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The Economic Importance of New Jersey's Food System in 2017



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Executive Summary

New Jersey's agricultural and food production, processing, and distribution industries support the continued accessibility to food for the state's 8.9 million residents. The importance of New Jersey's food system extends well beyond the state's borders, directly serving the needs of consumers in New York City, Philadelphia, and other major metropolitan centers along the East Coast. New Jersey's food system also facilitates the production and trade of food items destined for other regions of the nation and world.

This publication is intended to inform policy making and industry leadership by measuring the composition, size, and economic significance of New Jersey's food system. The study quantifies the impact of New Jersey's agribusiness and food firms on the New Jersey economy using measures of direct gross output (sales), employment, wages, and value added, as well as by assessing the economic linkages between the food system and other supporting industries. Study highlights include:

- **In 2017, the New Jersey food system comprised 9,883 farms and 46,227 post-farm gate food firms.**

- **Thirty-five percent of New Jersey's food businesses were classified as non-employers; the vast majority of these were small proprietorships and business partnerships.**

- **The gross sales volume generated within the New Jersey food system totaled $138.5 billion in 2017.**

- **The value added impact of New Jersey's food system totaled $56.9 billion in 2017 (10.7% of New Jersey's private sector GDP).**

- **Approximately 1 out of every 10 dollars of private sector economic activity in New Jersey was linked to the production, processing, or distribution of food.**

- **Food firms and agricultural operations directly employed 499,112 workers in 2017. In addition, a significant number of indirect jobs are created in other industries as a result of the economic activity of food businesses.**

- **More than 1 out of every 5 private sector jobs (20.2%) were linked to the food system in 2017.**

- **The New Jersey food system generated an estimated $3.3 billion in New Jersey state tax revenue in 2017.**

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Introduction

The agricultural and food industries collectively constitute a system of interrelated activities that not only serves a function vital for human subsistence, but also represents a critical component of New Jersey's economy. The size and complexity of the food system, however, is generally not well understood. Information on the composition and importance of the food system is useful in a variety of policy making contexts, including prioritizing sectors for state economic development assistance, workforce development and training initiatives, international trade development, and planning for food safety, defense and critical infrastructure protection. This publication is intended to inform policy making and industry leadership by measuring the composition, size, and economic significance of New Jersey's food system.

Methods

The impact of New Jersey's agribusiness and food firms on the State economy are quantified using measures of direct gross output (sales), employment, wages, and value added, as well as by assessing the economic linkages between the food system and other supporting industries. The first section of this report provides a basic profile of New Jersey's agricultural and food sectors using data from the 2017 Agriculture and Economic Censuses. Next, estimates of the total economic contribution of New Jersey's food system are presented, including the multiplier effects from businesses and household spending of workers in food-related sectors.

Economic impact analysis was conducted using IMPLAN[1] to model and quantify the linkages extending from the State's food system. Quantifying the multiplier effects recognizes that the contribution of the New Jersey food system to the state economy extends beyond the commodities directly produced, delivered and served to the population. For example, agricultural service and supply industry sectors (e.g., pest management consultants, fertilizer manufacturers, farm equipment manufacturers, etc.) sell goods and services to agricultural producers, generating jobs and wages for local residents, and contributing to the overall economic activity of the State. Wages paid by food system and related industry sectors are also spent and re-spent throughout the economy. Economic impact analysis is based on the premise that a regional economy is built upon these inter-industry dependencies and that economic activity in one industry has ripple effects that move throughout the entire economic system.

[1] IMPLAN Group, LLC. IMPLAN 2018. Huntersville, NC. IMPLAN.com.

Profile of New Jersey's Food System

The United States Census Bureau and the National Agricultural Statistics Service conduct, respectively, a series of economic censuses and a Census of Agriculture every five years[2]. These censuses enable analysis of changes in the size and structure of the national economy. Data from the most recent (2017) Census of Agriculture and economic censuses were compiled to quantify the economic contributions of New Jersey's food system (see Table 1). For purposes of this analysis, the food system was defined broadly to comprise five major sectors (including firms with paid employees as well as non-employers) listed below.

- ***Agricultural producers*** [NAICS 111 and 112] – Farms are defined for census purposes as places "from which $1,000 or more of agricultural products were produced and sold, or normally would have been sold." Farms are typically classified based on whether they primarily produce crops for food and fiber or animals and animal products.

  In 2017, New Jersey had 9,883 farms producing products valued at $1.1 billion. During the same year, New Jersey farms employed 25,256 workers, including both family labor and seasonal and non-seasonal workers.[3] Total hired labor expenses were $312.6 million.

