

August 2016

EB 2016-09

# **The Economic Contributions of Agriculture in New York State (2014)**

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August 11, 2016

### Abstract

In 2014, agricultural industries, including agricultural production, agricultural support services, and agricultural manufacturing, directly contributed \$44.8 billion in total industry output, 145.3 thousand jobs, and \$13.8 billion in gross domestic product to the New York State economy. When backward-linked supply chain business-to-business transactions (indirect effects) and household spending out of labor income (induced effects) are considered, these values grow to \$63.8 billion, 251.5 thousand, and \$26.1 billion, respectively. This implies relatively strong multiplier effects in agriculture for the state, whereby every additional \$1 in output in agriculture generates an additional \$0.42 in backward linked non-agricultural industries, every additional job in agriculture generates an additional 0.73 non-agricultural jobs, and every additional \$1 in gross domestic product generates an addition \$0.89 in non-agricultural contributions to gross domestic product.

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\* Associate Professor, Charles H. Dyson School of Applied Economics and Management, Cornell University. This publication presents an update to similar analysis published in 2014 (Schmit 2014), with more recently available data. Any opinions, findings, conclusions, or recommendations expressed in this publication are the author's and do not necessarily reflect the views of Cornell University. All errors remain our sole responsibility.

# **The Economic Contributions of Agriculture to the New York State Economy (2014)**

## **Introduction**

Policymakers, industry leaders, planners and economic development professionals in New York State (NYS) are often confronted with a set of fundamental questions about agriculture-based economic development and its potential to support and/or enhance the economic vitality of communities across the state. Some of these questions are:

1. How can efforts to grow food and farming industries play into mainstream economic development efforts?
2. Are there unexploited opportunities to boost performance in agriculture and food sectors?
3. What types of programs or policies would support increases in backward linked business-to-business transactions (i.e., multiplier effects) for agricultural industries?
4. What benefits might come to local economies from more emphasis on local farm and food systems (i.e., import substitution) and/or more aggressive efforts to target offshore markets (i.e., exports)?
5. How can educators, community leaders, and public agencies intervene with farm and agribusiness firms in ways that lead to cumulative improvements in the economic and social climate for communities as well as farm and food production?

Answers to these types of questions are elusive. To remain successful, agricultural producers and associated agribusiness firms need to effectively and continuously adapt to changing economic conditions, consumer preferences, and technological advancements. To that end, firms are seeking innovative methods to attract new and growing markets for their commodities and products, vertically integrate their operations in both upstream and downstream markets, invest in new consumer-driven product development, and develop domestic and international joint ventures and strategic alliances. These activities suggest growing farm-to-food developments at the farm, as well as increased interaction and coordination with other industries, within and outside traditional agribusiness industries (Schmit and Bills 2012).

In order to define appropriate firm, industry, and public policy strategies to strengthen opportunities for economic development and improve the competitiveness of NYS's agribusiness industry, we must identify and understand the industry linkages associated with agricultural-based economic activity in the economy, and through that assess agriculture's impact (or contribution) to the economy. Given that structural relationships and market opportunities and challenges within the economy change over time, revisiting these issues regularly is important.

This report serves as an update to a previous effort that documented the importance and relationships of the State's major agricultural industries (see Schmit and Bills 2012, Schmit and Boisvert 2014, and Schmit 2014 for details). This report provides an updated assessment of the

overall contribution of agriculture to the NYS economy based on the framework utilized in Schmit (2014) using economic data from 2014. Such an assessment will aid in the understanding agriculture’s total contribution in terms of its direct and backward-linked industry exchanges, but also its contribution relative to other industries. Given changes in market demands and supplies (and therefore prices) overtime, once can also evaluate these changes relative to the changes in overall economic contributions.

**Methodological Approach**

One approach to assessing agriculture’s impacts in the NYS economy is through an economic contribution analysis. This type of analysis for an industry (like dairy farming) or collection of industries (like food processing) describes that portion of an economy that can be attributed to the existing industry (or industries) by using data internal to the underlying input-output (IO) model to identify all backward linkages in the study area; i.e., it identifies the total direct, indirect, and induced effects (see Box 1). IO models provide an insightful way to depict and investigate the underlying processes that bind an economy together. Its strengths lie in a detailed representation of: a) the primary and intermediate input requirements by production sector, b) the distribution of sales of individual industries throughout an economy, and c) the interrelationships among these industries and other economic sectors of an economy. The methodology’s analytical capacity lies in its ability to estimate the indirect and induced economic effects stemming from the direct expenditures that lead to additional purchases by final users in an economy (Schmit and Boisvert 2014).

In a contribution analysis, existing total output, not just final demand<sup>1</sup>, provides the initial (direct) effects of the analysis and, when compared to the entire economy, the results provide insight into the relative extent of the industry in the economy and the strength of its backward linkages. In our particular application, IO analysis is used to assess how the value of agriculturally-related production, support services, and manufacturing (i.e., the

<b>Box 1. What are direct, indirect and induced effects?</b>	
Direct effects	The set of expenditures applied to the predictive model (i.e., I/O multipliers) for impact analysis. It is a series (or single) of production changes or expenditures made by producers/consumers as a result of an activity or policy. These initial changes are determined by an analyst to be a result of this activity or policy.
Indirect effects	The impact of local industries buying goods and services from other local industries. The cycle of spending works its way backward through the supply chain until all money leaks from the local economy, either through imports or by payments to value added.
Induced effects	The response by an economy to an initial change (direct effect) that occurs through re-spending of income received by a component of value added. IMPLAN's default multiplier recognizes that labor income (employee compensation and proprietor income components of value added) is not a leakage to the regional economy. This money is recirculated through the household spending patterns causing further local economic activity.
Source: IMPLAN 2016	

<sup>1</sup> The value of goods and services produced and sold to final users (institutions) during the calendar year. Final use means that the good or service will be consumed and not incorporated into another product (IMPLAN 2016).

industries we define to represent agriculture in the state) permeate throughout the state’s economy.

There are several metrics in which to measure the size of an economy; here, we consider industry sales (output), labor income, total value added, and employment (see Box 2). In particular, we look at the contribution of: (i) all on-farm agricultural production industries, (ii) all agricultural support services industries (including forestry support services), (iii) all agricultural processing industries, and (iv) the combined impact of all three. We also examine more closely several individual agricultural production and processing sectors in the state. Finally, we highlight the backward-linked industries most affected by agriculture’s direct impacts; i.e., we highlight the distribution of industry indirect and induced effects.

The analysis is conducted using 2014 IMPLAN data and software. Following IMPLAN’s recommended procedure for an economic contribution analysis, two preliminary steps are required before estimating the indirect and induced effects.<sup>2</sup> First, commodity production for each industry of interest is modified so that each industry produces only its primary commodity; i.e., no by-products. This is necessary since trade flows within IMPLAN (which are modified next) apply to commodities, not industries.<sup>3</sup> Second, within the trade flows data, the Regional Supply Coefficient (RSC) for each commodity contained in the contribution analysis is set to zero.

