

## Existing Conditions: INTRODUCTION

Massachusetts' local food system is a complex network of consumers, workers, businesses, owners, and supporting organizations engaged in an array of activities, including fishing, farming, preparing, marketing, distributing, serving, and eating food. This network works to produce food that nourishes our communities, sustains businesses and workers, and supports responsible stewardship of our land and water. Historically a rich agricultural and fishing State, Massachusetts is a leader in direct to consumer sales of agricultural products, and is among the leading states in production of a number of specialty crops.

In recent decades, momentum in our local food movement has grown. Demand for local food is increasing, and farmers markets, community supported agriculture and fisheries programs, farm to school initiatives, cooperatives, and other local food markets are springing up throughout the Commonwealth and are making locally produced foods available to a broader population. Local and state governments around the nation are helping to grow vibrant local food systems, and Massachusetts has been a leader in many ways.

As Massachusetts works to increase local production, it is important to acknowledge that its food system does not exist in isolation, and that there are some imbalances between our food production and consumption. Massachusetts is the third most densely populated state in the nation, giving farmers, fishermen, and food producers in the State access to many consumers. However, high land prices and a short growing season limit production capacity. Additionally, although seafood catches in the Commonwealth surpass the amount of fish consumed by Massachusetts residents, most of that catch is exported, and much of the fish eaten in the State is imported. As such, we are deeply connected to the global food system.

Consolidation of the national and global food supply chain over the past 50 years has helped to fuel recent interest in growing local food systems. In the past century, the number of U.S. farms has declined, while the average farm size has increased significantly.<sup>1</sup> Technological advances and greater urbanization following World War II accelerated the shift from a predominantly locally-based agricultural system, to a national and global system. On-farm mechanization and availability of chemical fertilizers enabled higher production yields and crop specialization. Today, U.S. agriculture is highly regionalized and industrialized, with most corn and soybeans grown in the Midwest, and most vegetables in California.

As the agricultural landscape changed in the U.S., international food markets developed and expanded, and businesses throughout the food supply chain scaled up and consolidated. Improvements to transportation and shipping systems, and advancements in refrigeration made it possible to import food from around the world. Free trade agreements enabled easier exchange of goods across international borders. And a growing U.S. immigrant population demanded a greater variety and diversity of foods.<sup>2</sup>

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<sup>1</sup> Dimitri, Carolyn, Anne BW Effland, and Neilson Chase Conklin. (2005). "The 20th century transformation of US agriculture and farm policy." Accessed April 2015 from [http://www.ers.usda.gov/media/259572/eib3\\_1\\_.pdf](http://www.ers.usda.gov/media/259572/eib3_1_.pdf).

<sup>2</sup> Martinez, Steve. (2010). "Local food systems; concepts, impacts, and issues." USDA, Economic Research Service.

Whereas in the early 1900s most people in the U.S. got their food from local supply chains and often produced their own food, by the end of that century the majority relied on more distant and complex food markets to meet their food needs.

There are many challenges inherent in such a complex, global system. The world's population has quadrupled in just the past 100 years, now exceeding seven billion people, all in need of food. Droughts, flooding, and extreme weather events are compromising some food production and changing where agriculture can happen. Land use patterns are changing, with development competing with agriculture for limited and irreplaceable fertile soils. Food safety has become a greater concern, with small contaminations having potentially large consequences as food is produced in large quantities in central locations and then travels long distances to consumers. The combination of these pressures makes food production increasingly unpredictable, and can result in swings in food prices.<sup>3</sup>

Hunger and diet-related health concerns remain significant challenges. In the United States, 14.3 percent of people don't have enough to eat.<sup>4</sup> More than one third of U.S. adults are obese and their obesity is making many of them ill.<sup>5</sup> These issues disproportionately impact our population across race and class lines. Poor, minority, and single-parent households experience food insecurity more than the general populations.<sup>6</sup> Minority populations experience obesity and other diet-related illness at higher rates than national averages.<sup>7</sup> Even with better conditions than much of the rest of the nation, Massachusetts must address the complex causes of food insecurity and poor health impacting residents, such as inadequate income, lack of transportation and other barriers. As long as these barriers exist, hunger and poor nutrition will continue to have significant social and economic consequences for many residents.

Climate change poses increasing challenges to food production and yields worldwide. Shifting global weather patterns are influencing the geography of arable land, and rising sea temperatures are impacting marine ecosystems. More extreme temperatures, rainfall, and pest and disease migration are impacting land-based agriculture; warming temperatures and acidification of the ocean are prompting marine habitat migration; and occurrences of algal blooms and disease are compromising marine life and health.<sup>8</sup> Climate change modeling scenarios anticipate that crop yields will be more negatively impacted in the Southern Hemisphere, whereas warmer temperatures and longer and more productive growing seasons may be experienced in the Northern Hemisphere – suggesting that developing countries will be more negatively impacted than developed countries.<sup>9</sup>

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<sup>3</sup> Graziano da Silva, José. (2012). "Tackling the Root Causes of High Food Prices and Hunger." World Food Programme. Accessed April 2015 from <https://www.wfp.org/news-release/tackling-root-causes-high-food-prices-and-hunger>.

<sup>4</sup> "Food Security in the U.S: Food Security Status of U.S. Households in 2013." (2015). USDA, Economic Research Service. Accessed April 2015 from <http://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/key-statistics-graphics.aspx#foodsecure>.

<sup>5</sup> "Overweight and Obesity." (2014). Centers for Disease Control and Prevention. Accessed April 2015 from <http://www.cdc.gov/obesity/data/adult.html>.

<sup>6</sup> Alisha Coleman-Jensen, Christian Gregory, Anita Singh. (2014). USDA, Economic Research Service. Accessed April 2015 from [http://www.ers.usda.gov/media/1565410/err173\\_summary.pdf](http://www.ers.usda.gov/media/1565410/err173_summary.pdf).

<sup>7</sup> "Overweight and Obesity." (2014). Centers for Disease Control and Prevention. Accessed April 2015 from <http://www.cdc.gov/obesity/data/adult.html>.

<sup>8</sup> Kalra, Naveen, Subhash Chander, H. Pathak, P.K. Aggarwal, N.C. Gupta, Mukesh Sehgal, Debashis Chakraborty. (2007). "Impacts of Climate Change on Agriculture." *Outlook on Agriculture* 36, no.2 (2007): 109-118.

<sup>9</sup> Rosenzweig, Cynthia and Martin L. Parry. (1994). "Potential impact of climate change on world food supply." *Nature* 367, no. 6459 (1994): 133-138.

Massachusetts' temperatures are anticipated to increase over the next century to resemble today's temperatures in Virginia and North Carolina.<sup>10</sup> These changes could result in higher agricultural yields, but some land-based agricultural industries – such as cranberry, maple syrup, and dairy – are likely to be threatened.<sup>11,12,13</sup> Migration of species, like cod to cooler waters farther north, and impaired habitat and development of shellfish could further compromise the Massachusetts seafood industry.<sup>14</sup>

Attention to the needs of the food system workforce is critical as well. With more than one billion food system workers around the world, international farm labor accounts for about 35 percent of global employment.<sup>15</sup> In the United States 16 percent of the workforce is employed in the food system, a larger percentage than any other employment sector.<sup>16</sup> These employees work at farms, slaughterhouses, processing facilities, warehouses, grocery stores, and restaurants. Most food sector jobs are lower-wage and offer limited employee benefits and few opportunities for advancement, and the workers responsible for producing our nation's food use food stamps at twice the rate of the rest of the U.S. workforce.<sup>17</sup>

It is within this context that the goals and recommendations of the Massachusetts Local Food Action Plan have been developed. This chapter provides a more detailed examination of the issues and data within our State that frame our local food system, and provide a basis for the changes called for in this plan.

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10 "Climate Change: Impacts & Adaptation: Climate Impacts in the Northeast." (nd). U.S. Environmental Protection Agency. Accessed April 2015 from <http://www.epa.gov/climatechange/impacts-adaptation/northeast.html>.

11 Hanson, Emma, Matt Hazel, Christa Mayfield, Nina Rogowsky. (2014). "Climate Change and the Maple Syrup Industry in Massachusetts." Tufts University on behalf of the Massachusetts Food Policy Council. Unpublished.

12 Cunningham, Hilary, Kate Schaffner, Emily Dimiero. (2014). "Climate Change Adaptation and Mitigation Recommendations for Massachusetts Dairy Producers." Tufts University on behalf of the Massachusetts Food Policy Council. Unpublished.

13 Foster West, Erin, Elena Martinez, Ashley McCarthy, Max Wall. (2014). "Climate Change and Cranberry Cultivation in Massachusetts." Tufts University on behalf of the Massachusetts Food Policy Council. Unpublished.

14 Ayache, Nicole, Abigail Harper, Leah Hermens, Hannah Sobel. (2014). "Massachusetts Marine Fishing and Climate Change." Tufts University on behalf of the Massachusetts Food Policy Council. Unpublished.

15 "Industries and Sectors: Agriculture; plantations: other rural sectors." (nd). International Labour Organization. Accessed April 2015 from <http://www.ilo.org/global/industries-and-sectors/agriculture-plantations-other-rural-sectors/lang--en/index.htm>.

16 Dawson, Gloria. (2014). "The Hands that Feed Us." *Gastronomica: The Journal of Food and Culture* 14 no.2 (2014): 95-97.

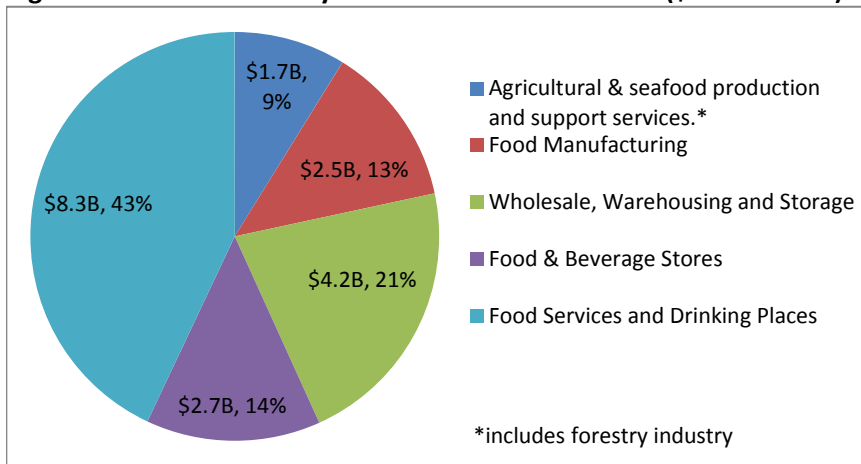
17 Dawson, Gloria. (2014). "The Hands that Feed Us." *Gastronomica: The Journal of Food and Culture* 14 no.2 (2014): 95-97.

# Food System Businesses

The following section offers summary data for food system businesses in Massachusetts. Subsequent sections delve deeper into the data for the various food system sectors. *Note: Data Collection and Analysis Methods: This plan has adopted the method for assessing food system data developed by Vermont Farm to Plate's Methodology for Assembling Food System Establishments and Employment to estimate the total number of food system establishments. The reason for using the Vermont method is the value of shared data. It is hoped that all New England states may eventually use a consistent method for calculating their respective food system employment and establishment numbers. Using this approach, each state will be better able to collaborate on issues that cross state lines. An example of the findings of the Vermont Farm to Plate method can be viewed at <http://www.vtfoodatlas.com/getting-to-2020/17-jobs-and-establishments>. The Methodology for Assembling Food System Establishments and Employment is included in the Appendices of this document.*

## Economic Data

**Figure EC.1: 2012 Food System Gross State Product (\$19.3 Billion)**



The food system's 2012 gross state product was \$19.3 billion or 4.5% of total gross state product. Food services and drinking places made up nearly half the food system gross state product.

Sources: Bureau of Economic Analysis and InfoUSA 2011

Note: seafood production and support services draws from value-added data. Data on seafood landings is available in the Fishing section.

**Table EC.1: Change in Number of Food System Businesses 2002 to 2012**

Category	2012 Total Establishments	% Change 2002-2012
Farm Inputs	1,542	4%
Wholesale Distribution	1,457	-2%
Manufacturing	1,479	12%
Food and Beverage Stores	6,714	9%
Food Services and Drinking Places	19,115	11%
Food Production (includes fishing)	11,034	13%
<b>Total Food System Businesses</b>	<b>41,341</b>	<b>10%</b>

Source: EOLWD ES-202, Census Nonemployer Statistics, USDA Census of Agriculture 2012

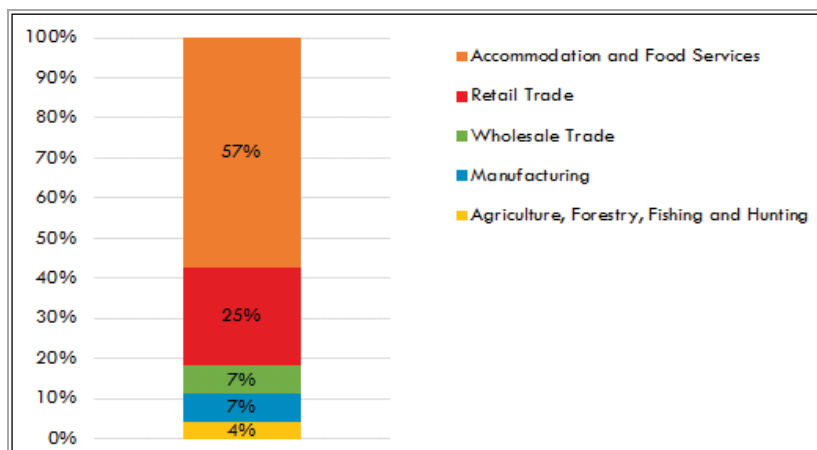
Note: Farm Inputs include support activities for crop production and animal production, support activities for forestry, and veterinary services. Wholesale Distribution includes grocery and related product merchant wholesalers, farm product raw material merchant wholesalers, farm supplies merchant wholesalers and refrigerated warehousing and storage. Manufacturing includes food, beverage and tobacco manufacturing. Food production includes farms, fishing, hunting, and trapping.

The number of food system businesses increased 10% between 2002 and 2012. The number of all businesses in the state increased by 12% during the same time.

## Food System Workers Demographics

There are approximately 426,000 food system workers in our State's food system, and food system workers residing in the State make up about ten percent of the Massachusetts workforce. Between 2002 and 2012 the number of food system workers increased 13 percent, as compared with the State's overall workforce which increased three percent.

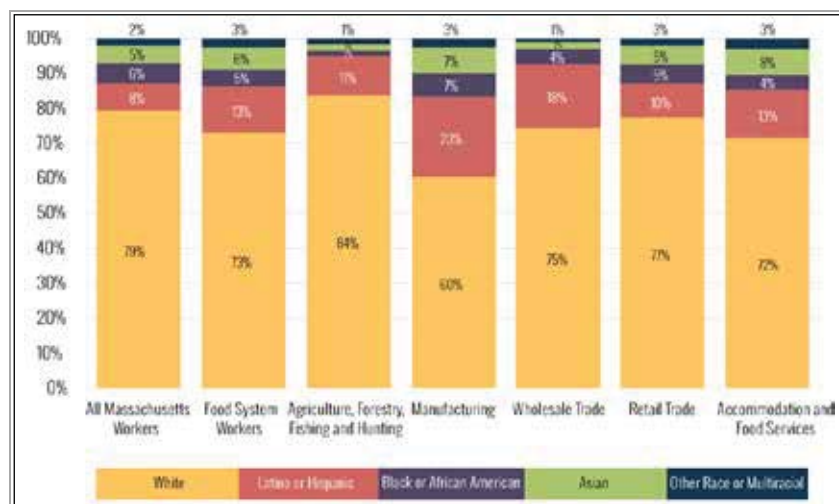
**Figure EC.2: Food System Workers by Industry**



Source: U.S. Census Bureau ACS Public Use Microdata Sample, 2007-2011.

Food system workers in accommodation and food service jobs account for over half of all food system workers.

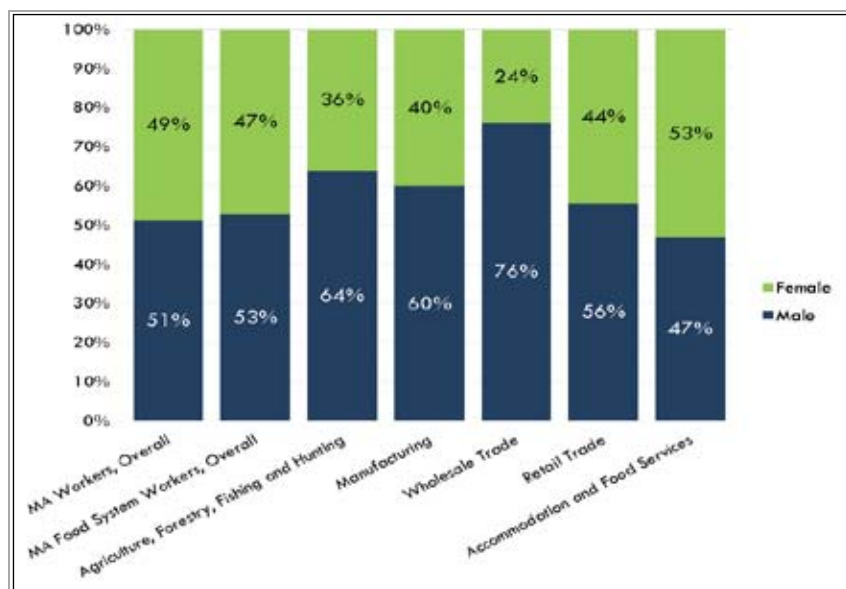
**Figure EC.3: Food System Workers by Race and Ethnicity**



Source: U.S. Census Bureau ACS Public Use Microdata Sample, 2007-2011.

Non-white workers make up 21% of the overall workforce and 27% of the food system workforce. The sector with the largest share of non-white workers is food manufacturing.

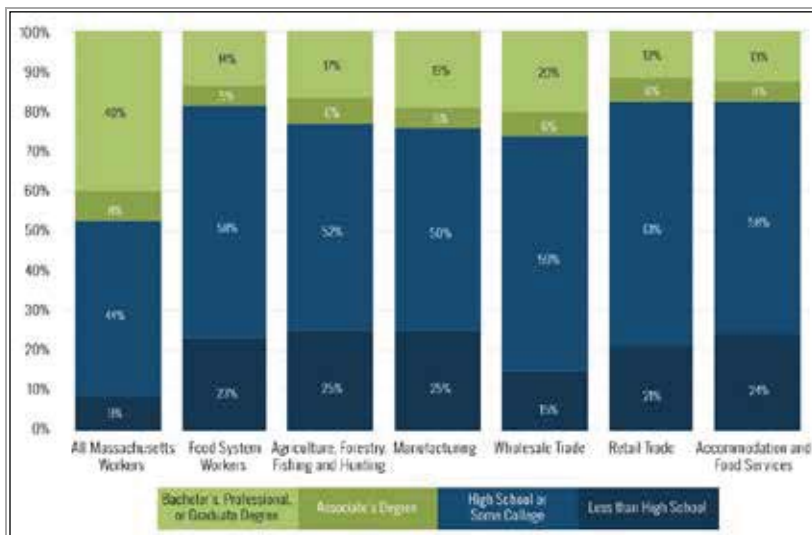
**Figure EC.4: Food System Workers by Gender**



Source: U.S. Census Bureau American Community Survey Public Use Microdata Sample, 2007-2011.

Food system workers are 53% male and 47% female. Wholesale trade employs the fewest females, while accommodations and food services employ the greatest number of females.

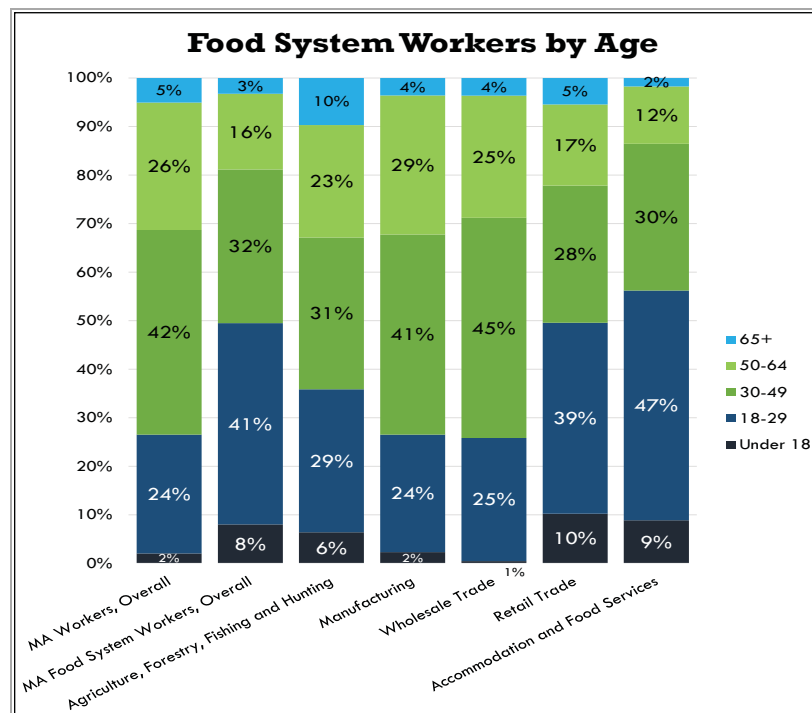
**Figure EC.5: Food System Workers by Educational Attainment**



Source: U.S. Census Bureau American Community Survey Public Use Microdata Sample, 2007-2011.

Just 20% of food system workers have a college degree, while nearly 50% of Massachusetts workers overall have college degrees.

**Figure EC.6: Food System Workers by Age**



Source: U.S. Census Bureau American Community Survey Public Use Microdata Sample, 2007-2011.

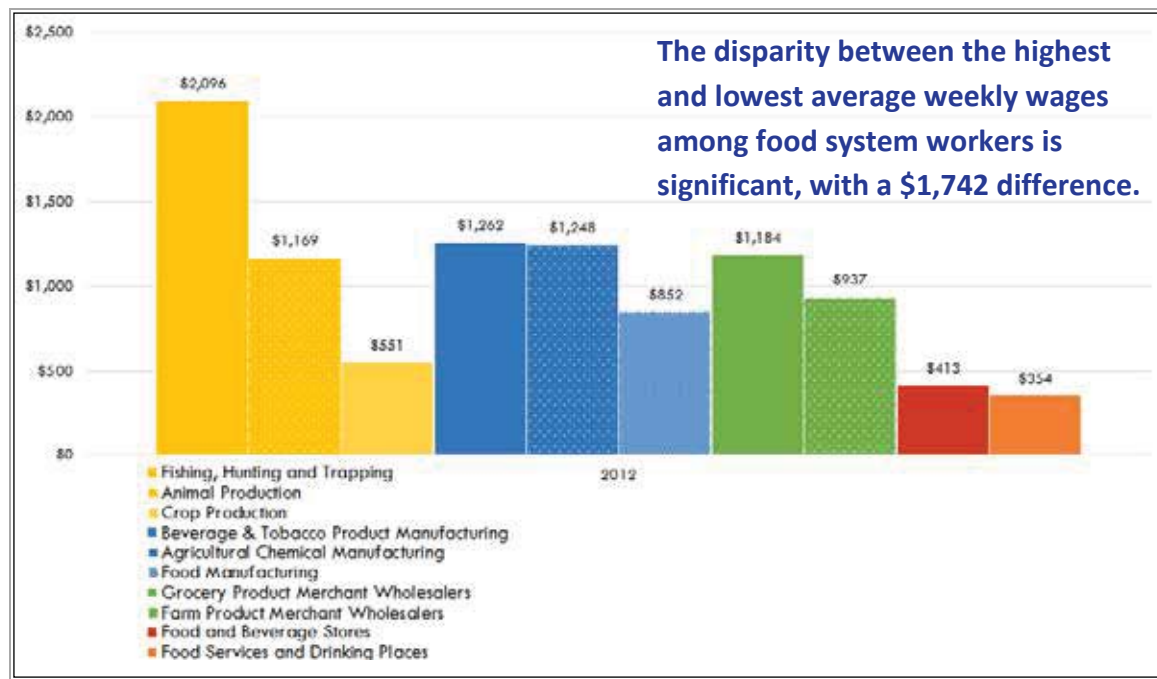
Workers in the food system are, on average, younger than the statewide workforce overall. Nearly 50% of the food system workforce is 29 years and younger, compared to about 25% of our overall workforce.



## Food System Wages

In 1912, Massachusetts was the first state to pass a minimum wage law. Massachusetts is one of 29 states (and the District of Columbia) with a minimum wage rate higher than the federal wage rate (\$7.25/hour).<sup>18</sup> As of Jan 1, 2015, the minimum wage in Massachusetts is \$9.00/hour. It is scheduled to increase to \$10.00/hour in 2016, and to \$11.00/hour in 2017. Massachusetts has a separate rate for agricultural workers, currently \$8.00 per hour.<sup>19</sup> Tipped employees in Massachusetts must be paid a service rate of \$3.00/hour. If they do not receive \$9.00/hour after tips, the employer must make up the difference. The service rate will increase to \$3.35/hour in 2016 and \$3.75/hour in 2017. In addition, some Massachusetts farms employ migrant farm labor through the federal H2A Program. The minimum wage for workers through this program is \$11.26/hour.

**Figure EC.7: Food System Average Weekly Wages 2012**



Source: MA Executive Office of Labor and Workforce Development (EOLWD).

Notes on wage data: All yearly data are adjusted for inflation to 2012 dollars. Beverage and tobacco product manufacturing is included, but alcoholic beverage merchant wholesale is excluded, to be consistent with VT methodology. Wages for restaurant and bar workers include tips.

<sup>18</sup> National Conference of State Legislatures. (2015). State Minimum Wages | 2015 Minimum Wage by State. Accessed October 2015 <http://goo.gl/XVe2AY>.

<sup>19</sup> MA Attorney General Office. (2015). Minimum Wage. Webpage accessed November 2015 <http://goo.gl/Adfaj3>.



## Existing Conditions: LAND

Massachusetts is home to slightly more than two percent of the country's residents, while the value of our State's agricultural production is less than a fraction of one percent of the nation's total agricultural production. These numbers, though, belie the important role our State plays in food production for our region. Our State has some of the best farmland soils in the world and has the potential to increase agricultural production. The challenges to doing so include competing interests in farmland, including using farmland for housing development. If this development of farmland continues, our State's agricultural capacity will be increasingly limited. This section examines land-related topics, including development pressures, zoning and land use, farmland protection programs, and other information relevant to farmland.

### Land in Farms, Farm Size, and Ownership

The amount of land devoted to farming has dramatically decreased since the early 1900s, when according to the 1920 USDA Census of Agriculture, there were nearly 2.5 million acres of land in farms in the State. After this time, there were shifts toward industrialization and away from an agricultural economy. Farmland began to be developed for roads, houses, and other uses. The amount of land in farms has decreased by nearly two million acres since then, to 523,517 acres of land in farms according to the 2012 USDA Census of Agriculture 2012, which defines a farm as "any place that produces \$1,000 or more of agricultural products." There are recent signs of a slowing or even reversing of the land loss trend in our State. While most of the U.S. witnessed a decline in agriculture from 2007 to 2012, Massachusetts was one of the few states that experienced growth (about one percent) in both acres in farmland and number of farms. Farmland in our State includes cropland, woodland, pasture, and other uses. The Farming section discusses land in farms by agricultural use and size.

**Table EC.2: Massachusetts Farmland Ownership in Acres by Principal Operator in 2012**

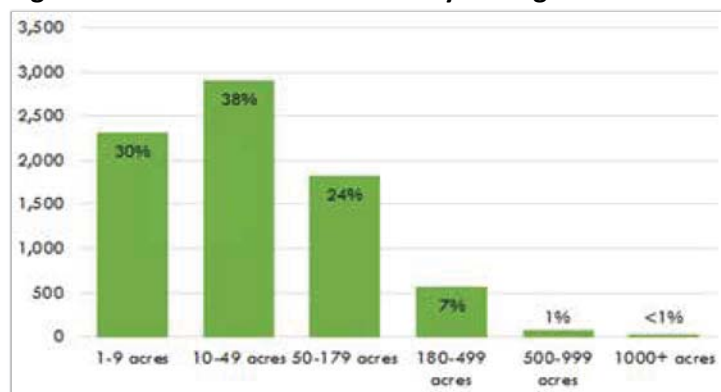
	Senior principal operator w/ next generation operator	Senior principal operator w/ no next generation operator	All senior principal operators	All farms
By Ownership (acres)				
Owned	28,001	132,543	160,544	435,233
Rented	4,660	358	5,018	88,284

Source: American Farmland Trust; USDA Census of Agriculture 2012: Tables 1, 2 and 8.

