



“The Northeast food system: context for innovative research”

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Introduction

The purpose of this document is to provide some basic information about the Northeast food system in the context of a major undertaking called “Enhancing Food Security in the Northeast” (EFSNE). EFSNE is a five-year multidisciplinary research project with the primary goal of determining whether greater reliance on regionally produced food could improve food access in low-income communities, while also benefitting farmers, food supply chain firms and others in the system.

The project employs a systems approach, engaging the entire food chain from production to consumption, as well as outreach and policy elements. It represents a collaborative effort among researchers from a range of disciplines and eight rural and urban locations across the Northeast where much of the research is being conducted and applied. A large portion of the EFSNE work occurs in specialized project teams that explore a specific segment of the food system—production, distribution, and consumption—and in concurrent efforts that link across teams to facilitate a trans-disciplinary systems approach.

The consumption team is working in the locations across the region to better understand the food buying practices, food needs, and potential opportunities and barriers for a healthier, more accessible regional food system experienced by low-income consumers in the Northeast. The distribution team is studying stores and evaluating a number of current supply chain models that move food from farms to consumers, exploring how changes in supply chains might enhance the stability of a regional food system. Finally, the production team is measuring the current and

potential capacity of the Northeast's rural and urban areas to produce food to meet consumer demand within the region, exploring the implications of repurposing Northeastern agricultural land to create a more self-reliant regional food system.

The EFSNE project is the first of its kind in scale, breadth, and approach to analyze a regional food system. This narrative presents useful secondary data on production, distribution, and consumption in the Northeast, often comparing findings across states or with the US as a whole. It presents a basic description of the Northeast food system within which to place the project's analyses and findings.

Consumption

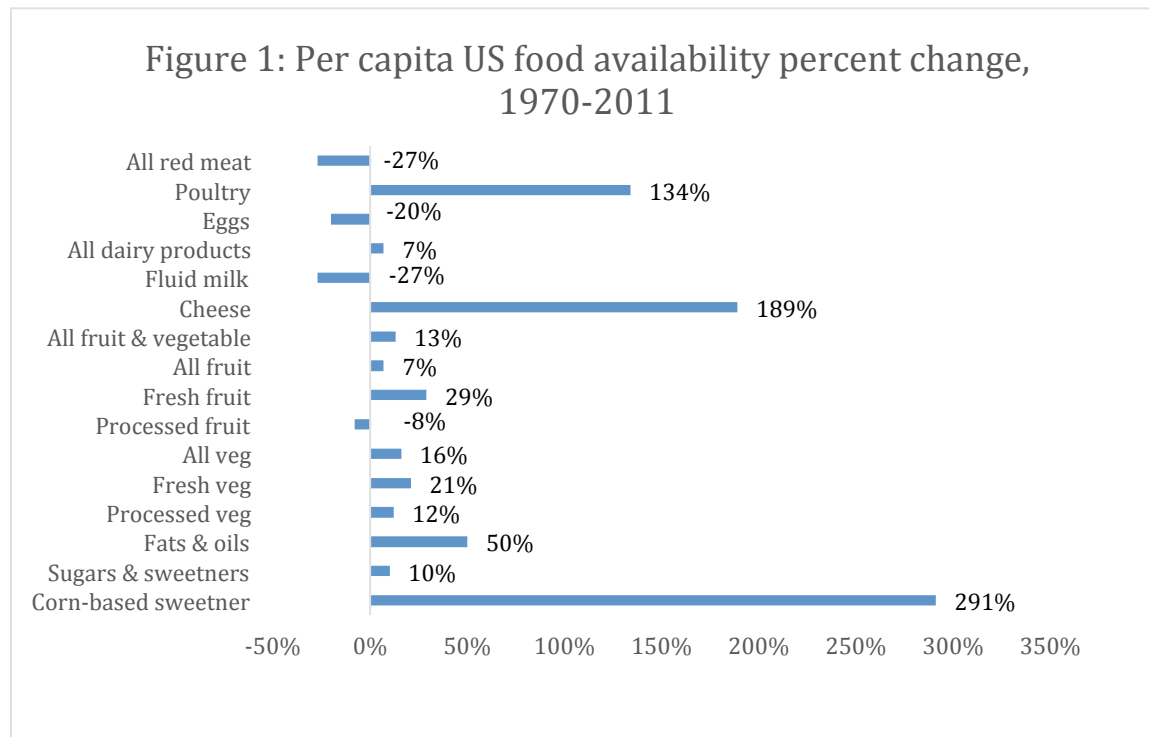
According to the 2010 Census, over 63 million people live in the Northeast region which includes 12 states from Maine to West Virginia and the District of Columbia and totals approximately 21 percent of the total US population (see Table 1, page 9). The Northeast comprises large metropolitan centers yielding a high population density almost four times the national average (342 vs. 87 people per square mile), and areas considered 'rural' by the 2010 US Census include only 15% of the population, compared to 19% nationally. In addition, relative to other regions and the US as a whole, the Northeast has a slightly larger proportion of women and a higher median age, but a lower percentage of blacks and Hispanics compared to the national average. With above average proportions of high school and college graduates, the Northeast has a higher per capita income and lower percentage of people who are unemployed and/or living below the poverty line.

