriculture regulations to their zoning code.[29] It allows urban agriculture including chickens and beekeeping on lots with a minimum lot size of 2,000 square feet. For the raising of livestock, three acres of land are required.

In the Lehigh Valley, chickens have been banned in all three cities, except on properties approved for farming in Bethlehem. The City of Easton recently took another look at the issue at the request of a number of residents wishing to keep small flocks on their properties, but declined to change the 2006 ordinance banning chickens due to the perceived cost of enforcement.

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[24] Center for Urban Environment and Economic Development, Ohio State University. (2012). Can cities become self-reliant in food? [Abstract]. *Cities 29*(1), 1–11. Retrieved from http://www.sciencedirect.com/science/article/pii/S0264275111000692

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[29] Pittsburgh Department of City Planning. *Urban Agriculture Zoning*. Retrieved from http://www.pittsburghpa.gov/dcp/files/urbanagriculture/Urban_Agriculture_Handout.pdf

Rooftop Garden at Brooklyn Navy Yard
Photo Credit: Brooklyn Grange

Policies to Encourage Sustainable Farming Methods

Municipal governments may also enact policies to encourage sustainable farming methods. As an example, Woodbury County, IA enacted a policy to provide up to $50,000 each year in real property tax rebates for farmers who convert to organic farming practices.[30]

In the Lehigh Valley, all farms in the farmland preservation programs are required to have conservation plans. According to Jeff Zehr, Director of Farmland Preservation for Lehigh County, these plans are developed by County Conservation Districts, sub-units of state government, with landowner and farm operator input, in order to promote the use of practices that protect soil, water, woodland, and wildlife resources. Typical soil protection practices include crop rotations, contour farming, and minimum or no-till farming. Livestock farms typically have pasture management, grazing practices, and nutrient management recommendations included in their conservation plans. (personal communication, October 7, 2013).

8.4 Support for Farmers

As discussed in Chapter 2, there is a need in the Lehigh Valley to help young and beginning farmers overcome the barriers to farm entry and establish farming operations. In 2011, the National Young Farmers' Coalition published a report in which it set out a number of strategies to help young farmers overcome the challenges of land access and affordability, as well as access to capital and credit, including the following:

- offer competitive small grants for beginning growers;
- enact restrictions in farmland preservation programs requiring that preserved land be resold at 'agricultural value" to ensure that it is affordable for farmers; and
- offer tax incentives to land owners for selling or leasing land to beginning farmers.[31]

Numerous other possibilities have been suggested.[32] Some regions, for example, are creating programs to connect new farmers to farmland. The Farmlink program in Northeast Ohio provides an online database to help those who need farmland connect with landowners wanting to keep their property in agricultural use.[33] All of these possibilities could be considered in the Lehigh Valley.

Access to technical assistance and training is also needed for new farmers. In the Lehigh Valley, there are two principal sources of education for new farmers: Cooperative Extension and the Seed Farm. As discussed in Chapter 2, Lehigh and Northampton Counties contribute $562,000, annually to Cooperative Extension in the Lehigh Valley. Lehigh County is also a major contributor to the Seed Farm. It initiated the project by providing the land, and developing the site with a driveway, parking area, building pads, a well, access to electricity, and a pole building. The County also owns most of the farming equipment, including a new tractor, the majority of which was purchased with a federal Beginning Farmer and Rancher Development Program grant. The land, equipment, and infrastructure are provided at no cost as part of the lease agreement between Lehigh County and the Seed Farm. The County also provides staff support for such things as bookkeeping, grant writing, Board of Directors work, property upkeep, and vehicle maintenance. Finally, the County provides direct financial support ($10,000 in 2013; $9,000 proposed for 2014) to pay for electricity, fuel, a portable toilet, and farm supplies.

Both Cooperative Extension and BFBL-GLV provide marketing support for local farmers, such as workshops, Local Foods Guides, and online promotion.

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[31] National Young Farmers' Coalition. (2011). *Building a Future with Farmers - Challenges Faced by Young, American Farmers and a National Strategy to Help Them Succeed.* New York: Lusher Shute, L. Retrieved from http://www.youngfarmers.org/reports/Building_A_Future_With_Farmers.pdf

[32] New England Small Farm Institute. (2001). *Northeast New Farmers: Opportunities for Policy Development.* Ruhf, K.R. Retrieved from http://www.smallfarm.org/uploads/uploads/Files/Policy_Background_Paper.pdf

[33] Cuyahoga Valley Countryside Conservancy. (2013). *Farmlink - Program Description.* http://www.cvcountryside.org/farmland/farmlink-program-descption.php

8.5 Support for Healthy Food Choices

There are numerous policies that local governments and businesses can adopt in order to support healthy food choices by consumers. They can be directed both at traditional food retailers to encourage more healthy food offerings and at alternative food resources to improve access and make purchasing these foods more convenient. Policies directed towards consumers, such as education, incentives, and workplace or school programs, can also be used to promote healthy eating.

Support for alternatives to traditional supermarkets can also be used as a means of ensuring healthy food access.

Support for Healthy Food Resources

In order to improve food access and support local food economies, both local governments and businesses can provide support for healthy food resources, not only to traditional retail outlets, but also to alternative food resources, such as community gardens, urban farms, farmers' markets, and CSAs.

The New York City Department of Health has implemented a Healthy Bodega Initiative to increase offerings of fruit and vegetables in underserved communities. The Department provided two free boxes of pre-packaged New York State grown apple slices and baby carrots to bodegas each week, who promoted the health benefits of eating fruits and vegetables using Department materials. 520 bodegas were recruited to participate, and owners reported that they had an increase in produce sales. As a result of the Initiative, many bodegas increased the variety and quantity of fruits and vegetables offered.[34]

Support for alternatives to traditional supermarkets can also be used as a means of ensuring healthy food access. In 2008, New York City implemented a Green Cart program, allowing permits for 1000 mobile carts to sell fresh produce in underserved areas. To aid in the recruitment of vendors, private foundation grants were used to offer low-cost microloans to finance the carts.[35]

In the Lehigh Valley, many of the municipal governments support their local farmers' markets. According to Chris Boehm, Macungie Farmers' Market Manager, the Borough of Macungie supports the Market by providing land, staff (a market manager, administrative staff to create promotional materials and administer the website and social media, and public works staff to set up the information booth, grill, generator and signs each week), and a Borough pickup truck to transport the generator, canopy, signs, and grill. (personal communication, October 7, 2013).

According to Kevin Donahoe, Managerof the Nazareth Farmers' Market, the Borough of Nazareth provides land for its farmers' market and created the Nazareth Economic Development Committee, which oversees the volunteer market manager. The Borough and vendor fees from the market contribute towards the salary of a new Main Street Manager, who has begun to assist in managing the market. (personal communication, October 4, 2013).

Shelley Goldberg, Manager of the Saucon Valley Farmers' Market, states that the Borough of Hellertown is very supportive of the market. It provides land at a Borough park, police patrol, and property maintenance through the Public Works Department. It is currently looking to renovate the park, and is making provisions for the Market. The Mayor is an integral part of the market on a volunteer basis. (personal communication, October 8, 2013).

The City of Easton amended its Code in May 2013 to update ordinances pertaining to the hosting of the Easton Farmers' Market on City property.[36] According to Market Manager Megan McBride, the City also contributes its police force and Department of Public Works, and a grant to the Greater Easton Development Partnership (GEDP), a non-profit economic development corporation that receives general funding support from the City. GEDP provides two full-time managers and one part-time bookkeeper for the market and also offers administrative support through its own bookkeeper (personal communication, October 14, 2013).

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[34] New York City, Department of Health and Mental Hygiene. *Healthy Bodegas Initiative*. CEO Internal Program Review Report. Retrieved from http://www.nyc.gov/html/ceo/downloads/pdf/BH_PRR.pdf

[35] United State Department of Agriculture, Economic Research Service. (2009). *Access to Affordable and Nutritious Food: Measuring and Understanding Food Deserts and their Consequences*. Report to Congress. Retrieved from http://www.ers.usda.gov/publications/ap-administrative-publication/ap-036.aspx#.UnFZcHAY6So

[36] City of Easton. (2013). Chapter 350: Markets, Public. *Code of the City of Easton*. Retrieved from http://ecode360.com/9642696?highlight=markets,market#9642696

Private support is also provided for farmers' markets in the Lehigh Valley. According to Daniel Paashaus, Emmaus Farmers' Market Manager, National Penn Bank hosts the Market, maintains the property, provides an annual funding grant, and hangs promotional banners on their building (personal communication, October 4, 2013). And Lehigh University provides the land, staff, and all necessary materials for the Bethlehem Farmers' Market at Campus Square.

Other alternative resources for healthy foods also receive support, both private and public. The West Ward Neighborhood Partnership community gardens are funded by a grant from the Wells Fargo Foundation. And, the City of Easton is investing in a new Easton Public Market, a year-round indoor market that will house approximately twenty-five independent food and retail businesses and provide residents with access to fresh food from the region. The project is being overseen by the GEDP, which received a grant from the City for building acquisition and initial establishment of the Public Market. (J. Mast, personal communication, October 14, 2013).