Note: Senior farmer is 65 years or older.

**Senior farmers own about 37% of farmland and about 83% of that farmland does not have a next generation operator identified.**

**Figure EC.8: Massachusetts Farms by Acreage Size in 2012**



Source: USDA Census of Agriculture, 2012, Table 1. Historical Highlights.

**68% of farms are smaller than 50 acres. Only a little over 1% of farms are 500 or more acres.**

Over 88,000 acres of farmland is leased or licensed by farmers, often based on informal, handshake agreements. These types of agreements, while offering some amount of flexibility to both the land owner and farmer, can have detrimental impacts on the person farming the land. These can include unpredictability on the person farming the land, including insecure or overly-short term tenure, both of which discourage investment in or improvement of farmland.

## Cost of Land and Taxes

Massachusetts farmland is valued at an average of \$10,400 per acre, fourth highest in the nation.<sup>1</sup> The high cost of farmland is a considerable barrier to increasing production. It contributes to the fact that the cost of doing business in the State for farmers is higher than in other parts of the country and that farmers are often carrying more debt. The high cost of farmland also makes it more challenging for communities, land trusts, and the State to conserve land.

While there is no aggregate accounting of property taxes collected on farmland in Massachusetts, there has been some data analysis for individual municipalities. In every case, both for Massachusetts towns as well as for towns around the nation, these Cost of Community Services (COCS) studies found that working agricultural land generates significantly more public revenues than they cost their municipality in public services.<sup>2</sup> A 2009 study conducted by American Farmland Trust in Deerfield, Massachusetts, for instance, found that for every \$1 paid in taxes by owners of that town's agricultural land, 33 cents of services were returned.

## Causes of Farmland Loss

Population growth, low-density development and sprawl, climate change, limited funding for preservation, insufficient technical support for farmers, a decline in the number of children who wish to follow in their farming family's career, and many other factors all create significant challenges to keeping land in farming, to ensuring availability of farmland for those who want to farm it, and to increasing food production to meet increasing demand.

<sup>1</sup> USDA NASS. (2015). *Land Values 2015 Summary: August 2015*. Accessed October 2015 from <http://goo.gl/uEDI5y>.

<sup>2</sup> American Farmland Trust. (2010). *Fact Sheet: Cost of Community Services Study*. Accessed October 2015 from <http://goo.gl/uL3Sgg>.

MassAudubon's 5<sup>th</sup> Edition of *Losing Ground: Planning for Resilience* indicates that 1.1 million acres of land, or 21 percent of Massachusetts, are developed, mostly in the eastern half of the State.<sup>3</sup> At the same time, the State's population has increased by three percent between 2010 and 2014, and is projected to increase by an additional 12 percent from 2010 to 2035. See demographics in the Food Access, Security, and Health section for more information. From 2005 to 2013, approximately 38,000 acres of land were converted to development in Massachusetts, translating to a loss of 13 acres per day through this eight-year period, which is significant given this time period includes the years of the Great Recession.<sup>4</sup>

Some of the State's best farmland – flat, open, and with nutrient-rich soil – is located in and along river valleys, often within floodplains. Climate change may threaten production on some of this farmland, and associated flooding could mean farmers having to abandon farm fields or change the types of crops grown. Climate change could drive farmers to seek less vulnerable farmland and could further increase the demand for farmland located away from river valleys and floodplains.

In addition to extreme weather events damaging farmland, climate change is projected to impact farmland in other ways, according to the EPA.<sup>5</sup> Warmer temperatures associated with climate change could cause some crops to grow faster, but that faster growth rate could reduce crop yields.<sup>6</sup> Increases in CO<sup>2</sup>, also associated with climate change, have been found in studies to decrease the quality of forage, meaning cattle and other grazing livestock have to eat more to get the same nutritional benefits.<sup>7</sup> Both these conditions could increase the need for more farmland and could intensify the demand for farmland overall.

### **Farmland Protection Programs and Strategies**

As of May 2015, there were 74,122 acres of permanently protected land whose primary purpose is agriculture, based on the Massachusetts Office of Geographic Information (MassGIS) data. The economic slow-down of the last decade slowed development and increased preservation -- according to the *Losing Ground* report using MassGIS data, from April 2005 through April 2013, 120,389 acres of land were permanently protected, or ten percent of all land that has ever been conserved in the State. Of the land permanently protected during this time, 12,567 acres of it was agricultural land or nearly a fifth of all agricultural land that has ever been conserved in the State.<sup>8</sup>

There are a number of farmland protection tools and programs available in the Commonwealth.

### **Agricultural Preservation Restriction (APR) Program**

About 71,000 acres are permanently protected by Statefunded APRs. Created by the Massachusetts Legislature in 1979, the APR program was the first program of its kind in the nation and has been a model for other states. The Program is designed to preserve and protect agricultural land, particularly with productive soil, from being developed, with an eye toward maintaining the value of land in the program at a level that can be supported by what can be produced on it.

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<sup>3</sup> Mass Audubon. (2014). *Losing Ground: Planning for Resilience*. Accessed October 2015 from <http://goo.gl/leuv6J>.

<sup>4</sup> Mass Audubon. (2014). *Losing Ground: Planning for Resilience*. Accessed October 2015 from <http://goo.gl/leuv6J>.

<sup>5</sup> US EPA. (n.d.) *Climate Change: Impacts: Climate Impacts in the Northeast*. Accessed October 2015 from <http://goo.gl/DuAkQi>.

<sup>6</sup> US EPA. (n.d.) *Climate Change: Impacts: Climate Impacts in the Northeast*. Accessed October 2015 from <http://goo.gl/DuAkQi>.

<sup>7</sup> US EPA. (n.d.) *Climate Change: Impacts: Climate Impacts in the Northeast*. Accessed October 2015 from <http://goo.gl/DuAkQi>.

<sup>8</sup> Mass Audubon. (2014). *Losing Ground: Planning for Resilience*. Accessed October 2015 from <http://goo.gl/leuv6J>.

The APR Program is voluntary and pays farmland owners the difference between the "fair market value" and the "agricultural value" of their farmland in exchange for a permanent deed restriction which precludes any use of the property that will have a negative impact on its agricultural viability. The program supports farming in the State by keeping farms in active use. APRs are often an important tool for farmers to use to transfer their farms to their children since reducing the value of land to its agricultural value greatly reduces inheritance taxes. At the same time, concerns have been raised about APR and other similar programs stripping equity from farms, leaving farmers with little to borrow against as they need funds for operating costs and infrastructure improvements.

### **Land Trusts**

Land trusts have been vital to protecting farmland across our State. Land trusts are typically nonprofit organizations that assist farmers and other landowners in protecting their land, often by holding the deed restriction to parcels of land and by overseeing stewardship of land under restrictions. There are approximately 135 land trusts in Massachusetts. According to MassGIS data, land trusts own approximately 123,250 acres in fee and an additional 87,000 acres in Conservation Restrictions and APRs.

### **Conservation Restrictions (CRs)**

A Conservation Restriction (CR) provides another way to protect land from development in perpetuity, through the sale of development or usage rights to a third party with agreed-upon terms. Landowners can opt to prevent any improvements at all on their land, or can use CRs to prevent development on the land while allowing other uses, such as growing crops, pasturing livestock, maple sugaring, and timber harvesting. The uses agreed upon by the land owner and the holder of the CR, typically a land trust, are contained in the deed to the land and are passed from one owner to the next.

### **Executive Order 193 (EO 193): Preservation of State-Owned Agricultural Land**

Issued in 1991, Executive Order 193 complements the APR program as a protective tool through which State agencies are directed to avoid and lessen the conversion of farmland. EO 193 seeks to reduce the extent to which State activities contribute to the conversion of agricultural land. State funds and Federal grants administered by the State cannot be used to encourage the conversion of agricultural land to other uses when feasible alternatives are available. State agencies controlling State-owned land suitable for agriculture are required to coordinate agricultural land management policy with EOEEA. MDAR negotiates agreements for mitigation of farmland loss.<sup>9</sup>

### **Community Preservation Act (CPA)**

Under MGL Chapter 44B, the Community Preservation Act (CPA) is a Massachusetts State law passed in 2000. Communities can adopt the CPA and create a local dedicated fund for the preservation of open space and historic resources, as well as the development of affordable housing and the purchase and development of outdoor recreational facilities.

Funds are raised locally through a surcharge on local property tax bills of up to three percent. Local adoption of CPA by a community triggers annual distributions from the State's Community Preservation Trust Fund, a statewide fund held by the Massachusetts DOR. Revenues from these two sources combine

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<sup>9</sup> American Farmland Trust. (2002). *Mitigation of Farmland Loss*. Retrieved October 2015, from <http://goo.gl/6W2sTM>.

to form a town's Community Preservation Fund. To date over 40 percent of the Commonwealth's municipalities have adopted CPA. Funds from CPA could become a powerful tool to help preserve farmland in towns across the State.

### **Transfer of Development Rights (TDRs)**

TDRs is a regulatory strategy that relies upon private market forces to help achieve smart growth. The two objectives that are achieved via TDRs, according to EOEEA, are open space protection and infill of existing population centers. Through a TDR, open space and natural resources, including farmland, are permanently protected via the transfer of some or all of the development to more suitable locations. The suitable locations, such as city and town centers, "become more vibrant and successful as the development potential from the protected resource areas is transferred to them." Essentially, development rights are transferred from a sending district to a receiving district to help achieve both open space and economic goals statewide. While allowed in some municipalities, TDRs are not widely used in the Commonwealth.

### **Farm Viability Enhancement Program (FVEP)**

This program offers farmers (except those enrolled in MDAR's APR Program, who have access to a complementary program solely available to farms in that Program) environmental, technical, and business planning assistance to expand, upgrade, and modernize their existing operations. Capital for the implementation of the improvements recommended in the viability plan is available in exchange for an agricultural covenant on the farm property for a fixed term of five or ten years.<sup>10</sup>

### **Farm Transition Planning**

It's not uncommon for farms in Massachusetts to be passed down through several generations. Farming is a way of life and farm families often keep their land in farming, ensuring future generations have access to land and a livelihood. But increasingly, children raised in farm families are choosing to leave the farm and pursue other livelihoods. In the case where a farm is passed from one generation to the next, sometimes complicated tax and estate questions can get deferred. But in the case where exiting farmers do not have an estate plan or an identified successor, understanding options and legal implications of selling the land and business can be challenging.

Farm transition planning is critical to helping farmers keep their land in farming. There are organizations that help farm families find innovative solutions to keep their farmland active, while addressing a number of legal, financial, and business issues. Some land trusts also have the skills to provide similar assistance to farmers. A relatively new free service to farm and other food system businesses is Conservation Law Foundation's Legal Services Food Hub. The program matches food system businesses that meet an income cap with pro bono legal services. The Legal Services Food Hub launched in Massachusetts in 2014, with an initial focus on cases involving transactional issues, such as land acquisition/transfer, estate issues, taxes, contracts, and incorporation, among other.

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<sup>10</sup> MA EOEEA. (2015). *Farm Viability Enhancement Program*. Webpage accessed October 2015 from <http://www.http://goo.gl/oVf56e>

## **Farmland Linking**

With the high demand for farmland and relatively little idle farmland to satisfy demand, some prospective and existing farmers are turning to farmland linking services to find land that suits their needs. While some land trusts and real estate agents have been serving this need informally, land linking services have formalized the process with online databases and other tools to list available land and to locate potential land. New England Small Farm Institute hosts New England Landlink, an online program to help farmers and landholders locate and transfer farms in New England. New Entry Sustainable Farming Project also offers an online matching service. Land for Good provides both farmers and land holders assistance with the successful transfer of land to preserve active agriculture.

## **Demand for Farmland**

The demand for farmland is somewhat difficult to quantify. A survey conducted in Franklin County and subsequently in Worcester County has obtained data to support the assertion that the demand for farmland outpaces the supply. The 2014 Franklin County Farm and Food System farmer survey of 134 farmers found that 39 of them were looking for a total of 47 parcels of land to farm, categorized by land type and size. The actual demand for farmland is likely much higher, since people look for land to begin new farming ventures were not counted in this survey. The most sought-after farmland was cropland, followed by pasture, hay, sugarbush, wood lots, and orchards. In contrast, only four farmers indicated they might have idle farmland they would be willing to lease. Preliminary findings of a similar farmer survey conducted by the Central Massachusetts Regional Planning Commission showed that of the 123 farmers who responded, 31 of them identified a total of 45 needs for additional farmland.

People are being creative order to find land. Prospective and existing farmers are looking to sources such as private non-farming land owners and State and municipal land as potential strategies for locating land, as described below.

## **Private Land**

There are initiatives in Massachusetts to identify good open land owned by non-farming private land owners and to approach land owners to determine their level of interest in leasing to a farmer. American Farmland Trust and Land for Good have partnered on an initiative to do this across New England and New York. The project will include a detailed landowner survey, with the twin purpose of identifying landowners who are interested in making their land available for farming, and testing landowner attitudes about constraints to doing so. There are likely opportunities to identify land owned by private entities and to broker relationships between willing owners and farmers.

## **State and Municipal Land**

There are 589,785 acres of permanently protected State-owned land, of which 15,029 acres are open land or farmland, based on 2015 MassGIS open space data and 2005 MassGIS land use data, the most current available. Currently only a small percent of this land is being farmed, based on information from MDAR's Bureau of Land Use State-Owned Farmland Licensing Program. There are currently only eight parcels listed with this program, ranging from 7.5 to 205 acres. Farmers who lease land through this program do so under an initial five-year lease with an option to renew for up to ten years. More land could be added to this inventory under MGL Chapter 128, section 7E, which allows for any State agencies and municipalities



owning land to develop contracts with MDAR's Bureau of Land Use which in turn facilitates leasing arrangements with farmers.

In addition to State-owned land, there is land owned by towns and cities across the State which could be made available to farmers via lease agreements.

**Article 97:** This amendment to the Massachusetts Constitution provides that "the people shall have the right to clean air and water, freedom from excessive and unnecessary noise, and the natural, scenic, historic, and esthetic qualities of their environment." "Lands and easements taken or acquired for such purposes shall not be used for other purposes or otherwise disposed of except by laws enacted by a two thirds vote" These public lands include both state-owned lands and municipal lands acquired for conservation or recreation purposes.

### **Land and Urban Agriculture**

Urban food growing can provide benefits to cities, such as cleaned up land, business development, and access to fresh food for low income community members. But in urban areas, affordable and available land for farming is scarce. Even in cities with vacant lots, challenges to farmers and community gardens accessing land include lack of ability and willingness of city officials to craft land lease or license agreements, contamination of land and associated costs for clean up, and regulations and ordinances that prohibit or over-regulate farming activities in cities.

In spite of the challenges of finding land for urban food production as well as the challenges of towns having a wide range of different zoning and regulations related to agriculture, urban farms, and community gardens are being established all over the State. In the Boston metro area for example, Boston, Brookline, Cambridge, and Somerville are home to over 200 community gardens and urban agriculture facilities. These facilities cover nearly 50 acres in total, and provide opportunities for community members and urban farmers to grow food and work the land.<sup>11</sup>

There are 26 designated Gateway Cities in the State, which have seen manufacturing and other jobs disappear and have been slow to draw investments in new businesses and jobs.<sup>12</sup> These cities may be good locations for siting new urban agriculture, especially on vacant land which may be quite affordable to buy or lease, and are eligible for economic assistance and targeted funding opportunities.

### **Workforce**

Workforce challenges related to land include the high cost and availability of land which inhibits farm growth, new businesses development, and associated jobs. The biggest area of need in the land segment of the food system is for technical assistance providers in the areas of water quality and management, land access, and land use, including conservation stewards. A focused effort to increase access to land and to keep farmland in farming would potentially increase the services that land trusts offer. This would likely expand expertise needed by staff.

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<sup>11</sup> USDA Census of Agriculture, USDA AMS, Farmland Information Center, City of Boston. (2012, 2013, 2014). *Production: Agricultural Land..* Accessed June 2015 from <http://goo.gl/kaDj1j>.

<sup>12</sup> MA EOHED. (2014). *Gateway Cities and Program Information*. Website accessed October 2015 from <http://goo.gl/uW77hh>.

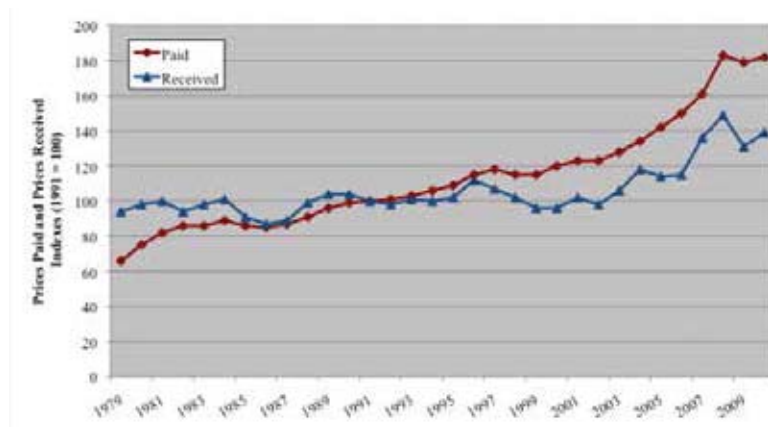


## Existing Conditions: **INPUTS**

Land-based food production requires some basic inputs: energy, water, soil, equipment, animal feed, and seeds. This section provides an overview of supply and demand for these items in Massachusetts.

### Summary Cost of Inputs

**Figure EC.9: Prices Received vs. Prices Paid for Farm Products and Farm Inputs, 2002-2012**



Although the prices received by farmers for all farm products increased by close to 50% between 1979 and 2010, the prices paid by farmers for inputs rose by nearly 300%.

Source: UMass Amherst and USDA Census of Agriculture 2012

### Energy

Food production requires energy, and energy costs in the Commonwealth are some of the highest in the nation. At the other end of the food chain, food waste has the potential to generate renewable energy, and there are already great examples of waste-to-energy production in the State. Renewable energy also offers the potential for an additional source of income and a way to reduce costs for farmers. This section explores the role of energy in farming and food production in Massachusetts.

#### **Farming, Food Production, and the Cost of Energy**

Use of energy in farming includes direct and indirect energy. Direct energy use includes electricity, fossil fuels, and renewable fuels for farm activities. Indirect energy use includes fuel to manufacture inputs such as fertilizers and pesticides. Petroleum-based fuel is the primary fuel used for both livestock and crop operations. It is used for crop tilling, harvesting, and other operations that require heavy machinery. Irrigation can also demand lots of energy, with electrical or fossil-fuel driven pumps used to transfer water from groundwater sources or from rivers or ponds.

In food production, energy is used to run processing facilities for washing, blanching, cooking, and flash freezing. After food is processed, it is held in cold storage or in non-temperature controlled storage facilities, both requiring energy. In the distribution system, energy is used to transport food and to power end use storage or preparation, such as in school kitchens, restaurants, grocery stores, and residences.

Energy costs directly impact the cost of food. The cost of electricity in New England is higher than any other area of the contiguous U.S, according to the U.S. Energy Information Administration. In 2014 the average price for electricity was 15.45 cents per kilowatt hour (KWH) in New England, while elsewhere in the country it ranged from 8.66 to 13.42 cents per KWH. The average price in Massachusetts over the last four years was 14.43 cents, slightly under the average 14.60 cents per KWH New England wide.<sup>1</sup>

Higher energy costs make it more expensive for farmers and other food system businesses in Massachusetts to buy power, resulting in a narrower margin for goods sold and less money in farmers' and food system business owners' pockets, higher food prices, and more challenges when competing with foods produced elsewhere.

In a snapshot of gasoline prices surveyed by the U.S. Energy Information Administration in April 2015, New England's gasoline prices were third-highest in the nation. Diesel fuel prices in New England over the last ten years were on average about five percent higher than those nationally.

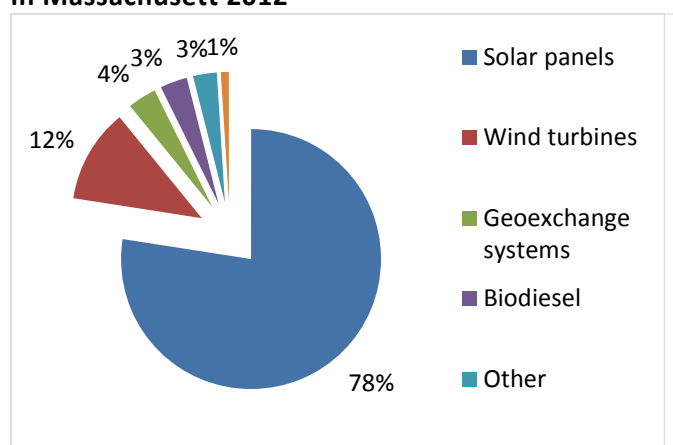
On average in 2012, over nine percent of Massachusetts farmers' production expenses are energy related, including the costs for gasoline, fuels, oils, and utilities.<sup>2</sup>

Transportation of food accounts for nearly 11 percent of greenhouse gasses emitted in the food supply chain.<sup>3</sup>

## On-Farm Energy Production

A key strategy for farms to be more profitable – and more resilient in the face of climate change and volatile energy prices – is to reduce the costs of fuel and electricity through on-site renewable energy generation. Upfront investment in infrastructure can be costly, but pays off over the long term.

**Figure EC.10: On-Farm Renewable Energy Sources in Massachusetts 2012**



Source: USDA Census of Agriculture - Table 52. Energy: 2012  
[http://www.agcensus.usda.gov/Publications/2012/Full\\_Report/Volume\\_1\\_Chapter\\_1\\_State\\_Level/Massachusetts/st25\\_1\\_051\\_052.pdf](http://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1_Chapter_1_State_Level/Massachusetts/st25_1_051_052.pdf).

**Solar panels are by far the most prevalent renewable energy technology on farms, making up 78% of the projects installed.**

**On-farm energy projects between 2009 and 2011 provided an average annual savings per farm of \$8,487 in energy efficiency in the state.**

[\(http://massfarmenergy.com/get-started/technical-resources/\)](http://massfarmenergy.com/get-started/technical-resources/)

<sup>1</sup> U.S. Energy Information Administration. (2015). *Electric Power Monthly*, Table 5.6.A. Website accessed August 2015 from <http://goo.gl/1xrHDv/>.

<sup>2</sup> USDA. (2012). *Census of Agriculture, Massachusetts*, Table 4. Accessed April 2015 from <http://goo.gl/Hpi9Yb>.

<sup>3</sup> Weber, Christopher L. and H. Scott Matthews. (2008). *Food-Miles and the Relative Climate Impacts of Food Choices in the United States*. Environ. Sci. Technol. 2008, 42, 3508-3513, Accessed on April 2015 from <http://goo.gl/Ai6rl9>.

MDAR's Farm Energy Program (MFEP) provides direct technical assistance through energy audits, renewable energy assessments, and incentives for implementation of audit recommendations with assistance from the CET.

Other renewable energy and energy efficiency programs targeted to farmers include MDAR's Agricultural Energy Grant Program, USDA's Rural Energy for America (REAP), and EQIP, administered by the USDA-NRCS. Commercial programs run by the Massachusetts CEC, Massachusetts DER, Mass Save®, and through the utilities also are available to farms and food system businesses.

Renewable energy can provide benefits to farms and to the environment including lowering operating costs and increasing profits over time, as well as lowering carbon emissions. The types of renewable energy used by farms vary, depending upon sites, needs, and goals. Technology available to maple sugaring operations includes heat recovery and steam-enhanced pre-heater units, reverse osmosis systems, and high-efficiency maple syrup evaporators. Technology for dairy operations, orchards, and vegetable farms includes high-efficiency refrigeration systems and energy-efficient ventilation.

## **Waste-to-Energy**

Food waste to energy conversion uses microorganisms to break down food waste and other organic materials, such as manure, in the absence of oxygen. The byproducts of this process are biogas and solids. The biogas is a mixture of methane and carbon dioxide which can be used to produce heat, electricity, or fuels for vehicles. Food waste-to-energy technology can be used by food manufacturers and distributors, as well as farmers and any other operations with food and other organic waste.

According to Massachusetts CEC, the benefits of organics-to-energy systems, which are usually sited on farms, food processing plants, or wastewater treatment facilities include:

- diversion of organic waste from landfills or incinerators;
- generation of renewable energy;
- reducing dependence on other fuels; and
- manufacturing of materials that improve soil health or productivity.

Anaerobic digesters, which convert organic waste into fuel that can be used for generating electricity, are located at some Massachusetts wastewater treatment facilities. Like other industrial uses, there are a number of barriers to building new anaerobic digesters facilities including financing, an uncertain market for high quality feedstock and for digestate (what's left over after the digestion process), and potential conflicts with neighbors. The greatest impediment is the uncertainty around the availability of high quality feedstock. In order to justify the expense of designing, permitting, building, and operating a facility, there must be a high quality, guaranteed waste stream. According to MassDEP, the majority of higher quality industrial, commercial, and institutional organic waste is already being diverted.<sup>4</sup>The 2014 Commercial Organic Material Waste Ban, described in this section, has the potential to spur further innovation and increased conversion of organic waste to energy.

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<sup>4</sup> Neale, Zoe. (2014). *Assessing Organics Processing Capacity*. BioCycle, October 2014. Webpage accessed November 2015 from <http://goo.gl/yYUQu5>.

### **Barriers to Renewable Energy Production in the Food System**

There are a number of barriers to siting renewable energy projects on farms and throughout the food system, including regulatory limitations, insufficient technical assistance and programs targeted to these sectors, and financing. Access to three-phase power in rural locations, prohibitive interconnection costs to link to the grid, and net-metering caps all limit the potential for continued expansion of renewable energy. Three phase power is needed for larger energy projects, but is frequently not available in rural locations. The costs to upgrade to three phase is often prohibitive. Even for smaller projects, costly upgrades to the distribution and transmission can make a project unfeasible. There can be the problem of “last one in pays” where once additional capacity is allocated, the next project is responsible for paying for the entire upgrade costs necessary to expand capacity. Finally, net-metering helps make solar energy systems feasible, but one utility in the State has already reached its net-metering cap and others are nearing their caps. This prevents new projects from coming online until either the caps are lifted or another policy solution is implemented.

Other barriers include upfront costs, uncertain incentives, and the time it takes to research, apply, and implement a project. Many of the programs require the proponent to pay for investments upfront and reimburse a portion of the project cost later, which may not work for some that would otherwise be interested. Rebates and incentives vary by utility and over time. For example, the federal business investment tax credit that provides a 30 percent credit for renewable energy systems is scheduled to fall to ten percent in 2016. Finally, most farmers don’t have the time to become experts in renewable energy programs and must rely on programs like MFEP to provide the expertise needed to navigate the array of programs, rebates, and technologies.

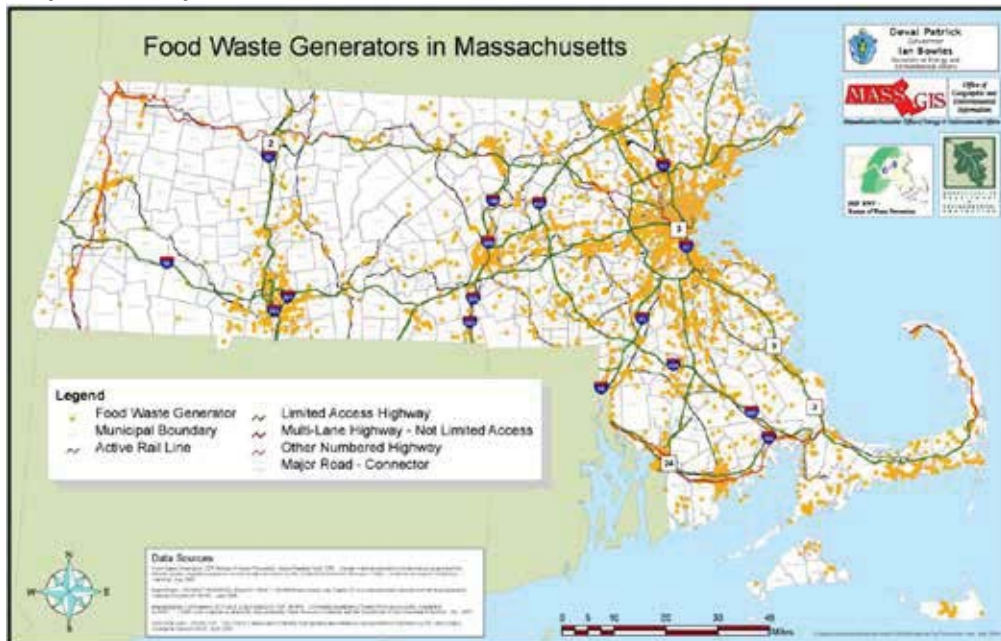
Siting renewable energy projects on prime farmland can bring conflict between the goals of expanding local energy production and farmland preservation. On-farm energy projects fall under the agricultural zoning exemption in MGL Chapter 40A, Section 3. Municipalities, however, interpret the exemption differently leading to inconsistent rules between towns. For lands under an APR, MDAR has a policy of allowing renewable energy facilities if 51 percent of the energy produced powers operations on the farm itself.