This higher median income in the Northeast corresponds with overall lower rates of food insecurity in the region, as eight states have significantly lower food insecurity prevalence than the national average of 15% of households, and only Maine and Rhode Island show rates higher than the national average. An extended discussion of food security in the Northeast region is available in the EFSNE companion document "Food Security in the Northeast US."

Although consumption trends are not available at the state or regional levels, data on food availability illuminate changing trends in US per capita consumption, as availability serves as proxy for national-level consumption (USDA ERS 2014). Since 1970, food availability patterns have shifted in several distinct ways (see Figure 1, page 3). First of all, protein availability has moved away from red meats (-27%) and eggs (-20%) and toward poultry meat, which increased 134% during the 41-year period. While total dairy availability has modestly increased by 7%, a segmented look of the sector shows that fluid milk availability decreased (-27%) and cheese

availability more than doubled (+134%) from 1970 to 2011. Both fruit and vegetable availability have also increased, with the trend led by gains in the quantities of fresh versus canned, frozen, and other processed forms of produce, totaling a 29% and 21% increase in fresh fruit and vegetable availability respectively.

As reported by Volpe and Okrent (2012), in spite of higher per capita demand for fruits, vegetables, and cereal grains since 1970 (see Figure 1), US consumers still purchase these items at levels far below the USDA’s recommended *Dietary Guidelines*. Per capita consumption increases in fats and oils (+50%) and sugars and sweeteners (+10%) reflect the growth of packaged food demand in the US, as these products are commonly found in prepared foods, including corn-based sweeteners, which increased 291% from 1970-2011. Particularly from 1998 to the present, US households have shifted their food budgets toward more processed and packaged food items, a pattern more pronounced among low-income consumers (Volpe and Okrent 2012). The overall trend implies a mixed consumption pattern of increases in both fruits and vegetables and unhealthy food items. A key element of the EFSNE project is investigating the potential of regional food systems to increase the amounts of healthier foods in markets serving low-income populations.



Processing and Distribution

While the USDA Agricultural Census produces robust data on agricultural production, specific data on the quantity and variety of foods that are processed and distributed to markets in a discreet geography (such as the Northeast) are not readily available. These supply chain details are one area of anticipated findings from the EFSNE project. Fortunately, some economic impacts of the processing and distribution sectors of the economy can be surmised from government data sources. New York and Pennsylvania, the two most populous states in the Northeast with the largest land areas and greatest agricultural output, are also leaders in the processing and distribution segments of the agricultural supply chain. Since these states produce the most raw agricultural goods, it is logical that a high volume of proximate processing and distribution businesses exist to prepare and transport food items to retail venues. New Jersey, the most population dense state in the region, has the third most processing and distribution businesses, likely a function of the state's central location within the northeastern seaboard and the high concentration of flavor industry firms located there (Schlosser 2001). In sum, as of 2007, the agricultural processing and distribution sector in the Northeast totaled 25,766 establishments, employing 543,442 people. These figures equate to 15% (processing) and 23% (distribution) of the US total employment in these agricultural sectors as based in the Northeast region (see Table 2, page 10).

The US food processing sector has undergone remarkable change in the past several decades, marked by consolidation of processing firms across many food product types. For example, from 1972-1992, the number of US meatpacking and meat processing plants declined almost 30% from 3,785 to 2,665, while production totals increased 11%, suggesting a shift to fewer but larger plants that process more meat that accommodated increased demand during the time period. A similar national-level trend is also evident in the dairy processing sector over the same time period (60% decline in processing plants), and although the real number of poultry processors only decreased 11%, overall poultry production volume increased 142% from 1972-1992 (Ollinger et al. 2005). These structural changes correspond to increased industry concentration in each sector, marked by the largest processor firms controlling more and more of each sector (Ollinger et al. 2005). There are fewer data describing national-level fruit and vegetable processing; however, the USDA reports that over half of all fruit and vegetable production is processed in some way—canned, frozen, or juiced, for example—with the remainder sold fresh (Lucier et al. 2006). Consolidation has also affected the fruit and vegetable industry, particularly as the largest wholesalers and retailers have increased their market share by almost 50% from 1987 to 2001 (Lucier et al. 2006). With a higher market share, these firms

have a greater ability to control prices and influence production and packaging practices at the farm and packinghouse level. As noted above, processing data are not available at the regional level, and these national trends give some indication of changing processing patterns in the US as a whole.