Another way to support a local food economy is to make acquiring locally grown foods more convenient. One strategy for doing this is to provide local foods at the workplace. A study in Maine, which involved giving workers the opportunity to order local produce at their place of work, concluded that purchasing locally grown produce at work motivated consumers to purchase local produce outside the workplace; workers' observations of coworker and management participation in the program increased local food purchases; and sales at worksites offered a potentially important way to increase purchases of locally grown produce. [37]

Some Lehigh Valley businesses are offering their employees the opportunity to purchase locally grown foods at the workplace. Bonnie Coyle and Rita Koller at St. Luke's University Health Network's Community Health Department organized a CSA program at the hospital in 2013, in which 81 employees registered to receive weekly deliveries of fresh produce from Eagle Point Farm Market. A number of shares were also purchased for the community: Daybreak in Allentown, a drop-in program of the Lehigh County Conference of Churches providing daily meals for the homeless, the impoverished elderly, and transients, received three half shares each week; and the Hispanic Center in South Side Bethlehem, which provides a hot lunch for their senior group, received four half shares each week. These donations increased during the summer months when CSA participants were on vacation and donated their shares. The community groups were very appreciative of the deliveries of fresh produce (personal communication, October 10, 2013).

Support for Healthy Eating

Healthier eating habits can be encouraged with policies directed towards both education and incentives. Local governments and private establishments can get involved in public campaigns to educate people about healthy eating, nutrition, and food preparation and to promote the consumption of fresh, locally grown foods for preventative health care.

Policies can also be implemented to improve food choices in schools. Increasingly, community leaders are recognizing that farm to school programs have the potential to counteract obesity and other diet-related chronic diseases among America's youth. Changing school menus and bringing locally grown fresh fruits and vegetables into cafeterias encourages children to consider the intersection between their health and their food.[38] The Baltimore Food Policy Initiative (BFPI), an inter-governmental collaboration, implemented a Healthy School Food Challenge Grant, awarding $1,000 each to eleven city schools (8,000 students) to promote fruit and vegetable consumption in the classroom.[39] In Iowa, the Woodbury County Board passed the Woodbury Health Initiative, which established middle school cooking classes using local fresh ingredients.[40]

As discussed in Chapter 3.4, local policies can be used to create programs that give low-income consumers incentives to purchase more fruits and vegetables.

Support for Reducing Food Waste

Local governments can also encourage and promote composting of both yard and food waste to avoid having these sent to landfills (See Chapter 5).

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[37] Ross, N. J., Anderson, M. D., Goldberg, J. P., & Rogers, B. L. (2000). *Increasing Purchases of Locally Grown Produce Through Worksite Sales: An Ecological Model* [Abstract]. J. Nutr. Ed., 32(6), 304-313. Retrieved from http://www.sciencedirect.com/science/article/pii/S0022318200705899

[38] *Counties and Local Food Systems: Ensuring Healthy Foods, Nurturing Healthy Children.*

[39] City of Baltimore. (2013). *Planning / Baltimore Food Policy Initiative / Schools*. Retrieved from http://www.baltimorecity.gov/Government/AgenciesDepartments/Planning/BaltimoreFoodPolicyInitiative/Schools.aspx

[40] *Counties and Local Food Systems: Ensuring Healthy Foods, Nurturing Healthy Children.*

8.6 Investment in Local Food Systems

There is a strong case for local governments to invest in the local food sector since investment yields considerable local benefits: it creates local economic opportunities, improves access to healthy and sustainable food for their residents, and helps to create a more sustainable food system.

One report states that for each dollar invested in the local food sector, approximately $0.30 to over $3.00 of benefits are generated, depending on locality, ownership structure, location, clustering of businesses, connectivity to supporting infrastructure and assets, and risk management of the investment activity.[41] This report also points out that the processing and retail/consumption segments of the food supply chain offer the best investment areas for generating the greatest local benefits in jobs, wages, and access to healthy food. It further suggests that cities are in a unique position to invest in innovative business models and approaches to local food systems challenges because they have population density and demand, allowing projects to be scaled up.

All levels of local government can invest in the local food sector. With direct public financing, they can support individual projects or provide investments to support the clustering of food activities along the supply chain. For example, Woodbury County, IA, partnered with community stakeholders and contributed $20,000 towards a project to renovate a commercial kitchen.[42] Local governments can also streamline permit processes, donate government resources, support new products and certification standards, provide incentives such as tax rebates, offer technical assistance in business skills and risk reduction techniques, and provide political support.

In 2013, The Wallace Center released a report to provide cities with a roadmap to create a local food investment strategy and choose the best investment opportunities.[43] It provides steps to establish a local vision, inventory and map both food assets and gaps, evaluate investment options and manage financial risk, and select municipal policies and initiatives that can improve the success of local food entrepreneurs and local businesses. The report also profiles the most promising supply chain categories, concluding that the greatest potential for positive impacts on local and regional economic development and job creation are with local food hubs, food business technology companies, and food business incubators.

There are numerous policies that local governments and businesses can create and implement in order to improve both fresh food access and local food economies. A Food Policy Council could be invaluable in helping to guide and prioritize these policies in the Lehigh Valley.

[41] *Ibid.*

[42] Wallace Center at Winrock International. (2013). *North American Food Sector, Part One: Program Scan and Literature Review.* Arlington, VA: Pansing, C., Fisk, J., Muldoon, M., Wasserman, A., Kiraly, S., & Benjamin, T. Retrieved from http://www.wallacecenter.org/our-work/Resource-Library/wallace-publications

[43] Wallace Center at Winrock International. (2013). *North American Food Sector, Part Two: Roadmap for City Food Sector Innovation and Investment.* Arlington, VA: Pansing, C., Wasserman, A., Fisk, J., Muldoon, M., Kiraly, S., & Benjamin, T. Retrieved from http://www.wallacecenter.org/our-work/Resource-Library/wallace-publications

Questions to Consider:

What kind of local food system do we envision?

How do we want our current food system to change? What do we want to stay the same?

How do we create the food system we want?

What is the role of our counties, cities, and other municipalities in changing the food system?

If we had a food council, what would it look like?

What does success or progress in the local food system look like?

Next Steps

This report is the first phase in creating a Fresh Food Access Plan, which is intended to improve the sustainability of the Lehigh Valley local food system and increase food access for all Lehigh Valley residents. The goal of this report is to inform stakeholders about the current state of the local food system, including both its challenges and opportunities.

The second phase of this project involves public forums to discuss and prioritize strategies for moving forward. To this end, Food Forums will be held in various venues (real and virtual) across the Lehigh Valley in late 2013 and early 2014, in order to acquire public input on these issues. The topic of food is very complicated, involving a large number of diverse stakeholders (farmers, organizations, individuals, industries, businesses, and government), often with differing motivations and perspectives. It is the goal of this project to gather input from all of these voices.

The third phase will consist of compiling the information gathered during the Food Forums, and using it to guide the creation of a Fresh Food Access Plan. This Plan will present ideas and strategies for policy, system, and individual changes that can lead to a stronger local food economy to ensure the availability of fresh, healthy, affordable, culturally appropriate food for all residents of the Lehigh Valley. The Fresh Food Access Plan will then be used to update the Lehigh Valley Planning Commission's Comprehensive Plan, "The Lehigh Valley … 2030."

Eric Schubert, Blue Blaze Farm, Danielsville
Photo Credit: BFBL-GLV

Appendix A: Community Gardens in the Lehigh Valley

ALLENTOWN

Casa Guadalupe
143 W Linden St, Allentown, PA 18101
Founded 2000. Raised beds on side of building. Produce for personal use, but participants donate produce to senior lunch program. Water on site.
Open to Senior Citizens who come to the Center and attend a daily program.
Plot Size: 8 beds
Contact: Cathy 610-435-9902.

Cedar Brook Community Gardens
Cedar Brook Rd and Dorney Park Rd, Allentown, PA 18104
Founded 1989. Water trough available on site. Hosted by Bureau of Farmland Preservation. Close to Cedar Creek by Cedar Brook Nursing Home. Yearly application/renewal process for plots. $25/yr rental fee. Some food donated to charitable organizations.
Open to Lehigh County Residents.
Plot Size: 110 plots, 20'x30'
Contact: Dora Gensemer, Garden Plot Program Administrator 610-391-9583 ext.17.

Chestnut Street Community Garden
137-139 Chestnut St, Allentown, PA 18101
Founded 2009. 7 plots for residents; 1 for middle school students. $5 application fee. Gardeners must sign agreement and are expected to maintain their plots. Restrictions on use of fertilizers, herbicides, and pesticides. Water, water fountain, pavillion, and shed on site. Hosted by City of Allentown's Planning and Zoning Department. Food for personal consumption. Plots available.
Open to Allentown's First Ward Residents & Harrison-Morton Middle School Students.
Plot Size: 8 plots, 10'
Contact: Phylis Alexander 610-437-7679.

Franklin Park Playground
Turner & N Franklin St, Allentown, PA 18102
Founded 2010. 800 sq ft community garden space. City park garden in wooden planters surrounding playground. Run by St. Stephen's Church pastoral team and City of Allentown Community Garden Task Force. Harvest for community and food pantry. No individual plots leased. . Pavillion, drinking fountain, and playground on site.
Open to Community and Food Pantry.
Plot Size: 6 planters, approx. 80sq ft each will build 4 more
Contact: Rev. Maritza Dolich, St. Stephen's Lutheran Church 610-439-8821

Garden of New Beginnings
N 7th St and Turner St, Allentown, PA 18102
Founded 2005. Several fenced-in small raised beds for use by residents in transitional housing. Hosted by 6th Street Shelter - Community Action of the Lehigh Valley. Volunteers, residents, and program staff decide what to plant. Residents maintain garden. Food for supplementing meals for residents.
Open to Residents of Turner St Apts and local kids club participants.
Plot Size: several
Contact: Sixth St Shelter 610-435-1490

Muhlenburg College Community Garden
behind 2208 and 2214 Chew St, Allentown, PA 18104
Founded 2010. Garden was started by Sociology of Food Class. Situated behind Garden House and Sustainability House whose residents help run it. Compost for pre-consumer waste. http://www.facebook.com/groups/110658598946241
Open to Muhlenburg College Community.
Contact: muhlenberggarden@gmail.com.