Other parts of the food system also are implementing renewable energy and energy efficiency projects to lower costs and emissions. Refrigeration and transportation are two significant energy users. There are a number of commercial programs that support investments in these sectors.

## Waste

### Waste Data

**Map EC.1: Major Food Waste Generators in Massachusetts**



Major food waste generators contribute nearly 950,000 tons of food waste per year.

Source: Massachusetts Department of Environmental Protection 2011 Study.

**Table EC.3: Summary Commercial/Institutional Food Waste Generation Data**

Generator Sector	# Listed in Database	% of Total Listed Generators	Average Food Waste Generation/Location (tons/year)	Estimated Total Generation (tons/year)	% of Total Generation
Food and Beverage Manufacturers/Processors*	836	12.2%	656	548,416	57.9%
Restaurants	3,833	55.9%	43	164,819	17.4%
Supermarkets and Grocery Stores	714	10.4%	146	104,244	11.0%
Wholesale Distributors*	500	7.3%	147	73,500	7.8%
Healthcare Facilities	672	9.8%	44	29,568	3.1%
Colleges/Universities	92	1.3%	209	19,228	2.0%
Resorts and Conference Facilities	181	2.6%	32	5,792	0.6%
Correctional Facilities	14	0.2%	123	1,722	0.2%
Independent Schools	19	0.3%	33	627	0.1%
	6,861	100.0%		947,916	100%

Food and beverage processors are the largest commercial/institutional food waste generators, generating nearly 58% of waste.

Source: Massachusetts Department of Environmental Protection 2011 Study. The original source for data in this spreadsheet is a 2002 study for MassDEP by Draper/Lennon, Inc. titled *Identification, Characterization, and Mapping of Food Waste and Food Waste Generators in Massachusetts*. The data was updated in summer 2011 by the U.S. Environmental Protection Agency Region 1 office.

\*Data not available for specific facilities, data point is sector wide estimate from 2002 report, "Identification, Characterization, and Mapping of Food Waste and Food Waste Generators in Massachusetts".

## **Waste Generation**

Food waste and other organic materials, such as processing plant waste, make up approximately 25 percent of all waste disposal in Massachusetts, or over 900,000 tons per year<sup>5</sup>. Sources of food waste generation include industrial facilities such as food processors and manufacturers; other commercial facilities such as supermarkets, restaurants, and colleges; and residents. Food disposed of in the solid waste stream ends up being burned in large-scale waste incinerators which emit pollutants, or buried in landfills which emit greenhouse gases.

There are a number of reasons for this large amount of waste. On farms, low market prices, pest infestations, and labor shortages can contribute to produce going unharvested. At the retail level, overly large portion sizes, expired sell-by dates, and damaged or imperfect goods contribute to unsold food. At home, impulse purchases, poor planning, and cooking too much all contribute to waste. For the average U.S. household of four, food waste amounts to an estimated \$1,350 to \$2,274 in annual losses.<sup>6</sup> A recent report found that nearly 40 percent of food in the U.S. goes uneaten and that reducing food losses by 15 percent would enable more than 25 million Americans access to food.<sup>7</sup>

A 2011 U.S. EPA study commissioned by MassDEP identified major generators of food waste in Massachusetts, concentrated in and around population centers, as shown in Map EC.1. With major food waste generators contributing nearly 900,000 tons of food waste per year,<sup>8</sup> diversion of food waste from the solid waste stream is key to reducing the State's overall solid waste disposal.

## **Waste Diversion**

The EPA and MassDEP estimate that less than ten percent of food waste in Massachusetts is currently diverted from disposal. A portion of this food waste is being diverted through methods other than composting, such as food donation and sending food waste to animal feed operations, industrial uses, and anaerobic digestion facilities. In the Massachusetts 2010-2020 Solid Waste Master Plan, MassDEP set goals of reducing total solid waste disposal by 30 percent and diverting at least 35 percent of source separated organics from disposal by 2020.

General permits are by issued MassDEP for aerobic or anaerobic digestion operations that receive no more than 100 tons per day of organic material from on or off site, based on a 30 day rolling average. Above those limits, digesters require a separate conversion facility permit from MassDEP.

According to MassDEP, there are currently about 30 permitted composting and anaerobic digestion operations accepting food materials in Massachusetts, with a combined permitted capacity to accept nearly 150,000 tons of organic material per year. The recent passage of the Commercial Organic Material Waste Ban in Massachusetts is likely to cause a significant increase in food waste utilization businesses, such as large-scale composting, anaerobic digestion, and animal feed production.

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<sup>5</sup> MA Department of Environmental Protection. (2015). *Fact Sheet: Food Waste Composting*, accessed April 2015 from <http://goo.gl/sgtXFq>.

<sup>6</sup> Gunders, Dana. (2012). *Wasted: How America is Losing Up to 40 Percent of Its Food from Farm to Fork to Landfill*. NRDC Issue Paper, August 2012. Accessed November 2015 from <https://goo.gl/3DIKv2>.

<sup>7</sup> Gunders, Dana. (2012). *Wasted: How America is Losing Up to 40 Percent of Its Food from Farm to Fork to Landfill*. NRDC Issue Paper, August 2012. Accessed November 2015 from <https://goo.gl/3DIKv2>.

<sup>8</sup> MA Department of Environmental Protection. (2015). *Fact Sheet: Food Waste Composting*. Accessed April 2015 from <http://goo.gl/sgtXFq>.



## Food Waste Ban

In October 2014, the Commonwealth took a significant step to reduce food waste in the solid waste stream, with a goal to divert 450,000 tons of food waste each year from landfills and incinerators. The Commercial Organic Material Waste Ban, commonly known as the Food Waste Ban, prohibits businesses and institutions from disposing one ton or more of food waste per via the solid waste stream. MassDEP estimates 1,700 entities may be subject to the ban.

The State has put in place programs and funding to help with the successful implementation of the Food Waste Ban. RecyclingWorks in Massachusetts, funded by MassDEP, is providing no-cost technical assistance to businesses and institutions to establish food waste diversion programs. The Commonwealth has also made \$3 million in low-interest loans for private companies to build anaerobic digestion facilities and \$1 million in grants for anaerobic digestion to public entities through MassDEP's Sustainable Materials Recovery Grant Program.

The Food Waste Ban has the potential to realize significant benefits including increased composting and improved soil fertility, decreased fossil fuel use, and improved air quality through the reduction in the amount of materials being incinerated, and economic and workforce development for the new businesses that will likely spring up to meet the need for food waste handling.



### Food Waste Reduction, Recovery, and Rescue

The US EPA's Food Recovery Hierarchy provides guidance on reducing food waste. Reducing surplus food in the first place is the most preferred action in this model, as well as making sure that good and edible food being used to feed people in need.

Businesses and institutions can take steps to reduce food waste from production, processing, and distribution, such as more accurate inventorying and ordering, better training of food processing workers, and improved storage techniques, to name a few.

Even with effective food waste reduction practices, surplus food may still be generated during production, processing, and distribution. In this case, there are often opportunities for the surplus food to be donated or re-purposed. The emergency food system accepts surplus food and food donations of overstocked or items nearing their sell-by dates from food system businesses. These donations serve the double duty of keeping good food from being wasted and keeping people from going hungry.

Despite federal tax breaks and a federal liability protection law, The Bill Emerson Good Samaritan Food Donation Act, significant quantities of safe food are being disposed of rather than donated. Surplus prepared foods are a growing share of redirected foods, but sometimes local boards of health and inadequate training about how to comply with food preparation and storage regulations can be barriers to additional re-use of prepared foods.



Many food pantries and donation distribution organizations have limited refrigeration capacity, which reduces the amount of fresh foods that can be utilized. Sell-by dates are another frequently misunderstood barrier to donation. The Harvard Food Law and Policy Clinic has found that while Massachusetts has one of the strictest labeling laws in the country, sell-by dates set by manufacturers are based on freshness, as opposed to food safety.<sup>9</sup>

While food donated to food banks and pantries is often processed and frequently not highly nutritious, whole, fresh food is also being donated by farmers, grocers, and other organizations. Some farmers have long-standing relationships with their local food pantry or church to donate surplus food. Some farms also have as part of their mission to help provide access to underserved populations.

Groups across the State are also finding ways to rescue fresh, whole surplus food – food that is left in the field or on the tree – from spoilage. With organized volunteer networks, gleaning organizations form relationships with growers and are contacted when there are surplus crops available for harvest. Gleaners mobilize and harvest the crops, which are then typically donated to food pantries.

### **Compost**

Waste, sometimes thought of as the end of the food cycle, can in fact be just the beginning. Food and organic waste can be converted to compost providing nutrients and improved soil quality, which in turn can help sustain farms, food system businesses, and our environment.

Composting is a process that breaks down organic material diverted from the waste stream, such as food scraps, leaves, manure, food processing residuals such as whey, and other materials, into a soil enrichment amendment. Composting is a valuable method to recover nutrients from food scraps and other organic material and recycle them, enriching and cleaning soils, reducing the need for chemical fertilizers, and reducing pollution by diverting waste from landfills and incinerators.

Composting can have a positive effect on farm viability, through improved soil fertility and as an additional source of income, and decreasing the need for water and chemical fertilizers. More community-wide composting can also mean increased jobs and more household composting can mean more productive home vegetable gardens.

Composting of agricultural wastes generated on a farm is a common agricultural activity. When farms compost waste generated from sources off the farm, they are engaged in a solid waste management activity and may be subject to regulatory control. Agricultural composting on a farm is considered to be exempt from MassDEP general permit of composting permit requirements, provided that the owner and operator comply with the MDAR's compost program guidelines. MDAR registers agricultural compost operations annually and provides education and technical assistance to operators.

As of November 2014, MassDEP listed 49 facilities in Massachusetts accepting 15 to 30 tons per day of diverted food materials. Farm-based composters receiving less than 105 tons per week are exempt from MassDEP permitting requirements and are only required to register with MDAR.

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<sup>9</sup> Broad Leib, Emily, et. al. (2013). *The Dating Game: How Confusing Food Date Labels Lead to Food Waste in America*. NRDC Report, September 2013. Accessed April 2015 from <http://goo.gl/6INUP4>.

Municipalities are implementing composting programs as well. As of 2014, three communities, Hamilton, Wenham, and Manchester-by-the-Sea, have full curbside composting. Three other communities, Ipswich, Salem, and Cambridge, have pilot programs, which may require residents to pay for the pickup service or only involve a certain area of a city.<sup>10</sup>

## **Wastewater**

In addition to food waste, there are other waste streams related to food, including wastewater from sewage treatment plants and from food processing plants. Water can be recycled and reused on site, such as in a processing facility where water used to process food can be captured and reused for a cooling process. Another example of water reuse is the use of gray water, reusable, nonhazardous wastewater that can be reused on site, typically for landscape irrigation.<sup>11</sup>

## **Water**

The Commonwealth has a relative abundance of surface and ground water, compared with other parts of the country. California has recently been experiencing “the drought of the century,” and there are water shortages around the world.<sup>12</sup> According to the United Nations, water use has grown at more than twice the rate of population increase in the last century.<sup>13</sup> Although we currently receive sufficient annual precipitation to meet most human and ecosystem needs, at least two river basins are frequently in low-flow conditions, with the Ipswich River notoriously slowing to a trickle in years past. Climate change models are predicting warmer climates for New England, with periods of floods and droughts likely. Another threat to water resources in the State and New England is the potential for it to be tapped by large corporations, intending to extract and sell bottled water.

### **Water Use in Farming**

Water used in agriculture activities account for 80 percent of freshwater consumed in the U.S. and over 90 percent in many western states.<sup>14</sup> In Massachusetts, irrigation of farmland has risen. In 2012, about 24,000 acres of farmland were irrigated, up from about 18,000 in 1974.<sup>15</sup>

The quantity of water withdrawn from surface and groundwater sources for agricultural and other uses is regulated by MassDEP under the Water Management Act (WMA), MGL Chapter 21G, which took effect in 1986. The purpose of the WMA is to ensure adequate water supplies for current and future needs. The threshold for registration of water withdrawals is an average use of 100,000 gallons per day for three consecutive months of the year or nine million gallons over a three-month period.<sup>16</sup> When this threshold is reached, a permit is required from MassDEP.

While MassDEP regulates water withdrawals, they do not publish the location or annual withdrawal amounts. However, the United States Geological Survey (USGS) National Water Use Information Program

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<sup>10</sup> Sustainable Cities Network (2014). Massachusetts Prepares for Mandatory Composting. Accessed April 2015 from <http://goo.gl/EQphe2>.

<sup>11</sup> US Environmental Protection Agency (2015). *Water Recycling and Reuse: The Environmental Benefits*. Accessed April, 2015 from <http://goo.gl/63jDYU>.

<sup>12</sup> State of California. (2015). *State Water Board Adopts 25 Percent Mandatory Water Conservation Regulation*. Accessed May 2015 from <http://goo.gl/vBmXqb>.

<sup>13</sup> National Geographic (2015). *Freshwater Crisis*. Webpage accessed April 2015 from <http://goo.gl/uNfrR4>.

<sup>14</sup> USDA (2015). *Irrigation & Water Use*. Webpage accessed April 2015 from <http://goo.gl/UuxEUZ>.

<sup>15</sup> UMass Extension. (2012). *Massachusetts Agricultural Census 2012: Land in Farms*. Accessed April 2015 from <http://goo.gl/5QZ0xR>.

<sup>16</sup> MA EOEEA. (2015). *BRP WM 03 – Water Management Withdrawals Permits*. Webpage accessed April 2015 from <http://goo.gl/R7ymgj>.

compiles and publishes the nation's and state-by-state water-use data.<sup>17</sup> The 2010 report estimates that Massachusetts used 139 million gallons of water per day for irrigation, and 1.4 million gallons per day for livestock.<sup>18</sup> Farmers employ many water conservation techniques and best practices, such as using high efficiency irrigation systems and building the organic content of soil that reduces the need for additional irrigation.

Farming in urban settings brings with it its own set of challenges, such as limited access to water sources. While water in more rural settings is relatively abundant, water access in urban areas is often limited to municipal sources. Urban agriculture projects are sometimes required to shoulder unaffordable connection costs to link to municipal system.

### **Water Use and Food Processing**

Food processing is another sector of the food system that uses substantial amounts of water. Using USGS's median value of 469 gallons of water used per employee per day for food processing facilities in the United States and methodology from the Vermont Farm to Plate Plan, a total water usage per day can be estimated. Massachusetts has 27,485 food processing workers. Multiplying this number by the USGS median value of 469 gallons of water per day, food processing facilities in Massachusetts use nearly 13 million gallons of water used per day. Opportunities exist for food processors to conserve water through recycling or grey water systems.

### **Water Quality and Non-Point Source Pollution**

In many cases farms in rural settings help to reduce stormwater runoff with vegetated buffers, wetlands, and other open spaces, providing a sponge to absorb runoff from farm fields to rivers and lakes. But agriculture and other food-sector activities can also diminish water quality if operations are not in compliance with applicable laws and regulations. Though it has not been fully analyzed or quantified in Massachusetts, agricultural runoff can be a major contributor to water pollution. Technical assistance and grant programs are attempting to reduce this type of pollution. One of the largest USDA grants of 2015 includes \$10 million to be used along the Connecticut River Valley to address agricultural runoff and other water pollution causes.

### **Farming and the Wetlands Protection Act**

Because of the important ecological services and habitat that wetlands provide, they are protected by the Massachusetts Wetlands Protection Act [WPA (MGL Ch. 131 Section 40)] and its companion regulations (310 CMR 10.00). MassDEP and municipal conservation commissions are charged with enforcing the WPA. In addition, about one-third of municipalities have local wetland protection bylaws that provide additional protections and requirements beyond those in the statewide law. The WPA and local bylaws regulate the activity that is allowed in the defined wetland jurisdictional areas.

Certain activities are exempt from the WPA, including agricultural activities. The WPA specifies the sort of agricultural activities that are exempt – activities must be for “...the normal maintenance or improvement

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<sup>17</sup> United States Geological Survey. (2015). *USGS Water Use Data for Massachusetts*. Webpage Accessed April 2015 from <http://goo.gl/x1rEkn>.

<sup>18</sup> Maupin, Molley A, et. al. (2014). *Estimating Use of Water in the United States in 2010*. USGS Circular 1405. Accessed April 2015 from <http://goo.gl/6OfnF4>.

of land in agricultural or aquacultural use” (310 CMR 10.04). Expanding agricultural uses into areas not presently farmed are not covered by the exemption, even in the case where agriculture had historically occurred, but had been abandoned for more than five years. Conflicts have arisen between farmers and local conservation commissions over interpretations of what constitutes a normal agricultural activity with regard to wetlands regulations.

## Other Inputs

### Soil

Soil is one of the Commonwealth’s greatest assets in terms of food production. As described earlier in the Land section, the State has some of the best agricultural soils in the world. Soils are mapped in the State using soils surveys from USDA-NRCS. Prime Farmland is comprised of three important farmland categories that are best suited for agriculture. Prime Farmland is determined based upon physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. In general, prime farmland soils have adequate and dependable precipitation, a favorable temperature and growing season, acceptable acidity or alkalinity, and few or no surface stones. They are permeable to water and air. Prime farmland soils are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding.

According to MassGIS data, there are 1,338,907 acres of prime farmland, land most suitable for agricultural production or soils of statewide importance, important for the production of food, feed, fiber, forage, and oil seed crops.<sup>19</sup> Of the 1,338,907 acres, 168,216 acres are in farming (cropland, pasture or orchard), 627,873 are covered in forest, and 287,367 are residential<sup>20</sup>. Given the number of acres of land in forest on prime farmland or soils of statewide importance, there are likely opportunities to clear forest adjacent to existing farms as to create more farmland. A challenge to this strategy is that the woodlots on farms are often a source of fuel for wood heat or income from timber harvest for lumber or firewood.

### Soil Fertility and Amendments

Healthy soil is critical to good crop yields. Soil fertility can be achieved using compost as discussed earlier in this section. Along with organic farming practices and the use of soil amendments including manure, farmers also use fertilizers and soil conditioners. In Massachusetts, 3.5 percent of farm input costs were spent on fertilizers and other synthetic soil amendments in 2012. In comparison, only 3.2 percent was spent in 2007.<sup>21</sup> The USDA Census of Agriculture 2012 indicates that farms in the Commonwealth used manure as a fertilizer on about 24,400 acres, down from 32,200 acres in 2007, and commercial fertilizer, lime, and soil conditioners on approximately 86,000 acres in 2012, down from 98,000 acres in 2007.<sup>22</sup>

According to Vermont Farm to Plate, inorganic fertilizer use in the U.S. has increased at the same time that cropland in use has decreased. The implementation of the Food Waste Ban may have the positive effect of

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<sup>19</sup> USDA Natural Resources Conservation Service. (2012). *MassGIS Data - NRCS SSURGO-Certified Soils*. Webpage accessed November 2015 from <http://goo.gl/RfPzVY>.

<sup>20</sup> MassGIS. (2005). *MassGIS Data - Land Use (2005)*. Accessed November 2015 from <http://goo.gl/qXrYZ5>.

<sup>21</sup> USDA. (2012). *Census of Agriculture, Massachusetts, Table 4*. Accessed April 2015 from <http://goo.gl/eODZf1>.

<sup>22</sup> USDA. (2012). *Census of Agriculture, Massachusetts, Table 49*. Accessed April 2015 from <http://goo.gl/xPTCty>.

making more compost available to farms and at a price that may encourage farmers to reduce chemical fertilizers. Soil amendments can also be obtained from seafood and aquaculture waste.

Erosion from wind, rain, and flooding can negatively impact soil fertility and cause the loss of topsoil, decreasing soil health. Soil fertility can also be negatively impacted by contamination, particularly in urban settings where vehicle exhaust and emissions from manufacturing have been absorbed by the soil over the course of decades.

### **Pollinators and Our Food System**

Bees and other insects play a critical role in pollinating crops and much of the food system depends on their contributions. From an economic and environmental perspective, maintaining healthy pollinator populations is crucial. According to USDA-NRCS, the over 3,500 species of native bees (often called pollen bees) help increase crop yields and may serve as important insurance when cultivated European honey bees are not available. Without pollinators, many of the foods we are used to enjoying would vanish (onions, beets, broccoli, peppers, carrots, strawberries, and apples, to name a few).

Honey bees, however, have experienced a variety of threats including Colony Collapse Disorder – with some hives experiencing up to 90 percent losses. Loss of habitat, pathogens, parasites, and pesticides may all be playing a role contributing to Colony Collapse Disorder. The decline of pollinators has been studied with increased intensity in recent years, with scientists looking at the relationship between pollinator health and variables such as the increased use of herbicides and the decline of plants that support pollinators. There is a debate about the link between the decline of honey bees and other pollinators to the chemicals contained in many common herbicides. A number of federal, State, and private research projects are underway to better understand the causes of Colony Collapse Disorder, but certain actions can be taken now to support healthy populations of pollinators.

Common practices farmers use to help protect pollinator populations<sup>23</sup> include:

- ✓ planting hedgerows/windrows of pollinator plants such as milkweed, coneflower and others.
- ✓ properly applying chemicals; and
- ✓ using flowering cover crops to support bees.

### **Animal Feed**

Massachusetts does not produce much animal feed, given the large amount of acreage needed to grow it. Because farmers don't produce much of their own animal feed, they are at the whim of the broader market as far as prices are concerned. In some cases, the fluctuating costs of animal feed had led farms to transition to grass-based livestock.

In 2012, farmers in Massachusetts purchased \$50,732,000 in animal feed. This amount increased from 2007, when \$45,134,000 was purchased, but the percent of total farm expenses made up by animal feed decreased slightly, from 9.8 percent in 2007 to 9.4 percent in 2012.<sup>24</sup>

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<sup>23</sup> Vaughan, Mace, et.al. (2015). *Farming for Bees: Guidelines for Providing Native Bee Habitat on Farms*. Accessed April 2015 from <http://goo.gl/sh2Wzo>.

<sup>24</sup> USDA. (2012). *Census of Agriculture, Massachusetts, Table 4*. Accessed April 2015 from <http://goo.gl/eODZf1>.

## **Seeds**

Seeds are a vital input, along with sun, water, and soil, for growing food. The world has seen increasing corporate ownership of seeds, with a few big companies owning a larger and larger share of our seeds – many of them genetically engineered, particularly those for commodity crops. This trend has driven the price up for farmers. For example, since the USDA's National Agricultural Statistics Service (NASS) began collecting information on prices for biotechnology-derived corn seeds in 2001, seed expenses have risen 67 percent.

Going hand-in-hand with this trend, the tradition of seed-saving declined in the 20<sup>th</sup> century. In recent years though, there has been a resurgence of seed saving and seed libraries, as people try to regain control of seeds and food. There are several seed libraries in the State and informal networks of seed savers and seed swaps.

According to the USDA Census of Agriculture 2012, seeds and plants bought by farmers in the Massachusetts were valued at \$39,460,000, which was 7.3 percent of their total expenses.

## **Farm Implement Sales and Repair**

Like many other industries, there has been significant consolidation of farm implement sales and repair services. Where rural towns used to have their own equipment dealers and repair people, very few remain, leaving farmers to develop these skills on their own or rely on mechanics who may not have experience with specialized farm equipment.

## **Workforce**

Workforce challenges related to inputs include:

- The State's recently implemented Food Waste Ban brings with it potential for increased businesses and jobs, but the market for anaerobic digestion byproducts is immature, constraining new business and workforce development.
- Energy price spikes can cause fluctuations in food system businesses and employment.

The biggest area of need in the inputs segment of the food system is for technical assistance providers in the areas of food waste management (particularly generation) and energy efficiency/renewable energy.

Potential for job growth in the inputs area of the food system is good. Food waste management and anaerobic digester technology hold some potential for agribusiness development and job growth. This is likely a longer term expansion, but there may be technical assistance work developing in the shorter term. On-farm renewable energy installation and maintenance work may also increase, as more farmers recognize renewable energy as a path to lower inputs cost and a potential additional income stream.

Technical assistance with regulatory compliance is critical. Current staffing levels for these kinds of services at an array of federal, State, and nonprofit agencies have been identified as insufficient and additional personnel are needed.

## Existing Conditions: **FARMING**

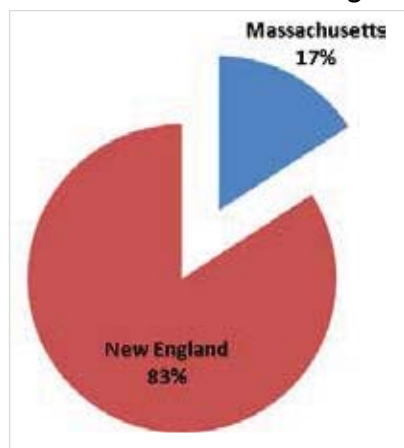
Increasing food production in the Commonwealth is one of the explicit purposes of this planning project. As such, farms, land, and farm workers are of particular importance. While much of our food production occurs in rural landscapes, food growing in our urban areas is an increasingly vital part of our food economy. For the purposes of this plan, all agriculture, regardless of where it happens, is classified as farming. Urban agriculture, including farming and community gardens, is a particularly important vehicle for getting fresh produce to people with limited access, and is an essential element for training some of the next generation of farmers and food entrepreneurs.

### Farming Data and Trends

This section examines the economic impact of farming, educational and technical assistance needed by farmers, and the regulatory and financial support necessary for thriving farm businesses.

#### Economic Data

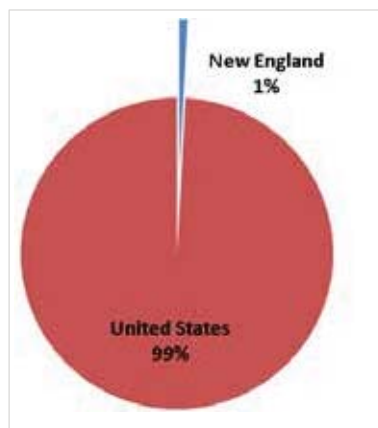
**Figure EC.11: Agricultural Production Value in New England**



Source: Massachusetts Department of Agricultural Resources.

Agricultural goods from Massachusetts make up 17% of New England's agricultural production.

**Figure EC.12: Agricultural Production Value in the United States**



Source: Massachusetts Department of Agricultural Resources.

Agricultural goods from Massachusetts make up only 1% of the nation's agricultural production.



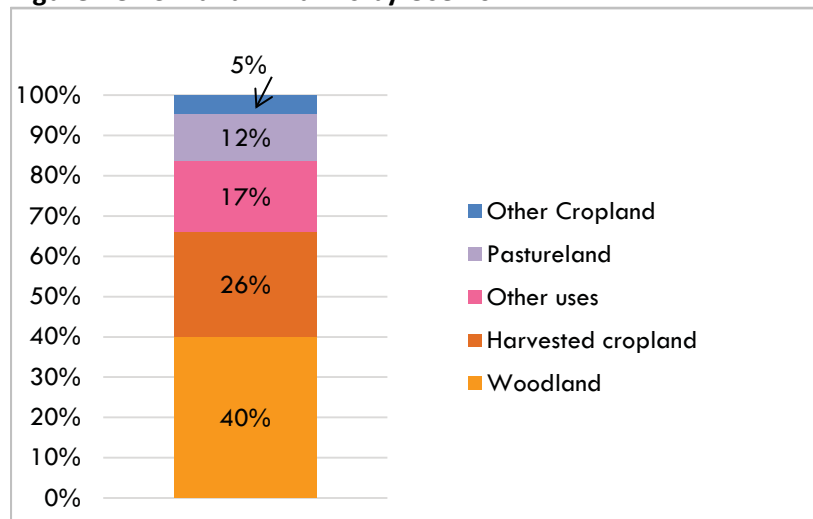
**Table EC.4: Massachusetts Economic Impacts of Agriculture**

SECTOR	DIRECT SALES	ECONOMIC IMPACT
	\$ million	\$ million
<b>AGRICULTURAL PRODUCTION</b>		
Vegetable and melon farming	77.3	122.9
Fruit farming (includes cranberries)	132.7	213.1
Greenhouse, nursery and floriculture production	164.9	255.2
Tobacco farming	21.9	39.0
Cattle ranching and farming	10.6	13.9
Dairy cattle and milk production	43.4	55.5
Poultry and egg production	10.5	14.2
Other livestock	47.2	62.6
Other crop farming	54.2	89.2
Support activities for agriculture	51.9	100.1
<b>Subtotal</b>	<b>614.6</b>	<b>965.7</b>

Source: *Northeast Economic Engine: Agriculture, Forest Products and Commercial Fishing, Farm Credit East, 2015.*

Greenhouse, nursery and floriculture production generates the largest direct sales of the agricultural sectors - about \$165M in 2014.