<b>Box 2. Metrics Considered in our Analysis</b>	
Output	The value of annual industry production, expressed in producer prices. For manufacturers this would be sales plus/minus change in inventory. For service sectors production = sales. For retail and wholesale trade, output = gross margin and not gross sales.
Labor Income	All forms of employment income, including employee compensation (total payroll costs of the employee paid by the employer; i.e., wages and benefits) and proprietor income (payments received by self-employed individuals and unincorporated business owners).
Value Added	The difference between an industry’s total output and the cost of its intermediate inputs. It equals gross output minus the cost of intermediate inputs Value added consists of compensation of employees, taxes on production and imports less subsidies, and gross operating surplus. Gross regional product derived from the income paid to owners of the factors of production. It is calculated as the difference between an industry’s total output and the cost of its intermediate inputs. It consists of employee compensation, proprietor income, other property type income, and net taxes on production and imports.
Employment	The average annual number of jobs, both full and part time. Not full-time equivalents.
Source: IMPLAN (2016)	

The RSC indicates the proportion of local net supply of a commodity that goes to meet local

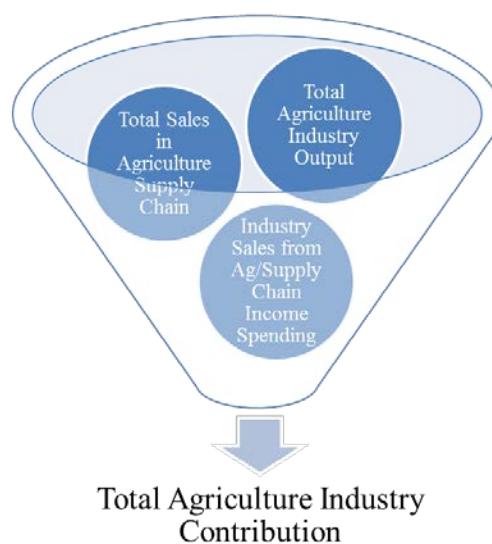
<sup>2</sup> A full description for conducting a contribution analysis in IMPLAN is available at [http://support.implan.com/index.php?option=com\\_content&view=article&id=366](http://support.implan.com/index.php?option=com_content&view=article&id=366).

<sup>3</sup> An industry may produce more than one commodity. For example, the industry “dairy cattle and milk production” produces three commodities: “dairy cattle and milk products”, “agriculture and forestry support services”, and “other amusements and recreation”; the proportional values are 0.98, 0.01, and 0.01, respectively. This likely reflects the dairy farming industry producing such things as technical farm services and agri-tourism, albeit in very small amounts.

demands. Editing the by-products and changing the RSC implies that all specified industry sectors will have sales only to exports (domestic or foreign), with zero intermediate output. This ensures that no one will purchase from these industries beyond the industry's total output. It forces the model to not be able to create any additional local impact for any of the sectors included in the contribution analysis, and effectively eliminates double counting of backward linkages. Furthermore, since all intermediate sales have been changed to final sales, the direct and indirect effects reported by IMPLAN have slightly different interpretations. Specifically, the direct effects (with respect to output) represent all sales by the industries of interest (in our case, agricultural industries as defined above). Total gross output is used as the direct effect, including final demand and the indirect and induced agricultural effects associated with that final demand. The indirect effects represent all sales by the backward-linked supply chain industries. In other words, all indirect purchases in upstream sectors or, in our case, all sales in the agricultural supply chain. The induced effects (by consumers) have their common interpretation; i.e., additional industry sales due to consumption out of increased income. The contribution concept is illustrated in Figure 1.

Using the IMPLAN data bases, it is possible to examine transactions among 536 industrial sectors of an economy as defined by the North American Industry Classification System (NAICS), the standard used by Federal statistical agencies to classify business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy. To gain a better understanding of the structure of industries within New York's agricultural system, we construct an IO model for New York State based on this 2014 data.<sup>4</sup>

The 536 industries in the IMPLAN data base are aggregated into 36 economic sectors. In this process of aggregation, we define 16 of these industry sectors specifically aligned with the major components of the State's agricultural system, including agricultural production (5), service (1), and manufacturing (10) sectors. The other 20 economic sectors are defined by aggregating the remaining industries at the 2-digit NAICS level (Table 1).<sup>5</sup>



**Figure 1. Elements of an agricultural economic contribution analysis**

<sup>4</sup> Technically, we incorporate our analysis into a IMPLAN Social Accounting Matrix (SAM) model, rather than an IO model. The SAM has an input-output model at its core, but because the SAM distinguishes household purchasing patterns by income group, the impacts and multipliers based on the SAM reflect the ripple-effects throughout the economy with somewhat greater precision than do those based in an I-O model (Miller and Blair, 2009, chapter 11).

<sup>5</sup> The detailed aggregation scheme is shown in Appendix Table A1.