Although regional data on processing and distribution is sparse, Goetz and colleagues (2004) explored the notion of industry clustering in the food processing industry in the Northeast, applying county-level 2001 data to establish geographical areas where food manufacturing activities are prominent. As examples, their research suggests that fruit and vegetable canning operations cluster in western New York, eastern Pennsylvania, and the New York metro area. Fluid milk processing, on the other hand, shows a high concentration of firms in eastern Massachusetts, as well as southeastern Pennsylvania, with additional manufacturers distributed throughout the region except West Virginia where only one county features a fluid milk processor. Although non-poultry meat production is highly concentrated in western Pennsylvania and West Virginia, processing and slaughter of meat products clusters in eastern Pennsylvania and the New York City metro area. Regional poultry processing demonstrates a more coupled clustering relative to production, as the geographies with poultry production concentration (southeastern Pennsylvania and Delaware) are also the locations with clusters of poultry processing.

Consumers choose from a number of venues when purchasing food items, with grocery retailers being the most common type of food seller. However, shoppers are increasingly buying their food at supercenters or wholesale clubs such as Walmart or Sam's Club, as well as other nontraditional venues such as discount retailers (e.g., Dollar General) or pharmacies like CVS and Rite-Aid (Martinez 2007). Nonetheless, the Northeast region has a higher per capita total of traditional grocery store retailers and fewer supercenters compared to the US as a whole (see Table 3), suggesting that traditional grocery retailing venues are still a large feature of Northeast food shopping behavior.

Production

According to the 2010 Census, approximately 21% of the total US population lives in the Northeast region of the United States, yet the Northeast accounts for less than six percent of the nation's total land mass. With varied and sloped terrain, ample forest tracts, and areas of high population density, farms in the Northeast are on average smaller and more diverse than the rest of the US (NESAWG 2002).

The 2012 Agricultural Census reports that the Northeast has 174,991 farms, approximately eight percent of the US total, covering 26 million acres, or less than three percent of the US total (see Table 3, page 11). The average farm size of 148 acres is also well below the national average of 434 acres, partly an artifact of the topographical diversity in the region. Table 3 shows the proportion of agricultural land that is planted with crops, forested, and used for grazing. Relative to the US as a whole, distinguishing traits of the Northeast include the high amount of farmland that is wooded (28% vs. 8%) and a lower portion of farm pastureland (13% vs. 45%).

Demographically, farmers in the Northeast are in many ways representative of the US farming sector as a whole. For example, the average age of farmers by state in the Northeast ranges from 56 (Pennsylvania) to 60 (West Virginia), while the national average is 58 years old. Overall, the proportion of primary farm operators in the Northeast under the age of 35 (6.2%) is comparable to the national average (5.7%, see table 3). Table 1 shows the percentage of principal farm operators whose primary occupation is farming, with the Northeast having a higher than national average portion of full-time farmers. These statistics also vary by state in the Northeast, ranging from 43% (West Virginia) to 64% (Delaware). Also, the Northeast has noticeably more women principal farm operators than the US as a whole, but the proportion of non-white farmers is four times lower than the national average of principal operators.

Agricultural production in the Northeast accounted for over \$18.4 billion in gross market value according to the 2012 Ag Census, led by Pennsylvania (\$7.4 billion), New York (\$5.4 billion), and Maryland (\$2.3 billion) (see Table 4, page 12). Overall, the Northeast accounts for about five percent of the nation's total gross agricultural value. Table 4 shows the breakout of several product categories by state. The two primary categories—crops and livestock—demonstrate variation compared to the US as a whole, with the region producing a higher overall proportion of dollars from livestock (57% vs. 46%) and lower proportion from crops (43% vs. 54%). These differences are clarified in sub-categorizations of the crop and livestock categories (see Table 4, page 12). Fruit and vegetable crop sales (10% of total sales) account for 24% of all crop sales in the Northeast, while nationally fruit and vegetable sales (11% of total sales) are only 20% of the crop sales total. In other words, while the proportion of total sales that are from fruits and vegetables is similar in the Northeast and the US as a whole, the proportion of other crops—namely feed grains—is higher nationally than in the Northeast. Table 2 also shows a partial breakout of the livestock category, showing that dairy products account for 26% of all agricultural sales in the Northeast, easily the largest farming sector in the region. Poultry

production is also highly concentrated in the southern part of the region, as Delaware, West Virginia, and Maryland all produce large proportions of these products.