BETHLEHEM

Diefenderfer Garden - Northampton County Parks
Jacksonville & Hanoverville Rd, Bethlehem, PA 18017
Plots open from mid-April through October. Annual applications due by December. No fee. Water on site. Metal stakes and pesticides prohibited. Participants must maintain garden and adhere to rules of good stewardship.
Open to residents and non-residents. Plot Size: 24 plots
Contact: Bob McTague, Northampton County Parks Department 610-746-1975.

Friendship Park Community Garden
Between Garrison, North, Linden, & High Streets, Bethlehem, PA 18018
Lots along northern wall of park.

Hispanic Center Garden
Morton & Filmore Streets, Bethlehem, PA 18015
Founded 2012. Lehigh students started garden for Basilio Huertas Senior Center program. Food is used for seniors' lunches.
Open to Members of the Hispanic Center.
Plot Size: 1 large garden with a few raised beds.
Contact: Damaris or Lorna 610-868-7800.

Historic Bethlehem Partnership: Burnside Plantation Gardens
1461 Schoenersville Rd, Bethlehem, PA 18018
Founded 1990. Historical period garden with plots available to public volunteers. Yearly meeting in early March for interested participants. Volunteers can bring home produce and flowers.
Open to Public. Plot Size: 46 plots, varying sizes
Contact: Charlene Donchez Mowers 610-868-5044.

Kirkland Village Garden
1 Kirkland Circle, Bethlehem, PA 18018
Founded 2001. Residents grow produce and flowers for themselves and to donate to other residents. Garden run by committee of 23 residents. Water on site. Fenced in.
Open to Kirkland Village Residents. Plot Size: 16 plots
Contact: Fred Henderson

Lehigh University Community Garden
Lehigh Goodman Campus, Off Goodman Dr. near Creek Rd, across from transportation services,
Bethlehem, PA
Founded 2008. Organic practices used, but next to conventional corn field. Includes composting project. Individual gardeners maintain their own plots. Room for expansion.
Open to Lehigh University students, faculty and staff.
Plot Size: 1 acre, 45plus plots, approx. 6'x10' each
Contact: South Side Initiative ssi@lehigh.edu.

Martin Luther King Park Community Garden
400 block of Carlton Ave, Bethlehem, PA 18015
Founded 2007. $25 application fee. Organic: no pesticides or weed repellants allowed. 55 gallon tank on site to collect rain water. Gardeners must maintain gardens and participate in fall clean-up. No pets allowed. 2 covered compost bins and 2 uncovered compost bins on site. Several beds used to grow food for New Bethany Ministries.
Open to Paying members.
Plot Size: 16 raised bed plots, 4'x8' each
Contact: Dale Kochard 610-758-5801.

The Maze Garden
E 3rd St & S New St, Bethlehem, PA 18015
Founded 1995. Designed as community gathering space by Lehigh University students and children of Banana Factory summer art program. Flowing design with central pond and various beds. Weekly harvest donated to New Bethany Ministries. Plans to connect garden with the Greenway. Water, electricity, and fountain pond with fish on site.
Open to Use by university and community.
Plot Size: no individualized plots
Contact: Sharon Shaw, Sun*LV.

Ullman Park Community Garden
Near Wyandotte & Sassafras Sts, Bethlehem, PA 18015
Founded 2008. $25 application fee. Organic: no pesticides or weed repellants allowed. 275 gallon tank on site that City fills. Gardeners must maintain gardens and participate in fall clean-up. No pets allowed. 2 covered compost bins on site. A few beds used to grow food for New Bethany Ministries
Open to Neighborhood residents.
Plot Size: 8 beds, approx 4'x8'

Wesley Church Community Garden
2540 Center St, Bethlehem, PA 18017
Several raised beds available. Donates minimum of half of harvest to local food pantries like New Bethany Ministries. In 2012, donated 566 lb. Open to Community.
Contact: 610-865-5715, www.wesleygarden.org.

West Side Park
Spring St & 11th Ave, Bethlehem, PA 18018
$15 annual donation. Water and compost bin on site. Organic practices preferred. Good stewardship expected.
Open to Preference to neighborhood residents (2nd to 16th and Broad to Lehigh).
Plot Size: 18 raised beds, 8'x12' each

EASTON

1075 Lehigh Drive
1075 Lehigh Drive, Easton PA 18042
Founded 2012. Raised beds. Part of West Ward Neighborhood Partnership Community Gardens.
Open to Easton Residents. Plot Size: 10 raised beds
Contact: Sophia Feller, West Ward Neighborhood Partnership 610-515-0891 ext. 4200.

203 N. 7th Street
203 N. 7th St, Easton PA 18042
Planted with vegetables to share with neighborhood children. Plot Size: 3 raised beds
Contact: Sophia Feller, West Ward Neighborhood Partnership 610-515-0891 ext. 4200.

823 Walnut Street
823 Walnut St, Easton, PA 18042
One large vegetable garden. Part of West Ward Neighborhood Partnership Community Gardens.
Plot Size: 1 large bed
Contact: Sophia Feller, West Ward Neighborhood Partnership 610-515-0891 ext. 4200.

Bushkill House Garden
7th and Spring Garden St, Easton, PA 18042
Founded 2011. Raised beds tended by Bushkill House Tenants Association.
Open to Bushkill House residents.
Contact: Sophia Feller, West Ward Neighborhood Partnership 610-515-0891 ext. 4200.

City of Easton Recreation Bureau
Lower Hacket Park, Wood Ave, Easton, PA 18042
Water available. Tool shed. $10 per plot yearly fee; $5 for returning members. Help from West Ward Neighborhood Partnership and Penn State Master Gardener. Deer problems.
Open to Easton Residents.
Plot Size: 30-40 plots, 5'x10' each
Contact: Eric Daly 610-250-6711.

Easton Area Community Center (Formerly Saint Anthony's Youth Center)
901 Washington St, Easton, PA 18042
Several raised planting beds behind Center.
Open to Youth in the Center's summer camp program.
Plot Size: several
Contact: 610-253-8271.

Easton Area Neighborhood Center / Easton Urban Farm
902 Philadelphia Rd, Easton, PA 18042
Residents must apply for plot. $10/yr fee for new members; $5/yr for returning members. Members choose plots. Water on site. No pesticides allowed. Managed in association with West Ward Neighborhood Project. Food given to clients of Easton Area Neighborhood Center's food bank and senior citizen housing centers. A few hundred pounds of produce harvested in 2012, over 300lb of butternut squash alone. Open to Easton Residents.
Plot Size: 15 plots (5'x10'each) at farm, several at lower hacket
Contact: Sophia Feller, West Ward Neighborhood Partnership 610-515-0891 ext. 4200.

Ferry Street Apartments Garden
6th and Ferry St, Easton, PA 18042
Founded 2011. Garden designed by an Eagle Scout. Tended by the apartment families.
Open to Ferry Street Apartment residents.
Plot Size: 2 raised beds
Contact: Sophia Feller, West Ward Neighborhood Partnership 610-515-0891 ext. 4200.

Hope VI Garden - Delaware Terrace
508 Charles St, Easton, PA 18042
New community garden planned as part of HOPE VI renewal, Neston Heights new housing.
Contact: hace@eastonhousing.org

Lafayette College Community Garden
3412 Sullivan Trail, Easton, PA 18040
A combination of a community garden for members of the Lafayette community and a student farm for Lafayette students to grow vegetables in a sustainable way which will hopefully be served in dining halls.
Open to Lafayette College Faculty & Staff.
Contact: 610-330-5754.

Lynn Street Garden
1426 Lynn St, Easton, PA 18042
Founded 2008. Garden is result of partnership between Teen Center, West Ward Neighborhood Partnership, and Lehigh/Northampton Master Gardener Program. Tool shed, tools, and water tank on site. Now run by West Ward Neighborhood Partnership.
Open to teens attending the Teen Program.
Contact: Sophia Feller, West Ward Neighborhood Partnership 610-515-0891 ext. 4200.

Walter House Garden
Washington St and Michael J Koury Pl, Easton, PA 18042
Founded 2010. Garden run by tenants (senior citizens).
Open to Walter House residents.
Contact: Sophia Feller, West Ward Neighborhood Partnership 610-515-0891 ext. 4200.

West Ward Neighborhood Partnership Community Gardens
S 5th and Ferry St, Easton, PA 18042
Founded 2009. Hosted by Community Action of the Lehigh Valley: urban ecology, neighborhood garden, communally raised vegetables.
Open to Easton Residents. Plot Size: no plots
Contact: Sophia Feller, West Ward Neighborhood Partnership 610-515-0891 ext. 4200.

West Ward Neighborhood Partnership Community Gardens
S 10th and Pine St, Easton, PA 18042
Founded 2009. Hosted by Community Action of the Lehigh Valley: urban ecology, neighborhood garden, communally raised vegetables.
Open to Easton Residents. Plot Size: no plots
Contact: Sophia Feller, West Ward Neighborhood Partnership 610-515-0891 ext. 4200.

OTHER LOCATIONS

Emmaus Community Garden
250 Adrian St, Emmaus, PA 18049
Founded 2000. $15 resident fee; $20 non-resident fee. No formal application process. Fenced in. 3 receptacles for water. Access to Borough's compost. Extra produce donated to Allentown Food Bank.
Open to Both residents and non-residents of Borogh of Emmaus.
Plot Size: 56 plots, 15'x30' each
Contact: Richard Keim 610-965-5707.