**Table 1. Direct economic activity, New York State, 2014.**

Industry	Industry Sales		Employment		Labor Income		Total Value Added	
	\$ million	% of total	Number of jobs	% of total	\$ million	% of total	\$ million	% of total
<b>Ag production - fruit and vegetable</b>	<b>807</b>	<b>0.0</b>	<b>11,039</b>	<b>0.1</b>	<b>420</b>	<b>0.0</b>	<b>696</b>	<b>0.1</b>
<b>Ag production - greenhouse and nursery</b>	<b>512</b>	<b>0.0</b>	<b>5,926</b>	<b>0.1</b>	<b>282</b>	<b>0.0</b>	<b>408</b>	<b>0.0</b>
<b>Ag production - grain, oilseed, other crops</b>	<b>981</b>	<b>0.0</b>	<b>15,403</b>	<b>0.1</b>	<b>239</b>	<b>0.0</b>	<b>469</b>	<b>0.0</b>
<b>Ag production – dairy</b>	<b>3,472</b>	<b>0.2</b>	<b>13,145</b>	<b>0.1</b>	<b>800</b>	<b>0.1</b>	<b>1,905</b>	<b>0.1</b>
<b>Ag production - beef, poultry, other animal</b>	<b>893</b>	<b>0.0</b>	<b>8,971</b>	<b>0.1</b>	<b>164</b>	<b>0.0</b>	<b>462</b>	<b>0.0</b>
<b>Ag support services</b>	<b>304</b>	<b>0.0</b>	<b>7,088</b>	<b>0.1</b>	<b>198</b>	<b>0.0</b>	<b>221</b>	<b>0.0</b>
Forestry and comm. logging, fishing, & hunting	376	0.0	5,623	0.0	141	0.0	177	0.0
Mining and drilling	3,257	0.2	17,428	0.1	1,167	0.1	815	0.1
Utilities - generation and distribution	48,340	2.3	40,509	0.3	6,082	0.7	18,626	1.4
Construction	99,450	4.6	519,476	4.4	33,110	3.8	47,045	3.4
<b>Ag manufacturing - animal foods</b>	<b>2,284</b>	<b>0.1</b>	<b>1,740</b>	<b>0.0</b>	<b>125</b>	<b>0.0</b>	<b>267</b>	<b>0.0</b>
<b>Ag manufacturing - grain and oilseed milling</b>	<b>1,607</b>	<b>0.1</b>	<b>1,037</b>	<b>0.0</b>	<b>91</b>	<b>0.0</b>	<b>187</b>	<b>0.0</b>
<b>Ag manufacturing - sugar and confectionary</b>	<b>1,285</b>	<b>0.1</b>	<b>3,159</b>	<b>0.0</b>	<b>167</b>	<b>0.0</b>	<b>246</b>	<b>0.0</b>
<b>Ag manufacturing - fruit, vegetable, specialty</b>	<b>2,739</b>	<b>0.1</b>	<b>6,087</b>	<b>0.1</b>	<b>360</b>	<b>0.0</b>	<b>463</b>	<b>0.0</b>
<b>Ag manufacturing – dairy</b>	<b>8,236</b>	<b>0.4</b>	<b>10,084</b>	<b>0.1</b>	<b>700</b>	<b>0.1</b>	<b>976</b>	<b>0.1</b>
<b>Ag manufacturing - meat and seafood</b>	<b>2,061</b>	<b>0.1</b>	<b>4,656</b>	<b>0.0</b>	<b>247</b>	<b>0.0</b>	<b>347</b>	<b>0.0</b>
<b>Ag manufacturing - bakery and tortilla</b>	<b>5,262</b>	<b>0.2</b>	<b>37,942</b>	<b>0.3</b>	<b>1,343</b>	<b>0.2</b>	<b>2,131</b>	<b>0.2</b>
<b>Ag manufacturing - other foods</b>	<b>5,164</b>	<b>0.2</b>	<b>8,487</b>	<b>0.1</b>	<b>523</b>	<b>0.1</b>	<b>910</b>	<b>0.1</b>
<b>Ag manufacturing - beverages (alc &amp; nonalc)</b>	<b>7,829</b>	<b>0.4</b>	<b>8,839</b>	<b>0.1</b>	<b>804</b>	<b>0.1</b>	<b>3,759</b>	<b>0.3</b>
<b>Ag manufacturing – fert., chem., machinery</b>	<b>1,378</b>	<b>0.1</b>	<b>1,726</b>	<b>0.0</b>	<b>119</b>	<b>0.0</b>	<b>320</b>	<b>0.0</b>
Non-food/ag manufacturing	173,780	8.1	408,183	3.5	32,974	3.8	55,439	4.0
Wholesale trade	101,178	4.7	377,712	3.2	36,020	4.2	68,714	5.0
Retail trade	92,193	4.3	1,068,869	9.1	41,378	4.8	63,341	4.6
Transportation & warehousing	51,691	2.4	365,350	3.1	18,347	2.1	25,671	1.9
Information	175,072	8.2	311,148	2.6	45,262	5.2	103,002	7.5
Finance and insurance	341,330	15.9	889,086	7.5	146,695	17.0	254,281	18.5
Real estate & rental	228,585	10.7	522,178	4.4	19,646	2.3	163,295	11.9
Professional- scientific and technical services	191,610	8.9	1,033,204	8.8	109,519	12.7	130,536	9.5
Management of companies	41,573	1.9	155,089	1.3	23,787	2.8	28,141	2.0
Administrative and waste services	47,771	2.2	605,423	5.1	28,580	3.3	35,013	2.5
Educational services	32,703	1.5	377,103	3.2	19,574	2.3	21,756	1.6
Health and social services	154,202	7.2	1,629,499	13.8	93,294	10.8	100,104	7.3
Arts- entertainment and recreation	30,527	1.4	339,703	2.9	13,492	1.6	19,323	1.4
Accommodations and food services	59,131	2.8	840,594	7.1	25,873	3.0	38,387	2.8
Other services	50,065	2.3	737,303	6.2	27,439	3.2	33,511	2.4
Government	176,640	8.2	1,412,592	12.0	135,130	15.6	154,335	11.2
<b>Total</b>	<b>2,144,286</b>	<b>100.0</b>	<b>11,801,400</b>	<b>100.0</b>	<b>864,093</b>	<b>100.0</b>	<b>1,375,279</b>	<b>100.0</b>

Source: IMPLAN 2016



## Direct Impacts of Agriculture

Before discussing the results of the agriculture contribution analysis, it is useful to provide an overview of the NYS economy and to highlight agriculture's direct and relative contributions. A snapshot of the economy for 2014 is presented in Table 1. In terms of the relative contributions to the state's gross domestic product (i.e., total value added of \$1,375 billion), the top five industries in NYS are finance and insurance (18.5%), real estate and rental (10.9%), and government (11.2%), professional technical services (9.5%) and information (7.5%). Given differences in labor intensities across industries, rankings on employment (total full and part time jobs) tell a slightly different story. Here, the highest relative contributions to the state's total employment (i.e., 11.8 million jobs) are for health and social services (12.8%), government (12.0%), retail trade (9.1%), professional technical services (8.8%), and finance and insurance (7.5%). Given over 40% of the state's population lives in New York City, state-level industry concentrations are certainly influenced by the composition of industries in the New York City Metropolitan Area.

Looking towards the agricultural industries, five aggregated on-farm production sectors are considered: (i) fruit and vegetable, (ii) greenhouse and nursery, (iii) grain, oilseed, and other crops, (iv) dairy, and (v) beef, poultry, and other animal production (Table 1, see Appendix Table A1 for detailed sector listings). In total, agricultural production activity generated about \$6.6 billion in sales in 2014, which accounted for 0.3% of total industrial sales across the state. In terms of employment, agricultural production had over 54 thousand direct jobs, which represented about 0.5% of total state-level employment. Not surprisingly, on-farm dairy production was the largest single industry agricultural production sector in the state.

The agricultural and forestry support services sector is included within our broad definition of agriculture to encompass its key linkages with the farm production sectors. Agricultural support services include a variety of support activities related to custom harvesting and field preparation, fertilizer and chemical spraying, sorting, grading, and packing services, livestock insemination and breeding services, milk and crop testing, etc. While the overall sales contributions are relatively small (\$304 million, Table 1), the relatively labor-intensive nature of the sector implies relatively strong contributions to overall agricultural employment; i.e., over 7,000 jobs in 2014.

Food (including beverages) and agricultural-based (including fertilizers, chemicals, and machinery) product manufacturers are represented by over 45 individual sectors in IMPLAN (see Appendix Table A1). For ease of exposition, we aggregated the individual sectors into 10 composite sectors, namely: (i) animal foods, (ii) grain and oilseed milling, (iii) sugar and confectionary (iv) fruit, vegetables, and specialty products, (v) dairy, (vi) meat and seafood, (vii) bakery and tortilla, (viii) other foods, (iv) beverages (both alcoholic and nonalcoholic), and (x) fertilizer, chemicals, and machinery manufacturing (Table 1). In total, agriculturally-based manufacturing industries in the state contributed nearly \$38 billion in sales, representing about

1.8% of all sales in the state, and employment of over 83 thousand workers, representing slightly more than 0.7% of all state-wide employment. Over \$9.6 billion in value added contributed to about 0.7% of state totals.