- ***Food and beverage manufacturers*** [NAICS 311 and 3121] – Manufacturers are defined as establishments that transform livestock and agricultural products (i.e., generally of animal or vegetable origin) into products for intermediate or final consumption. Also included are manufacturers of non-alcoholic, fermented, and distilled alcoholic beverages.

  New Jersey had 2,239 food and beverage manufacturers in 2017, more than half (51%) of which were operations reporting no paid employees. Industry sales totaled $15.2 billion. Food and beverage manufacturing businesses employed 35,775 workers with wages of $1.7 billion.

- ***Food and beverage wholesalers*** [NAICS 4244, 4248, 42512044, and 42512048] – Food and beverage wholesalers are defined as businesses (e.g., wholesale merchants, distributors, import/export merchants, agents, brokers) that serve as intermediaries in the food distribution chain by selling goods (generally without transformation) for which they have assumed ownership or arranging the sale of goods owned by others.

  Approximately 44% of New Jersey's 3,429 food wholesale and brokerage operations did not have paid employees. The food wholesale sector generated sales of $77.4 billion. The 53,628 workers employed in the industry earned a total of $3.2 billion in wages.

[2] All private sector businesses are required by law to participate in the censuses, data from which are classified under the North American Industry Classification System (NAICS) to support industry level analysis.

[3] Only hired employees are considered. Excluded from this count are the 16,556 farm proprietors (operators) responsible for day-to-day decision making (USDA-NASS, 2017). This count is conservative since the National Agricultural Statistics Service only collects information on a maximum of three operators per farm. Their omission is intended to make employment data for the farm sector more comparable with employment figures in the post-farm gate sectors, which do not report the number of proprietors or self-employed individuals.

- ***Food and beverage retailers*** [NAICS 445] – Food retailers are defined to include establishments that sell food and beverage merchandise from fixed point-of-sale locations (e.g., supermarkets, grocery stores, convenience stores, and specialty stores). Other retailers that primarily sell general lines of merchandise, which may include food, (e.g.,"big box" retailers, pharmacies, price clubs, supercenters, etc.) are not included.

  In 2017, New Jersey had 10,933 food retail establishments, more than 37% of which had no paid employees (i.e., small independent businesses). Food retailers generated sales of $26.0 billion and employed 111,658 workers earning wages of $2.7 billion.

- ***Foodservice and drinking places*** [NAICS 722] – Foodservice establishments prepare meals, snacks, and beverages to customer order for immediate on-premises and off-premises consumption. Examples of foodservice businesses include full- and limited-service restaurants, caterers, and foodservice contractors that provide meals in institutional and other settings.

  Sixty-four percent of all post-farm gate food businesses are engaged in some form of foodservice. They range from large chain quick-serve restaurants to small catering businesses and from institutional foodservice contractors to independent white tablecloth full-service restaurants. Roughly 32% of the 29,626 foodservice businesses operating in 2017 did not report paid employees. In total, foodservice firms posted sales of $18.8 billion and employed 272,795 workers. Industry payroll totaled $5.0 billion.

Table 1 aggregates data across these five sectors to provide an overview of the size and composition of the New Jersey food system. In 2017, the New Jersey food system comprised 9,883 farms and 46,227 post-farm gate food firms. Thirty-five percent of food businesses (16,115 firms) were classified as "non-employers." The vast majority (92%) of these were small proprietorships and business partnerships.

The gross sales volume of New Jersey post-farm gate food firms totaled $137.4 billion in 2017. Coupled with the $1.1 billion worth of agricultural products sold by New Jersey farmers, ***the gross sales volume generated within the New Jersey food system amounted to $138.5 billion in 2017***.

A more refined measure of an industry's true economic contribution is "value added."[4] Value added represents the difference between output (sales) and the cost of intermediate inputs. In other words, value added measures an industry's contribution to gross domestic product (GDP). ***New Jersey food firms and agribusinesses directly created an estimated $29.9 billion in value added in 2017***.[5]

The food system also contributes substantially to New Jersey's employment base. ***In 2017, New Jersey's farms and food businesses employed 499,112 workers earning wages of $12.8 billion***.[6] The

[4] Value added allows the elimination of the multiple counting of economic activity that occurs when intermediate goods developed in one industry are utilized as inputs by another industry. For example, the sale of a tomato by a farmer to a tomato soup manufacturer contributes to output in the agricultural sector, but is again considered (double counted) when the output of the manufacturer is measured.