Louise W Moore County Park - Northampton County Parks
Country Club Rd, Lower Nazareth & Bethlehem Township
Plots open from mid-April through October. Annual applications due by December. No fee. Water on site. Metal stakes and pesticides prohibited. Participants must maintain garden and adhere to rules of good stewardship.
Open to Both residents and non-residents.
Plot Size: 56 plots
Contact: Bob McTague, Northampton County Parks Department 610-746-1975.

Lower Macungie Township Community Garden
Camp Olympic on Cedar Crest Blvd & Bogie Ave, Macungie, PA 18062
$10/yr fee. Contact Lower Macungie Township office for application process. Water on site. Plots tilled and fertilized. Gardeners expected to maintain plots, No restrictions on fertilizer or pesticide use.
Open to Lower Macungie Residents.
Plot Size: 71 plots at Bogie, 38 plots at Camp Olympic
Contact: Community Center 610-966-4343.

Jordan Creek Parkway Community Garden
Lehnert Rd, Whitehall, PA
Founded 1989. $25/yr rental fee. Yearly application/renewal process for plots. Water wagons available on site. Hosted by Bureau of Farmland Preservation. Some donated to charitable organizations.
Open to Lehigh County Residents.
Plot Size: 93 plots, 20'x30' each
Contact: Dora Gensemer, Garden Plot Programer Administrator, 610-391-9583 ext.17.

Sunrise Community Garden at Flint Hill Farm
1922 Flinthill Rd, Coopersburg, PA 18036
Founded 2009. Garden located on private preserved farm that serves as agro-educational facility. $25/yr fee. Gardeners must sign agreement outlining terms/conditions and responsibilities. Cooperative Extension Master Gardeners provide spring gardening classes as needed. Tool shed, cold frame, hoop house, and water on site. Composted manure ploughed into field each year.
Open to Area residents.
Plot Size: 5 plots, 10'x20' each
Contact: 610-838-2928

Appendix B: Price Comparisons of Food at Lehigh Valley Farmers' Markets vs. Grocery Stores

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Abstract

A popular perception of farmers' markets is that their food is more expensive than food in grocery stores. This study looks to test the truth of that perception through the analysis of price data collected from Lehigh Valley, Pennsylvania farmers' markets and grocery stores in the fall of 2012. When the price of a shopping bag of farmers' market food grown/raised using organic methods is compared to the price of a shopping bag of grocery store certified organic food, no statistically significant difference is found. There is also no statistically significant price difference between a bag of farmers' market conventional and grocery store conventional food. Nor is there a statistically significant difference between the farmers' market and grocery store bags of combination (organic methods/ certified organic & conventional) food.

Introduction

Farmers' markets contribute to fresh (whole and unprocessed) food access by increasing the fresh food available in the areas they serve. We have seen extraordinary growth in the numbers of farmers' markets in the Lehigh Valley over the last ten years. According to information gathered by Buy Fresh Buy Local of the Greater Lehigh Valley (BFBL-GLV), the number of producer-only farmers' markets in the Lehigh Valley is currently 13; up from 0 in 2002. Two of these farmers' markets opened in 2003, one in 2006, four in 2007, two in 2008, one in 2009, and two in 2011. Another market introduced producer-only restrictions in 2005. This is an average increase of 1.3 producer-only farmers' markets per year in the Lehigh Valley. [Producer-only farmers' markets consist only of vendors that grow, raise, or produce the products that they sell. Some of these markets allow vendors to sell products from other identified local farms under certain conditions.]

A few of these markets have taken fresh food access a step further by accepting EBT (electronic benefits transfer) from their lower income patrons. This allows these patrons to use their SNAP (Supplemental Nutrition Assistance Program) benefits to buy food at the farmers' markets. Four Lehigh Valley farmers' markets currently accept EBT: Easton Farmers' Market began accepting EBT in 2010, while Boyertown, SteelStacks, and the Penn St. Farmers' Markets all began accepting EBT in 2011. There are also individual vendors that accept EBT at some of the other markets. It has been noticed, however, that many patrons are surprised to find that they can use their SNAP benefits at the farmers' market.[1] There are on-going efforts to promote the EBT/SNAP program: advertising on farmers' market and BFBL-GLV websites, flyers and promotional efforts within low-income neighborhoods, signs and banners at the farmers' markets themselves, and buttons worn on the shirts of farmers' market vendors. Promotional efforts at Lehigh Valley farmers' markets have been commendable, and knowledge of the program is spreading.

Perceptions may also play a role in fresh food access, such as consumer perceptions about pricing at farmers' markets. One such perception is that it is more expensive to shop at farmers' markets than at grocery stores. As Politics of the Plate blogger and author Barry Estabrook points out, "Most people think farmers' markets are more expensive than supermarkets - but studies don't always support that conclusion. In fact, they're often cheaper."[2] Producers at several of the Lehigh Valley's farmers' markets, spoke about customers who complained that their prices were too high. They were very familiar with the perception that farmers' market prices are higher than grocery store prices. The purpose of this study was to determine the truth of this perception.

Based on studies performed in other areas of the United States, Vermont[3], in particular, it was hypothesized that, in the Lehigh Valley, Pennsylvania, conventionally grown food sold at farmers' markets would be competitive in price to conventionally grown food sold at grocery stores, while food grown using organic methods and sold at farmers' markets would be lower in price than certified organic food sold in grocery stores.

[1] BFBL-GLV. 2012.
[2] Estabrook. 2011.
[3] Claro. 2011.

Materials and Methods

Materials: clipboard, digital food scale, calculator

Methods: Price data was collected for a period of just over three weeks: September 27th through October 14th, 2012. Within this time, each of four Lehigh Valley Farmers' Markets was visited three times. The farmers' markets included in this study were chosen because of timing and location convenience, as the data was collected by only one person. On Thursdays, two markets in Bethlehem were visited: the Bethlehem Farmers' Market at Campus Square and the SteelStacks Farmers' Market. On Sundays, two markets in relatively close proximity to each other were visited: the Saucon Valley Farmers' Market and the Emmaus Farmers' Market. Price data was also collected twice from two grocery stores (Wegmans and Giant) for this study. Giant was chosen to represent more economically priced groceries. Wegmans was chosen to represent a grocery store with premium goods and prices. [Other (possibly lower-priced) grocery stores were not chosen because of the lack of freshness of their produce. The freshness of produce at grocery stores needed to be somewhat comparable to that at farmers' markets.] Price comparisons were limited to nine seasonal items: kale, butternut squash, spaghetti squash, red potatoes, yellow potatoes (several varieties), apples (several varieties), Bosc pears, eggs, and ground beef. At all locations, price per pound data was collected (except for eggs, for which price per dozen data was collected). If the product was priced per item, a food scale and calculator were used to determine a price per pound. When weighing products, what appeared to be the largest and smallest of each was weighed and then that weight was averaged in an attempt to get as accurate a price per pound as possible. When recording data, not only prices of products were noted but also the methods used to grow or raise the product, such as conventional, certified organic, organic methods, pastured, and cage free. Then, using charts and graphs, the price ranges of each type of product at the Farmers' Markets were compared to those at the grocery stores, as well as price ranges across growing methods. The names of the farmers' market producers have not been included in this study; they are instead referred to by letter in the tables. Also, although data was collected for three weeks, each producer's price for a product was only listed once in the tables, unless the price changed.

The results were first analyzed by product type; however, due to limited price points for certain products (both organic and conventional), data was also analyzed as "shopping bags": multiple products, comparing shopping bags of farmers' market products to shopping bags of grocery store products. For the price of each product in a shopping bag, the average of all price points collected for that product was used. For example, for kale in the farmers' market organic methods shopping bag, the average price of all farmers' market kale grown using organic methods was used. A product was only included in a shopping bag when there was a corresponding product to include in the opposite shopping bag. For example: kale grown using organic methods in the farmers' market shopping bag corresponded to certified organic kale in the grocery store shopping bag. The difference in prices of these shopping bags was analyzed using t tests to check for statistical significance. Price differences of individual products were not tested for statistical significance because data was limited.

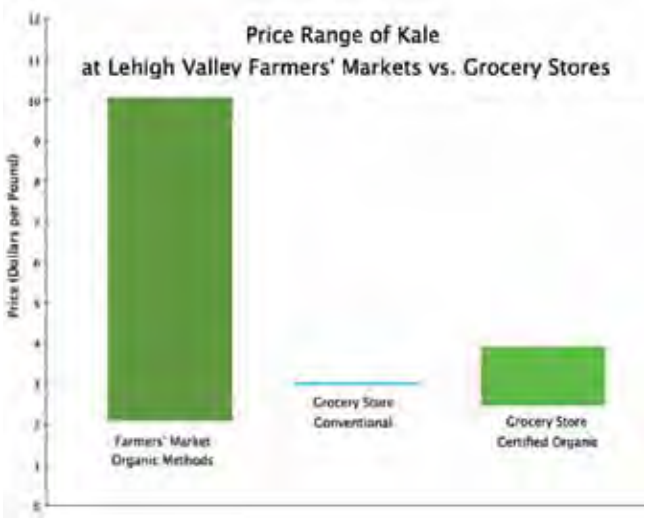
Results

Results for individual products are listed first and followed by shopping bag results. It is interesting to note that the broad price ranges displayed by some of the products at the farmers' markets are due to the amount of product included in each priced unit. For example, kale at farmers' markets was priced per bunch or bag and ranged from $2.50 to $4.00. When converted to price per pound, the price of kale spanned from $2.11 to $10.04, a much greater range, due to the varying amounts of kale the farmers placed in each bunch or bag.