Dairy manufacturing accounted for over 21% of all agricultural manufacturing sales and 12% of employment, and relies heavily on within-state milk production from the farming sector (i.e., strong backward linkages). Other processing sectors with relatively strong reliance on in-state farm production and with strong output contributions are from fruit and vegetable, meat processing, and the beverage sectors. Other relatively large agricultural manufacturing sectors include bakery and tortilla product manufacturing, grain and oilseed milling, and other foods, but generally rely less on raw product inputs produced in the state. The diversity of the composition of agricultural manufacturing is a reflection of both a diverse agricultural production sector and a large population base.

### **Economic Contribution Results**

The economic contribution of agriculture, as we have defined it, on total industrial sales in 2014 was \$63.8 billion; about 3.0% of NYS's total sales (see Industry Output, All Agriculture, Table 2). The \$44.8 billion of direct contributions (total gross output) support an additional \$11.5 billion and \$7.5 billion in indirect and induced industry sales, respectively, through agriculture's inter-industry linkages. Individual agricultural component contributions (i.e., for farm production, service, and manufacturing separately) are also shown in Table 2. Note, that while the direct contributions across agriculture's segments are additive (i.e., for the direct effects, agricultural production + agricultural support services + agricultural manufacturing = all agriculture), the same is not true for the indirect and induced impacts. For example, when looking at the agricultural manufacturing sector in isolation, a portion of the \$15.1 billion in indirect effects includes backward-linkages to agricultural production sectors (as defined in the contribution analysis). Thus, when looking at the composite agriculture sector results, those agricultural production effects are already accounted for in the direct effects. Simply summing the individual indirect and induced impacts across agriculture's three components would result in double counting.

The implied output multiplier for all agriculture in NYS (i.e., the sum of the direct, indirect, and induced effects divided by the direct effect) is 1.42, meaning that for every additional dollar generated in agriculture, \$0.42 is generated in backward linked (nonagricultural) industries (Table 2). If we decompose the multiplier effect into its indirect and induced components, the indirect effect is 0.25 (from business-to-business activity) and the induced effect is 0.17 (from labor income spending). Individual component contributions and output multipliers are also shown in the top section of Table 2.

**Table 2. Economic contribution of agriculture on the New York State economy, aggregate agricultural industry sectors, 2014.**

	Direct <sup>a</sup>	Indirect <sup>b</sup>	Induced <sup>c</sup>	Total	Implicit Multiplier <sup>d</sup>
<b>Industry Output (\$ million)</b>					
Agricultural Production	6,665	1,310	1,660	9,635	1.45
Agricultural Support Services	304	41	148	493	1.62
Agricultural Manufacturing	37,844	15,080	6,697	59,621	1.58
All Agriculture	44,813	11,499	7,536	63,849	1.42
<b>Employment (jobs)</b>					
Agricultural Production	54,484	8,898	11,294	74,675	1.37
Agricultural Support Services	7,088	181	1,009	8,278	1.17
Agricultural Manufacturing	83,757	77,718	45,963	207,437	2.48
All Agriculture	145,328	54,458	51,683	251,469	1.73
<b>Labor Income (\$ million)</b>					
Agricultural Production	1,905	458	667	3,030	1.59
Agricultural Support Services	198	14	60	271	1.37
Agricultural Manufacturing	4,480	5,391	2,713	12,585	2.81
All Agriculture	6,584	4,523	3,054	14,161	2.15
<b>Total Value Added (\$ million)</b>					
Agricultural Production	3,941	748	1,102	5,791	1.47
Agricultural Support Services	221	23	98	342	1.55
Agricultural Manufacturing	9,606	9,240	4,481	23,327	2.43
All Agriculture	13,768	7,270	5,042	26,081	1.89

Source: IMPLAN 2016

<sup>a</sup> Direct effects represent total activity (sales, employment, labor income, value added) by the respective industry.

<sup>b</sup> Indirect effects represent all activity by the backward-linked supply chain industries.

<sup>c</sup> Induced effects represent additional industry activity due to consumption out of increased income by households in the directly and indirectly affected industries.

<sup>d</sup> The implicit multiplier is calculated as the total effect divided by the direct effect.

Total employment contributions in 2014 by New York agriculture was 251,469 jobs, 145,328 jobs through its direct employment, and an additional 106,141 jobs through its indirect and induced industry effects (Table 2). This represents approximately 2.1% of total NYS employment. As with industry output, the majority of the jobs are generated by agricultural manufacturing activity. Indeed, the agricultural manufacturing employment multiplier (2.48) is well above either the agricultural production (1.37) or support services (1.17) sectors and, in part, reflects strong linkages to agricultural production. In total, an additional job generated in agriculture supports another 0.73 jobs in backward-linked non-agricultural industry sectors.

Now consider labor income, which includes employee compensation (wages and benefits) and proprietor (self-employment) income. All of agriculture supports \$14.2 billion in labor income, which is 1.6% of all labor income generated in NYS. The overall labor income multiplier is 2.15,

which indicates that for every additional dollar of labor income generated in agriculture, \$1.15 is generated elsewhere in the NYS economy. As with output and employment, the bulk of the impact comes from agricultural manufacturing. Finally, consider total value added. Here, agriculture contributes \$26.1 billion to the state's total GDP (1.9% of the total), through direct contributions of \$13.8 billion, and indirect and induced contributions of \$7.2 billion and \$5.0 billion, respectively.

Economic contribution analyses were also conducted for each of the five defined on-farm agricultural production sectors (Table 3) and a subset of agricultural manufacturing sectors (Table 4). The results allow a more detailed comparison of the relative size of contributions across industries, and their related indirect and induced contributions. In addition, the relative contributions within industries can provide insight into the input-based nature of their production processes. For ease of exposition, we leave a detailed examination of each of the sector's results to the interested reader. However, note that for the on-farm production sectors (Table 3), the induced effects for the fruit and vegetable and greenhouse and nursery sectors are consistently larger than the indirect effects highlighting more intensive labor inputs required per unit of output (i.e., higher payments to labor) for these sectors. In contrast, the indirect effects are relatively larger for the grain, oilseed, and other crop, dairy sectors, reflecting relatively stronger business-to-business transactions. In addition, the indirect contributions are consistently larger than the induced contributions for each of the agricultural manufacturing sectors examined (Table 4) due, in part, to their relatively strong inter-industry linkages to farm production sectors in NYS.

### **Distributional Implications of Inter-Industry Linkages**

Table 2 provides the total contributions from indirect and induced effects as a result of agriculture's direct contributions. While these results are useful in assessing total contributions to the NYS economy, it is additionally useful to examine what industry sectors contribute to those total indirect and induced effects. In other words, examining the relative sizes of the backward linkages across sectors.

#### *Agricultural Production Linkages*

Table 5 ranks the industry linkages (from highest to lowest) based on the level of indirect output effects from on-farm agricultural production activity in NYS (i.e., the direct effect), following the sector aggregation scheme illustrated in Table 1. The sizes of the individual indirect and induced effects are shown, along with the total of the indirect and induced effects. Ranking industries by the indirect effects places more attention to the business-to-business transactions in the state, rather than spending out of labor income, which is assumed in the model to be invariant to where the direct effect occurs (i.e., household spending is the same whether the labor income came from agriculture or a nonagricultural industry).