**Figure EC.13: Land in Farms by Use 2012**



Source: *USDA Census of Agriculture, 2012, Table 37. Specified Crops by Acres Harvested.*

Woodland makes up 40% of all land in farms and harvested cropland makes up 26%.

**Table EC.5: Land in Farms by Commodity Type 2002-2012**

Commodity	Acres	Percent of Total	Farms
Hay	116,980	22.3%	1097
Fruit, tree nuts and berries	80,568	15.4%	779
Dairy cattle and milk production	50,367	9.6%	147
Vegetable and melon	42,248	8.1%	923
Other crop	42,024	8.0%	394
Horse and other equine production	40,968	7.8%	1183
Beef cattle ranching and farming	37,967	7.3%	628
Greenhouse, nursery, floriculture	34,886	6.7%	968
Sheep and goat farming	24,278	4.6%	365
Other animal production	17,988	3.4%	440
Poultry and egg production	15,851	3.0%	380
Oilseed and grain farming	7,375	1.4%	41
Hog and pig farming	7,128	1.4%	135
Animal aquaculture	1,809	0.3%	175
Tobacco farming	1,672	0.3%	11
Apiculture	1,508	0.3%	89
<b>Total</b>	<b>523,517</b>	<b>100%</b>	<b>7755</b>

*Source: UMass Amherst, Massachusetts Agricultural Census 2012.*

Excluding woodland, hay uses about 22% of farmland and fruit, tree nuts and berries us about 15%.

#### Census of Agriculture Definitions:

**Harvested Cropland:** includes land from which crops were harvested and hay was cut, short-rotation woody crops, Christmas trees, and land in orchards, groves, vineyards, berries, nurseries, and greenhouses.

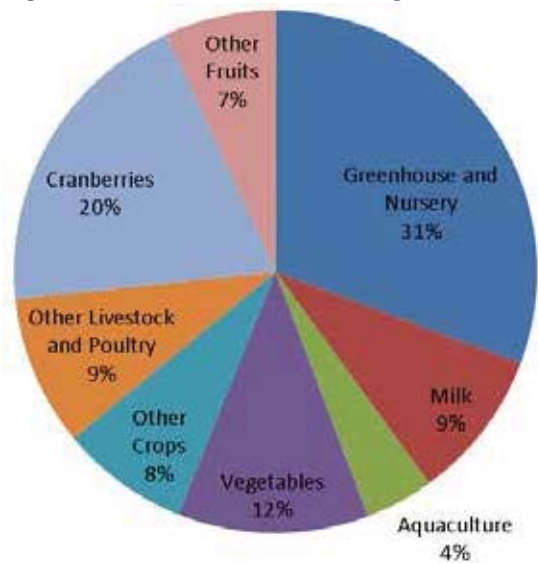
**Other Cropland:** This includes all cropland other than harvested cropland or other pasture and grazing land that could have been used for crops without additional improvements. It includes cropland idle, used for cover crops or soil improvement, cropland which all crops failed or were abandoned, and cropland in cultivated summer fallow.

**Other Uses:** Not defined

**Pastureland:** Grazable land

**Woodland:** natural or planted woodlots or timber tracts, cutover and deforested land with young growth which has or will have value for wood products and woodland pastured.

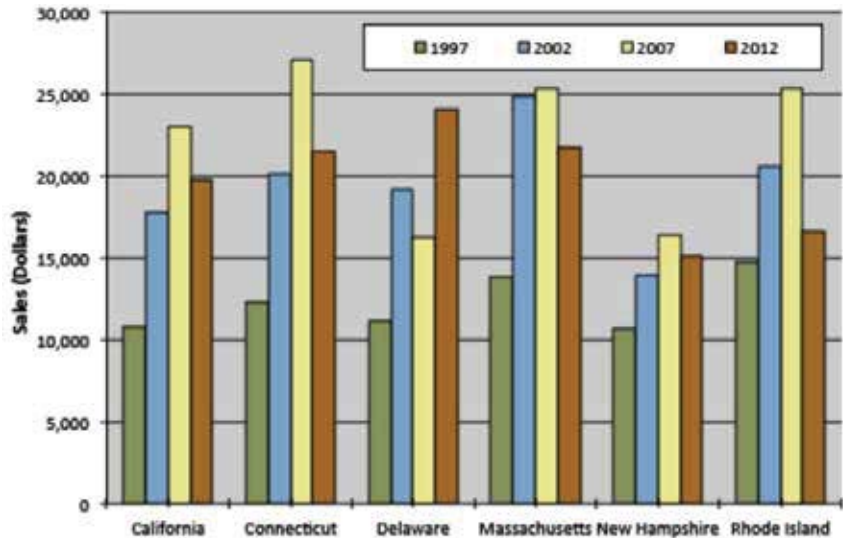
Figure EC.14: Massachusetts Agricultural Output 2012



In terms of dollars per commodity, green house and nursery comprise 31% while cranberries comprise 20%.

Source: MDAR and New England Agricultural Statistics 2012

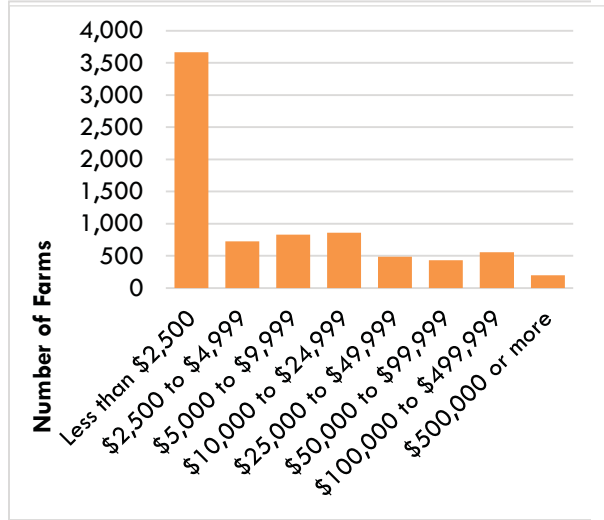
Figure EC.15: Average per Farm Agricultural Sales Direct to Consumers 1997 - 2012



Massachusetts was 3rd in the nation in the average per-farm value of agricultural products sold directly to consumers - nearly \$22,000

Source: Center for Agriculture, Food and the Environment UMass Amherst, USDA Census of Agriculture.

**Figure EC.16: Farms by Value of Sales in 2012**



About two thirds of Massachusetts farms gross less than \$10,000 in market value from their products

Source: USDA Census of Agriculture 2012, Table 1. Historical Highlights.

**Table EC.6: Percent Change in Gross Market Value of Sales for Farms 2002-2012**

Gross Market Value	2002	2012	# change	% change
Less than \$2,500	2,592	3,663	1,071	41%
\$2,500-\$4,999	647	727	80	12%
\$5,000 - \$9,999	623	828	205	33%
\$10,000 - \$24,999	715	861	146	20%
\$25,000 - \$49,999	422	486	64	15%
\$50,000 - \$99,999	385	432	47	12%
\$100,000 - \$499,999	556	558	2	0%
\$500,000 or more	135	200	65	48%
<b>Total # of farms</b>	<b>6,075</b>	<b>7,755</b>	<b>1,680</b>	<b>28%</b>

Source: USDA Census of Agriculture 2012.

Two thirds of Massachusetts farms gross less than \$10,000 in market value from their products. On the other end of the spectrum, there are 200 farms with \$500,000 sales and above, representing 3% of all farms in the state but 61% of all gross sales.

### **Economic Impact of Farming**

There was over \$614 million in sales related to agricultural production with an economic impact of over \$965 million in Massachusetts in 2014 (Figure EC.4). Subtracting out tobacco and greenhouse sales, agricultural sales in the State were over \$427 million, with an economic impact of \$671 million. See Table EC.4 for more information.

Massachusetts is a national leader in direct to consumer sales. Massachusetts was fifth in the nation for total direct to consumer sales<sup>1</sup> and third in the nation for the average per-farm agricultural products sold

<sup>1</sup> USDA. (2012). *Census of Agriculture: Farmers Marketing*. Accessed November 2015 from <http://goo.gl/6flMM2>.

directly to consumers. Despite the State's high standing, 2012 direct sales were actually down 14 percent compared to 2007.<sup>2</sup>

According to USDA, costs related to food production include marketing, processing, wholesaling, distribution, and retailing, and account for more than 80 cents of every food dollar spent in the United States. After these costs, farmers receive a little less than 11 cents on the dollar that consumers spend on food.

### **Number of Farms**

Across the United States, the acreage of farmland decreased one percent and the number of farms decreased four percent between 2007 and 2012. Massachusetts, however, was one of only ten states during that time that saw an increase in both land in farms and number of farms by about one percent each. There were 7,755 farms in the State in 2012, up just under one percent from 7,691 in 2007, and up almost 28 percent from 2002, when there were 6,075 farms in the State. The acres of land in farms in the State was 523,517 in 2012, up from 517,879 in 2007.<sup>3</sup>

### **Farms by Agricultural Use**

Farms are defined by a variety of agricultural uses, including cropland, woodland, pastureland, and other uses. Woodland makes up the largest percent of the total land in farms. It is important to note that these numbers for agricultural production don't translate equally into those for food production, since so much of the State's agricultural output is in the form of forest and nursery products. Even the harvested cropland category represents more than just food, including items such as hay and Christmas trees. Even in the narrow context of a food plan, though, it is worth noting these broader numbers, as many farmers rely on these kinds of agriculture to support their farms' food production and keep their operations viable.

It is important to acknowledge in talking about food agriculture that many of the issues raised in this plan – land and the environment, in particular, as well as regulatory considerations – are also critical concerns for non-food agricultural sectors, such as forestry and nurseries, as well as the equine industry.

### **Farms by Product Types and Agricultural Output**

Diversity is a common characteristic of Massachusetts farms. Many farmers who produce vegetables, for instance, to also tap their sugarbush for maple syrup, cut trees for firewood, or raise bees for honey. Anecdotal evidence points to a shift in the products produced as farmers age or as certain types of farms go out of business. For examples, some dairy farms sell their herds but stay in farming by transitioning to growing hay.

The largest segment of agricultural output based on dollars per commodity in the State in 2012 was greenhouse and nursery, making up 31 percent of the output, this according to MDAR and NASS 2012. Cranberries was next largest at 20 percent, following by vegetables at 12 percent. The other 37 percent of the agricultural output included livestock and poultry, milk, other crops, other fruits, and aquaculture.

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<sup>2</sup> Center for Agriculture, Food and the Environment UMass Amherst. (n.d.). *Massachusetts Agricultural Census 2012*. Webpage accessed November 2015 from <https://goo.gl/DMgMpo>.

<sup>3</sup> USDA. (2012). *2012 Census of Agriculture: Massachusetts State and County Data*. Accessed November 2015 from <http://goo.gl/oLV9u9>.

## **Cranberries**

Until 1995, Massachusetts ranked number one in the nation for cranberry production. Wisconsin has since replaced the State as top producer with Massachusetts now ranking second. Our State has about 400 cranberry growers and the total annual market value is nearly \$100 million. The cranberry market has been experiencing increased volatility of late, as more international production and stagnant demand is driving the value of cranberries down. The average cost of cranberry production is about \$30 per barrel but prices have plummeted to as low as \$6 per barrel.<sup>4</sup>

## **Dairy**

Nine percent of the State's agricultural output is made up of dairy, for a total market value of over \$44 million. According to the 2012 USDA Census of Agriculture, there were 155 dairy farms across the State, down from 902 in 1978. The majority of the dairy farms are members of cooperatives, and 15 of the farms produce, process, and market their own pasteurized milk, according to MDAR, while more than 25 sell unpasteurized milk directly to consumers.

The average herd size at Massachusetts dairies is 87 cows, but most dairies in the State have fewer. There has been a rise in recent years of small dairies, particularly those making value-added products such as yogurt and cheese, and those selling unpasteurized milk directly to consumers. The 2008 Dairy Farm Preservation Act brought about the Massachusetts Dairy Promotion Board to help market Massachusetts dairy products, and a number of financial supports for dairy farmers, such as the Dairy Farm Income Tax Credit, which supports farmers when the pay price for milk falls below the production costs. Since the instability of the federally-set prices for milk has a greater effect on smaller dairies, such as all of those in Massachusetts, this Act has proven critical to slow the loss of dairies in the State. Since implementation of Dairy Farm Preservation Act, the number of dairy farms has held steady.

## **Produce**

According to MDAR, the produce sector has an annual market value of \$96 million with nearly 1,600 producers. Of these producers, 40 percent grow vegetables and 60 percent grow fruit.

## **Livestock and Poultry**

Livestock and poultry raised in Massachusetts have an annual market value of \$48 million, according to MDAR. This sector is growing by value, output, number of producers, and variety of products. Growth in the sector can be attributed to the increase in demand for local meats. Massachusetts growers have access to the Boston market and niche markets across the State, in which consumers are able to pay for local meat products. Continued growth in this market will likely necessitate the development of more meat and poultry slaughter and specialty processing options for growers.

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<sup>4</sup> Cape Cod Cranberry Growers' Association. (n.d.) *Cranberry Statistics*. Accessed November 2015 from <http://goo.gl/gdumrK> and USDA NASS. (2015). *Quick Stats*. Accessed November 2015 from <http://goo.gl/jl2C2d>.

## **Maple**

Massachusetts ranks 9<sup>th</sup> in the nation for maple production, averaging around 50,000 gallons a year and at least \$3 million in sales per year, according to NASS. There are more than 300 maple producers, utilizing less than one percent of trees available for tapping<sup>5</sup>.

## **Other crops**

Massachusetts farmers raise a range of other crops, including honey, grains, herbs, and others. While these sectors are growing, they have not reached the scale where reliable data is available.

## **Farm Size by Acreage**

Massachusetts is a State of small farms, with the most prevalent farm size from ten to 49 acres. The next most prevalent farm size is one to nine acres, and a few farms over 180 acres. See Figure EC.8.

Between 2002 and 2012 the average farm size dropped from 85 acres to 67.<sup>6</sup> This is, in part, due to development pressures that are causing more and more fragmentation of large agricultural land holdings.

## **Farms by Value of Sales**

Two thirds of Massachusetts farms gross less than \$10,000 in market value from their products. On the other end of the spectrum, there are 206 farms with \$500,000 sales and above, representing three percent of all farms in the State but 61 percent of all gross sales. See Figure EC.16: Farms by Gross Market Value of Sales in 2012 .

## **Farming Practices**

Massachusetts farms employ a wide range of management practices, adapting their techniques to best suit their crops, the soils available to them, the changing climate, and the demands of a shifting market. A growing number use IPM practices, and many also certify their farms as organic under the USDA National Organic Program. This program allows organic farms to label their products, indicating that they have been produced through approved methods and without synthetic fertilizers, sewage sludge, irradiation, or genetic engineering.<sup>7</sup>

Many farmers rely on technologies like high tunnels and greenhouses to mitigate increasing variability in weather and to extend the State's short growing season. The significant growth in direct to consumer sales has meant farmers need to communicate with their customers about their choices in management practices, and this level of transparency has helped educate consumers and strengthen the local farm economy.

Urban agriculture has its own particular farming practices influenced by smaller growing spaces, micro-climates, soil contamination, and other factors. Vertical growing, intensive growing techniques, rooftop and container gardening, raised beds, and rainwater harvesting are among the farming practices employed by urban farmers.

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<sup>5</sup> Farrell, Michael. (2013). *The Sugarmaker's Companion; An Integrated Approach to Producing Syrup from Maple, Birch, and Walnut Trees*. White River Junction, VT, Chelsea Green.

<sup>6</sup> Center for Agriculture, Food and the Environment UMass Amherst. (2012). *Massachusetts Agricultural Census 2012; Lands in Farms*. Accessed November 2015 from <https://goo.gl/Bek5I0>.

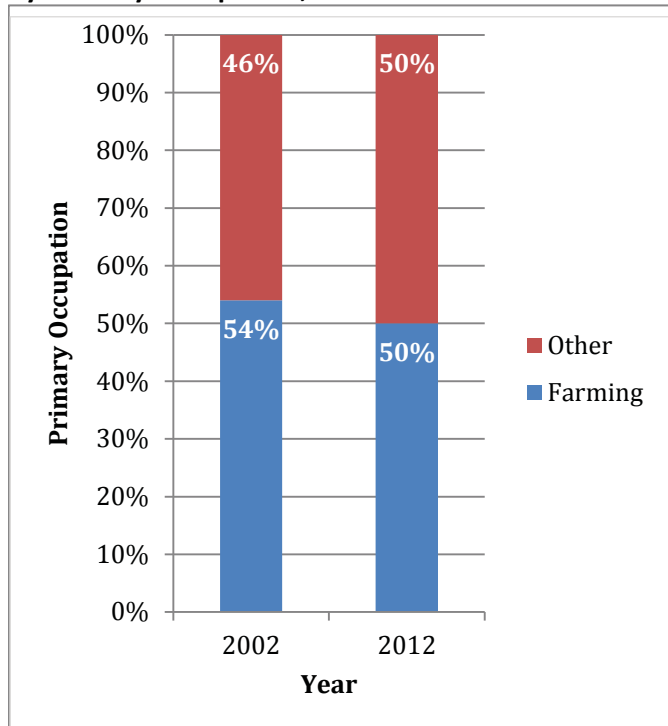
<sup>7</sup> USDA. (2015). *National Organic Program*. Webpage accessed October 2015 from <http://goo.gl/YB8QIE>.



Food produced in community gardens and backyard gardens is vital to the individuals and organizations who grow it, but putting a number to how much food is produced in Massachusetts in this way is challenging. According to Somerville's *The ABCs of Urban Gardening*, a typical four foot by eight foot raised bed can yield 75 to 100 pounds of crops annually. More study is needed to understand the impact of community and backyard gardens on our food production in the State and to determine the needs of such gardeners related to technical assistance and funding.

### **Farmer Demographics**

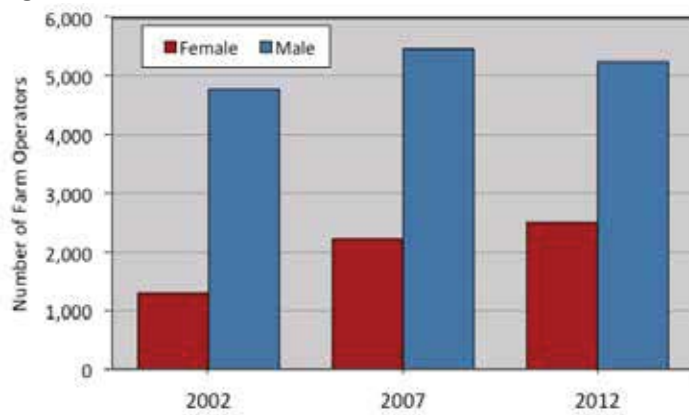
**Figure EC.17: Percent Massachusetts Farm Operators by Primary Occupation, 2002 to 2012**



Between 2002 and 2012, the number of farm operators who have primary occupations other than farming has increased to one half of all farmers.

Source: USDA Census of Agriculture 2012.

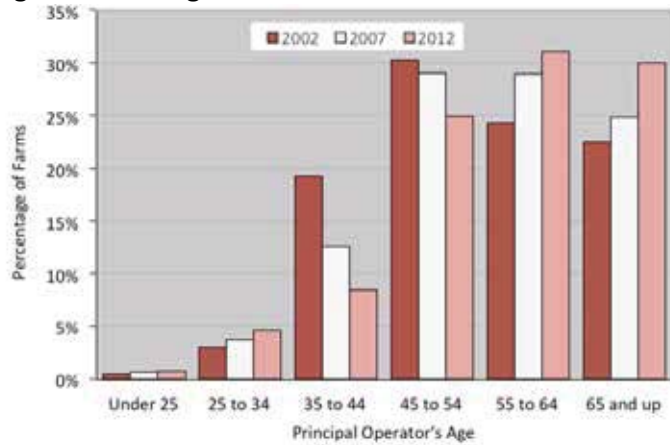
**Figure EC.18: Gender of Farmers in the State 2002-2012**



Women farmers in the state make up 32% of all farmers, while nationally they comprise only 14%.

Source: UMass Amherst and USDA Census of Agriculture.

**Figure EC.19: Age of Farmer 2002-2012**



**30% of farmers are 65 years or older. Less than 5% are under 34 years old.**

*Source: UMass Amherst and USDA Census of Agriculture.*

### **Farm Labor**

Hiring and keeping farm laborers can be a daunting task for farmers. Many of Massachusetts farms rely at least partially upon family members, but larger operations need to hire other workers. Workers hired through the Federal H2A program provide much needed seasonal labor for many Massachusetts farms. Understanding and navigating federal labor regulations related to farm workers, is a challenge for many Massachusetts farm operators. According to the 2012 Census of Agriculture data, there were 15,649 farm workers in the State in 2012, of which about 40 percent worked more than 150 days per year. In 2012, there were 812 migrant workers on 132 farms in the State. Migrant farm workers are defined as farm workers whose employment requires travel that prevents the worker from returning to his or her permanent place of residence the same day. There were also 9,760 unpaid farm workers in the State in 2012, defined by USDA as “agricultural workers not on the payroll who performed activities or work on a farm”.<sup>8</sup> According to U.S. Department of Labor data for Massachusetts, in 2012, there were 402 H-2A workers doing agricultural work.<sup>9</sup> A H-2A visa allows a entry into the U.S. for temporary or seasonal agricultural work.

### **Farm Labor Wages**

As shown in Figure EC.7, the average weekly wages for crop production are some of the lowest of all food system workers. Farm workers in crop production, a typically seasonal job, averaged \$551 per week. This number, derived from a 52-week average, factors in non-growing season weeks when farm workers would presumably not make any money. Farm workers employed in animal production fared much better, making an average of \$1,169 per week. About half of all farmers as well as many farm family members have full-time jobs off the farm. See Figure EC.18. For many farmers, this arrangement is necessary to be able to make enough to keep farming and to have consistent wages and affordable access to benefits.

### **Workforce Findings for Farming**

Massachusetts farms face several labor challenges, including the seasonal nature of farming jobs, the limited pool of farm workers, which requires some farms to hire workers through the Federal H2A

<sup>8</sup> USDA. (2014). *2012 Census of Agriculture, Massachusetts State and County Data, tables 7 and 64*. Accessed October 2015 from <http://goo.gl/xl2dmi>.

<sup>9</sup> U.S. Department of Labor. (2012). *State Employment-Based Immigration Profiles: Massachusetts*, retrieved October 9, 2015 from <http://goo.gl/7baX7c>.

program, outmoded or confusing labor regulations and the multiple skills and abilities needed to do many of the jobs on a farm. An assessment of opportunities in the farming sector identified external factors such as increased demand and increased processing infrastructure as being key to more job opportunities.

By far the largest potential for new business development or expansion in the land-based food production part of Massachusetts' food system, as well as job creation, will come with increased demand for Massachusetts-grown and -produced products. Further development of season extension infrastructure and expertise also holds promise for both new business growth and job creation, as does the development of new food production business models, including those that incorporate light processing and value-added production.

Increased access to essential farm business infrastructure, like additional slaughterhouse and meat cutting services or additional dairy processing, will allow for expansion of agricultural businesses and related jobs.

### **Farms and Regulations**

Regulations, while necessary, are often costly barriers to farmers being able to increase their production, develop new products, protect their land, and manage other elements of their business. For farmers of all types, regulations related to labor, local boards of health, and meat processing are some of the most vexing.

#### **Labor regulations**

The three primary labor regulations that cause challenges to farmers are the Fair Labor Standards Act of 1938 (FLSA), which establishes minimum wages and overtime pay, the Migrant and Seasonal Agricultural Worker Protection Act, which safeguards the migrant and seasonal agricultural workers and the H2A Temporary Agricultural Workers program, which provides for bringing immigrant agricultural labor to the US. All are federal regulations, and so somewhat outside of the scope of this planning process. The challenges they pose, however, are critical enough to merit mention.

FSLA has not kept pace with the changing face of farming, including even the basic definition of what a farm is. This Act fails to take into account many of the issues most important to small and mid-sized diversified operations that dominate Massachusetts' agricultural industry, in particular those of aggregation, intern labor, record keeping requirements and overtime exemptions. Particularly in these areas, the challenges of the regulations are compounded by a lack of understanding of the regulations.

Internships (sometimes inaccurately called apprenticeships) on Massachusetts farms have sometimes been seen as a way to provide interested workers with agricultural experience. The US Department of Labor has a narrow definition of allowable unpaid interns at for-profit enterprises.<sup>10</sup> Because of this, so-called internships on farms, whether unpaid, or paid at a rate lower than minimum wage, are in violation of federal labor laws. This is something that isn't always well understood by some farmers. There is a formal category of apprenticeships, and regulations at both the federal and State level, and a registration process for them. Because of this, apprenticeships are not a good option for agricultural operations.

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<sup>10</sup> U.S. Department of Labor. (April 2010). *Fact Sheet #71: Internship Programs Under The Fair Labor Standards Act*, retrieved October 9, 2015 from <http://goo.gl/r1ruHY>.

The federal H2A program allows farmers to employ foreign workers for seasonal labor. In order to participate, farmers must demonstrate a shortage of U.S. workers and that their wages and working conditions meet certain minimum requirements.<sup>11</sup> Under the H2A program, farmers must pay transportation and housing costs for H2A workers, but since the workers may only work on one farm for the whole time they're in the U.S., the program is not useful for farms that have just a short period during which they need help because the costs of transportation are so high. Also, H2A workers are not allowed to be in the U.S. for a full year at a time, which makes the program useless to farmers who need labor year round, such as dairy farmers.

While Massachusetts has adopted some labor regulations with agricultural issues in mind, there remain many challenges. The minimum wage for agriculture, for instance, applies to field workers, but not for workers at farm stands. Rules around the use of interns and apprentices are confusing and inconsistently enforced.

### **Livestock Processing**

Livestock processing regulations and siting of facilities are a top challenge. Slaughter regulations for red meat and poultry are a complex mix of federal and State requirements. Both federal and State oversight is based on relatively old regulations, which did not anticipate things like direct sales, farmers markets, consumer interest in local meat, and other changes in the market. Considerable policy has arisen from agency interpretation of regulations, much of which is unwritten and difficult to find or follow.

### **Zoning**

Land use and zoning regulations can be a particular challenge for farmers. Zoning is a primary barrier to farming in populous areas. Farming may not be an allowable use in urban settings and, in some cases, is explicitly excluded. Ordinances that prohibit raising chickens and bees, and prohibit food growing in "front yards," are examples of regulatory hindrances to food production.

### **Local Regulations**

Under Massachusetts General Laws, State and local regulations and community direction, local boards of health are responsible for disease prevention and control, health and environmental protection, and promoting a healthy community. In many cases this means writing and enforcing regulations related to agriculture.

Boards of health are the only governing bodies in our State that have the authority to create and enforce rules with no oversight from another body or process. Their rules can exceed, but not conflict with, State law. For example, some local boards of health require farmers sampling products at farmers markets to have ServeSafe certification and some don't allow residential kitchens for food processing, even though the State allows it. Some boards of health ban the keeping of pigs.<sup>12</sup> As a result, a farm's economic viability can be threatened based on what town they are located in or are trying to sell products in. Compliance is particularly difficult for farms that do business in multiple towns. Local BOH regulations can sometimes be based on a board of health member's particular concern, or a lack of understanding of a situation. In some

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<sup>11</sup> U.S. Department of Homeland Security. (2015) *H-2A Temporary Agricultural Workers*, retrieved October 9, 2015 from <http://goo.gl/rBHTJj>.

<sup>12</sup> Massachusetts Association of Health Boards. (1997). *Guide Book For Massachusetts Boards of Health, Chapter 20, Nuisances and Noisome Trades*, retrieved October 9, 2015 from <http://goo.gl/X1LmDY>.

cases a board’s lack of capacity to properly address a concern leads to simply banning a practice. There are no requirements under that members of local BOHs have any specific training, education or certifications.

In some rare cases State laws pre-empt local authority to create rules – boards of health can’t regulate pesticide use, for example – but support for home rule limits the number of situations where this is the case. Some boards of health have their own health agents for enforcement, and some are part of regional agencies that provide this service. Some boards of health are elected, and others are appointed.