Locally Grown Strawberries
Photo Credit: Gabby Salazar

Kale

Kale prices were collected from seven producers at the four Lehigh Valley Farmers' Markets listed above, as well as from the two grocery stores listed. There was no conventional kale available for pricing at the farmers' markets; all of the farmers' market producers used organic methods. Kale varieties included in price collection were Winterbore, Dinosaur, Curly, Red Russian, White Russian, and Tuscan. Farmers' market kale produced using organic methods had a wide price range: $2.11/lb to $10.04/lb. Grocery store conventional kale had a small price range: $2.99/lb to $3.02/lb. Grocery store certified organic kale had a price range of $2.49/lb to $3.89/lb. This data shows that although some kale at the farmers' markets was more expensive than at the grocery stores, it was also possible to find less expensive kale at farmers' markets. It is also interesting to note that some of the farmers' market kale, which was grown using organic methods, was also less expensive than the conventional kale at the grocery stores.



KALE				
Location	Producer/ Grocery Store	Method	Price/lb	Price/each
Farmers' Markets	A	organic methods	$5.26/lb	$3/gal bag
	B	organic methods	$10.04/lb	$4/bag
	C	organic methods	$2.11/lb	$2.50/bunch
	D	organic methods	$8/lb	$3/bunch
	E	organic methods	$7.11/lb	$4/bag
	F	organic methods	$4/lb	$3/bunch
	A	organic methods	$3.84/lb	$3/gal bag
	H	organic methods	$6.40/lb	$3/bunch
Grocery Stores	W	conventional	$3.02/lb	$1.99/bunch
	G	conventional	$2.99/lb	
	G	certified organic	$2.49/lb	
	W	certified organic	$3.89/lb	$2.49/bunch

Butternut Squash

Butternut squash prices were collected from seven producers at the four Lehigh Valley Farmers' Markets listed above, as well as from the two grocery stores listed. Two of the farmers' market producers grew their butternut squash conventionally, while the other five used organic methods. Farmers' market conventional butternut squash prices ranged from $0.40/lb to $0.88/lb, while farmers' market organic methods prices ranged from $0.55/lb to $2.00/lb. Only one grocery store price ($1.29/lb) was collected for conventional butternut squash, as Wegmans did not have any conventional Butternut Squash for sale during the study period, and the price at Giant did not change over the three-week period. Only Wegmans had organic butternut squash available, and it was priced at $1.69/lb. This data shows that although some butternut squash (organic methods) at the farmers' markets was more expensive than at the grocery stores, it was possible to find butternut squash (organic methods) at farmers' markets that was less expensive than both certified organic and conventional butternut squash at grocery stores. It was always less expensive to buy conventional butternut squash at the farmers' market than both conventional and certified organic grocery store butternut squash.

BUTTERNUT SQUASH				
Location	Producer/ Grocery Store	Method	Price/lb	Price/each
Farmers' Markets	K	conventional	$0.40/lb	$1/each
	J	conventional	$0.88/lb	$2/each
	B	organic methods	$2/lb	
	D	organic methods	$1/lb	
	C	organic methods	$1.60/lb	$2/each
	I	organic methods	$0.55/lb	$1.50/each
	A	organic methods	$0.86/lb	priced according to size ($2-$4)
Grocery Stores	G	conventional	$1.29/lb	
	W	certified organic	$1.69/lb	

Spaghetti Squash

Spaghetti squash prices were collected from five producers at the four Lehigh Valley Farmers' Markets listed above, as well as from the two grocery stores listed. One of the farmers' market producers grew their spaghetti squash conventionally, while the other four used organic methods. The price for farmers' market conventional spaghetti squash was $1.07/lb, while farmers' market organic methods prices ranged from $0.70/lb to $2.01/lb. Grocery store conventional spaghetti squash prices ranged from $0.99/lb to $1.29/lb. Only Wegmans had organic spaghetti squash available and it was priced at $1.69/lb.

This data shows that although some organic methods spaghetti squash at the farmers' markets was more expensive than at the grocery stores, it was possible to find less expensive organic methods spaghetti squash at farmers' markets than both certified organic and conventional spaghetti squash at grocery stores. Conventional spaghetti squash prices at the farmers' market were in range and thus competitive with conventional grocery store spaghetti squash prices.

SPAGHETTI SQUASH				
Location	Producer/ Grocery Store	Method	Price/lb	Price/each
Farmers' Markets	J	conventional	$1.07/lb	$2/each
	A	organic methods	$0.86/lb	priced according to size ($2-$4)
	B	organic methods	$2.01/lb	priced according to size ($5-$6.50)
	F	organic methods	$1.50/lb	
	I	organic methods	$0.70/lb	$1.50/each
	F	organic methods	$0.96/lb	$2/each small $3/each large
Grocery Stores	G	conventional	$1.29/lb	
	W	conventional	$0.99/lb	
	W	certified organic	$1.69/lb	

Red Potatoes

Red potato prices were collected from six producers at the four Lehigh Valley Farmers' Markets listed above, as well as from the two grocery stores listed. One of the farmers' market producers grew their red potatoes conventionally, while the other five used organic methods. The price for farmers' market conventional red potatoes was $0.60/lb, while farmers' market organic methods prices ranged from $0.98/lb to $2.19/lb. Grocery store conventional red potato prices ranged from $0.60/lb to $1.00/lb. Only Wegmans had organic red potatoes available, and they were priced at $1.66/lb. This data shows that although some organic methods red potatoes at the farmers' markets were more expensive than at the grocery stores, it was possible to find organic methods red potatoes at farmers' markets that were less expensive than both certified organic and conventional red potatoes at grocery stores. Conventional red potato prices at the farmers' market were less than conventional grocery store red potato prices.

RED POTATOES				
Location	Producer/ Grocery Store	Method	Price/lb	Price/each
Farmers' Markets	L	conventional	$0.60/lb	$3.00/5lb bag
	A	organic methods	$2/lb	$4/quart
	B	organic methods	$2.19/lb	$4.75/quart
	I	organic methods	$1.35/lb	$3/quart
	E	organic methods	$0.98/lb	$2.50/quart or $2.50/pint
	E	organic methods	$2.11/lb	$2.50/quart or $2.50/pint
	A	organic methods	$1.86/lb	$4/quart
	C	organic methods	$1.39/lb	$3/quart
Grocery Stores	W	conventional	$0.80/lb	$3.99/5lb bag
	G	conventional	$1/lb	$4.99/5lb bag
	G	conventional	$1/lb	$4.99/5lb bag
	W	certified organic	$1.66/lb	$4.99/3lb bag

Yellow Potato Varieties

Yellow potato prices were collected from five producers at the four Lehigh Valley Farmers' Markets listed above, as well as from the two grocery stores listed. One of the farmers' market producers was selling three varieties of yellow potatoes conventionally, while the other 4 producers each were selling one variety of yellow potato and had used organic methods to grow them. Yellow potato varieties included in price collection at both the farmers' markets and grocery stores were Lehigh, Baking, Yukon Gold, Russet, and Golden potatoes. The price for farmers' market conventional yellow potato varieties was $0.50/lb, while farmers' market organic methods prices ranged from $1.45/lb to $3.14/lb. Grocery store conventional yellow potato variety prices ranged from $0.70/lb to $1.19/lb. Grocery store certified organic yellow potato variety prices ranged from $1.20/lb to $1.66/lb.

This data shows that although some organic methods yellow potato varieties at the farmers' markets were more expensive than certified organic yellow potato varieties at the grocery stores, it was possible to find organic methods yellow potato varieties at farmers' markets that were less expensive than both certified organic and conventional yellow potato varieties at grocery stores. Conventional yellow potato variety prices at the farmers' market were less than conventional grocery store yellow potato variety prices.

YELLOW POTATO VARIETIES				
Location	Producer/ Grocery Store	Method	Price/lb	Price/each
Farmers' Markets	L	conventional	$0.50/lb	$2.50/5lb bag
	L	conventional	$0.50/lb	$2.50/5lb bag
	L	conventional	$0.50/lb	$2.50/5lb bag
	A	organic methods	$1.73/lb	$4/quart
	B	organic methods	$3.14/lb	$6.50/quart
	I	organic methods	$1.45/lb	$3/quart
	C	organic methods	$1.45/lb	$3/quart
Grocery Stores	W	conventional	$0.70/lb	$3.49/5lb bag
	W	conventional	$1.19/lb	
	G	conventional	$1/lb	$4.99/5lb bag
	G	conventional	$0.80/lb	$3.99/5lb bag
	W	certified organic	$1.66/lb	$4.99/3lb bag
	G	certified organic	$1.20/lb	$5.99/5lb bag
	G	certified organic	$1.20/lb	$5.99/5lb bag
	W	certified organic	$1.50/lb	$4.49/3lb bag

Bosc Pears

Bosc pear prices were collected from two producers at the four Lehigh Valley Farmers' Markets listed above, as well as from the two grocery stores listed. Both farmers' market producers grew their Bosc pears conventionally. The prices for farmers' market conventional Bosc pears ranged from $1.37/lb to $1.82/lb. Grocery store conventional Bosc pear prices ranged from $1.69/lb to $1.79/lb. Neither grocery store had certified organic Bosc pears for sale.This data shows that although price ranges of conventional Bosc pears at farmers' markets and grocery stores overlap, it was possible to find both less and more expensive Bosc pears at farmers' markets than at grocery stores.

It is also interesting to note that all farmers' market pears would have been less expensive than the grocery store pears, had one of the producers not priced their pears incorrectly: Producer J was selling Bosc pears for $0.75 each or six pears for $5.00, which converted to approximately $0.83 per pear. This was the high price point ($1.82/lb) in the farmers' market Bosc pear data. A few weeks later, Producer J realized their mistake and changed their bulk price to seven pears for $5.00 (approximately $0.71/pear or $1.56/lb). After Producer J changed their prices, the high price point for farmers' market Bosc pears was $0.75/pear ($1.64/lb).