**Table 3. Economic contribution of agricultural production sectors, New York State, 2014.**

	<b>Direct<sup>a</sup></b>	<b>Indirect<sup>b</sup></b>	<b>Induced<sup>c</sup></b>	<b>Total</b>	<b>Implicit Multiplier<sup>d</sup></b>
<b><u>Industry Output (\$ million)</u></b>					
Fruit and Vegetable	807	69	316	1,193	1.48
Greenhouse and Nursery	512	42	208	762	1.49
Grain, Oilseed, and Other Crops	981	322	251	1,555	1.58
Dairy	3,472	836	757	5,065	1.46
Beef, Poultry, and Other Animals	893	139	147	1,179	1.32
<b><u>Employment</u></b>					
Fruit and Vegetable	11,039	729	2,152	13,920	1.26
Greenhouse and Nursery	5,926	354	1,418	7,698	1.30
Grain, Oilseed, and Other Crops	15,403	2,603	1,710	19,716	1.28
Dairy	13,145	5,415	5,161	23,720	1.80
Beef, Poultry, and Other Animals	8,971	759	998	10,728	1.20
<b><u>Labor Income (\$ million)</u></b>					
Fruit and Vegetable	420	29	127	576	1.37
Greenhouse and Nursery	282	17	84	382	1.36
Grain, Oilseed, and Other Crops	239	120	101	460	1.92
Dairy	800	272	305	1,376	1.72
Beef, Poultry, and Other Animals	164	43	59	266	1.62
<b><u>Total Value Added (\$ million)</u></b>					
Fruit and Vegetable	696	44	210	950	1.36
Greenhouse and Nursery	408	26	138	572	1.40
Grain, Oilseed, and Other Crops	469	205	167	841	1.79
Dairy	1,905	454	503	2,863	1.50
Beef, Poultry, and Other Animals	462	71	97	631	1.37

Source: IMPLAN 2016

<sup>a</sup> Direct effects represent total activity (sales, employment, labor income, value added) by the respective industry.<sup>b</sup> Indirect effects represent all activity by the backward-linked supply chain industries.<sup>c</sup> Induced effects represent additional industry activity due to consumption out of increased income by households in the directly and indirectly affected industries.<sup>d</sup> The implicit multiplier is calculated as the total effect divided by the direct effect.

**Table 4. Economic contribution of selected agricultural manufacturing sectors, New York State, 2014.**

	<b>Direct<sup>a</sup></b>	<b>Indirect<sup>b</sup></b>	<b>Induced<sup>c</sup></b>	<b>Total</b>	<b>Implicit Multiplier<sup>d</sup></b>
<b><u>Industry Output (\$ million)</u></b>					
Grain and Oilseed	1,607	760	251	2,618	1.63
Fruit, Vegetable, and Specialty	2,739	1,128	532	4,399	1.61
Dairy	8,236	5,646	1,642	15,524	1.88
Meat and Seafood	2,061	616	295	2,972	1.44
Beverages (alc and nonalc)	7,829	2,145	1,108	11,081	1.42
<b><u>Employment</u></b>					
Grain and Oilseed	1,037	5,045	1,703	7,786	7.51
Fruit, Vegetable, and Specialty	6,087	5,601	3,617	15,305	2.51
Dairy	10,084	25,359	11,198	46,640	4.63
Meat and Seafood	4,656	4,748	2,008	11,411	2.45
Beverages (alc and nonalc)	8,839	9,854	7,555	26,248	2.97
<b><u>Labor Income (\$ million)</u></b>					
Grain and Oilseed	91	272	101	464	5.11
Fruit, Vegetable, and Specialty	360	412	214	986	2.74
Dairy	700	1,672	661	3,032	4.33
Meat and Seafood	247	180	119	546	2.21
Beverages (alc and nonalc)	804	799	446	2,049	2.55
<b><u>Total Value Added (\$ million)</u></b>					
Grain and Oilseed	187	455	166	809	4.32
Fruit, Vegetable, and Specialty	463	671	353	1,487	3.21
Dairy	976	3,244	1,093	5,313	5.44
Meat and Seafood	347	345	196	888	2.56
Beverages (alc and nonalc)	3,759	1,285	736	5,780	1.54

Source: IMPLAN 2016

<sup>a</sup> Direct effects represent total activity (sales, employment, labor income, value added) by the respective industry.

<sup>b</sup> Indirect effects represent all activity by the backward-linked supply chain industries.

<sup>c</sup> Induced effects represent additional industry activity due to consumption out of increased income by households in the directly and indirectly affected industries.

<sup>d</sup> The implicit multiplier is calculated as the total effect divided by the direct effect.

**Table 5. Indirect and induced output effects, by industry, from agricultural production activity, New York State, 2014.<sup>a</sup>**

Rank	Industry	Indirect		Induced		Indirect+Induced	
		\$ million	% of total	\$ million	% of total	\$ million	% of total
1	Wholesale trade	300.5	22.9	82.2	5.0	382.6	12.9
2	Ag support services	208.5	15.9	0.1	0.0	208.5	7.0
3	Ag manufacturing - animal food	164.7	12.6	1.3	0.1	166.0	5.6
4	Real estate and rental	112.8	8.6	298.5	18.0	411.4	13.8
5	Finance and insurance	86.9	6.6	200.3	12.1	287.2	9.7
6	Transportation and warehousing	75.8	5.8	40.0	2.4	115.8	3.9
7	Professional services – scientific and technical	61.2	4.7	74.4	4.5	135.5	4.6
8	Utilities - generation and distribution	45.0	3.4	38.2	2.3	83.2	2.8
9	Ag manufacturing – fertilizer, chemicals, machinery	39.0	3.0	0.3	0.0	39.3	1.3
10	NonAg-based manufacturing	35.8	2.7	31.8	1.9	67.6	2.3
11	Construction	32.5	2.5	17.4	1.0	49.8	1.7
12	Government	27.4	2.1	63.2	3.8	90.6	3.0
13	Information	25.7	2.0	89.8	5.4	115.5	3.9
14	Administrative and waste services	23.8	1.8	39.9	2.4	63.8	2.1
15	Management of companies and enterprises	17.4	1.3	17.4	1.1	34.9	1.2
16	Other services	12.0	0.9	68.1	4.1	80.1	2.7
17	Retail trade	10.1	0.8	132.6	8.0	142.7	4.8
18	Ag manufacturing – grain and oilseed milling	9.0	0.7	0.6	0.0	9.6	0.3
19	Accommodations and food services	5.8	0.4	85.2	5.1	91.1	3.1
20	Ag manufacturing – beverages (alc and nonalc)	5.1	0.4	5.7	0.3	10.7	0.4
21	Arts, entertainment, and recreation	4.3	0.3	37.8	2.3	42.1	1.4
22	Ag manufacturing - meat and seafood	2.1	0.2	2.2	0.1	4.2	0.1
23	Mining and drilling	1.7	0.1	0.8	0.0	2.4	0.1
24	Educational services	1.4	0.1	47.7	2.9	49.1	1.7
25	Ag manufacturing - dairy	0.5	0.0	4.1	0.2	4.6	0.2
26	Ag manufacturing - other foods	0.5	0.0	1.9	0.1	2.3	0.1
27	Ag manufacturing - sugar and confectionary	0.3	0.0	0.4	0.0	0.7	0.0
28	Forestry and commercial logging, fishing, and hunting	0.3	0.0	0.3	0.0	0.6	0.0
29	Ag manufacturing – bakery and tortilla	0.2	0.0	3.3	0.2	3.6	0.1
30	Ag manufacturing – fruit, vegetables, and specialty	0.1	0.0	1.6	0.1	1.6	0.1
31	Health and social services	0.0	0.0	272.9	16.4	272.9	9.2
	<b>Total</b>	<b>1,310.4</b>	<b>100.0</b>	<b>1,659.8</b>	<b>100.0</b>	<b>2,970.2</b>	<b>100.0</b>