Conclusion

The purpose of this report is to clarify the context of the Northeast food system and present basic findings from secondary data sources about the region. The Northeast is densely populated relative to the US as a whole, and the region's population has a higher median income and lower poverty rate compared to other regions. However, food insecurity is still a challenge in parts of the region, including both rural and urban areas. Nationally, the food processing sector has endured widespread consolidation in recent decades, and the Northeast employs 15% of the nation's food processing workforce. New York, Pennsylvania, and New Jersey are the region's leaders in food processing and distribution, and the Northeast has a higher per capita total of supermarkets than the US as a whole. The Northeast's farms are much smaller in acreage compared to other regions of the US, and overall the region accounts for about 6% of the nation's total agricultural sales, led by Pennsylvania and New York. Dairy is the largest farming sector in the region, and the Northeast produces a higher proportion of fruits and vegetables and lower proportion of livestock than the US as a whole.

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Table 1: Demographic data by region of the United States

	Northeast	Midwest	South	West	US
Population (millions)	64.44	66.93	114.56	71.95	308.75
Population density	342	89	132	41	87
% Rural	15.0	24.1	24.2	10.2	19.3
% Female	51.4	50.8	51.0	50.1	50.8
% Black	11.7	10.3	19.2	4.7	12.6
% Hispanic	13.0	7.1	16.2	29.9	16.6
Median Age	39.3	37.9	37.1	35.7	37.3
% High school grad.	87.5	88.8	84.3	84.7	85.9
% Bachelor's degree	33.0	27.3	26.5	29.9	28.6
% Unemployed	9.5	9.6	10.1	11.1	10.1
% Families below poverty line	9.7	10.6	13.1	11.7	11.6

Source: 2010 US Decennial Census

Table 2: Processing and Distribution/Wholesaling Sectors in the Northeast and United States

	Northeast US	United States
# of processing businesses	15,497	83,591
# of employees: processing	320,917	2,179,781
% of all US processing employment	14.6%	100%
# of distribution and wholesale businesses	10,269	37,977
# of employees: distribution and wholesaling	222,525	959,455
% of all US distribution and wholesaling employment	23.3%	100%
# grocery stores (per 10,000 people)	2.52	2.15
# supercenter stores (per 10,000 people)	0.09	0.14

Source: State Level Food System Indicators Project: State Fact Sheets, 2007.
foodindustrycenter.umn.edu/Research/foodsystemindicators/statefactsheets/index.htm.
 See King et al. (2012) for documentation of variables.

Table 3: Select farm and farmer characteristics, Northeast region

	Northeast US	United States
Land in Farms (million acres)	26.0	914.6
Number of Farms	174,991	2,109,363
Avg Farm Size (acres)	148	434
% Crop land	51.1	42.6
% Woodland	28.5	8.4
% Pastureland	12.6	45.4
% Primary farm operators under age 35	6.2	5.7
% Primary farm operators, principal occupation farming	51.1	47.8
% Primary farm operators, women	18.2	13.7
% Primary farm operators, non-white	1.2	4.6

Source: 2012 USDA Agricultural Census

Table 4: Northeast Total Agricultural Sales and Percentage of Agricultural Sales by product category

	Total value of agricultural sales (millions \$)	% of total ag value from <u>all</u> crops	% of total ag value from <u>fruit and vegetable</u> crops only	% of total ag value from <u>all</u> livestock	% of total ag value from <u>cattle</u> only	% of total ag value from <u>milk and dairy</u> only	% of total ag value from <u>poultry and eggs</u> only
Connecticut	550.6	70.7	11.6	29.3	1.8	12.7	8.9
Delaware	1274.0	33.7	4.8	66.3	0.7	1.3	63.7
Maine	763.1	62.1	42.2	37.9	4.1	16.6	5.1
Maryland	2271.4	46.3	4.0	53.7	3.1	8.3	40.6
Massachusetts	492.2	77.8	42.0	22.2	1.9	9.0	2.4
New Hampshire	190.9	52.8	12.3	47.2	5.0	28.7	7.1
New Jersey	1006.9	88.5	33.5	11.5	0.9	2.6	4.0
New York	5415.1	41.5	12.4	58.5	8.3	44.6	2.7
Pennsylvania	7400.8	37.6	4.1	62.4	9.7	26.6	18.4
Rhode Island	59.7	82.1	22.4	17.9	2.0	6.5	3.7
Vermont	776.1	22.9	4.5	77.1	8.0	65.1	1.7
West Virginia	806.8	17.2	4.0	82.8	26.9	4.1	49.8
Northeast Total	21007.6	43.4	10.3	56.6	7.6	26.0	18.1
United States	394644.5	53.8	10.9	46.2	19.4	9.0	10.8

Source: USDA Agricultural Census, 2012