Relatively recent laws allow towns to establish agricultural commissions, which serve to advocate for farms’ interests. These bodies have not been vested with any authority, however, or any oversight responsibilities.

**Right-to-Farm Related Laws**

Statutes and laws that pertain to agriculture include Chapter 111 related to public health and Chapter 243 related to private nuisances. Elements of Chapter 111 provide a protection for farming operations “conducting generally accepted farming activities from being deemed a nuisance by the board of health.” Section 1 of the Chapter (Definitions) contains a definition of “Farming” or “Agriculture,” Section 125A contains the nuisance exemption language, and Section 143 removes piggeries from the exemption in Section 125A.

Chapter 243 provides limitations to the actions that may be taken against farming operations for private nuisances, protecting farms from nuisance claims that result from “ordinary aspects” of said farming operations. Despite these regulations, there have been instances across the State of housing springing up adjacent to active farms, only to have new residents complain about odors and other “inconveniences” of living next to a farm. To protect against this situation, many towns have adopted Right-to-Farm bylaws.

As of the end of 2014, 139 communities across the Commonwealth had adopted local Right-to-Farm bylaws, intended to reiterate the town’s commitment to protecting the rights to farm accorded to all citizens under the State laws cited above. While local ordinances can’t grant rights not granted by the State laws, according to EOEEA “this bylaw encourages the pursuit of agriculture, promotes agriculture-based economic opportunities, and protects farmlands within a town by allowing agricultural uses and related activities to function with minimal conflict with abutters and town agencies.” Any municipality may develop and pass a right to farm bylaw.

**Education, Training, and Technical Assistance**

**Table EC.7: Change in UMass Extension Employees, 1988-2015**

Year	University FTEs	County FTEs	Total FTEs
FY88	349.76	31.6	381.36
FY99	122.48	15.75	138.23
FY15	108.97	20.97	124.94

**The number of UMass Extension employees has dropped by about two thirds between 1988 and 2015.**

*Source: UMass Amherst Center for Agriculture, Food and the Environment.*

## **UMass Extension**

The UMass Extension Service has been a vital resource for farmers since its founding in 1914, and had county-funded offices in each county until the 1980s. Extension agents were available for on-farm visits to provide assistance on a wide range of topics, and were a key element in the food system in our State, particularly farming and food production.

With the dissolution of county government, resources available to UMass Extension have declined and UMass has had to look elsewhere for funding. As a result, Extension priorities are often dependent upon funding availability, rather than on the needs of the Massachusetts food system and farmers. This has left many gaps between what farmers need, and what UMass Extension can provide.<sup>13</sup>

Some of the technical assistance gaps identified include objective information and assistance with regulations, technology, food safety, pollinators, large-scale composting, maple sugaring, and consumer education. Additionally, home gardening was once a priority for Extension but was dropped due to budget cuts. Home gardening offers significant opportunities to increase people's consumption of fresh fruits and vegetables and to be more connected to food and the environment.

As UMass Extension's capacity has decreased, an extensive network of efforts to provide education and technical assistance to farms has developed. Nonprofit organizations, such as NOFA/Mass, and efforts based at other educational institutions, such as the Tufts-based New Entry Sustainable Farming Project offer workshops for farmers around particular management practices. A number of buy local organizations have stepped up to help farms with developing effective marketing and sales practices. Farm Credit East is one of a number of fee-for-service providers that can help farms with business planning and management. And membership-based trade associations for a number of agricultural sectors have helped those farmers progress. But these groups tend to set their own agendas independent of each other, and the aggregate of their work still fails to measure up to the services UMass Extension provided in its prime. As a result, there are still significant gaps in educational and technical services available to farmers.

## **MDAR and Technical Assistance**

MDAR's Division of Agricultural Conservation and Technical Assistance (DACTA) offers technical assistance for farmers, including assistance with aquaculture, concentrated animal feeding operations and energy efficiency, conservation, and renewables.

MDAR also runs the APR and the State-Owned Farmland Licensing Program. They offer outreach and education via their Agricultural BMPs, Agricultural Business Training Program and their On-Farm Strategies to Protect Water Quality Program.

MDAR launched the Urban Agriculture Program in the fall of 2013, one of the nation's first statewide programs to support and promote commercial urban farming enterprises. Funding through the program targets infrastructure needs, innovative food production, zoning ordinances, technical assistance, land acquisition, and youth leadership development.

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<sup>13</sup> Wang, Sun Ling. (2014). *Cooperative Extension System: Trends and Economic Impacts on U.S. Agriculture*. Choices: the Magazine of Food, Farm, and Resource Issues. Accessed October 2015 from <http://goo.gl/x1Z7RQ>.



### **Farms and Financing**

Farmers – both urban and rural – rely on multiple sources of flexible financing from institutions and organizations that understand the challenges and particularities of agriculture and food production. Traditional lending institutions are often poorly educated on food and farming, limiting farmers’ access to financing. Alternative sources for farm and food business financing, such as community-supported flexible financing and technical assistance programs, are on the rise in the State.

While some business support services do exist for farm development, on topics ranging from business planning to product development and marketing, there are not enough of these services, particularly from public agencies, to meet the needs of farmers and food business innovators.

## Existing Conditions: FISHING

Massachusetts' history, economy, and identity have long been closely tied to seafood. With 1,500 miles of ocean coastline, Massachusetts has plentiful access to the sea for near shore seafood harvesting, including fishing, clamming, and lobstering, as well as fishing in national waters in the Gulf of Maine and George's Bank. The following Fishing section summarizes findings and provides analysis of baseline data and information about the Massachusetts seafood industry. The section presents data both on commercial fishing and aquaculture activity.

### Commercial Fishing Overview

**Map EC.2: Seafood Landings Value of Massachusetts Largest Ports**

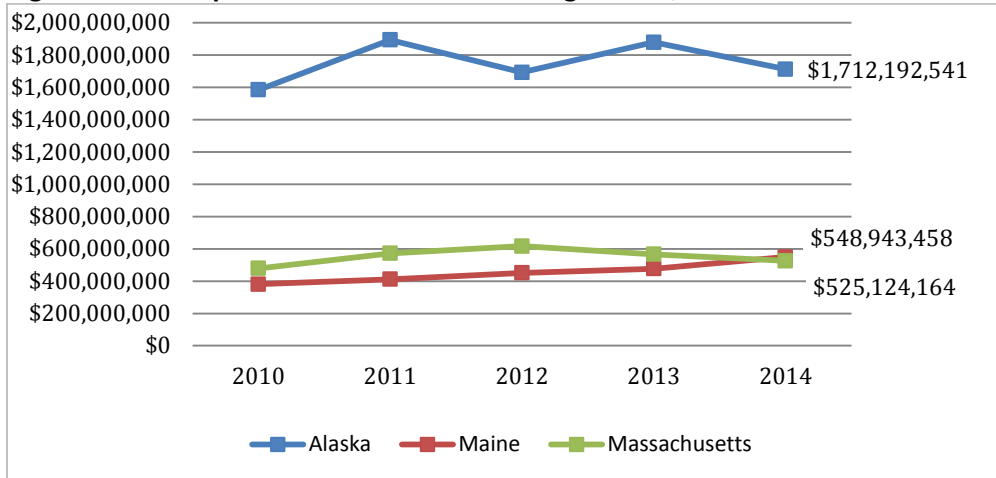


**New Bedford is the leading seaport nationally in terms of the dollar value of seafood landed.**

*\*Boston Landings data shown for 2013, all other ports show 2014 data.*

*Source: NOAA NMFS, Commercial Fisheries Statistics, 2014 data shown for Gloucester, New Bedford, Provincetown-Chatham; 2013 data shown for Boston.*

**Figure EC.20: Top States for Seafood Landings Value, 2010-2014**



Massachusetts is among the top three states nationally for the value of its seafood landings.

Source: NOAA National Marine Fishing Service (2014). Landings Query Results, 2010-2014. <https://goo.gl/Gkyo4F>.

**Table EC.8: Economic Impacts of the Massachusetts Seafood Industry**

	Jobs	Sales	Income	Value-Added
<b>Total Impacts</b>	<b>100,108</b>	<b>\$7,706,079,000</b>	<b>\$2,021,479,000</b>	<b>\$3,073,305,000</b>
Commercial Harvesters	13,524	\$1,027,556,000	\$330,189,000	\$482,560,000
Seafood Processors and Dealers	7,573	\$970,561,000	\$370,036,000	\$481,111,000
Importers	14,588	\$4,012,727,000	\$643,116,000	\$1,223,255,000
Seafood Wholesalers & Distributors	3,150	\$491,710,000	\$160,683,000	\$218,022,000
Retail	61,273	\$1,203,526,000	\$517,456,000	\$668,358,000

Over 100,000 people are employed in seafood industry-related jobs in Massachusetts.

Source: Fisheries Economics of the U.S. 2013, New England Region, Regional Summary <https://goo.gl/H8bkzd>.

## Commercial Fishing Economy

### Impact of Massachusetts Seafood Landings

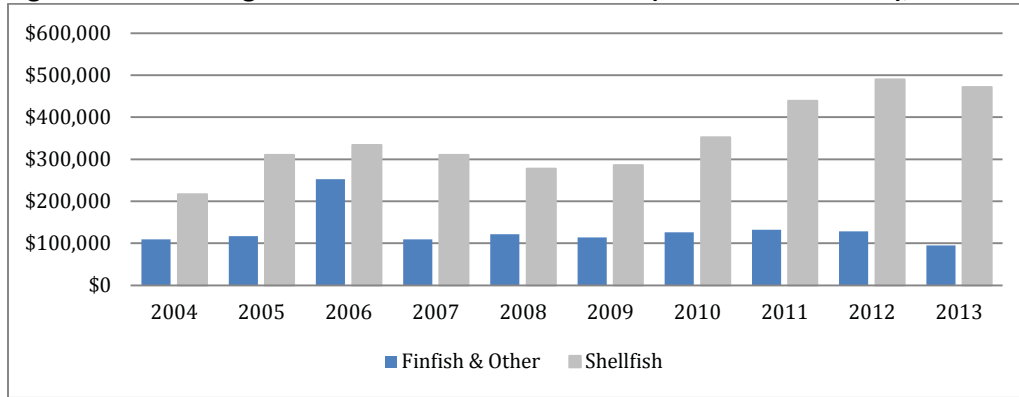
Massachusetts has a history of leadership in the commercial fishing industry, both nationally and in New England. The National Marine Fisheries Service collects and disseminates a range of data on fishing industry, and is the source for the data presented in this section. In 2014 it was the third strongest state for the value of seafood landed on its ports with a value of over \$525 million, following Maine (\$548 million) and Alaska (\$1.7 billion).<sup>1</sup> Generally, the State has maintained either a second or third position nationally, often trading places with Maine. Most of the landings value was from shellfish landings which comprised over \$472 million in 2013; in the same year the value of finfish and other fish contributed nearly \$95 million. Sea scallops and American lobster have consistently generated the most landings revenue in the past decade.<sup>2</sup> Nationally, New Bedford was the leading port with the value of seafood landed at \$379- and \$329-million in 2013 and 2014, respectively, landing mostly sea scallops.<sup>3</sup>

<sup>1</sup> NOAA National Marine Fishing Service (2013). [Landings Query Results, 2010-2014](https://goo.gl/Gkyo4F). Accessed November 2015 from <https://goo.gl/Gkyo4F>.

<sup>2</sup> NOAA National Marine Fishing Service (2013). *Fisheries Economics of the U.S. 2013, New England Region* <https://goo.gl/hcrvxx>.

<sup>3</sup> NOAA National Marine Fishing Service (2013). *Fisheries Economics of the U.S. 2013, New England Region* <https://goo.gl/hcrvxx>.

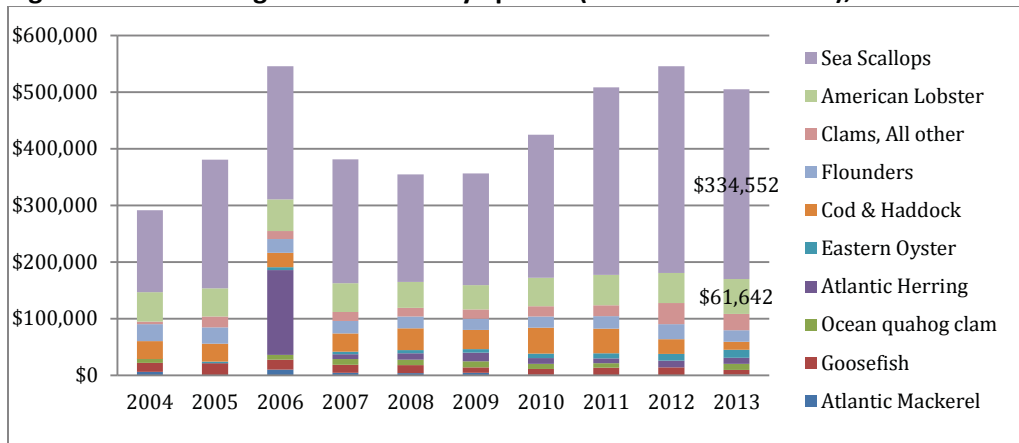
**Figure EC.21: Landings Revenue of Finfish and Shellfish (thousands of dollars), 2004-2013**



Source: NOAA Fisheries (2013). *Fisheries Economics of the U.S. 2013, New England Region* <https://goo.gl/hcrvxx>.

Most of the seafood landings value in the state is from shellfish landings, which were five times that of fin fish landings in 2013.

**Figure EC.22: Landings Revenue of Key Species (thousands of dollars), 2004-2013**



Source: NOAA Fisheries (2013). *Fisheries Economics of the U.S. 2013, New England Region* <https://goo.gl/hcrvxx>.

Sea scallops generate the most landings revenue by far of seafood in the State.

### **Economic Activity in the Seafood Supply Chain**

Commercial fishing in Massachusetts drives economic activity in the broader seafood supply chain. At each step of the seafood supply chain commercial harvesters, seafood processors, importers, wholesalers, distributors, and retailers contribute to industry sales, employment, income, and value-added impacts in the economy.<sup>4</sup> In New England in 2013, Massachusetts generated the largest total impacts across all of these impact categories.<sup>5</sup>

### **Sales**

In 2013, the total sales impact of the commercial fishing industry in Massachusetts was \$7.7 billion, with over half of this impact generated by sales related to imported fish (\$4 billion).<sup>6</sup>

<sup>4</sup> Fisheries Economics of the U.S. (2013). *New England Region, Regional Summary* <https://goo.gl/H8bkzd>.

<sup>5</sup> Fisheries Economics of the U.S. (2013). *New England Region, Regional Summary* <https://goo.gl/H8bkzd>.

<sup>6</sup> Fisheries Economics of the U.S. (2013). *New England Region, Regional Summary* <https://goo.gl/H8bkzd>.

## Jobs and Income

In 2013, the Massachusetts seafood industry, including activity related to seafood imports, employed 100,108 people, nearly twice as many seafood workers as those employed in all other coastal New England states. Without import-related jobs, the State still employed 64,279 people in the seafood industry. Both with and without import related jobs, the retail sector employed more than half of the total seafood industry workforce in the State. With imports, seafood industry income totaled over \$2 billion. Removing import-related employment, the income totaled nearly \$900 million.<sup>7</sup>

Calculated separately from commercial fishing, *recreational* fishing employment is also strong. This employment sector, which includes charter boats, deep-sea fishing excursions, employed 6,923 people in 2013. In all categories, Massachusetts recreational fishing has the greatest impacts of all coastal New England states.<sup>8</sup>

**Table EC.9: Job and Income Impacts in the Seafood Industry**

	With Imports		Without Imports	
	Jobs	Income	Jobs	Income
<b>Total Impacts</b>	<b>100,108</b>	<b>\$2,021,479,000</b>	<b>64,279</b>	<b>\$874,479,000</b>
Commercial Harvesters	13,524	\$330,189,000	13,524	\$330,189,000
Seafood Processors & Dealers	7,573	\$370,036,000	1,833	\$89,051,000
Importers	14,588	\$643,116,000	0	\$0
Seafood Wholesalers and Distributors	3,150	\$160,683,000	1,160	\$59,167,000
Retail	61,273	\$517,456,000	47,761	\$396,072,000

**The seafood industry generates over 64,000 jobs, not including seafood that is imported into the state.**

Source: *Fisheries Economics of the U.S. 2013, New England Region, Regional Summary*  
<https://goo.gl/H8bkzd>.

## Value-Added Impacts

Value-added calculations estimate the economic impact of an industry on the economy. The estimate is derived from a range of data, isolates the economic activity of a specific industry, and removes economic activity from other industries. Massachusetts value-added impacts were greater than all other coastal New England states both when including impacts from imports and without, amounting to \$3.1 billion and \$1.2 billion, respectively.

## Seafood Processing, Wholesaling, Retailing

**Table EC.10: Seafood Processing and Wholesaling plants and jobs, 2013**

	Processing		Wholesale		TOTALS	
	Plants	Jobs	Plants	Jobs	Plants	Jobs
Maine	38	741	170	1,287	208	2,028
New Hampshire	10	241	10	111	20	352
<b>Massachusetts</b>	<b>51</b>	<b>2,193</b>	<b>158</b>	<b>2,158</b>	<b>209</b>	<b>4,351</b>
Rhode Island	10	nd	37	nd	47	(3)
Connecticut	4	75	15	186	19	261
<b>Total</b>	<b>113</b>	<b>3,250</b>	<b>390</b>	<b>3,742</b>	<b>503</b>	<b>6,992</b>

NOAA National Marine Fishing Service (2014). *Fisheries of the United States, 2014*. Accessed November 2015 from <http://goo.gl/QrM7dl>. Note: Numbers in parenthesis are suppressed to due to confidentiality reporting requirements

**Massachusetts has over 40% of the seafood processing and wholesale plants and over 60% of the related jobs in New England.**

<sup>7</sup> MA Department of Fish & Game. (2013). *Massachusetts Division of Marine Fisheries 2013 Annual Report*. Accessed November 2015 <http://goo.gl/ydE7RB>

<sup>8</sup> NROC. (rev. 2013). *Overview of the aquaculture sector in New England*. Accessed November 2015 from <http://goo.gl/0EenSF>.

### Map EC.3: Largest Seafood Processing Clusters



The state's largest clusters of seafood processing businesses are located in Gloucester, Boston and New Bedford.

Source: InfoGroup Business Data, North American Industrial Classification System (NAICS)

Massachusetts is by far the leading New England state for seafood processing. The largest clusters of seafood processing businesses are in Gloucester, Boston, and New Bedford. In 2013 Massachusetts had a total of 209 processing and wholesaling plants, employing 4,351 people.

In 2013, 1,756 businesses were registered with the Massachusetts DMF as seafood dealers involved in wholesale or retail of seafood. Of these, 26 percent were categorized as primary buyers, purchasing marine species directly from fishermen.<sup>9</sup>

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<sup>9</sup> UMass Dartmouth Center for Marketing Research. (2015). *Massachusetts Shellfish Aquaculture Economic Impact Study*. Accessed November 2015 from <http://goo.gl/g9yzvd>.

## **Aquaculture**

Aquaculture is the farming of finfish and shellfish. In the case of marine aquaculture, this means managing a portion of a body of saltwater – natural or controlled-environment – to enhance production by intervening in propagation, feeding, protection from predators, and other factors. Land-based freshwater aquaculture operations use similar practices to raise finfish in controlled-environment tanks.

### **Marine Aquaculture**

In Massachusetts, marine aquaculture operations – all operations in natural bodies of water as well as several land-based saltwater shrimp farms – are managed by the Division of Marine Fisheries, and the sites are licensed by the local municipalities. In 2013, 349 marine aquaculture license holders held 378 licenses totaling 1,030 acres.<sup>10</sup>

Shellfish aquaculture in the State has demonstrated significant growth, from an approximately \$3.5 million harvest in 2004, to more than \$25 million in 2013. Shellfish farmers were responsible for approximately 769 direct jobs in 2013, paying \$11.9 million in wages. They also generated an additional 140 jobs through indirect and induced activity.<sup>11</sup>

Marine aquaculture faces significant challenges, including waste and discharge issues, limited available space, variation in New England weather, water quality issues relating to placement of facilities and facility operations, and competition with wild harvesters.<sup>12</sup> Local municipalities control the estuaries and submerged lands, leaving farmers to navigate town politics and the lack of security that comes with farming on leased land. Finally, as with most agriculture, margins are very low, particularly the high costs of feed and other inputs needed, and the need to keep prices low to compete with imported shellfish from larger producers.

### **Freshwater Aquaculture**

Land-based freshwater aquaculture is overseen by the Division of Fisheries and Wildlife. In 2013 there were 22 land-based finfish aquaculture operations, some raising fish for food, and some for stocking and for biomedical research. These operations employed 112 people and paid \$4.7 million in wages, and raised food and stocking fish with a value of \$6.5 million.<sup>13</sup>

Challenges for land-based aquaculture include the cost of land and inputs – particularly energy and feed – as well as resource issues concerning water uptake and discharge. There is a need for education to develop a market for land-raised fish, informing consumers that tilapia, trout, and other species are raised here in Massachusetts and available for purchase and consumption.

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<sup>10</sup> UMass Amherst Donahue Institute. (2006). *Report I: An Assessment of the Coastal and Marine Economies of Massachusetts*. Accessed November 2015 from <http://goo.gl/enVRQw>.

<sup>11</sup> MA EOLWD. (2015). *Employment and Wages (ES-202), NAICS Code 1125, Animal Aquaculture*. Accessed November 2015 from <http://goo.gl/1GAatW>

<sup>12</sup> NOAA Greater Atlantic Region. (2015). *Greater Atlantic Region 2015 Saltonstall-Kennedy Recommended Projects*. Webpage accessed November 2015 from <http://goo.gl/cICK21>.

<sup>13</sup> US Environmental Protection Agency. (2014). *Reducing Wasted Food & Packaging: A Guide for Food Services and Restaurants*. Accessed October 2015 from <http://goo.gl/PwaHWf>.



## **Fishing Issues and Opportunities**

### **The Globalized Seafood System**

Despite this robust seafood industry, the seafood economy is largely driven by the export-import markets. It is now estimated that about 80 percent of fish landed in New Bedford, for example, is shipped overseas, and conversely, 90 percent of seafood consumed in the State, particularly shrimp and salmon, is imported and is often frozen. Fish is also imported whole or in blocks, processed in plants in New Bedford and, to a lesser degree, in Gloucester and Boston to, in turn, be shipped out of State.

At the same time, consumer tastes have narrowed to fewer and fewer species, such as cod and haddock, and familiarity and use of whiting, mackerel, and other species has declined. In order to provide a steady supply of fish to restaurants, supermarkets, and institutional buyers, local fresh fish has been blended with imported stocks. For example, cod is often imported from Iceland and Canada.

Federal catch limits reduce local fishermen's ability to adapt to the demands of local markets, and are driving significant consolidation in the market. At the same time, there has been a dramatic reduction in support for of research and development in the harvesting marketing and processing sectors.

### **Ecosystem Costs and Benefits**

Fishing fewer species and increasing discards of unwanted, low-value fish are impacting the ocean ecosystem. Other ecosystem threats, such as from climate change, pollution, real estate development, invasive species, have caused deterioration to essential fish habitat and other parts of the coastal/ocean system. On the positive side, shellfish aquaculture has a pronounced beneficial effect on estuarine water quality, and more could be done to promote it's benefits.

### **Seafood and Food Safety**

According to NOAA Fish Watch, up to 90 percent of seafood consumed in the United States is imported, and about half is wild-caught. A significant portion of the seafood imported by the United States is caught by American fishermen, exported overseas for processing, and then reimported to the United States.

Recalls of imported fish raise the public's awareness and concern about our seafood supply. Recalls have been required in response to such issues as foodborne illness outbreaks and inadequate processing, a reminder that as we continue to rely upon a global system for our seafood – as well as other food – we remain dependent upon other countries to enforce adequate food safety and processing standards.

### **Fishing Research**

Funded at \$65 million annually in the 1980s, the Saltonstall-Kennedy federal grant program has since been at times completely defunded or seen dramatic reductions. This program provides important funding for research that supports fishing community viability and job opportunities. In 2015 the Great Atlantic distributions are estimated at \$8.8 million for 33 projects.<sup>14</sup>

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<sup>14</sup> USDA. (2012) *Know Your Farmer, Know Your Food Compass: Local Food Infrastructure*. Accessed October 2015 from <http://goo.gl/5IJJOi>.

Two research laboratories, one managed by the National Marine Fisheries Service, the other by the University of Massachusetts Food Sciences Department both closed in the mid 1900's. The Large Pelagic Research Center in Gloucester is still in operation, though its research focuses on tuna and swordfish, species for which there are already strong markets. Previously it also included research and design for high-value fish products, such as omega-3 oil and fish waste fertilizer.

### **Local Fishing Economy**

Consolidation of fleets and processors, including shipment of locally landed seafood out of state and overseas, has stripped coastal ports of income, jobs, and taxes – including support services of engine and boat repair, ice, fuel, and other items – and has deprived the local ports of a strong economic multiplier from the high-wage fisheries. Many ports are left with low-wage, seasonal work in tourism and real estate development. Dockage and processing plant capacity have also been displaced by recreational boating and real estate development more generally in coastal waterfronts.

In response to these challenges, parts of a local seafood value chain have been developed in the last few years in Massachusetts. Community supported fisheries (CSF) projects have been organized, the largest of which is Cape Ann Fresh Catch out of Gloucester, while several smaller CSFs have also been organized on Cape Cod and the South Shore. Some local fishermen also participate in broader buy local groups. There are also traditional CSAs in other parts of the State partnering with CSFs to provide consumers not near the coast with fresh seafood.

There has been increased outreach on the part of the fishing industry to increase public awareness of the threats to local fishermen and to educate consumers about how to cook under-utilized species. Local seafood distributors are increasing distribution to high-end restaurants in Boston and elsewhere, including as far afield as Vermont.

### **Workforce Findings for Fishing**

Workforce challenges for fisheries include:

- a predicted labor shortage as current fishermen retire;
- the grueling physical work of fishing, as well as the seasonal nature of fisheries work;
- a need for increased small business acumen to develop fishing operations;
- the current price and market constraints and the need to increase demand for underutilized seafood species; and
- the Federal regulations that constrain species caught, days fished, and where fishing can be done

An assessment of opportunities in the fishing industry acknowledges that the current domestic value chain in Massachusetts fishing is fragmented and disjointed. Opportunity is seen for both business development and job creation, but the Massachusetts-based fishing industry is using a business model that has been subject to extraordinary pressures and contraction, including cheap imports and waterfront real estate development, among others.

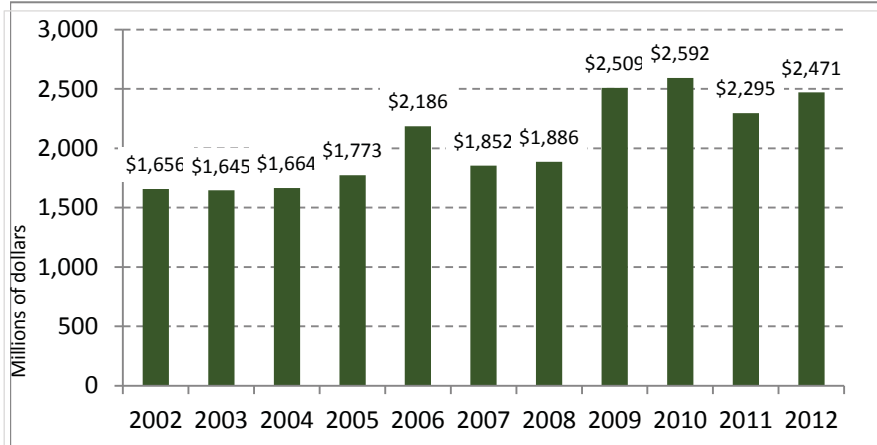
## Existing Conditions: PROCESSING

### Introduction

Increased production, sales, and consumption of Massachusetts-grown foods relies upon enough of the right kinds of processing facilities – from food processing incubators for startup food businesses to manufacturing facilities for higher volume food production. A well-prepared workforce, adequate infrastructure, and ecologically sustainable food processing practices are also necessary for successful expansion of our food processing capabilities. This section provides data and analysis on the food manufacturing sector in Massachusetts. Note that the terms manufacturing and processing are used interchangeably in this report. Food products processed in Massachusetts do not necessarily use raw products grown in Massachusetts.

### Food Processing Data

**Figure EC.23: Food Manufacturing Revenue in Massachusetts 2002 to 2012**



Revenue generated by food manufacturing in the state grew 12% between 2002 and 2012.