Source: IMPLAN 2016

<sup>a</sup> Industries are ranked based on their level of indirect effects (i.e., business-to-business linkages) generated from the (direct) agricultural production activity. The total output contribution from agricultural production sectors (i.e., the direct effect) was \$6,665 million in 2014. Industry aggregation follows from Table 1, with the full sector aggregation scheme outlined in Appendix Table A1.

While all sector effects are shown, note that the top 10 industries represent over 86% of all indirect sector contributions. Major household consumption expenditure categories are clearly articulated in the top induced effects; i.e., housing (real estate and rental), finance and insurance, health care (health and social services), and retail trade (including food purchases). The primary indirect effects highlight important supply chain industries for agriculture in NYS; i.e., wholesale trade (including wholesale product sellers and distributors), agricultural support services (e.g., crop and animal care), animal food manufacturing (consistent with large dairy and other livestock activities), real estate and rental (e.g., rented or leased land and equipment), and finance and insurance. In fact, these top five indirectly affected industries represent two-thirds of total indirect effects (i.e., \$873 million of the \$1.3 billion). The total indirect and induced effects from the agricultural production sectors is nearly \$3.0 billion.

Table 6 provides a similar ranking of the strongest industrial sector backward linkages, but now in terms of employment effects. Again, the top 10 industry effects comprise most (92.1%) of the total indirect effects. While some of the top industries from Table 5 remain near the top, the relative rankings have changed considerably, and now represent sectors that are relatively more labor intensive (particularly service sectors). In particular, note the very strong employment linkages with firms involved in agricultural support service that comprises 54.6% of all indirect effects. Strong linkages with wholesale trade, transportation and warehousing, professional technical services, and administrative services also exist and account for 12.6%, 6.0%, 3.7%, and 3.4% of all indirect effects, respectively. Strong induced employment effects with retail trade, accommodations food services, real estate and rental, and other service sectors are consistent household spending activities in highly-oriented service types of sectors.

#### *Agricultural Processing Linkages*

The nature of the backward-linked industries, ranked by total indirect effects, for agricultural manufacturing activity are shown in Table 7 (with respect to output) and Table 8 (with respect to employment). In terms of output (employment), the top 10 industries represent 78.9% (83.2%) of all indirect sector contributions. As before, major industry expenditures by households are reflected in the highest induced effects, namely real estate and rental, health and social services, finance and insurance, and retail trade (Table 7).

The strong backward linkages to on-farm dairy production are evident when considering linkages to agricultural manufacturing activity in New York State. Just behind purchases from wholesalers and distributors, the dairy farming sector represents nearly 20% of all indirect output effects (Table 7). Relative sourcing volumes by food manufacturing firms for NYS farm produced products is indicative in the relative rankings beef and other livestock farming (ranked 13<sup>th</sup>), grain, oilseed, and other crop farming (ranked 14<sup>th</sup>), and fruit and vegetable farming (ranked 18<sup>th</sup>) (Table 7). Strong volumes of business with wholesale trade operations and



**Table 6. Indirect and induced employment effects, by industry, from agricultural production activity, New York State, 2014.<sup>a</sup>**

Rank	Industry	Indirect		Induced		Indirect+Induced	
		\$ million	% of total	\$ million	% of total	\$ million	% of total
1	Ag support services	4,855.1	54.6	1.3	0.0	4,856.4	24.1
2	Wholesale trade	1,121.6	12.6	306.8	2.7	1,428.5	7.1
3	Transportation and warehousing	535.9	6.0	282.7	2.5	818.5	4.1
4	Professional services – scientific and technical	329.8	3.7	400.9	3.5	730.7	3.6
5	Administrative and waste services	302.1	3.4	505.9	4.5	808.0	4.0
6	Real estate and rental	257.8	2.9	682.0	6.0	939.7	4.7
7	Finance and insurance	226.4	2.5	521.7	4.6	748.1	3.7
8	Government	219.1	2.5	505.4	4.5	724.4	3.6
9	Other services	176.2	2.0	1,003.4	8.9	1,179.6	5.8
10	Construction	169.5	1.9	90.7	0.8	260.2	1.3
11	Ag manufacturing - animal food	125.5	1.4	1.0	0.0	126.5	0.6
12	Retail trade	116.6	1.3	1,537.5	13.6	1,654.1	8.2
13	NonAg-based manufacturing	84.0	0.9	74.7	0.7	158.7	0.8
14	Accommodations and food services	82.9	0.9	1,211.5	10.7	1,294.4	6.4
15	Management of companies and enterprises	65.1	0.7	65.1	0.6	130.2	0.6
16	Ag manufacturing – fertilizer, chemicals, machinery	48.9	0.5	0.4	0.0	49.3	0.2
17	Arts, entertainment, and recreation	48.4	0.5	420.6	3.7	469.0	2.3
18	Information	45.7	0.5	159.6	1.4	205.3	1.0
19	Utilities - generation and distribution	37.8	0.4	32.0	0.3	69.7	0.3
20	Educational services	16.3	0.2	549.7	4.9	566.0	2.8
21	Mining and drilling	9.0	0.1	4.1	0.0	13.1	0.1
22	Ag manufacturing – grain and oilseed milling	5.8	0.1	0.4	0.0	6.2	0.0
23	Ag manufacturing – beverages (alc and nonalc)	5.8	0.1	6.4	0.1	12.1	0.1
24	Ag manufacturing - meat and seafood	4.7	0.1	4.9	0.0	9.6	0.0
25	Forestry and commercial logging, fishing, and hunting	4.0	0.0	4.8	0.0	8.7	0.0
26	Ag manufacturing – bakery and tortilla	1.7	0.0	23.9	0.2	25.6	0.1
27	Ag manufacturing - other foods	0.8	0.0	3.1	0.0	3.8	0.0
28	Ag manufacturing - sugar and confectionary	0.7	0.0	1.0	0.0	1.7	0.0
29	Ag manufacturing - dairy	0.6	0.0	5.1	0.0	5.7	0.0
30	Ag manufacturing – fruit, vegetables, and specialty	0.1	0.0	3.5	0.0	3.6	0.0
31	Health and social services	0.1	0.0	2,883.6	25.5	2,883.6	14.3
	<b>Total</b>	<b>8,897.7</b>	<b>100.0</b>	<b>11,293.5</b>	<b>100.0</b>	<b>20,191.2</b>	<b>100.0</b>

Source: IMPLAN 2016

<sup>a</sup> Industries are ranked based on their level of indirect effects (i.e., business-to-business supply chain linkages) generated from the (direct) agricultural production activity. The total employment contribution from agricultural production sectors (i.e., the direct effect) was 54,484 jobs in 2014. Industry aggregation follows from Table 1, with the full sector aggregation scheme outlined in Appendix Table A1.