[5] IMPLAN Professional® Version 3.0 (2018 data) was used to estimate the direct value added of the New Jersey food system.

[6] Employment in the post-farm gate food firms is as of March 2017. This figure excludes individuals that operate firms with no reported payroll (i.e., sole proprietors and partners operating their own businesses), farm operators, and contract farm workers.

foodservice and food retail sectors were by far the largest employers, accounting for 77% of the workers employed in the food system.

Table 1 - Composition of New Jersey's Food System (2017)

Food Industry Sector	2017 Direct Impacts				
	Firms[a]	Value Added ($ billion)	Value of Sales ($ billion)	Annual payroll ($ billion)	Employees[b]
Production Agriculture	9,883	$0.53	$1.10	$0.31	25,256
Food and Beverage Manufacturing	2,239	$4.24	$15.22	$1.67	35,775
Food and Beverage Wholesale	3,429	$8.25	$77.43	$3.15	53,628
Food and Beverage Retail	10,933	$6.34	$26.01	$2.67	111,658
Foodservice and Drinking Places	29,626	$10.52	$18.76	$4.99	272,795
Total New Jersey Food System[c]	**56,110**	**$29.87**	**$138.52**	**$12.80**	**499,112**

[a] For production agriculture, the number of farms is used as a proxy for "establishments."
[b] For production agriculture, hired farm labor (which includes paid family members, seasonal workers, etc.) is used as a proxy for "paid employees."
[c] Totals may not add due to rounding.

Recent Growth in the Size of the Food System

Comparison with a 2012 economic impact assessment (Schilling and Sullivan, 2016) shows that total food system output (sales) increased in New Jersey by approximately $11.7 billion from 2012 to 2017 (an increase of 9.2%). This translates into an expansion of 2.3% in real (inflation-adjusted) terms. The direct value added to New Jersey's economy by the food system increased by 11.6%, from $26.8 billion to $29.9 billion. This equates to a real economic expansion within the industry of 4.5%. For comparison, New Jersey's private sector GDP (adjusted for inflation) expanded by 7.5% in the same five-year period.[7] Direct employment rose from 440,885 workers to 499,112 workers from 2012 to 2017 (a 13.2% increase), while New Jersey's total (non-farm) private sector employment rose by 12.7% over the same time period.

Total Economic Impact of the Food System in New Jersey

Economic impact analysis is based on the premise that a regional economy is built upon inter-industry dependencies and that the expansion (or contraction) of economic activity in one industry will have ripple effects that move throughout the entire economic system. For example, the food system utilizes a wide range of business services (e.g., data processing and management, accounting, printing, advertising, maintenance, legal services, etc.). Changes in the business volume of food firms will impact these and other support industries. These are often referred to as "indirect effects". Economic activity in the food system also impacts other sectors of the economy through increased household spending. For example, wages paid to food industry employees are spent on a variety of goods and services ranging from household products to medical care to real estate to restaurant meals. These "induced effects" ripple throughout the economy as these other industry sectors, in turn, purchase supplies and services, and hire more workers.

[7] Sales were deflated using the consumer price index for all urban consumers (all items) provided by the U.S Department of Labor, Bureau of Labor Statistics.

The value added created by food firms through "indirect and induced effects" amounted to $27.0 billion in 2017 (see Table 2). Thus, the total impact on New Jersey's gross domestic product attributed to the food system was estimated to be $56.9 billion. This amounts to 10.7% of New Jersey's private sector GDP. ***In other words, when the indirect and induced economic impacts of the food system are considered, approximately 1 out of every 10 dollars of economic activity in New Jersey was linked to the production, processing, or distribution of food.***

Food firms and agricultural operations are also a substantial part of the state's employment base. Directly employing 499,112 workers in 2017, the food system was among the largest employers in the state. IMPLAN analysis shows that an additional 211,899 jobs were created in other industries as a result of the economic activity stimulated by food businesses, bringing the food system's total employment impact to 711,011. ***To place this in context, more than 1 out of every 5 private sector jobs (20.2%) were linked to the food system in 2017.***

Table 2 - Total Economic Impacts of New Jersey's Food System (2017)

Value Added		
Direct Value Added	$29.87	billion
Indirect and Induced Value Added	$26.98	billion
Total Value Added	$56.85	billion
New Jersey Private Sector GDP[a]	$532.75	billion
Food System as Percent of Total Private Sector GDP	10.7	%
Employment		
Direct Employment	499,112	jobs
Indirect and Induced Employment	211,899	jobs
Total Employment Impact	711,011	jobs
NJ Private Sector Employment (March 2017)[b]	3,516,700	jobs
Food System as Percent of Total Employment	20.2	%

[a] Source: U.S. Bureau of Economic Analysis (gross domestic product, current dollars, for private industries).