BOSC PEARS				
Location	Producer/ Grocery Store	Method	Price/lb	Price/each
Farmers' Markets	J	conventional	$1.64/lb	$0.75 each
	J	conventional	$1.82/lb	6 for $5
	I	conventional	$1.37/lb	$3/quart
	J	conventional	$1.56/lb	$0.75 each or 7 for $5
Grocery Stores	W	conventional	$1.79/lb	
	G	conventional	$1.69/lb	
	W	conventional	$1.69/lb	

Apples

Apple prices were collected from four producers at the four Lehigh Valley Farmers' Markets listed above, as well as from the two grocery stores listed. All of the farmers' market producers grew their apples conventionally. Apple varieties included in price collection were Cortland, Yellow Delicious, Golden Delicious, Red Delicious, Liberty, Royalty, Snow Sweet, Sugar Snap, Florina, Mutsu, Gala, McIntosh, Ida Red, Fuji, Granny Smith, and Ginger Gold. The prices for farmers' market conventional apples ranged from $0.51/lb to $1.93/lb. Grocery store conventional apple prices ranged from $1.00/lb to $2.49/lb.

Grocery store certified organic apple prices ranged from $1.56/lb to $2.99/lb. Both grocery stores also had regional/conventional apples available, which ranged in price from $0.99/lb to $1.99/lb. This data shows that although price ranges of apples at farmers' markets and grocery stores overlap, it was possible to find conventional apples at farmers' markets that were less expensive than certified organic, conventional and regional/conventional apples at grocery stores. Farmers' market conventional apples had the lowest price range, followed by grocery store regional/conventional, grocery store conventional, and then grocery store certified organic apples.

APPLES

Location	Producer/ Grocery Store	Method	Price/lb	Price/each
Farmers' Markets	J	conventional	$0.98/lb	$0.75 each
	J	conventional	$0.92/lb	$0.75 each
	L	conventional	$1.14/lb	$3.50/quart
	L	conventional	$1.19/lb	$3.50/quart
	L	conventional	$1.30/lb	$3.50/quart
	N	conventional	$2/lb	
	P	conventional	$1.25/lb	$4/quart
	P	conventional	$1.26/lb	$7/half peck
	P	conventional	$1.08/lb	$12/peck
	J	conventional	$0.51/lb	$0.75 each
	J	conventional	$1.64/lb	$5/fourth peck
	J	conventional	$1.93/lb	$9/half peck
	J	conventional	$0.51/lb	$0.75 each
	J	conventional	$1.64/lb	$5/fourth peck
	J	conventional	$1.93/lb	$9/half peck
	J	conventional	$0.51/lb	$0.75 each
	J	conventional	$1.64/lb	$5/fourth peck
	J	conventional	$1.93/lb	$9/half peck
	J	conventional	$0.51/lb	$0.75 each
	J	conventional	$1.64/lb	$5/fourth peck
	J	conventional	$1.93/lb	$9/half peck
Grocery Stores	W	conventional	$1.99/lb	
	G	conventional	$1.89/lb	
	G	conventional	$1.99/lb	
	G	conventional	$1.99/lb	
	G	conventional	$1.99/lb	
	G	conventional	$2.49/lb	

Location	Producer/ Grocery Store	Method	Price/lb	Price/each
Grocery Stores	G	conventional	$1.99/lb	
	W	conventional	$1.99/lb	
	W	conventional	$1.00/lb	$7.99/8lb bag
	W	conventional	$1.19/lb	
	W	conventional	$1.99/lb	
	W	conventional	$1.00/lb	$7.99/8lb bag
	W	conventional	$1.99/lb	
	W	conventional	$1.99/lb	
	W	conventional	$1.99/lb	
	W	certified organic	$2.49/lb	
	W	certified organic	$1.56/lb	$4.69/3lb bag
	G	certified organic	$1.83/lb	
	G	certified organic	$2.99/lb	
	G	certified organic	$2.99/lb	
	G	certified organic	$2.99/lb	
	G	certified organic	$2.99/lb	
	W	certified organic	$2.49/lb	
	W	certified organic	$2.49/lb	
	W	certified organic	$1.66/lb	$4.99/3lb bag
	W	certified organic	$1.66/lb	$4.99/3lb bag
	G	certified organic	$2.49/lb	
	G	certified organic	$2.49/lb	
	G	certified organic	$2.49/lb	
	G	certified organic	$2.49/lb	
	J	conventional	$1.99/lb	
	Q	conventional	$1.49/lb	
	Q	conventional	$0.99/lb	

Honeycrisp Apples

Honeycrisp apple prices were collected from one producer at the four Lehigh Valley Farmers' Markets listed above, and from one additional producer that sells at the Easton Farmers' Market in order to increase the amount of Honeycrisp apple price data. Price data was also collected from the two grocery stores listed. Both farmers' market producers grew their Honeycrisp apples conventionally. The prices for farmers' market conventional Honeycrisp apples ranged from $1.55/lb to $2.19/lb. Grocery store conventional Honeycrisp apple prices ranged from $2.00/lb to $2.99/lb. Only Wegmans carried certified organic Honeycrisp apples and they were priced at $3.49/lb. This data shows that although price ranges of Honeycrisp apples at farmers' markets and grocery stores overlap, it was possible to find conventional Honeycrisp apples at farmers' markets that were less expensive than both certified organic and conventional Honeycrisp apples at grocery stores. Farmers' market conventional Honeycrisp apples had the lowest price range, followed by grocery store conventional, then grocery store certified organic Honeycrisp apples.

HONEYCRISP APPLES				
Location	Producer/ Grocery Store	Method	Price/lb	Price/each
Farmers' Markets	J	conventional	$2.13/lb	$1 each
	M	conventional	$2.19/lb half peck	$8.50/half peck
	M	conventional	$1.55/lb peck	$12/peck
Grocery Stores	G	conventional	$2.99/lb	
	W	conventional	$2.99/lb	
	W	conventional	$2.00/lb	$5.99/3lb bag
	W	certified organic	$3.49/lb	

Eggs

Egg prices were collected from six producers at the four Lehigh Valley Farmers' Markets listed above, and from the two grocery stores listed. All farmers' market producers' eggs came from pastured chickens; the prices ranged from $3.50/dozen to $5.00/dozen. Grocery store conventional egg prices ranged from $1.99/dozen to $2.39/dozen. Grocery store cage free egg prices ranged from $2.99/dozen to $4.49/dozen. Grocery store certified organic egg prices ranged from $3.49/dozen to $4.99/dozen. This data shows that the price range of grocery store conventional eggs was the lowest. The price range of farmers' market pastured eggs overlaps with both grocery store cage free and certified organic egg price ranges. The price ranges of farmers' market pastured and grocery store certified organic eggs are the most similar to each other.

EGGS				
Location	Producer/ Grocery Store	Method	Price/lb	Price/each
Farmers' Markets	B	pastured		$4/dozen
	R	pastured		$4/dozen
	S	pastured		$3.50/dozen
	T	pastured		$4.50/dozen
	U	pastured		$4.50/dozen
	V	pastured		$3.75/dozen
	U	pastured		$5/dozen
Grocery Stores	W	conventional		$1.99/dozen
	G	conventional		$2.39/dozen
	W	cage free		$4.49/dozen
	G	cage free		$2.99/dozen
	W	certified organic		$3.99/dozen
	G	certified organic		$3.49/dozen
	W	certified organic		$4.99/dozen

Ground Beef

Ground beef prices were collected from three producers at the four Lehigh Valley Farmers' Markets listed above, and from one additional producer that sells at the Easton Farmers' Market in order to increase the amount of ground beef price data. Prices were also collected from the two grocery stores listed. All farmers' market producers' ground beef was from pastured cows. The prices for farmers' market pastured ground beef ranged from $6.50/lb to $8.00/lb. Grocery store conventional ground beef prices ranged from $3.99/lb to $5.49/lb. Grocery store certified organic ground beef prices ranged from $5.49/lb to $5.99/lb. This data shows that the price range of farmers' market pastured ground beef was highest, while the price range of grocery store conventional ground beef was lowest.

GROUND BEEF				
Location	Producer/ Grocery Store	Method	Price/lb	Price/each
Farmers' Markets	B	organic methods	$7/lb	
	R	organic methods	$6.50/lb	
	U	organic methods	$8/lb	
	X	organic methods	$6.50/lb	
Grocery Stores	W	conventional	$3.99/lb	
	G	conventional	$5.49/lb	
	W	conventional	$5.19/lb	
	W	certified organic	$5.49/lb	
	G	certified organic	$5.99/lb	

Shopping Bags

The shopping bags containing produce and animal products (eggs and ground beef), as well as all types of growing methods (conventional, organic methods, pastured, and certified organic), appeared similar in price range. The farmers' market shopping bag range of mean product prices was $0.50 to $7.00. The grocery store shopping bag range of mean product prices was $0.92 to $5.74. A test showed no significant price difference between the farmers' market shopping bag and the grocery store shopping bag.