**Table 7. Indirect and induced output effects, by industry, from agricultural manufacturing activity, New York State, 2014.<sup>a</sup>**

Rank	Industry	Indirect		Induced		Indirect+Induced	
		\$ million	% of total	\$ million	% of total	\$ million	% of total
1	Wholesale trade	11,726.7	15.1	1,229.4	2.7	12,956.1	10.5
2	Dairy farming	11,105.3	14.3	0.5	0.0	11,105.8	9.0
3	Transportation and warehousing	8,203.0	10.6	1,123.7	2.4	9,326.6	7.5
4	Professional services - scientific and technical	5,815.5	7.5	1,628.4	3.5	7,443.9	6.0
5	Administrative and waste services	5,181.1	6.7	2,064.8	4.5	7,245.9	5.9
6	Grain, oilseed, and other crop farming	5,077.1	6.5	4.6	0.0	5,081.7	4.1
7	Management of companies and enterprises	4,909.1	6.3	254.9	0.6	5,164.0	4.2
8	Beef, poultry, and other animal farming	3,824.0	4.9	23.2	0.1	3,847.3	3.1
9	Government	3,072.4	4.0	2,061.9	4.5	5,134.4	4.2
10	Support activities for agriculture and forestry	2,409.3	3.1	8.8	0.0	2,418.1	2.0
11	Other services	2,299.1	3.0	4,091.5	8.9	6,390.6	5.2
12	Fruit and vegetable farming	2,112.8	2.7	49.9	0.1	2,162.8	1.7
13	Retail trade	2,110.9	2.7	6,263.1	13.6	8,374.0	6.8
14	Finance and insurance	1,797.3	2.3	2,121.5	4.6	3,918.8	3.2
15	Accommodations and food services	1,646.6	2.1	4,926.2	10.7	6,572.8	5.3
16	Real estate and rental	1,511.5	1.9	2,806.9	6.1	4,318.3	3.5
17	NonAg-based manufacturing	1,434.0	1.8	303.7	0.7	1,737.6	1.4
18	Construction	1,175.7	1.5	370.7	0.8	1,546.3	1.3
19	Information	751.1	1.0	658.5	1.4	1,409.6	1.1
20	Arts, entertainment, and recreation	489.8	0.6	1,702.6	3.7	2,192.3	1.8
21	Utilities - generation and distribution	445.8	0.6	132.0	0.3	577.8	0.5
22	Forestry and commercial logging, fishing, and hunting	387.1	0.5	18.6	0.0	405.7	0.3
23	Mining and drilling	99.9	0.1	16.8	0.0	116.7	0.1
24	Greenhouse, nursery and floriculture production	99.7	0.1	12.0	0.0	111.6	0.1
25	Educational services	32.5	0.0	2,150.2	4.7	2,182.7	1.8
26	Health and social services	1.0	0.0	11,938.5	26.0	11,939.5	9.7
	<b>Total</b>	<b>15,080.2</b>	<b>100.0</b>	<b>6,696.8</b>	<b>100.0</b>	<b>21,777.1</b>	<b>100.0</b>

Source: IMPLAN 2016

<sup>a</sup> Industries are ranked based on their level of indirect effects (i.e., business-to-business supply chain linkages) generated from the (direct) agricultural manufacturing activity. The total output contribution from agricultural manufacturing sectors (i.e., the direct effect) was \$37,844 million in 2014. Industry aggregation follows from Table 1, with the full sector aggregation scheme outlined in Appendix Table A1.

**Table 8. Indirect and induced employment effects, by industry, from agricultural manufacturing activity, New York State, 2014.<sup>a</sup>**

Rank	Industry	Indirect		Induced		Indirect+Induced	
		\$ million	% of total	\$ million	% of total	\$ million	% of total
1	Wholesale trade	11,726.7	15.1	1,229.4	2.7	12,956.1	10.5
2	Dairy farming	11,105.3	14.3	0.5	0.0	11,105.8	9.0
3	Transportation and warehousing	8,203.0	10.6	1,123.7	2.4	9,326.6	7.5
4	Professional services - scientific and technical	5,815.5	7.5	1,628.4	3.5	7,443.9	6.0
5	Administrative and waste services	5,181.1	6.7	2,064.8	4.5	7,245.9	5.9
6	Grain, oilseed, and other crop farming	5,077.1	6.5	4.6	0.0	5,081.7	4.1
7	Management of companies and enterprises	4,909.1	6.3	254.9	0.6	5,164.0	4.2
8	Beef, poultry, and other animal farming	3,824.0	4.9	23.2	0.1	3,847.3	3.1
9	Government	3,072.4	4.0	2,061.9	4.5	5,134.4	4.2
10	Ag support services	2,409.3	3.1	8.8	0.0	2,418.1	2.0
11	Other services	2,299.1	3.0	4,091.5	8.9	6,390.6	5.2
12	Fruit and vegetable farming	2,112.8	2.7	49.9	0.1	2,162.8	1.7
13	Retail trade	2,110.9	2.7	6,263.1	13.6	8,374.0	6.8
14	Finance and insurance	1,797.3	2.3	2,121.5	4.6	3,918.8	3.2
15	Accommodations and food services	1,646.6	2.1	4,926.2	10.7	6,572.8	5.3
16	Real estate and rental	1,511.5	1.9	2,806.9	6.1	4,318.3	3.5
17	NonAg-based manufacturing	1,434.0	1.8	303.7	0.7	1,737.6	1.4
18	Construction	1,175.7	1.5	370.7	0.8	1,546.3	1.3
19	Information	751.1	1.0	658.5	1.4	1,409.6	1.1
20	Arts, entertainment, and recreation	489.8	0.6	1,702.6	3.7	2,192.3	1.8
21	Utilities - generation and distribution	445.8	0.6	132.0	0.3	577.8	0.5
22	Forestry and commercial logging, fishing, and hunting	387.1	0.5	18.6	0.0	405.7	0.3
23	Mining and drilling	99.9	0.1	16.8	0.0	116.7	0.1
24	Greenhouse, nursery and floriculture production	99.7	0.1	12.0	0.0	111.6	0.1
25	Educational services	32.5	0.0	2,150.2	4.7	2,182.7	1.8
26	Health and social services	1.0	0.0	11,938.5	26.0	11,939.5	9.7
	<b>Total</b>	<b>77,718.2</b>	<b>100.0</b>	<b>45,962.6</b>	<b>100.0</b>	<b>123,680.9</b>	<b>100.0</b>

Source: IMPLAN 2016

<sup>a</sup> Industries are ranked based on their level of indirect effects (i.e., business-to-business supply chain linkages) generated from the (direct) agricultural manufacturing activity. The total employment contribution from agricultural manufacturing sectors (i.e., the direct effect) was 83,757 jobs in 2014. Industry aggregation follows from Table 1, with the full sector aggregation scheme outlined in Appendix Table A1.

transportation and warehousing firms reflect strong purchases by agricultural manufacturing firms for input supplies used in their production and distribution and storage services.