[b] Source: New Jersey Department of Labor and Workforce Development (nonagricultural wage and salary employment, seasonally adjusted – total private sector).

State Taxes

The New Jersey food system generated an estimated $3.3 billion in New Jersey state tax revenue in 2017. This estimate of state tax revenues includes sales and use tax ($2.4 billion), personal income tax ($691 million), and corporate business tax ($203 million).[8] This comprises more than 13% of State tax revenues from those three tax revenue sources.[9]

[8] IMPLAN's estimated tax impacts are based on actual taxes collected by governments in the given data year (i.e., estimated tax impacts are not based on tax rates). IMPLAN allocates taxes by labor income in each sector, and distributes by type of tax based on the Annual Census of Government Finances distribution.

[9] New Jersey collected $24.19 billion in tax revenue from sales and use tax ($9.3 billion), personal income tax ($13.4 billion), and corporate business tax ($2.3 billion). State of New Jersey Department of the Treasury, Division of Taxation, 2016 Annual Report.

Conclusions

This bulletin examines the economic impacts of the food system on New Jersey's private sector economy and employment base. The food system comprises a complex set of business activities that involve the production, processing, and distribution of food and beverage products destined for consumption within the state and elsewhere. However, these activities are inextricably linked to many other business sectors within the state.

Economic impact estimates derived from the 2017 economic censuses and economic impact modeling show that food firms and agribusinesses generated 10.7% of New Jersey's private sector gross domestic product and 20.2% of jobs in 2017. These data demonstrate the vital economic importance of the food system to the state's economic health and suggest the value of understanding the opportunities and challenges that will impact future growth and performance within this sector.

References

New Jersey Department of Labor and Workforce Development, Labor and Planning Analysis. New Jersey Nonagricultural Wage and Salary Employment: 2010 to 2014 (seasonally adjusted). Retrieved September 16, 2020, https://www.nj.gov/labor/lpa/employ/ces/ces_index.html.

Schilling, B. & Sullivan, K.P. 2016. "The Economic Impact of New Jersey's Food System in 2012" Rutgers Cooperative Extension fact sheet E355.

United States Bureau of Economic Analysis. SAGDP2N Gross domestic product (GDP) by state (Millions of Current Dollars). Retrieved September 16, 2020, https://apps.bea.gov/iTable/index_regional.cfm.

United States Census Bureau. 2017 Economic Census, All Sectors: Geographic Area Series: Summary Statistics for the U.S., States, and Selected Geographies: 2017, Table EC1700BASIC. Retrieved September 16, 2020, https://www.census.gov/programs-surveys/economic-census.html.

Appendix I – IMPLAN Model

IMPLAN is a regional economic analysis software application that is designed to estimate the impact or ripple effect (specifically backward linkages) of a given economic activity within a specific geographic area through the implementation of its Input-Output model. IMPLAN provides the estimated indirect and induced effects of a given economic activity as defined by the user. Several modifications were made to the IMPLAN data to reflect conditions in New Jersey. First, fourteen agricultural sectors in the IMPLAN model were aggregated into one agricultural sector. Next, using data from the 2017 Agricultural Census, the IMPLAN model was modified to reflect 2017 agricultural output (sales), on-farm employment (workers)[10], and employee compensation (labor expenses) of hired workers. Then, using data from the 2017 Economic Census, the model was modified to reflect 2017 output (sales), employment (number of jobs), and employee compensation (wages) for food and beverage manufacturers, food and beverage wholesalers, food and beverage retailers, and foodservice and drinking places. Next, the model's production functions were redefined to ensure no double counting took place within the food industry sectors. Finally, before running the impact model, output (sales) for 1) food and beverage wholesalers and 2) food and beverage retailers were converted to producer prices using margins provided by IMPLAN and sourced from the United States Department of Commerce, Bureau of Economic Analysis.

The following assumptions are true of IMPLAN as with any Input-Output Model:

- Backward-linkages
- Constant returns to scale
- No supply constraints
- Fixed input structure
- Model is static
- Prices are static.

Input-Output models do not account for forward linkages. Price changes cannot be modeled in IMPLAN directly; instead, the final demand effects of a price change must be estimated by the analyst before modeling them in IMPLAN to estimate the additional economic impacts of such changes.

[10] Only hired employees are considered, including both family labor and seasonal and non-seasonal workers.