Farmers' Market Food Prices vs. Grocery Store Food Prices

Farmers' Market Shopping Bag		Grocery Store Shopping Bag	
Product	Mean Price	Product	Mean Price
Kale - organic methods	5.85	Kale - certified organic	3.19
Butternut Squash - conventional	0.64	Butternut Squash - conventional	1.29
Butternut Squash - organic methods	1.20	Butternut Squash - certified organic	1.69
Spaghetti Squash - conventional	1.07	Spaghetti Squash - conventional	1.14
Spaghetti Squash - organic methods	1.21	Spaghetti Squash - certified organic	1.69
Red Potatoes - conventional	0.60	Red Potatoes - conventional	0.93
Red Potatoes - organic methods	1.70	Red Potatoes - certified organic	1.66
Yellow Potato Varieties - conventional	0.50	Yellow Potato Varieties - conventional	0.92
Yellow Potato Varieties - organic methods	1.94	Yellow Potato Varieties - certified organic	1.39
Apples - conventional	1.31	Apples - conventional	1.83
Honeycrisp Apples - conventional	1.96	Apples - regional/conventional	1.49
Bosc Pears - conventional	1.60	Honeycrisp Apples - conventional	2.66
Eggs - pastured	4.18	Bosc Pears - conventional	1.72
Ground Beef - pastured	7.00	Eggs - certified organic	4.16
		Ground Beef - certified organic	5.74
N=	14		15
MEAN=	2.20		2.10
STDEV=	2.02		1.33
P Value =	0.8828	(NO SIGNIFICANT DIFFERENCE)	

Notes: Price is in $ per pound for produce and ground beef, in $ per dozen for eggs.
Only values of products with comparable product in opposite shopping bag are used.
N = count of values
STDEV = Standard Deviation
When P Value = 0.05, there is no significant difference between the groups
P Value obtained through T Test.

Shopping Bags

The shopping bags containing conventional produce, appeared slightly less similar in price range. (No conventional animal products were included in the shopping bags because there were no conventional animal products available at the farmers' markets.) The farmers' market shopping bag range of mean product prices was $0.50 to $1.96. The grocery store shopping bag range of mean product prices was $0.92 to $2.66. A test, however, showed no significant price difference between the farmers' market shopping bag and the grocery store shopping bag.

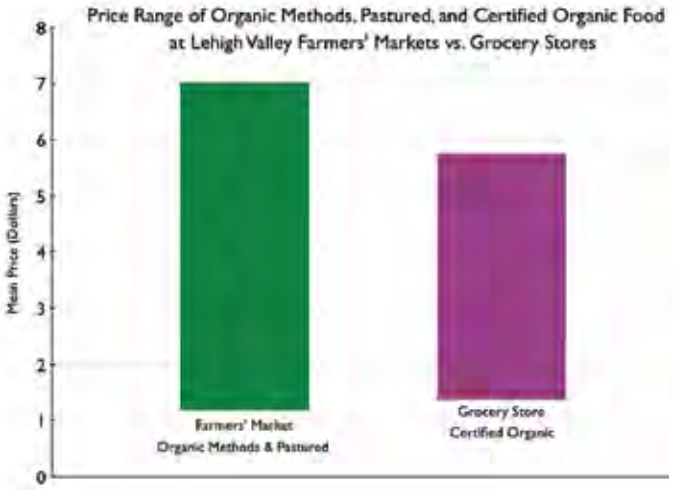
Farmers' Market Coventional Produce Prices vs. Grocery Store Conventional Produce Prices

Farmers' Market Shopping Bag		Grocery Store Shopping Bag	
Product	Mean Price	Product	Mean Price
Butternut Squash - conventional	0.64	Butternut Squash - conventional	1.29
Spaghetti Squash - conventional	1.07	Spaghetti Squash - conventional	1.14
Red Potatoes - conventional	0.60	Red Potatoes - conventional	0.93
Yellow Potato Varieties - conventional	0.50	Yellow Potato Varieties - conventional	0.92
Apples - conventional	1.31	Apples - conventional	1.83
Honeycrisp Apples - conventional	1.96	Apples - regional/conventional	1.49
Bosc Pears - conventional	1.60	Honeycrisp Apples - conventional	2.66
		Bosc Pears - conventional	1.72
N=	7		8
MEAN=	1.10		1.50
STDEV=	0.55		0.58
P Value=	0.1920	(NO SIGNIFICANT DIFFERENCE)	

Notes: Price is in $ per pound for produce and ground beef, in $ per dozen for eggs.
Only values of products with comparable product in opposite shopping bag are used.
N = count of values
STDEV = Standard Deviation
When P Value > 0.05, there is no significant difference between the groups.
P Value obtained through T Test.

Shopping Bags

The shopping bags containing organic methods, pastured, and certified organic food (produce and animal products) also appeared similar in price range. The farmers' market shopping bag range of mean product prices was $1.20 to $7.00. The grocery store shopping bag range of mean product prices was $1.39 to $5.74. A test showed no significant price difference between the farmers' market shopping bag and the grocery store shopping bag.



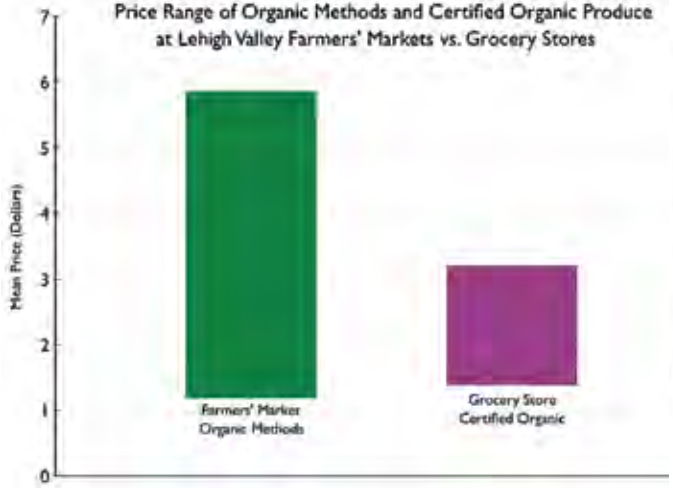
Farmers' Market Organic Methods/Pastured Food Prices vs. Grocery Store Certified Organic Food Prices

Farmers' Market Shopping Bag		Grocery Store Shopping Bag	
Product	Mean Price	Product	Mean Price
Kale - organic methods	5.85	Kale - certified organic	3.19
Butternut Squash - organic methods	1.20	Butternut Squash - certified organic	1.69
Spaghetti Squash - organic methods	1.21	Spaghetti Squash - certified organic	1.69
Red Potatoes - organic methods	1.70	Red Potatoes - certified organic	1.66
Yellow Potato Varieties - organic methods	1.94	Yellow Potato Varieties - certified organic	1.39
Eggs - pastured	4.18	Eggs - certified organic	4.16
Ground Beef - pastured	7.00	Ground Beef - certified organic	5.74
N=	7		7
MEAN=	3.30		2.79
STDEV=	2.39		1.65
P Value =	0.6527	(NO SIGNIFICANT DIFFERENCE)	

Notes: Price is in $ per pound for produce and ground beef, in $ per dozen for eggs.
Only values of products with comparable product in opposite shopping bag are used.
N = count of values
STDEV = Standard Deviation
When P Value > 0.05, there is no significant difference between the groups.
P Value obtained through T Test.

Shopping Bags

When excluding the higher priced animal products (eggs and ground beef), the shopping bags containing organic methods, and certified organic produce still appeared similar in price range. The farmers' market shopping bag range of mean product prices was $1.20 to $5.85. The grocery store shopping bag range of mean product prices was $1.39 to $3.19. A test showed no significant price difference between the farmers' market shopping bag and the grocery store shopping bag.



Farmers' Market Organic Methods Produce Prices vs. Grocery Store Certified Organic Produce Prices

Farmers' Market Shopping Bag		Grocery Store Shopping Bag	
Product	Mean Price	Product	Mean Price
Kale - organic methods	5.85	Kale - certified organic	3.19
Butternut Squash - organic methods	1.20	Butternut Squash - certified organic	1.69
Spaghetti Squash - organic methods	1.21	Spaghetti Squash - certified organic	1.69
Red Potatoes - organic methods	1.70	Red Potatoes - certified organic	1.66
Yellow Potato Varieties - organic methods	1.94	Yellow Potato Varieties - certified organic	1.39
N=	5		5
MEAN=	2.38		1.92
STDEV=	1.96		0.72
P Value =	0.6473	(NO SIGNIFICANT DIFFERENCE)	

Notes: Price is in $ per pound for produce and ground beef, in $ per dozen for eggs.
Only values of products with comparable product in opposite shopping bag are used.
N = count of values
STDEV = Standard Deviation
When P Value > 0.05, there is no significant difference between the groups.
P Value obtained through T Test.

Good Work Farms, Emmaus
Photo Credit: Sarah Edmonds

Discussion

The outcome expected was not what the results showed. Although it was expected that conventional product prices would be comparable between farmers' markets and grocery stores, and organic products would be less expensive at farmers' markets, my results showed no significant difference between farmers' markets and grocery stores for either production method, as well as no significant difference between farmers' markets and grocery stores for both methods combined. A significant difference was expected at least for organic food, because this was what the Vermont study[4] had showed. There were several differences between this study and the Vermont study, which may account for the difference in results:

Location – The cost of food in the U.S. varies from state to state, and this may account for some of the difference in results between the Vermont study and this study, based in Pennsylvania.

Time frame – The Vermont study data was collected primarily in the months of July and August with a few additional collection dates occurring in September. The data collection for this study took place from late September to mid-October. This meant that different foods were in season for each of these studies, which may account for varying price differences between farmers' market and grocery store products.

Organic Certification – For this study, prices of foods grown/raised with organic methods from the farmers' markets were compared to prices of organically certified foods from the grocery store. It was not possible to compare certified organic prices between venues because none of the producers at any of the farmers' markets in the Lehigh Valley had organic certification, although many did use organic methods to grow their food. The Vermont study compared prices of farmers' market food grown with organic methods (not certified organic) as well as conventional farmers' market food to prices of conventional food in grocery stores. These distinctions as to what was compared in each study may also account for varying price differences between farmers' markets and grocery stores.