Source: NAICS 311 and 312 Bureau of Economic Analysis and InfoUSA 2011.

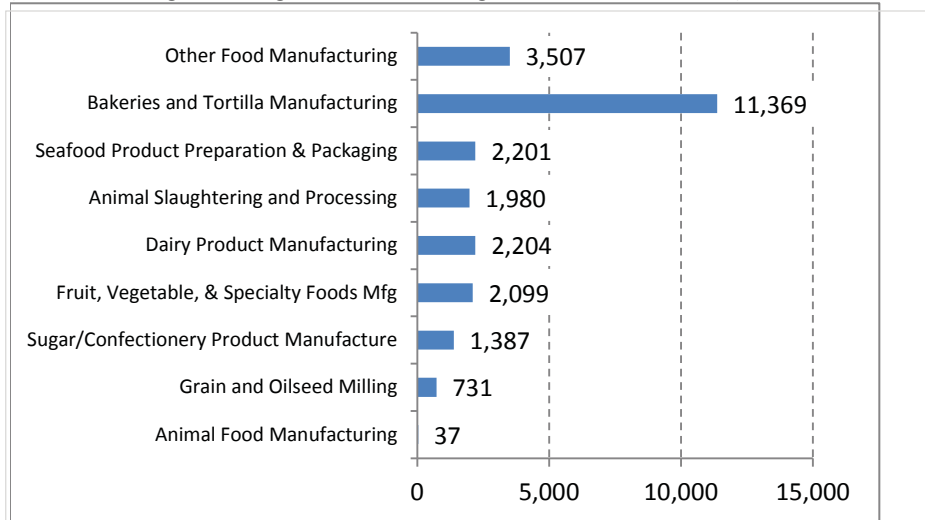
### Food Processing Businesses

Food processing businesses, which include food and beverage manufacturing, contribute about 13 percent to the food system contributions to the economy (see Massachusetts Gross State Product). The sector generates roughly \$2.5 billion dollars of the total \$19.3 billion generated in the food system overall. In 2012, the food processing sector was comprised of 1,479 businesses, or 3.6 percent of food-related businesses. While the number of these businesses has fluctuated slightly from 2002-2012, it has experienced a 12 percent growth in establishments in this ten year period. As the economy has rebounded from the economic recession, starting in 2010, the number of food processing businesses have increased incrementally and steadily.

Leading food processing sectors in Massachusetts in terms of number of businesses are bakeries and seafood manufacturing. These segments are also important job providers, as shown in Figure EC.24.

## **Food Processing Worker Data**

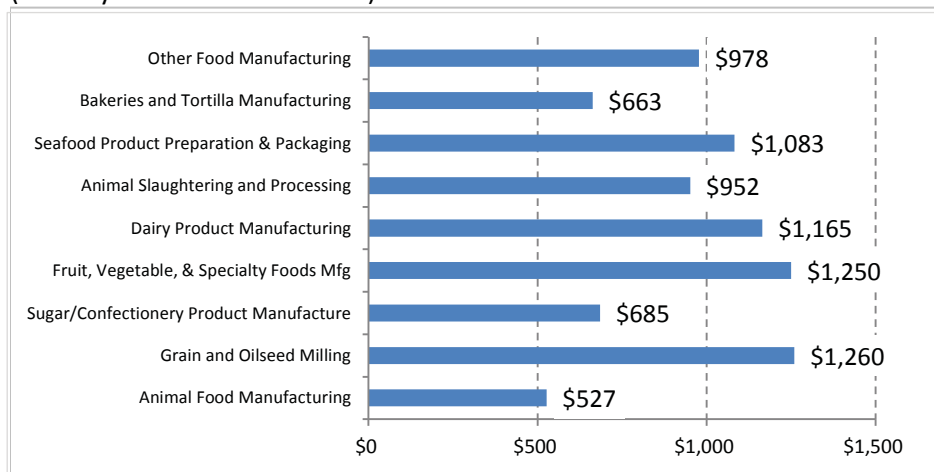
**Figure EC.24: Massachusetts Food Manufacturing Employment 2013**  
(not including beverage, tobacco or agricultural chemicals)



**Bakeries and tortilla manufacturing employ over three times as many workers as any other food manufacturing category in the state.**

Source: Massachusetts DET ES-202 <[http://lmi2.detma.org/lmi/lmi\\_es\\_a](http://lmi2.detma.org/lmi/lmi_es_a)> Primary NAICS 311 Industries

**Figure EC.25: Massachusetts Food Manufacturing Average Weekly Wages 2013**  
(Primary NAICS 311 Industries)



**Food processing workers' average weekly wages were \$1,121 in 2012.**

Source: Massachusetts DET ES-202 <[http://lmi2.detma.org/lmi/lmi\\_es\\_a](http://lmi2.detma.org/lmi/lmi_es_a)>

## **Food Processing Workforce**

According to 2012 data, Massachusetts food processing sector employed 27,485 people, about seven percent of the food system workforce. These jobs were held in businesses that range from small on-farm value-added operations to internationally known brands, like Kayem Foods, Inc. that makes the famous Fenway Franks. Wages in this sector amounted to nearly \$1.4 billion, with average weekly wages of \$1,121. Notably, in Massachusetts nearly 75 percent of jobs in food processing are full-time, a higher percentage than even statewide full-time employment averages. In the period 2002-2012 the food processing sector gained more than 1,500 jobs, increasing about six percent. Following the increase in number of food processing businesses after the economic recession, most of these jobs were added between 2010 and 2012.

The largest number of food processing jobs is in the baking industry, with more than five times the number of jobs as the second leading processing sector, seafood product preparation. Bakery jobs range from those in large-scale industrial bakeries that sell wholesale to grocery stores, to tortilla processing and small corner pastry shops.

Within the broader manufacturing industry, which in addition to food includes computer, machinery, furniture, transportation equipment, and other manufacturing professions, the number of jobs declined 43 percent in the period from 2002-2012. Food manufacturing jobs during this period remained resilient, however, and, as previously noted, the sector saw a six percent increase in jobs. This sector makes up about ten percent of all jobs in the manufacturing industry.

### **Workforce Challenges for Processing**

The seasonality of Massachusetts-grown food means that food processing jobs that use Massachusetts-grown food are seasonal, making them less desirable positions than year-round work. But a growing number of food processing entities, including shared-use kitchens that are focused on building processing capacity through new business development, strengthening of infrastructure, and workforce education and training, hold the promise of business and job creation. There is significant potential for increased Massachusetts food processing business development and expansion, as well as job creation and growth. There is also the potential for a shared labor pool which could create year-round, full-time employment for food manufacturing workers.

### **Food Processing and Sustainability**

Food processing and distribution industries can have significant impacts on the environment through the use of water, raw materials, fuel, electricity, and its contribution to post-consumer food and packaging waste. Aside from energy used for cooking at home, food processing consumes more energy than any other part of the food supply chain. Water is an essential for several parts of food processing, and a significant quantity of water is used as a primary ingredient, for washing and cleaning, running equipment, and for sanitizing. Food waste and packaging containers account for nearly 45 percent of materials discarded in landfills in the United States.<sup>1</sup>

Energy-efficient technologies and practices, food waste reduction and composting, improved packaging, and more streamlining in transportation are all components of efforts to make food processing and distribution in Massachusetts more sustainable.

### **Food Processing and Infrastructure**

The cost of starting a new food processing business can be a real barrier. Food processing equipment can be highly specialized and scaled to certain amounts of production and expensive. According to the USDA, much of our existing food infrastructure doesn't work well for local and regional producers. It is often too

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<sup>1</sup> Code of Massachusetts Regulations, 105 CMR 590.000: State Sanitary Code Chapter X – Minimum Sanitation Standards for Food Establishments. Accessed October 2015 from <http://goo.gl/WVV3bC>.

large to accept smaller amounts of product and to process in small batches, maintaining the products origin.<sup>2</sup>

### **Commercial Kitchens**

Shared-use commercial kitchens are an important segment of the food manufacturing economy, as the popularity and market share of prepared foods continues to grow in response to consumer demand for convenience. For this report, commercial kitchens are understood to be kitchens that are licensed by local boards of health for food preparation by people or businesses that own, rent or lease the facility.

Definitive data on the total numbers and locations of commercial kitchens is lacking. In addition to larger food processing and business incubation facilities, there are numerous commercial kitchens in places like church basements and senior centers. Often these types of kitchens might be available to rent but without a formal leasing program in place. For some building managers, leasing their commercial kitchen to other users is perceived as too onerous or poses liability issues. Others, however, rely upon the rental of their kitchen and other facilities as a regular income stream.

Food entrepreneurs may also choose to begin their business in their home kitchens, and by doing so reduce their startup costs. Massachusetts cottage laws (105 CMR 590) specify that non-potentially hazardous foods – such as baked goods, some snacks, and jams or jellies – can be made in permitted residential kitchens. These food products can be retailed directly to in-state markets, including farmers markets and restaurants<sup>3 4 5</sup>. Wholesale of foods made in residential kitchens is not permitted. Home kitchens can play an important role in providing a step up for farmers or food entrepreneurs who want to try their hand at processing without the more serious commitment utilizing other facilities might require.

### **Food Processing and Regulations**

As with all other food system sectors, regulations often pose challenges for food processors, particularly small businesses. There are regulations for handling, preparing, packaging, storing, and selling food – all of which are designed to protect food safety. Federal and State agencies as well as local boards of health all have a hand in defining and enforcing various regulations. Often the complex and difficult to navigate regulations discourage entrepreneurs from developing new products and cost existing food processing businesses time and money to understand and comply with the regulations.

The primary regulations for food processors concern food safety. Food safety is achieved through the handling, preparation, and storage of food in ways to prevent food borne illness. Food laws and regulations help ensure food is safe from production to consumption.

### **Food Safety Regulations and Programs**

#### **Good Agricultural Practices and Good Handling Practices**

GAP and GHP are programs administered by USDA. The programs were begun in 1998 in response to food safety concerns, and offer guidance for the fresh fruit and vegetable industry to reduce the contamination

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<sup>2</sup> Harvard Food Law and Policy Clinic. (2013). *Cottage Food Laws in the United States*, Accessed October 2015 from <http://goo.gl/NkdY4U>.

<sup>3</sup> *Forrager Cottage Food Community* (2012). Massachusetts. Accessed October 2015 from <http://goo.gl/X6YPBg>.

<sup>4</sup> FDA. (2015). *Current Good Manufacturing Practices*. Accessed October 2015 from <http://goo.gl/Ec7Nf5>.

<sup>5</sup> MA EOHHS. (2015). *Massachusetts Retail Food Regulations Fact Sheet*. Accessed October 2015 from <http://goo.gl/ua3gTO>.

of fresh produce. Shortly thereafter, many wholesale produce companies began to seek assurances that fresh produce suppliers were following GAP. In January 2002, the USDA implemented the USDA GAP & GHP audit verification program.

The annual audit program is provided to assess a company's efforts to avoid the contamination of fresh fruits and vegetables by microbial contamination. UMass Extension offers trainings in GAP to help growers develop and implement farm food safety plans, and to prepare them for USDA GAP certification. MDAR provides USDA Fresh Produce audits.

### ***Good Manufacturing Practices Regulations***

Good Manufacturing Practice Regulations (GMP), promulgated by the USDA, require food producers to proactively ensure food safety and quality. The regulations encompass kitchen and equipment safety and cleanliness, food production processes, and recordkeeping.<sup>6</sup> Massachusetts' Food Code (part of 105 CMR 590.000) further defines sanitation requirements food establishments for the State, and in addition to reiterating the federal GMP, lays out requirements for residential kitchens, mobile food units, and details on administration, licensing and enforcement.<sup>7</sup>

### ***Food Safety Modernization Act (FSMA)***

FSMA is a federal food safety law that grants the FDA broad new power to enforce food safety standards on farms. It will impact produce growers, farms that aggregate product with other farms and farms that even minimally process what they produce across the country, although most Massachusetts farms will be exempt from FSMA because they are well below the financial threshold. They will, however, still find themselves having to comply if they want to sell to stores, because many stores are expected to require FSMA from their vendors.

The two sets of rules that are relevant to human food are the Produce Safety Rule and the Preventive Controls Rule. The Produce Safety Rule is intended to reduce the food safety risks in raw produce. The Preventive Controls rule is intended to reduce risks in food processing.

These rules have unintended consequences for our New England farms, according to New England Farmers' Union (NEFU). As currently written, NEFU says the rules will:

- Suppress local food: the proposed rules unfairly burden local and regional food innovations and limit opportunities for family farmers to launch and grow their businesses.
- Undermine conservation efforts: the proposed rules make it harder for farmers to use soil and water conservation plans that enhance soil health, water quality, and wildlife habitat.
- Raise costs: the proposed rules impose major expenses on small farms and food businesses and lack fairness, clarity, and consistency.

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<sup>6</sup> Community Involved in Sustaining Agriculture. (2015). *Local Food Calculator*. Accessed October 2015 from <http://goo.gl/L5o8OK>.

<sup>7</sup> USDA. (2014). *Massachusetts Agriculture Defies National Trends*. Accessed October 2015 from <http://goo.gl/u3jzl0>.



## Existing Conditions: DISTRIBUTION & MARKETING

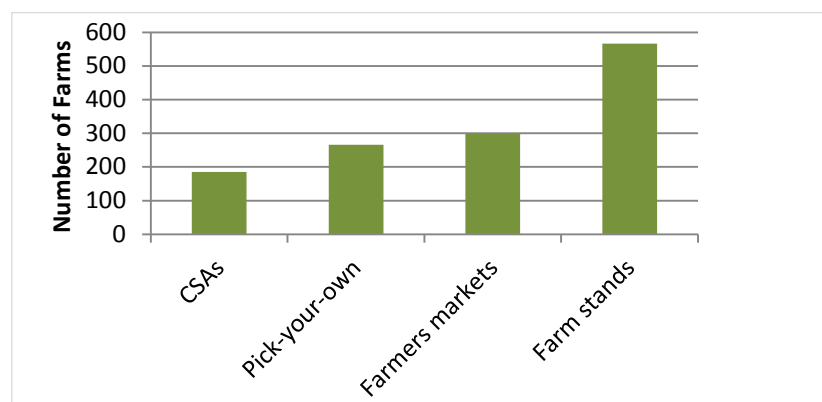
Food is circulated and delivered throughout the Commonwealth through a variety of methods. Some is through a complex network of companies and individuals, including large-scale distributors, working with institutions, supermarkets, and convenience store chains to deliver fresh and processed foods from around the globe. Some has a much shorter chain, such as farmers at farmers markets selling vegetables, fruits, and eggs, harvested that same morning. Restaurants are another aspect of the distribution network, with chefs interacting directly with farmers as well as with the larger supply network.

It can be difficult for local growers and food producers to break into the more established distribution system. In some cases, distributors and store owners don't want the extra work of dealing with smaller growers. In other cases, schools and institutions may have certain food handling or packaging policies in place that make it difficult for them to work with small- and mid-sized growers that follow protocols appropriate for their size operations. Chefs may need more training to take advantage of seasonal produce, as well as information on the best ways to source it.

There are also significant opportunities within the distribution system for delivering more fresh, local, healthy food to individuals. Institutions are getting the message that people want more locally grown and sourced food. Parents of school children are beginning to make the connection between health and fresh local food. There is more discussion about farmers needing to have fair and predictable contracts with institutions and supermarkets, and the technical support they need to innovate and expand their markets. And supermarkets are adding more local, in-season produce to their shelves. There are many opportunities for more large-scale sourcing of locally-produced food by distributors, supermarkets, schools, and institutions.

### Distribution Data

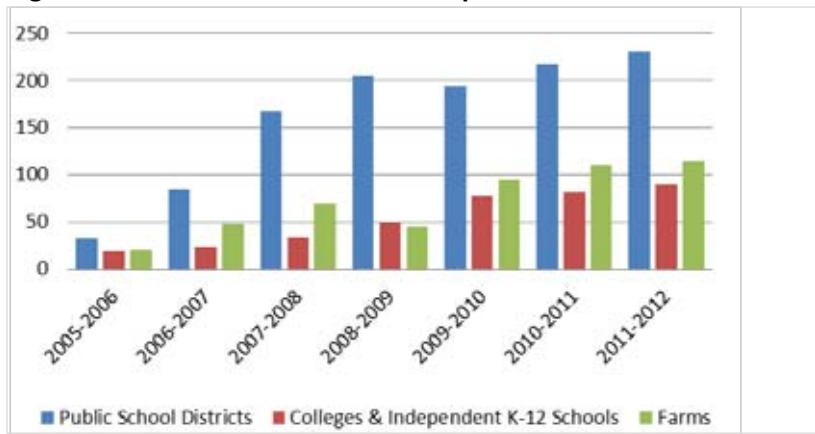
**Figure EC.26: Number of Direct to Consumer Sales Methods**



**There are about 566 farm stands in the state, the most common direct to consumer sales method used by farmers.**

*Source: EOLWD ES-202, Census Nonemployer Statistics, USDA Census of Agriculture*

**Figure EC.27: Farm to School Participation**



**There were seven times as many public school districts sourcing some of their food locally in 2012 than in 2005**

*Source: Mass Farm to School*

## Consumer Demand

For 2013, the USDA estimated per capita food sales for the U.S. to be \$2,271 for foods to be prepared and eaten at home, and \$2,233 for foods to be eaten away from the home. With a population of approximately 6.7 million, that amounts to nearly \$30.2 billion in food sales per year in the State of Massachusetts.

### **Direct to Consumer Sales by Farmers**

As stated previously, Massachusetts ranks third in the nation for the average per-farm agricultural products sold directly to consumers. In addition, Worcester and Middlesex counties are in the top ten counties nationwide for total value of direct market sales. These direct sales include those to retail outlets and via CSAs.

These sales are critical to sustainability for farmers, because the farmer is able to eliminate costly intermediaries, such as distributors and retailers, and capture more of the revenue for their own businesses. While they need to remain cognizant of the broader market, farmers are also able to set prices that reflect the cost of production, a key to ongoing viability.

Direct to consumer sales are also important to the broader economy of the State, with a ripple effect that goes far beyond the farms that produce the food. According to CISA, “If every household in Massachusetts spent \$20 more on local food per month (and \$20 less on non-local food), \$234,768,540 more local income would be generated per year and 3,876 local jobs would be created in the State.”

### **Consumer Supported Agriculture (CSA)**

According to 2012 USDA Census of Agriculture data, Massachusetts ranked number one in the nation for the percent of farms with CSAs. Nearly six percent of farms – or 465 – in our State market products through CSAs, up from three percent in 2007. Massachusetts ranks sixth nationally for number of farms operating CSAs, and four Massachusetts counties rank in the top ten nationwide for number of CSAs (Middlesex, Hampshire, Worcester, and Franklin).<sup>1</sup>

<sup>1</sup> MA EOWLD. (2015). *Employment and Wages (ES-202)*. Accessed November 2015 from <http://goo.gl/1GAatW>.

## Farmers Markets

MDAR classifies farmers markets as either three-season or winter. As of June, 2015, there were 253 three-season and 46 winter markets according to MassGIS. Winter farmers markets are growing in popularity in the Commonwealth, as more season-extending techniques have pushed the envelope of seasonality and consumers are seeking fresh produce year-round. In addition to winter storage crops, apples and frozen meats, it is not unusual to find salad greens and herbs available throughout winter at farmers markets. There has also been growth in the number of mobile farmers markets in the State, many of them specifically serving low income and seniors in isolated housing developments. In an effort to make fresh local food more accessible, more Massachusetts farmers and farmers markets accept Electronic Benefit Transfer (EBT) for SNAP. In 2014, 180 farmers and farmers markets accepted SNAP, up from just 24 in 2008. In 2014 that arrangement allowed SNAP recipients to purchase \$366,000 worth of produce from farmers markets, up from just \$7,333 in 2008.<sup>2</sup>

Farmers markets are a relatively low-overhead way through which farmers can reach numerous customers in a short amount of time, with the marketing and logistics handled by market managers. In recent years, as the number of farmers markets have increased, some have raised concerns that the market is saturated and that there are now too many markets. But others, especially those in low-income and urban communities, believe there is still demand and need for more farmers markets.

## Other Direct to Consumer Methods

In addition to CSAs and farmers market, farmers sell their products directly to consumers at farm stands, pick-your-own operations and farm stores. According to 2015 MassGIS data, there are 566 farm stands and 266 pick-your-own operations across the State.

## Wholesale Food Distributors

Wholesale food distributors in the Commonwealth accounted for approximately four percent of all the food system businesses in 2012, or 1,457 businesses. Wholesalers of grocery and related product decreased by five percent while wholesalers of farm product raw material increased by 76 percent and wholesalers for farm supplies increased by 44 percent.<sup>3</sup>

The wholesale food trade in the State generated \$22.63 billion in 2013, up from \$16.07 billion in 2002.<sup>4</sup>

Large distributors typically have catalogs and product lists from which their customers order or, in some/many cases, the distributors make the selection of products on behalf of the customer. Convenience stores are a prime example of businesses who allow the distributor to make the selections for them. Supermarkets also source food through distributors. Supermarkets may also have contracts agreements with local farmers to supply specific local produce or food products; generally, these are not contractual relationships. For dairy, supermarkets buy private label milk from bottlers. For branded milk they buy from a cooperative, or from larger distributors.

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<sup>2</sup> US Census Bureau. (2015). *Nonemployer Statistics*. Accessed November 2015 from <https://goo.gl/9bZb7N>.

<sup>3</sup> USDA. (2012). *Census of Agriculture, Volume 1, Chapter 1: State Level*. <http://goo.gl/G7moFg>.

<sup>4</sup> US Department of Commerce, Bureau of Economic Analysis. (2014). *Gross-Domestic-Product-(GDP)-by-Industry Data*. Accessed October 2015 from <http://goo.gl/brHeEX>.

### **Food Products Exported from Massachusetts**

Massachusetts food and agricultural producers export more than \$1.2 billion of products out of the U.S. each year. Fish products are the largest export, with a value of more than \$500 million. Prepared and preserved cranberries are also a significant export, with \$63 million being shipped overseas in 2014.

**Table EC.11: International Food and Agricultural Exports from Massachusetts: Selected Categories and Items**

	2010	2012	2014
Agricultural & Related Products Total	\$ 1,118,601	\$ 1,214,967	\$ 1,220,576
Fish Products	\$ 453,787	\$ 546,110	\$ 519,160
Processed Fruit	\$ 29,136	\$ 37,644	\$ 68,373
Dairy Products	\$ 66,546	\$ 50,015	\$ 65,503
Prepared Foods	\$ 49,572	\$ 60,150	\$ 46,825
Fruit & Vegetable Juices	\$ 45,174	\$ 50,580	\$ 42,202
Wine & Beer	\$ 4,084	\$ 9,245	\$ 18,252
Fresh Fruit	\$ 21,052	\$ 21,070	\$ 15,336
Beef & Beef Products	\$ 16,505	\$ 16,814	\$ 13,739
Processed Vegetables	\$ 5,751	\$ 5,665	\$ 11,855
Non-Alcoholic Bev. (ex. juices, coffee, tea)	\$ 12,740	\$ 8,640	\$ 11,553
Fresh Vegetables	\$ 2,137	\$ 5,475	\$ 6,057
Cranberry Juice exports from MA		\$ 33,709	\$ 35,796
Cranberries, prepared or preserved		\$ 24,376	\$ 63,527
(Dollars in thousands)			

**Fish products make up a substantial portion of food exported from our state.**

*Data Source: USDA Foreign Agricultural Service. (2015). Global Agricultural Trade System.*

### **Farm to Institution and Farm to School**

Increasing procurement of local food by institutions and schools would help feed demand and would provide more growers with more reliable markets. In 2010, to help boost procurement of local food, the State amended Chapter 7, Section 23B of MGL to require State agencies to prefer foods grown or produced within the State over foods grown or produced outside of the State in their procurement processes. State colleges and universities are not required to follow this procurement law – they only have to make “reasonable efforts” to source food locally. To date, this law has not compelled much change. Many State agencies have not achieved implementation and there is no tracking, reporting or benchmarking process in place. There has also been little education for farmers on Section 23B.

Similarly, the Massachusetts School Nutrition Act requires preferential purchasing, as long as the local option is less than ten percent more expensive than comparable foods sourced elsewhere. Public schools are also allowed to buy directly from farms without a public bid process, as long as the purchase is under \$25,000.

There are existing programs which make help boost local procurement. The first is E.O. 503 Small Business Purchasing Program (SBPP) which requires agencies to award contracts between \$50,000 and \$150,000 to SBPP participants. Although this existing program is a good option for farmers, no farmers are currently participating, probably due to lack of knowledge about the program. There is also the Supplier Diversity Program, which encourages agencies to give preference to bidders who work with minority- and women-owned business enterprises.

## Massachusetts Farm to School

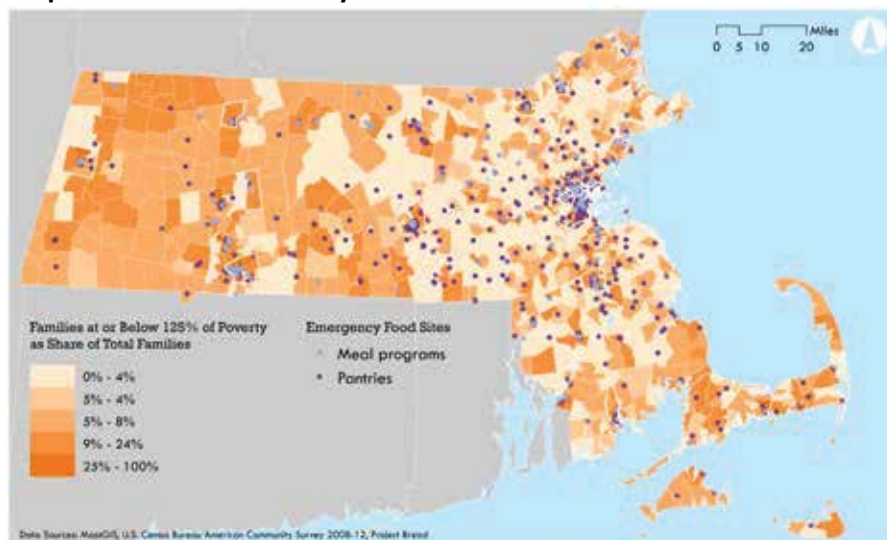
The goal of MA Farm to School is to “facilitate sustainable purchasing relationships between local institutions and local farms, promote local food and agriculture education for students, and support State, regional, and national networking of farm to school practitioners.”

In MA Farm to School’s last survey of their program’s participants, there were 320 public school districts, private schools, and colleges in the Commonwealth preferentially serving local foods, over half of which have received assistance from the MA Farm to School program. About 114 farms sold their products directly to schools across the State through this program. MA Farm to School focuses on facilitating sustainable procurement relationships – local foods arriving regularly at the loading dock of institutions – between farms and schools.

The USDA Farm to School Census estimates that \$8.9 million is being spent by Massachusetts schools on local food, though participation in the survey is optional and the estimate may not reflect all of the revenue being spent. The survey revealed that the average percent of food budgets spent on local food in Massachusetts is 15.91 percent, and Massachusetts ranks 12<sup>th</sup> in the nation in local food purchases for schools.<sup>5</sup>

## Retail Food Distribution

Map EC.4: Ratio of Grocery Store to Convenience Stores TK

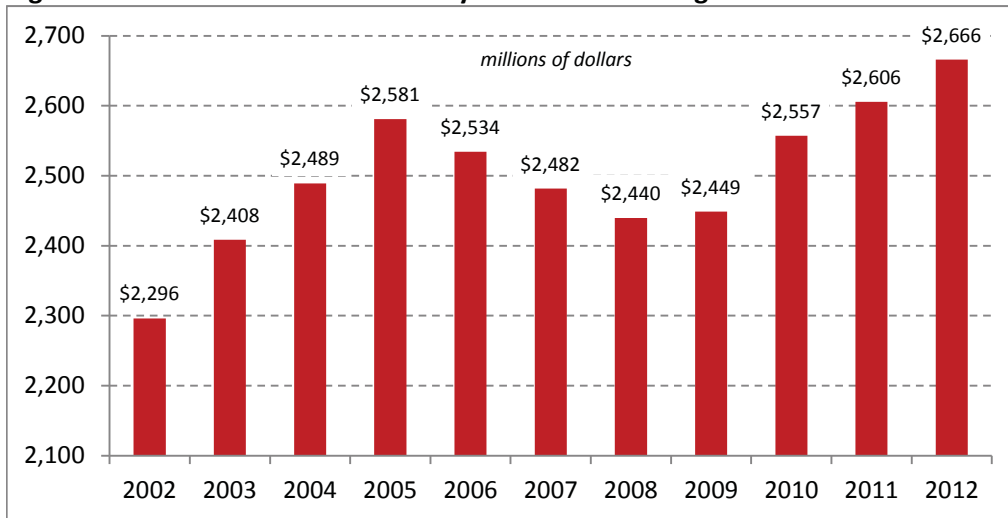


**Many of the towns in the State with the most families at or below 125% of poverty have no emergency food sites.**

Source: MassGIS, U.S. Census Bureau American Community Survey 2008-12, Project Bread.

<sup>5</sup> USDA Food and Nutrition Service. (2015). *Farm to School Census Explorer*. Accessed October 2015 at <http://goo.gl/Hof0YW>.

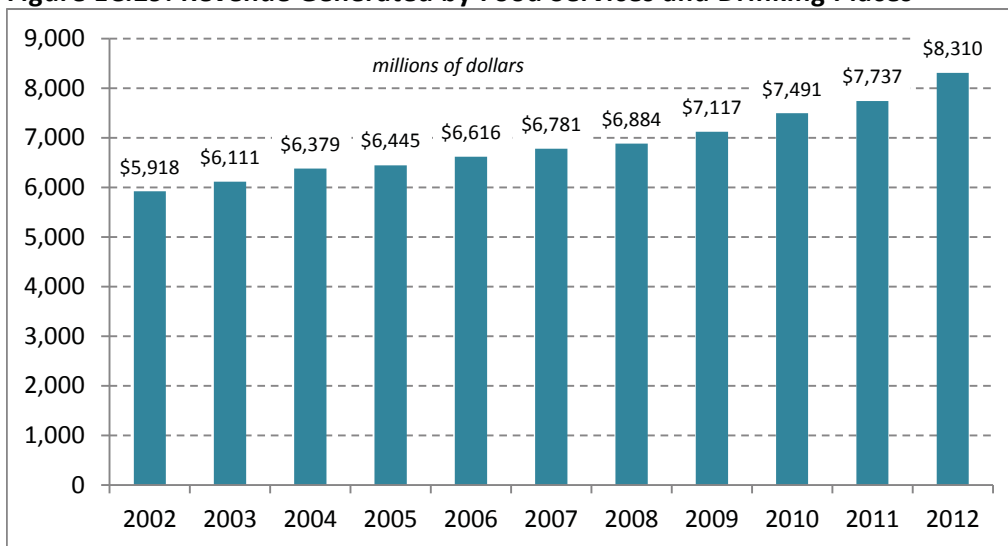
**Figure EC.28: Revenue Generated by Food and Beverage Stores**



Revenue generated by food and beverage stores increased by 16% from 2002 to 2012.

Source: U.S. Bureau of Economic Analysis and InfoGroup Business Data 2011

**Figure EC.29: Revenue Generated by Food Services and Drinking Places**



Revenue generated by food services and drinking places rose steadily from 2002 to 2012, increasing by 40% during this time.

Source: U.S. Bureau of Economic Analysis and InfoGroup Business Data 2011

### **Food and Beverage Stores**

Food and beverage stores make up approximately 16 percent of the food system businesses in the State. There were approximately 6,700 food and beverage stores in 2012, up from approximately 6,550 in 2002. The total revenue generated by these stores in the Commonwealth was about \$2.7 billion in 2012, up from about \$2.3 billion in 2002. See Figure EC.1: Change in Number of Food System Businesses 2002 to 2012.

### **Food Services and Drinking Places**

Food services and drinking places (restaurants and bars) overwhelmingly make up the majority of food system businesses in the State, at 14,687, or 42 percent. The number of restaurants and bars increased about ten percent between 2002 and 2012. Revenue generated by food services and drinking places totaled \$8.3 billion in 2012, up from \$5.9 billion in 2002. Unlike other food businesses that experienced fluctuations, this category saw a steady increase of revenue. See Figure EC.1.

### **Food Distribution and Branding**

Though relatively small in land mass, Massachusetts is a State of diverse regional identities, many related to food. The Berkshires, the Pioneer Valley, the Cape and Islands, Boston metro, the North Shore and other regions have their own distinct identity, and many of them have successful buy local organizations that have developed brands and marketing campaigns for their region.

At the statewide level, Massachusetts Grown...and Fresher!<sup>TM</sup> is a long-standing branding campaign, overseen by MDAR. Commonwealth Quality is a recently established certification that helps identify products that are made using practices that are safe, sustainable, and don't harm the environment following a set of standards developed by the industry and regulators. Savor Massachusetts is another statewide brand that is used to help boost culinary tourism and to highlight the regional specialties unique to our State.

### **Distribution Workforce**

Retail food system workers receive some of the lowest wages of all food system workers. Workers in food services and drinking places have the lowest pay, with a \$354 average weekly wage. Food and beverage store workers have the second lowest average weekly wage, at \$413. Wholesale distribution workers receive better pay than retail, with grocery product merchant wholesalers receiving \$1,184 in average weekly wages and farm product merchant wholesales receiving \$937. See Figure EC.7: Food System Average Weekly Wages 2012. Food system work is often seasonal, part-time, low-wage, and without benefits.

There is potential for growth in distribution-related businesses and jobs. Continued development of the infrastructure to freeze or preserve produce and other Massachusetts food products could create opportunities for business expansion and growth. Expanded aggregation and distribution options for Massachusetts producers also hold strong promise for business expansion and new business development.



## Existing Conditions: FASH (Food Access, Security, and Health)

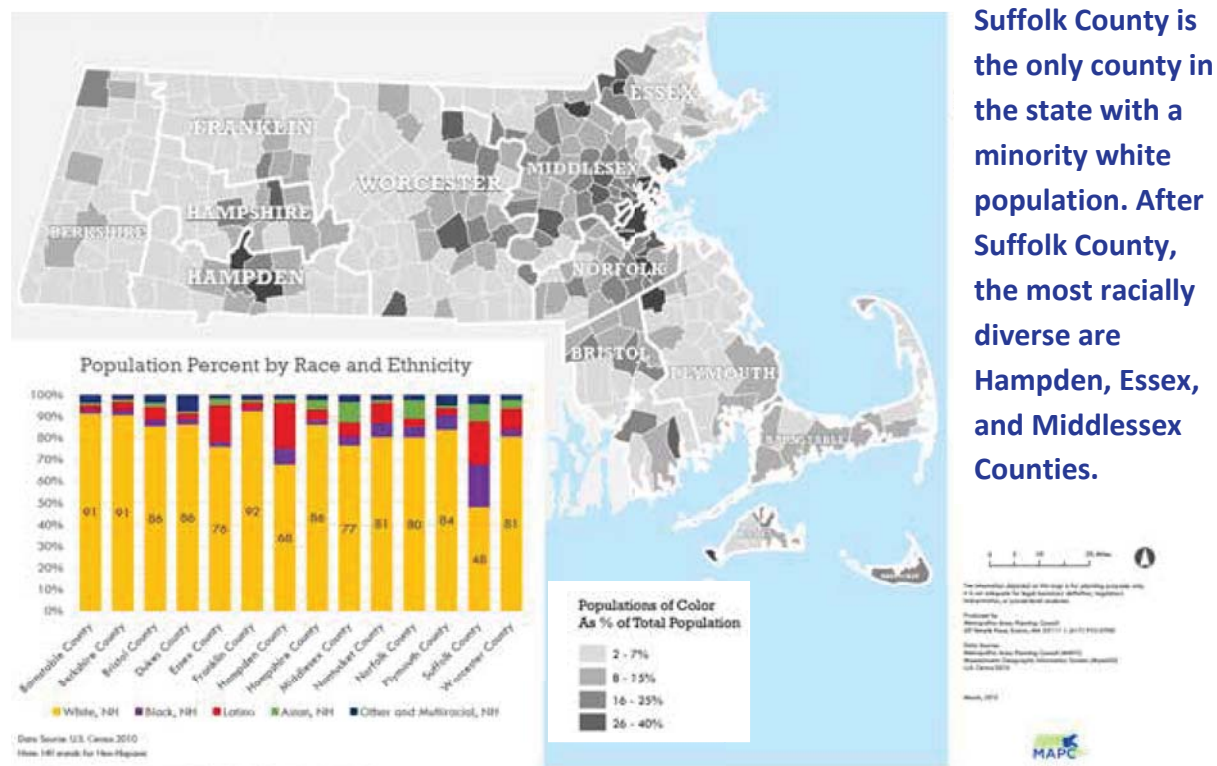
This section presents data and analysis that describe people. Each person may have several different relationships to the Massachusetts food system: as a shopper and consumer; as a parent who prepares meals for their family; as a restaurant or retail grocery worker; as a student who grabs a quick lunch at the school cafeteria; and many more.

This section also provides information that is intended to help improve our understanding of why an increasing number of people in the Commonwealth do not have secure, reliable sources of food, and why in most of our communities there are now epidemic levels of obesity, diabetes, and other chronic diseases that are associated with poor nutrition and a lack of regular access to healthy foods.

### Consumers

#### Consumer Demographics

**Map EC.5: Population Percent by Race and Ethnicity**



Source: MassGIS, U.S. Census 2010

**Table EC.12: Annual % Growth over Previous Year 2010-2014**

Geography	Population Estimate (as of July 1)		# Change from April 1, 2010 base to July 1, 2014	% Change from April 1, 2010 base to July 1, 2014
	2010	2014		
Massachusetts	6,564,073	6,745,408	197,591	3.0%
Barnstable County	215,903	214,914	(974)	-0.5%
Berkshire County	131,310	128,715	(2,557)	-1.9%
Dukes County	16,553	17,356	821	5.0%
Essex County	745,478	769,091	25,916	3.5%
Franklin County	71,317	70,862	(510)	-0.7%
Hampden County	464,160	468,161	4,536	1.0%
Hampshire County	159,266	160,939	2,859	1.8%
Middlesex County	1,506,852	1,570,315	67,189	4.5%
Nantucket County	10,154	10,856	684	6.7%
Norfolk County	672,645	692,254	21,511	3.2%
Plymouth County	495,856	507,022	12,107	2.4%
Suffolk County	725,319	767,254	45,167	6.3%
Worcester County	800,184	813,475	14,933	1.9%

While Massachusetts' population increased 3% between 2010 and 2014, Barnstable, Berkshire, and Franklin Counties all experienced modest declines during the same time period.

Source: UMass Donahue Institute Population Estimates Program. Source data: Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2014. U.S. Census Bureau Population Division. May 21, 2015

**Table EC.13: Projected Population Growth at State and County Levels**

AREA	Census 2010	Projection 2015	Projection 2020	Projection 2025	Projection 2030	Projection 2035	Percent Change
Massachusetts	6,547,629	6,792,591	6,950,668	7,105,878	7,231,126	7,319,469	12
Barnstable	215,888	215,073	205,411	198,550	192,894	187,674	-13
Berkshire	131,219	129,450	129,692	129,992	130,446	130,389	-1
Bristol	548,285	557,690	563,618	568,691	572,196	573,960	5
Dukes	16,535	17,291	17,305	17,604	17,972	18,453	12
Essex	743,159	783,531	798,824	813,666	824,650	831,063	12
Franklin	71,372	70,498	70,703	70,832	70,586	69,882	-2
Hampden	463,490	471,163	479,431	487,931	495,749	501,718	8
Hampshire	158,080	158,855	160,077	161,158	161,277	160,451	1
Middlesex	1,503,085	1,577,277	1,611,789	1,645,167	1,673,074	1,694,670	13
Nantucket	10,172	10,667	10,678	10,895	11,371	12,004	18
Norfolk	670,850	705,106	729,296	752,774	771,889	786,274	17
Plymouth	494,919	508,861	519,998	530,225	538,676	544,388	10
Suffolk	722,023	764,433	809,433	853,702	888,796	914,644	27
Worcester	798,552	822,696	844,413	864,691	881,550	893,899	12

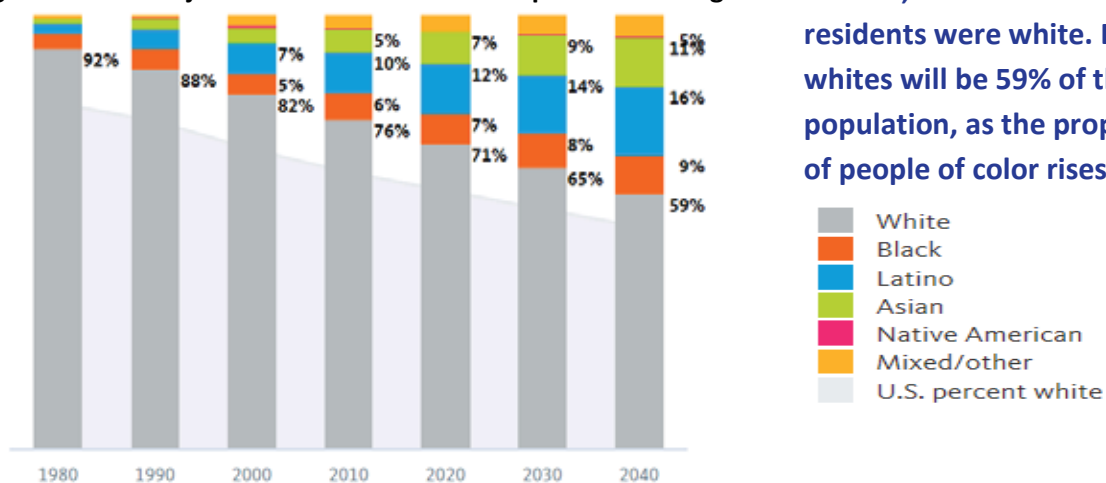
Source: UMass Donahue Institute Vintage 2015 Population Projections. March 2015

Massachusetts can expect to see a 12% increase in population from 2014 to 2035, but the population of Barnstable County is expected to decline 13% during the same period.

Massachusetts was home to 6.7 million people in 2014, up three percent from 2010 and 6.1 percent from 2000. While this represents an increase of nearly half a million new residents in the last 15 years, our population growth is significantly less than the U.S. average of 13 percent since 2000.<sup>1</sup> Yet Massachusetts remains the most populous state in New England, with many large consumer markets located within relatively short distances from farms and farm stands

<sup>1</sup> US Census Bureau. (2010). Decennial Census 2000 and 2010 and American Community Survey, One-year population estimates 2014. Accessed November 2015 from <http://goo.gl/gVqXhr> and <https://goo.gl/crw4pr>.

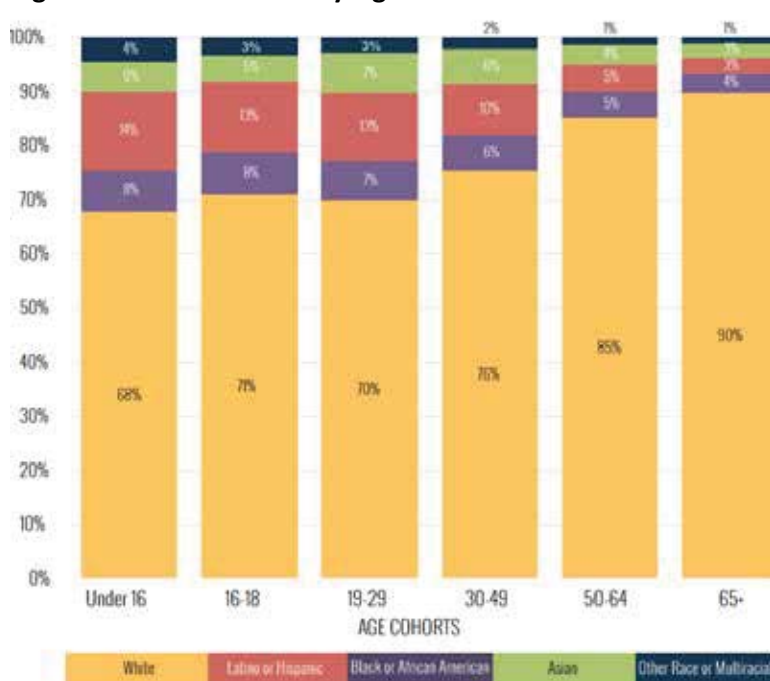
**Figure EC.30: Projected Racial and Ethnic Population Change**



In 1980, 92% of Massachusetts residents were white. By 2040, whites will be 59% of the population, as the proportion of people of color rises to 41%.

Source: UMass Donahue Institute Vintage 2015 Population Projections. March 2015

**Figure EC.31: Residents by Age and Race**



People under 30 are the most racially diverse age cohort in Massachusetts, while people age 65 and older are 90% white.

Source: American Community Survey Public Use Microdata Sample, 2007-2011

Middlesex County is the most populous of all Massachusetts counties, with over 1.5 million residents, followed by Worcester, Essex, and Suffolk Counties. The most rural counties are the two island counties, Nantucket and Dukes. Franklin County is the most rural non-island county, with just over 71,000 residents.

Massachusetts' total population is estimated to grow from 6.7 million in 2014 to more than 7.5 million in 2035, an increase of about 12 percent that will result in a commensurate increased demand for food.<sup>2</sup>

The Commonwealth is becoming more diverse. People of color accounted for the majority of the population growth between 2000 and 2010. The total number of white residents decreased over that time, by more than 200,000 people, while the population of color grew by more than 400,000. Statewide, the population of color has increased by six percent, from 18 percent in 2000 to 24 percent in 2010. Urban areas tend to be more diverse than rural.

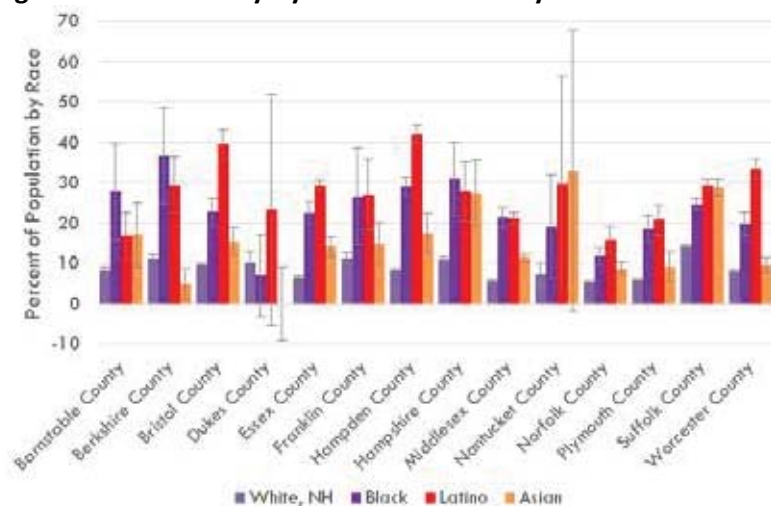
Younger Massachusetts residents are more diverse than older generations. Approximately 30 percent of our residents under 16 years old are non-white. This is a dramatic change from the proportion of people who are age 65 and older, which is approximately ten percent non-white. See figure EC.30.

## Hunger and Food Insecurity

More than three-quarters of a million people in Massachusetts or approximately one in every nine residents – 11.9 percent of all residents, and 16.6 percent of our State's children – experienced food insecurity in 2014.<sup>3</sup> The USDA defines food insecurity as consistent access to adequate food being limited by a lack of money and other resources at times during the year. Other commonly used terms for food insecurity are “hungry, or at risk of hunger,” and “hungry, or faced the threat of hunger.” Suffolk County has the highest average food insecurity with nearly 16 percent of its population unable to get all the food they need on a regular basis.

### Hunger and Food Insecurity Data

**Figure EC.32: Poverty by Race and Ethnicity**



**People of color consistently experience more poverty than whites in Massachusetts.**

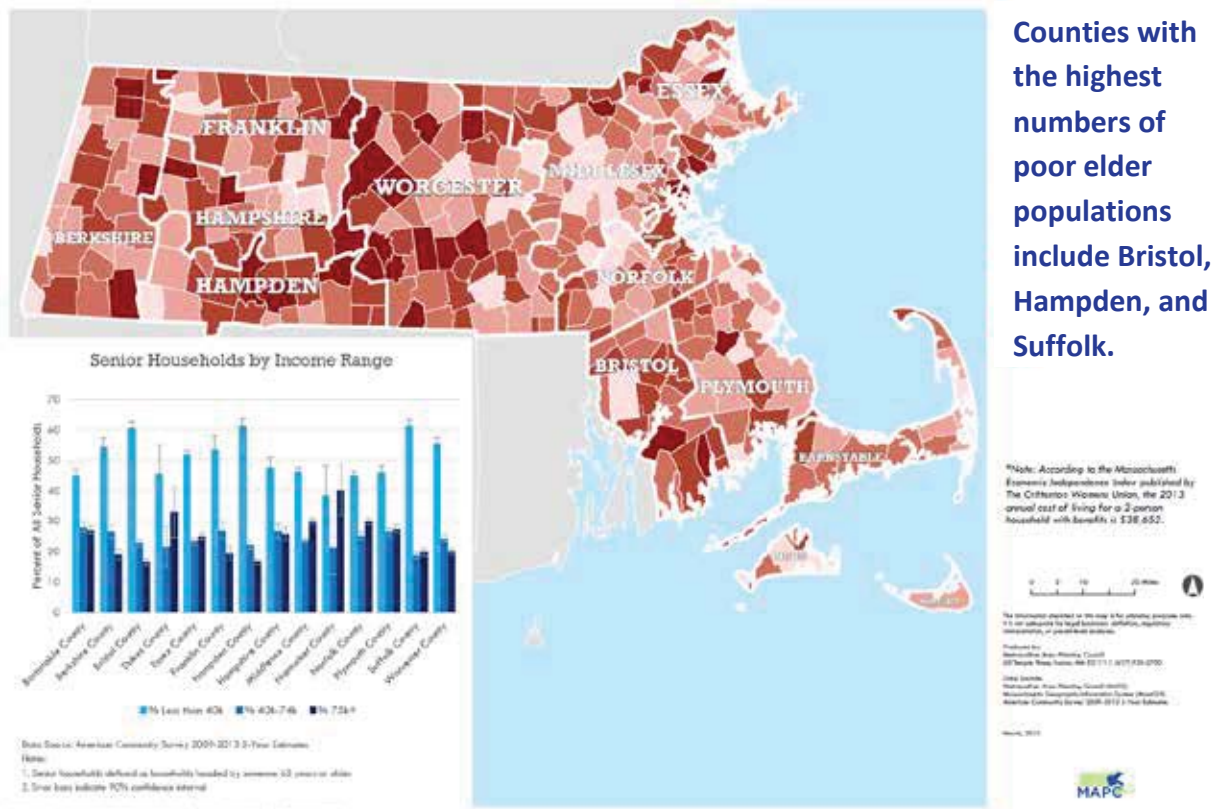
**Source: American Community Survey 2009-2013 5-year estimate**

*Note: Error bars indicate 90% confidence interval*

<sup>2</sup> Renski, Henry. (2015). *Long-term Population Projections for Massachusetts Regions and Municipalities*. UMass Donahue Institute. Accessed March 2015 from <http://goo.gl/0kAYTC>.

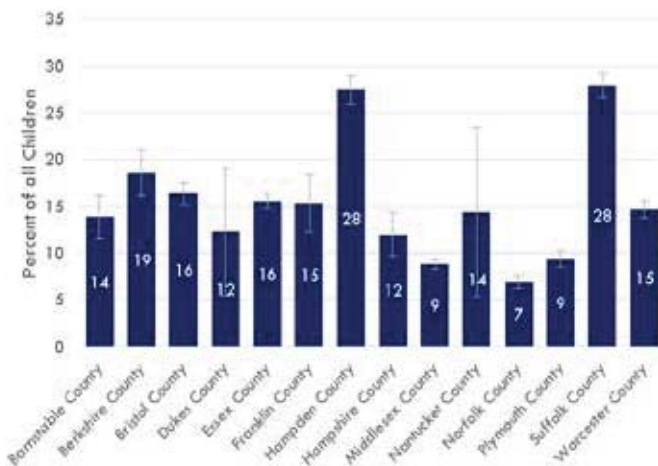
<sup>3</sup> Gundersen, Craig. et. al. (2015) *Map the Meal Gap 2015: Highlights of Findings for Overall and Child Food Insecurity*. Feeding America. Accessed November 2015 from <http://goo.gl/fM4vFE>.

**Map EC.6: Elder Populations and Income**



Source: American Community Survey 2009-2013 5-year estimate, MassGIS

**Figure EC.33: Children in Poverty**



Source: American Community Survey 2009-2013 5-year estimate

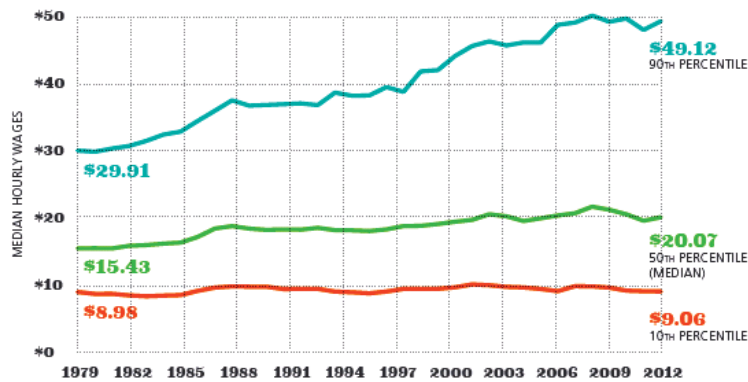
Note: Error bars indicate 90% confidence interval

In Hampden and Suffolk Counties, 28% of children live in poverty – significantly more than other counties.

People living in poverty are more likely to be food insecure. In Massachusetts, 11.9 percent of residents are below the federal poverty line (approximately \$20,090 per year for a family of three). But vulnerable Massachusetts residents face higher poverty rates: 16 percent for children, and 26.5 percent for working-age people with disabilities.



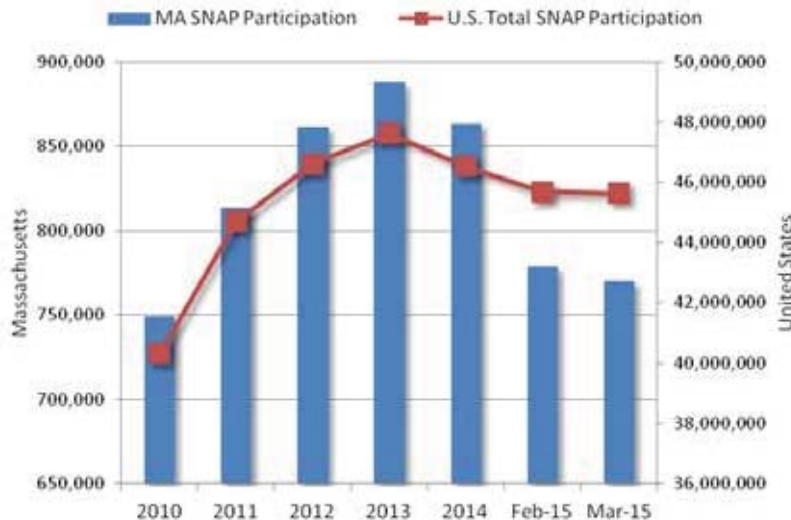
**Figure EC.34: Change in Median Hourly Wages**



The income gap in Massachusetts continues to widen, as low incomes have remained flat since 1997.

Source: *From Poverty to Opportunity: The Challenge of Building a Great Society*, Nancy Wagman, 2014  
[www.massbudget.org/report\\_window.php?loc=From%20Poverty%20to%20Opportunity.htm](http://www.massbudget.org/report_window.php?loc=From%20Poverty%20to%20Opportunity.htm).

**Figure EC.35: SNAP Participation in Massachusetts and the Nation**



The number of Massachusetts residents receiving SNAP benefits dropped nearly 11% during the first few months of 2015, compared to just a 1% drop nationally.

Source: *From Poverty to Opportunity: The Challenge of Building a Great Society*, Nancy Wagman, 2014  
[www.massbudget.org/report\\_window.php?loc=From%20Poverty%20to%20Opportunity.htm](http://www.massbudget.org/report_window.php?loc=From%20Poverty%20to%20Opportunity.htm).

Elderly residents are also vulnerable to hunger and food insecurity, and elderly families and individuals with low levels of income have the greatest food security challenges. Map EC.6 shows the proportion of senior-headed households with incomes less than \$40,000 per year. The darkest red indicates the highest proportion of low-income seniors (63 percent to 100 percent). Communities with the highest proportion of vulnerable seniors are distributed across Massachusetts, in both rural and urban areas. In seven counties, more than 50 percent of senior-headed households have incomes of less than \$40,000 per year. As shown in figure EC.32, white people have significantly lower levels of poverty than people of color. Bristol and Hampden Counties have the largest disparity between whites and Latinos, with the difference in poverty levels reaching approximately 30 percent.