Study Limitations:

Amount of price points collected – With more price points, the results of this study would have been more significant. This would have not only strengthened the statistical results for the shopping bag comparisons, but would have also warranted statistical analysis of the individual product price comparisons. Number of price points could have been increased in two ways: by visiting more venues, and by including more products in the study. As there was only one person collecting data, it was only possible to collect data from four of the existing thirteen farmers' markets in the Lehigh Valley and from only two grocery stores. Price data was also only collected on nine products.

Time in which data was collected – The products in this study were limited to what was in season from late September to mid-October. If this study had spanned more time, there would have been more and different produce on which to collect price data.

Pastured Meat and Eggs Not Available in Grocery Stores – Although pastured meat and eggs from farmers' markets were compared in price to certified organic meat and eggs from grocery stores, it should be noted that these are different products. Pastured products are derived from animals that spend their days outdoors on open pastures, eating grass and other forages (depending on the animals and operation, feed may be supplemented with grain). These products have been associated with nutritional benefits. For example, meat from pasture-raised cattle contains less total fat and higher levels of certain beneficial fats than meat from conventionally raised animals.[5] For animal products that are certified organic by the USDA, the producers have met animal health and welfare standards, did not use antibiotics or growth hormones, used 100% organic feed, and provided animals with access to the outdoors.[6] The predominant feed may be corn and grain. Animals are provided access to the outdoors; however, they may not actually go outside. Although certified organic and pastured products are very different, they were compared for the purposes of this study because certified organic meat and eggs were not available at the visited farmers' market, and pastured meat and eggs were not available in grocery stores. In addition, these products were more similar to each other than either was to conventionally-raised meat and eggs. It should, however, be noted that this may not be a fair or accurate price comparison.

Given its limitations, this study should be viewed as preliminary, and a larger, more expansive study should be conducted; nonetheless, this study still provides some insight into food prices in the Lehigh Valley.

[4] Claro. 2011.

[5] Clancy. 2006.

[6] Agricultural Marketing Service. 2012.

Conclusion

Prices at farmers' markets and grocery stores in the Lehigh Valley were shown to be competitive with each other with no statistically significant differences between shopping bags from the two venues, whether the products included in the bags were conventional, organic, or a mix of the two. These results oppose the perception that farmers' markets have higher prices than grocery stores. In fact, for all produce items studied, it was possible to find items at the farmers' market that were less expensive than what could be purchased at the grocery stores. For the Lehigh Valley, Pennsylvania, the perception has been disproved: farmers' market prices are not higher than those in grocery stores.

This study contains limited data regarding the number of price points collected, the number of farmers' markets and grocery stores visited, and the time over which data was collected, which in turn, limited the products to those in season in early fall; however, it still provides value in anticipating what a more expansive study may reveal about Lehigh Valley food prices at farmers' markets as compared to grocery stores.

Definitions

Certified Organic – A United States Department of Agriculture (USDA) certification. Certified organic food follows the definition by the USDA National Organic Standards Board (NOSB):

- "Organic agriculture is an ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity. It is based on minimal use of off-farm inputs and on management practices that restore, maintain and enhance ecological harmony."
- "'Organic' is a labeling term that denotes products produced under the authority of the Organic Foods Production Act. The principal guidelines for organic production are to use materials and practices that enhance the ecological balance of natural systems and that integrate the parts of the farming system into an ecological whole."
- "Organic agriculture practices cannot ensure that products are completely free of residues; however, methods are used to minimize pollution from air, soil and water."
- "Organic food handlers, processors and retailers adhere to standards that maintain the integrity of organic agricultural products. The primary goal of organic agriculture is to optimize the health and productivity of interdependent communities of soil life, plants, animals and people."[7]

Organic Methods – For the purposes of this study, food grown/raised using organic methods is food grown/raised without the input of synthetic substances.

Conventional – Conventional food is not grown/raised sustainably and may include the use of synthetic pesticides, herbicides, and/or fertilizers.

Cage Free – Cage free chickens are not raised in cages, but may still be raised indoors in overcrowded conditions.

Pastured – Animals raised outdoors on pasture. They are fed a diet of grass or other forage throughout their lives and have constant access to pasture or range. Pastured animals, because they are not overcrowded, do not require antibiotics as conventionally raised animals do. For the purposes of this study, pastured meat and eggs may also be defined as hormone- and antibiotic-free.

[7] Gold. 2007.

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Appendix C: The Economic Multiplier Effects of Farming in Lehigh and Northampton Counties

Prepared by Kirsten Hardy and Timothy W. Kelsey, undergraduate student in Community, Environment, and Development, and Professor of Agricultural Economics, The Pennsylvania State University.

What is the Local Economic Effect of Farming in the Lehigh Valley?

Lehigh and Northampton counties lie along the eastern edge of Pennsylvania and have a combined population of about 647,000 (US Census, 2010). This region, referred to as the Lehigh Valley, contains the major cities of Allentown and Bethlehem, which together are home to over 200,000 people and about 1,002 farms (USDA Census of Agriculture, 2007). The total sales of farm products sold by these farms in 2007 were over $72 million in Lehigh County and over $31 million in Northampton County (USDA Census of Agriculture, 2007).

Sales of farm product benefit other businesses in the counties and the region's economy, because farmers typically purchase many inputs from local businesses, and they similarly spend much of their income locally. Economists call how such spending ripples out from a sector a 'multiplier' effect, and it has important economic development implications. The size of farming's local economic effect is dependent upon several factors, including the local consumer base, transportation costs and infrastructure, and the local culture. Therefore the economic impacts of farming will be different in every community. This study uses the economic impact model IMPLAN to estimate the unique economic multipliers of farming in Lehigh and Northampton counties, as a means of better understanding the economic role that agriculture plays in the region.

The Economic Multiplier Effect

The input-output model IMPLAN aids in estimating the direct, indirect, and induced effects of spending within an area or combination of areas such as Lehigh and Northampton counties. The following analysis estimates the local economic effects of dollars received by farmers in these two counties. The dollars immediately spent on goods or services within an industry (in this case, what farmers receive in exchange for selling their production) are referred to as the Direct Effects. In turn these input dollars generate output dollars referred to as Indirect Effects and Induced Effects. Indirect Effects are dollars spent locally in other industries as a result of the direct spending, for example, the spending by farmers on seed, equipment or fuel to run farm equipment. Induced Effects are dollars spent as a result from increased household expenditures, such as farm employees spending their earnings locally on groceries, clothing, or local entertainment. This ripple effect of spending is known as the economic multiplier effect.

Estimated Local Economic Impacts

IMPLAN breaks the agriculture sector into twelve specific agricultural sectors and the estimated direct, indirect, induced and total economic multipliers for each, as in Table 1. The table shows that for each dollar farmers in these two counties receive, that dollar is then re-spent locally (e.g. multiplies), creating indirect and induced local economic effects in the counties. For example, each dollar received by oilseed farmers in these two counties creates an indirect effect of $0.215 and an induced effect of $0.19 locally within Lehigh and Northampton counties. In total, each dollar received by local oilseed farmers multiplies to $1.41 dollars locally. It is important to note the numbers shown here are based upon farmers' total sales, regardless of where their production is sold, not just on sales made within the two counties.

The sector with the greatest indirect economic multiplier is tobacco farming. For each dollar local tobacco farmers receive, an estimated $0.332 is generated indirectly. Other sectors with high indirect effects are other crop farming (e.g. hay) and cattle ranching and farming. These multiplier figures show that dollars spent within these sectors then are spent by the farmers, multiplying and recirculating the dollars throughout the community.

The estimated induced effects of direct spending in greenhouses, nurseries and floriculture production is remarkable. For each dollar spent in this industry, an estimated $0.547 are recirculated through the local economy due to increased spending by employees. Other industries such as fruit farming and tree nut farming also have high estimated induced effects within the economy ($0.467 and $0.485, respectively).

The top five types of farms with the largest local total economic multipliers within the Lehigh and

Northampton counties are:

1. Fruit farming
2. Tree nut farming
3. Vegetable and melon farming
4. Tobacco farming
5. Greenhouse, nursery, and floriculture production

Increased purchases from these types of farms generally will have greater local economic impact than will comparable increased purchases from other types of farms.

The numbers in this report show estimated multipliers for the dollars received by farmers in Lehigh and Northampton counties regardless of where they sell their production, not just for what those farmers sold locally. Several of the agriculture sectors had rather high indirect and induced effects multipliers, and it is likely that these figures would be even higher if they solely reflected local sales.

Table 1. Estimated Economic Multipliers by Farm Type in Lehigh and Northampton Counties

Sector	Direct Effects	Indirect Effects	Induced Effects	Total
Oilseed farming (e.g. soybeans)	1	0.215	0.190	1.405
Grain farming	1	0.286	0.173	1.459
Vegetable and melon farming	1	0.205	0.442	1.647
Fruit farming	1	0.196	0.467	1.663
Tree nut farming	1	0.176	0.485	1.661
Greenhouse, nursery, and floriculture production	1	0.084	0.547	1.632
Tobacco farming	1	0.332	0.304	1.636
All other crop farming (including hay)	1	0.302	0.270	1.573
Cattle ranching and farming	1	0.293	0.117	1.410
Dairy cattle and milk production	1	0.226	0.101	1.327
Poultry and egg production	1	0.237	0.179	1.416
Animal production, except cattle and poultry and eggs	1	0.165	0.245	1.411

IMPLAN Group LLC Economic Impact Analysis 2012

This research was sponsored, in part, by The Greater Lehigh Valley chapter of Buy Fresh Buy Local, a program of the Nurture Nature Center.

ASSESSMENT REPORT: LEHIGH VALLEY LOCAL FOOD ECONOMY

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NOV 2013