Families earning up to 125 percent of the federal poverty threshold (\$20,090 for a family of three in 2015) qualify to receive food assistance benefits such as SNAP or WIC. Undocumented immigrants are not eligible for SNAP but children of undocumented immigrants can get SNAP if they are citizens or legal permanent residents.

## Dietary Guidelines

The Dietary Guidelines for Americans are issued and updated every five years by USDA and the Department of Health and Human Services. (An update is due in late 2015.) These guidelines offer medical and nutritional consensus information about appropriate intake of calories, fats, sugar, salt, and other nutrients; how to make informed food choices; and the importance being physically active. All these factors contribute to maintaining a healthy weight, reducing one's risk of chronic disease, and promoting overall personal health.



The Dietary Guidelines for Americans healthy diet is one that:

- Emphasizes fruits, vegetables, whole grains, and fat-free or low-fat milk and milk products;
- Includes lean meats, poultry, fish, beans, eggs, and nuts; and
- Is low in saturated fats, trans fats, cholesterol, salt (sodium), and added sugars.

MyPlate helps individuals through the use of a place setting image to understand what proportions of each food group is recommended.

Massachusetts residents on average do not consume the nutritionally recommended amounts of fruits and vegetables, based on the MyPlate guidelines shown above. Only one-quarter of Massachusetts adults eat the recommended five servings of fruits and vegetables per day (2.5 cups of vegetables and two cups of fruit).<sup>4</sup>

Eating enough fruits and vegetables and other healthy food depends greatly on an individual's ability to get to a supermarket. Disparities in food access have significant health implications. For every additional supermarket in a census tract, produce consumption increases 32 percent for African Americans and 11 percent for whites.<sup>5 6</sup> In 2015, production of vegetables, legumes, and beans increased five percent between 2014 and 2015, but Americans are still only eating 1.6 cups per day on average.<sup>7</sup>

Some of the top impediments to eating fresh food in general include:

- Lack of money.
- Lack full-line supermarkets or other places that carry fresh, local food.
- Lack of transportation to supermarkets or other places that carry fresh, local food.
- Unfamiliar produce that is not culturally familiar.
- Lack of information on how to prepare fresh, local food.

<sup>4</sup> Centers for Disease Control and Prevention. (2013). *State Indicator Report on Fruits and Vegetables, 2013*. Atlanta, GA: Centers for Disease Control and Prevention, U.S. Department of Health and Human Services. Accessed November 2015 from <http://goo.gl/COAe2P>.

<sup>5</sup> The Boston Foundation. (2015). *Healthy People/Healthy Economy*. Accessed November 2015 from <http://goo.gl/iE9MYz>.

<sup>6</sup> Treuhaft, Sarah and Allison Karpyn. (2010). *The grocery gap: who has access to healthy food and why it matters*. PolicyLink. Accessed November 2015 from <http://goo.gl/nbMJNW>.

<sup>7</sup> USDA Economic Research Service. (2015). *Vegetables and Pulses Outlook: May 1, 2015*. Webpage accessed November 2015 from <http://goo.gl/W9Dvwf>.



## Response to Hunger and Food Insecurity

### Emergency Food System

Massachusetts' network of food banks, pantries, and meal sites is sometimes known as our "Emergency Food System." However, it is more commonly known simply as "hunger relief." The four regional food banks are:

- Eastern Massachusetts: Greater Boston Food Bank
- Central Massachusetts: Worcester County Food Bank
- Western Massachusetts: The Food Bank of Western Massachusetts
- Northeastern Massachusetts: Merrimack Valley Food Bank

These nonprofit agencies receive donations and purchases millions of pounds of food annually, which are distributed to more than 700 meal programs and food pantries throughout the State.<sup>8</sup>

Map with food pantry sites and poverty rates is TK.

### **Pounds of Food Distributed by Hunger Relief Organizations**

Approximately 13 percent of Massachusetts residents received emergency food assistance in 2014.<sup>9</sup> Additionally, 845 emergency food programs across the State were supported with product purchased with MEFAP funds, funded each year in the State's budget and administered by MDAR and distributed through the four regional food banks. See Table EC.13.

Of the \$14 million in 2014 MEFAP funding, \$780,000 (six percent) was allocated to the Massachusetts Grown Initiative to purchase produce, milk, and eggs produced in the State. This initiative was launched in 1999 as part of MEFAP to give low-income individuals access to fresh produce, while also creating new demand for local farm products.<sup>10</sup>

**Table EC.14: FY14 MA Regional Food Banks Distribution**

<u>Food Bank</u>	<u>Agencies Served</u>	<u>Total Pounds Distributed</u>	<u>MEFAP Pounds Distributed</u>	<u>MEFAP Meals Distributed**</u>
Food Bank of Western Massachusetts	182 (+1%)	8,529,736 (+11.3%)	2,361,661 (+26.0%)	1,968,051
The Greater Boston Food Bank	514 (+2%)	48,122,795 (+4.4%)	13,391,682 (+13.4%)	11,159,735
Merrimack Valley Food Bank	56 (-2%)	2,801,898 (-5.6%)	1,337,255 (+17.8%)	1,114,379
Worcester County Food Bank	93 (0%)	5,425,015 (+1.3%)	2,216,710 (+23.8%)	1,847,258
<b>Totals</b>	<b>845 (+36%)</b>	<b>64,879,444 (+4.5%)</b>	<b>19,307,308 (+16.3%)</b>	<b>16,089,423 (+16.3%)</b>

\*Table includes overall and MEFAP pounds distributed from July 1, 2013 to June 30, 2014. Numbers in parentheses indicate change over FY2013.

\*\* 1.2 pounds of food provides 1 meal.

**Source: MA Emergency Food Assistance Program Fiscal Year 2014**

### Hunger Assistance Programs

Food assistance programs provide critical support for families and individuals who are food insecure and hungry. SNAP is the cornerstone of the U.S. federal nutrition assistance safety net and the most widely used program in Massachusetts; SNAP benefits are widely used to purchase food at grocery stores, convenience stores, and many farmers markets. WIC is the other major federal food program, and funds

<sup>8</sup> Project Bread. (2014). <http://goo.gl/FbpbbsE>.

<sup>9</sup> The Food Bank of Western Massachusetts, The Greater Boston Food Bank, Merrimack Valley Food Bank, Inc., and Worcester County Food Bank. (2014). *Massachusetts Emergency Food Assistance Program (MEFAP) Fiscal Year 2014 Core Food Summary Report July 1, 2013-June 30, 2014*. Accessed November 2015 from <http://goo.gl/x7OiyK>.

<sup>10</sup> The Food Bank of Western Massachusetts, The Greater Boston Food Bank, Merrimack Valley Food Bank, Inc., and Worcester County Food Bank. (2014). *Massachusetts Emergency Food Assistance Program (MEFAP) Fiscal Year 2014 Massachusetts Grown Initiative Summary Report January 1, 2014 – December 31, 2014*. Accessed November 2015 from <http://goo.gl/2rVQrm>.

supplemental foods for low-income pregnant, breastfeeding, and non-breastfeeding women, and to infants and children up to age five at nutritional risk. Together with various other school meal programs and elderly food programs, food assistance programs serve nearly one million Massachusetts residents regularly.

In FY 2014, there were 863,412 people in Massachusetts participating in SNAP, which provided over \$1.27 billion in total benefits, resulting in a monthly average of about \$123 per person.<sup>11</sup> In March 2015, WIC had 111,461 Massachusetts participants. Because SNAP and WIC benefits are spent directly at retail food outlets in the State, every \$1 in food assistance generates a total \$1.80 in economic activity. Between 2008 and 2010 the SNAP participation rate among all people who are eligible to receive benefits jumped from 72 percent to 87 percent, largely due to the recession that began in 2008. In early 2015, SNAP participation was near 90 percent, even though the economy has recovered somewhat.

SNAP underutilization is a problem in Massachusetts, as it is throughout the U.S. This is largely because a significant number of people who qualify for SNAP do not apply for them, or fail to use all available benefits. Reasons for underutilization may include the stigma attached to using SNAP, the lack of local SNAP offices and staffing, and an online application system which may not be accessible to all populations.

In addition to SNAP and WIC, the Summer Food Service program (also a federal program) provides meals to low-income children when school is not in session. And the Child and Adult Care Food Program (CACFP) is a USDA program administered by DESE that reimburses participating day care operators for healthy meals and snacks served in child and adult day care facilities.

Healthy food options at food pantries and meals programs are a priority. Unfortunately, because food banks rely heavily on food donations and are put in a position of not being able to say “no” to processed foods, sodas, and candy, some of the food distributed is highly processed and low nutrition foods. The State's food banks make every effort to distribute foods that meet the highest nutritional value. In 2014, for example, the Greater Boston Food Bank showed that 81 percent of its inventory met the highest nutritional standard.<sup>12</sup>

In recent years, there has been more focus on getting more nutritionally healthful food to food banks, such as fresh produce and meats. Feeding America, a hunger advocacy organization comprised of a nationwide network of member food banks, has set a five-year goal to have 75 percent of food bank-distributed food considered as nutritious. But with an increase in fresh produce and frozen foods comes an increase in the need for storage, refrigeration, and freezing infrastructure to accommodate it, as well as increased hours for distribution and staff training to ensure proper handling of perishable items.

According to input from staff of food banks and pantries participating in the food system planning process, food pantries are no longer a short-term emergency resource to temporarily help people through a difficult time. Instead, our “Emergency Food System” is a regular source of food for people with low

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<sup>11</sup> The Greater Boston Food Bank. (2014). *Fiscal Year 2014 Impact*. Accessed November 2015 from <http://goo.gl/3vOI6U>.

<sup>12</sup> Korman, Phillip and Margaret Christy. (2015). *Food consumers must play role in strengthening viability of community-supported agriculture*. Daily Hampshire Gazette. May 6, 2015. Accessed November 2015 from <http://goo.gl/kzVssC>.

incomes. In addition, food pantries are being asked to do more than just distribute food; they also provide support services, such as education on food preparation and nutrition information.

### **Other Hunger Relief Strategies**

Participants in the food system planning process identified a series of other strategies to address hunger relief needs in Massachusetts. These included addressing structural issues, such as the need for living wage jobs and the prevalence of social and racial injustice. Some communities see a better path to food security via empowerment and education. One such way this is happening is through community gardens, often located in urban setting and a place for people without land to raise their own food. Community gardens sometime have the support of community groups, who teach people how to grow, harvest, and prepare food. Community gardens put power and choice in the hands of people who may have never had the ability to obtain fresh, local food.

Another example of hunger relief outside the traditional food bank model that was identified by planning participants is low-income and elder CSAs. Some farms have begun to finance low-income and elder shares by seeking donations from their existing CSA members and from community organizations. In 2015, CISA reported that 12 CSA farms worked with them to provide 400 farm shares during the summer to low-income elders in Franklin, Hampshire, and Hampden Counties.<sup>13</sup>

Nationwide, there are now 512 farmers markets that now offer SNAP matching incentives – and four out of five markets double SNAP benefits. These programs are designed to serve the twin purposes of increasing the availability of fresh, local food for people who are food insecure, and boosting the sales of Massachusetts-grown and processed foods. Leading private foundations supporting SNAP matching are Wholesome Wave Fair Food Network, Market Umbrella, and Roots of Change. One of the key barriers to even wider adoption of such SNAP programs is a lack of funds for management.

### **Healthy Incentives Pilot (HIP)**

One of the most successful food assistance incentives programs in the U.S. was HIP, an innovative 2012-2014 program of Massachusetts DTA. This program offered SNAP card users reduced pricing on eligible healthy foods included fresh, canned, frozen, and dried fruits and vegetables without added sugars, fats, oils, or salt – and excluded white potatoes and 100 percent fruit juice. A 30 percent incentive was immediately credited back to the shopper's electronic benefit transfer (EBT) card and could be spent on other SNAP-eligible items, even during the same shopping trip.

The program increased purchases of fruits and vegetables by 11 percent for households using SNAP assistance by offering a 30 percent incentive. People in households that participated in HIP ate almost one quarter of a cup (26 percent) more fruits and vegetables per day – and including more dark green, red, and orange vegetables, as well as more melons and dark berries, than non-participants. In addition, most retailers did not find the administration of HIP incentives difficult to implement. More than 90 percent of participating retailers, which included several large grocers, reported no change in check-out times, and only 15 percent said that incentive purchases were hard to process.

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<sup>13</sup> Manon, Miriam, Caroline Harries, and David Treering. (2010). *Food for Every Child: The Need for More Supermarkets in Massachusetts*. Accessed November 2015 from <http://goo.gl/nEGrqB>.

## **Food Knowledge**

Public education is seen as a crucial element to addressing poor diet, nutrition and healthy foods, according to public input during the planning process. Many people have become disconnected from whole food and have no skills or knowledge to prepare home-cooked meals. People also lack the information to understand that cooking from whole foods can be both cheaper and healthier. There is still a demand for processed – or convenience – food for households without the time, resources, or know-how to cook.

There is a need for increased education on food at all levels, including information on nutrition as well as growing, cooking, and preserving food. This education is envisioned as happening at many different levels and in many different settings – in schools, hunger assistance programs, community groups, and healthcare facilities. A greater food knowledge on the part of consumers could lead to more purchasing of local food which could lead to increased farm viability in the State.

UMass Extension is the leading provider of nutrition education in the State. Extension's SNAP Education and Expanded Food and Nutrition Education Programs (EFNEP) provides practical, skill-based nutrition education to low-income families with young children and to youth up to age 18 from these families. EFNEP programs are based in Amherst, Lawrence, Raynham, Springfield, and Worcester.

Also, innovative privately-funded programs offer models for child and adolescent food and nutrition education. One example is Project Bread's "Chefs in Head Start" program, based in Lynn, which brings a professional chef to preschool staff each week for trainings in how to prepare healthy, fresh food that children like to eat – and that Head Start programs can afford. The chef also teaches the children nutrition facts about the foods they are eating and includes a monthly workshop for parents on budget-friendly and healthy meals – and sends them home with recipes and fresh food.

## **Food Access: Transportation and Grocery Stores**

Grocery stores are critical sources of healthy food for most consumers, as they are reliable sources of fresh produce and meats. As such, a person's ability to physically get to the store is essential to their food security – whether it be on foot, by car, via mass transit, or bike. Therefore, people who do not have access to a car or frequent transit are more vulnerable to food insecurity.

According to the Food Trust, a nonprofit organization focused on food access, despite being one of the most affluent states in the nation, Massachusetts has fewer supermarkets per capita than almost any other state. The problem is statewide; when measured against the national rate of per capita supermarkets, Massachusetts has 141 too few.<sup>14</sup> This lack of access to the types of retail grocery outlets that carry a wide selection of fresh produce and meats is especially pronounced in urban areas of the State. For example, Lawrence is a predominantly low-income community with more than 76,000 residents, but has just one full-line supermarket. As a result, many Lawrence residents must rely on neighborhood corner stores and bodegas, very few of which offer fresh, affordable food at prices comparable to a grocery store. Health outcomes are telling: as of 2009, 46 percent of Lawrence's children were overweight or obese, the highest rate in the Commonwealth. This is consistent with a significant body of research

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<sup>14</sup> The Food Trust. (2010) *Food for Every Child*. <http://goo.gl/YOY3Yd>.

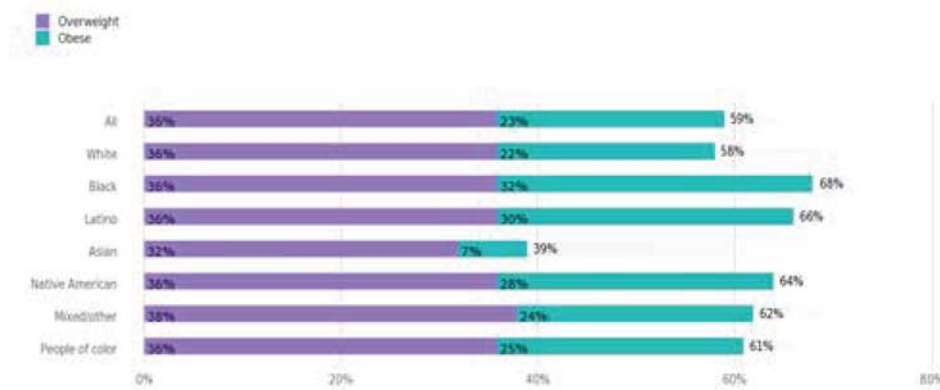
showing that convenient access to grocery stores is linked with lower rates of obesity, diabetes, and other diet-related diseases.

Communities with similar fresh food access issues include Brockton, Springfield, Fitchburg, Lowell, and several neighborhoods of Boston. In Lowell, the Food Security Commission found that 50 percent of food stores surveyed offered three or fewer fruit options and 60 percent of stores distributed three or fewer vegetable varieties, while more than a third of all stores surveyed did not sell any produce items at all.<sup>15</sup>

## Food and Public Health

### Public Health Data

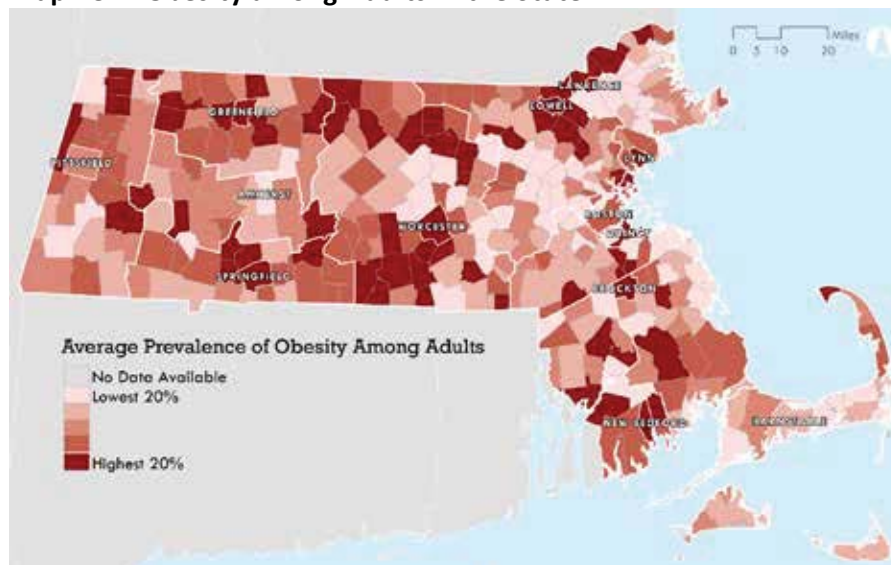
**Figure EC.36: Overweight and Obese Rates by Race and Ethnicity**



Overweight and obesity rates vary by race and ethnicity, with black people experiencing 40% higher obesity rates than the population as a whole.

Source: PolicyLink/PERE National Equity Atlas, [www.nationalequityatlas.org](http://www.nationalequityatlas.org)

**Map EC.7: Obesity among Adults in the State**



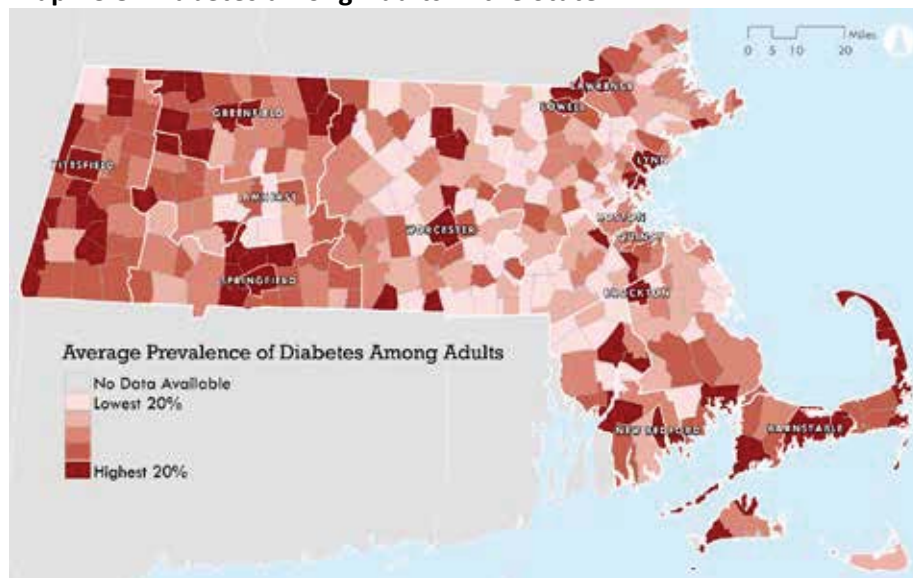
Although Massachusetts was third lowest nationally for obesity in 2013, over 36% of the state's adults are overweight and 23% are obese.

Source: Massachusetts Department of Public Health Prevention and Wellness Trust Fund Behavioral Risk Factor Surveillance System, 3-year average 2008-2010

<sup>15</sup> Cook, J. T., D.A. Frank, et. al, "Food insecurity is associated with adverse health outcomes among human infants and toddlers," *The Journal of Nutrition*, 134(6), 1432-1438. 2004.



## Map EC.8: Diabetes among Adults in the State



Diabetes has increased 28% in the last ten year in Massachusetts' residents.

Source: Massachusetts Department of Public Health Prevention and Wellness Trust Fund Behavioral Risk Factor Surveillance System, 3-year average 2008-2010

There is a direct connection between diet and health. Children who don't have enough food to eat have two times the chance of poor or fair health compared to those who do.<sup>16</sup> Poor diet leads to a variety of health issues, including obesity, high blood pressure, diabetes, and depression.

According to the report, *Healthy People / Healthy Economy; An Initiative to Make Massachusetts the National Leader in Health and Wellness*, for many decades the State's population overall has ranked high on most measures of health compared with other states, likely due to factors such as income, educational attainment, and access to healthcare.<sup>17</sup>

Obesity is an epidemic in the United States and can lead to chronic preventable diseases such as heart disease and diabetes, and other potentially fatal conditions such as cancer.<sup>18</sup> Though Massachusetts has a relatively low rate of obesity, ranking third lowest of the 50 states in 2013, 36 percent of Massachusetts' adults are overweight and 23 percent are obese.<sup>19 20</sup> By 2007, Massachusetts and the other 49 states were nearly 30 years into an unprecedented rise in the rates of unhealthy weight gain. Residents of every income, educational attainment level, and racial-ethnic group suffered increasing rates of both overweight (defined by the U.S. Centers for Disease Control and Prevention as a Body Mass Index between 25 and 29.9) and obesity (a Body Mass Index over 30).<sup>21</sup>

Although as a whole, the State's population has ranked high on most measures of health, not every Massachusetts resident enjoys the same level of good health. African American residents as a group were substantially less healthy, by many measures, than the broader population. The growing Hispanic

<sup>16</sup> The Boston Foundation. (2015). *Healthy People/Healthy Economy*. Accessed November 2015 from <http://goo.gl/iE9MYz>.

<sup>17</sup> CDC. (2014). *Adult Overweight and Obesity*. Centers for Disease Control and Prevention. Accessed April 2015 from <http://goo.gl/Q7HDPr>.

<sup>18</sup> CDC. (2014). *Prevalence of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2014*. Accessed November 2015 from <http://goo.gl/OMQax6>.

<sup>19</sup> MA DPH, (2013). *A Profile of Health Among Massachusetts Adults, 2013*. Accessed November 2015 from <http://goo.gl/HL2w8l>.

<sup>20</sup> CDC. (2015). *How do I interpret Body Mass Index Information?*. Accessed November 2015 from <http://goo.gl/LXb5bA>.

<sup>21</sup> CDC. (2015). *How do I interpret Body Mass Index Information?*. Accessed November 2015 from <http://goo.gl/LXb5bA>.

population suffered similar disparities in health status.<sup>22</sup> In Massachusetts in 2011, African American adults were 40 percent more likely to be obese, and Latino adults were 30 percent more likely to be obese than White adults.<sup>23</sup>

During the past ten years, the number of adults in Massachusetts with diabetes has increased 28 percent. There are different rates of these conditions among communities across the State, and there are some clear disparities in health outcomes by race and ethnicity. Diabetes rates for people of color are much higher than the overall population. As of 2009, the Massachusetts Department of Human Services recorded the following diabetes rates: African American, 12.8 percent; Hispanic, 14.2 percent; and Asian, 16.0 percent. In comparison, the diabetes rate for Whites was 6.5 percent. Diabetes and obesity are associated with elevated rates of lost productivity and disability.<sup>24</sup> In 2007, people with diabetes lost 15 million days of work due to diabetes, costing the US economy approximately 2.6 billion dollars.<sup>25</sup>

Hypertension, which is also linked to obesity, now affects 29 percent, or 1.2 million residents. The rate of obesity-related cancers in Massachusetts residents was approximately two percent, on track to double in the next 20 years. In addition, multiple studies from the CDC have found that people who eat less fruits and vegetables have higher rates of coronary heart disease.

Highly-processed and sugar-filled foods contribute to obesity. As of 2005, added sugars and sweeteners totaled 142 pounds per person annually, up 19 percent since 1970.<sup>26</sup> Numerous studies now demonstrate that as the amounts of added sugars have increased in processed foods in the U.S., so have the rates of obesity and being overweight.

According to *Healthy People / Healthy Economy; An Initiative to Make Massachusetts the National Leader in Health and Wellness* as diabetes rates have risen, there have been greater demands on the Massachusetts health-care system. The health risks posed by overweight, obesity, and diabetes “threatened to exacerbate a vicious cycle in which rising health-care spending diminished the Commonwealth’s ability to invest in other areas that were crucial determinants of its residents’ health.”<sup>27</sup>

In fact, between 2001 and 2015, spending by the State on health care has grown by nearly 100 percent while almost all other areas that are crucial determinants of residents’ health decreased, with the exception of modest increases in transportation, housing (including emergency assistance), and primary and secondary education. Overall, the State spending is still out of balance with direct spending on health care greatly exceeding investment in programs that support fundamental determinants of health.<sup>28</sup>

Traditionally our healthcare system has not overtly made the connections between nutrition and health. Screening for nutrition issues and providing information about nutrition are not necessarily a standard

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<sup>22</sup> MA EOHHS. (n.d.). *Mass In Motion, Obesity Statistics*. Accessed November 2015 from <http://goo.gl/s13AGZ>.

<sup>23</sup> Thompson, David, et al. (1998). Estimated economic costs of obesity to US business. *American Journal of Health Promotion*, 12(2), 120-127.

<sup>24</sup> American Diabetes Association. (2008). Economic Costs of Diabetes in the U.S. in 2007. *Diabetes Care*.31(6), 596–615.

<sup>25</sup> Hurt, Ryan, et al. (2010). The Obesity Epidemic: Challenges, Health Initiatives, and Implications for Gastroenterologists. *Gastroenterology & Hepatology*, 6(12), 780.

<sup>26</sup> The Boston Foundation. (2015). *Healthy People/Healthy Economy*. Accessed November 2015 from <http://goo.gl/iE9MYz>.

<sup>27</sup> The Boston Foundation. (2015). *Healthy People/Healthy Economy*. Accessed November 2015 from <http://goo.gl/iE9MYz>.



practice of our healthcare system. As we move forward, healthcare, health insurers, and hospitals could be a critical piece of the nutrition and health equation as champions for good nutrition and good health.

Some doctors' offices and walk-in clinics now offer food security screenings for at-risk individuals and families. These screenings include questions like: "Have you or any member of your family skipped a meal because there was not enough money for food?" A growing number of hospitals also offer these screenings, including Massachusetts General Hospital and Boston Medical Center. Nutritional counseling and take-home information are often included.

A 2015 report by Healthcare Without Harm, an international coalition of hospitals and health care systems, medical professionals, community groups, and others, focuses on food and healthcare in our State.

*Utilization of Community Benefits to Improve Healthy Food Access in Massachusetts* identifies the way in which hospitals use their community benefit resources to address food access and the community food environment as a means to improve community health. Community benefit programs were selected as the focal point for their study because they are a critical point of interaction between hospitals and their communities.

### **Workforce Findings for Food Access, Security, and Health**

The Workforce Report identified several workforce challenges that present significant difficulties to food access, security, and health. These include:

- The inadequate integration of health and nutrition information, including how to access healthy, fresh, local food, into the work of a diverse set of professionals including health care workers.
- The limitations that low-wage work puts on purchasing ability for many Massachusetts residents, inhibiting their ability to purchase healthy, fresh, and local food.

The Massachusetts Department of Transitional Assistance and Massachusetts Department of Public Health have prioritized food security, access, and health. Getting adequate nutrition, access and food preparation information out to clients, through multiple venues will be a big project. It may not create new jobs, but it will require existing staff at these agencies, as well as food security, public education, and healthcare professionals to expand their knowledge and information.