Given the strong output linkages from Table 7, it is not surprising that agricultural manufacturing (particularly dairy processing) strongly supports employment in the dairy farming sector. In particular, nearly 15% of all indirect employment effects for agricultural manufacturing are in this sector (Table 9). Other top sectors with strong backward linked indirect employment effects include wholesale trade, transportation and warehousing, and professional and technical services.

### **Summary**

Economic contribution analyses identify the portion of a region's economy that can be attributed to an existing industry or combination of industries through its direct, indirect and induced effects. Agriculture, incorporating agricultural production, support services, and manufacturing, represents a \$63.8 billion industry in NYS, with over 250,000 jobs when the value of inter-industry linkages is considered. While total agriculturally-related industry activity represents a relatively small proportion of total state output (3.0%), employment (2.1%), and contributions to GDP (1.9%), relative contributions for smaller rural agricultural areas and communities will vary.

The general points of this exercise were to better understand agricultures' total contribution to the NYS economy and to demonstrate the strong ripple (multiplier) effects agriculture has given its strong backward-linked supply chain effects and related industry spending out of labor income generated in agriculture. In addition, a closer examination of the distribution of the indirect and induced effects promotes a better understanding with what sectors these ripple effects arise from. While industries with strong ripple effects in the state may be desirable industries to target for expansion from a policy perspective, it is important to emphasize that the sizes of these multipliers says nothing about the likelihood or means by which they will/can be expanded. The likelihood of expansion of the sectors depends on where markets may be expanding and the extent to which these are the ones in which the multipliers are large. The extent to which public policy can help in expanding opportunities is also important.

Throughout this report we have examined the several multiplier effects associated with the various ag-based economic sectors in NYS. In closing, however, it is important to re-emphasize that it is most appropriate to use these multipliers to examine the impact of marginal (rather small) changes in any particular industry. Relatively large changes in an industry are most likely to be accompanied by structural changes in the nature of the economy's inter-industry transactions. Under these conditions, it may be more problematic to base estimates of the economic impacts on current estimates of economic multipliers.

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## Appendix

<b>Table A1. Mapping of IMPLAN industries to industries of the 2014 New York model (bolded industries included as agricultural industries).</b>	
New York model	Implan industry
Number and Name	Number and Name
<b>1</b> Ag production – fruit and vegetable	3 Vegetable and melon farming 4 Fruit farming 5 Tree nut farming
<b>2</b> Ag production – greenhouse and nursery	6 Greenhouse, nursery, and floriculture production
<b>3</b> Ag production – grain, oilseed, and other crops	2 Grain farming 1 Oilseed farming 7 Tobacco farming (no industry in NYS) 8 Cotton farming (no industry in NYS) 9 Sugarcane and sugar beet farming (no industry in NYS) 10 All other crop farming
<b>4</b> Ag production – dairy	11 Beef cattle ranching and farming 13 Poultry and egg production 14 Animal production, except cattle and poultry and eggs
<b>5</b> Ag production – beef, poultry, and other animal	6 Greenhouse, nursery, and floriculture production
<b>6</b> Ag support services	19 Support activities for agriculture and forestry
7 Forestry and commercial logging, fishing, and hunting	15 Forestry, forest products, and timber tract production 16 Commercial logging 17 Commercial fishing 18 Commercial hunting and trapping
8 Mining and drilling	20 Extraction of natural gas and crude petroleum 21 Extraction of natural gas liquids 22 Coal mining (no industry in NYS) 23 Iron ore mining (no industry in NYS) 24 Gold ore mining 25 Silver ore mining (no industry in NYS) 26 Lead and zinc ore mining (no industry in NYS) 27 Copper ore mining 28 Uranium-radium-vanadium ore mining (no industry in NYS) 29 Other metal ore mining 30 Stone mining and quarrying 31 Sand and gravel mining 32 Other clay, ceramic, refractory minerals mining 33 Potash, soda, borate mineral mining (no industry in NYS) 34 Phosphate rock mining (no industry in NYS) 35 Other chemical and fertilizer mineral mining 36 Other nonmetallic minerals 37 Drilling oil and gas wells 38 Support activities for oil and gas operations 39 Metal mining services 40 Other nonmetallic minerals services
9 Utilities – generation and distribution	41 Electric power generation - Hydroelectric 42 Electric power generation - Fossil fuel 43 Electric power generation - Nuclear 44 Electric power generation - Solar 45 Electric power generation - Wind 46 Electric power generation – Geothermal (no industry in NYS) 47 Electric power generation - Biomass 48 Electric power generation - All other 49 Electric power transmission and distribution 50 Natural gas distribution 51 Water, sewage and other systems
10 Construction	52 Construction of new health care structures 53 Construction of new manufacturing structures

10	Construction (continued)	54 Construction of new power and communication structures 55 Construction of new educational and vocational structures 56 Construction of new highways and streets 57 Construction of new comm. structures, incl. farm structures 58 Construction of other new nonresidential structures 59 Construction of new single-family residential structures 60 Construction of new multifamily residential structures 61 Construction of other new residential structures 62 Maintenance and repair construction of nonres. structures 63 Maintenance and repair construction of residential structures 64 Maint. & rep. constr. of highways, streets, bridges, tunnels
11	Ag manufacturing – animal foods	65 Dog and cat food manufacturing 66 Other animal food manufacturing
12	Ag manufacturing – grain and oilseed milling	67 Flour milling 68 Rice milling (no industry in NYS) 69 Malt manufacturing (no industry in NYS) 70 Wet corn milling (no industry in NYS) 71 Soybean and other oilseed processing 72 Fats and oils refining and blending 73 Breakfast cereal manufacturing
13	Ag manufacturing – sugar and confectionary	74 Beet sugar manufacturing 75 Sugar cane mills and refining 76 Nonchocolate confectionery manufacturing 77 Chocolate and confectionery manufacturing from cacao beans 78 Confectionery manufacturing from purchased chocolate
14	Ag manufacturing – fruit, vegetable, and specialty	79 Frozen fruits, juices and vegetables manufacturing 80 Frozen specialties manufacturing 81 Canned fruits and vegetables manufacturing 82 Canned specialties 83 Dehydrated food products manufacturing
15	Ag manufacturing – dairy	84 Fluid milk manufacturing (includes yogurt) 85 Creamery butter manufacturing 86 Cheese manufacturing 87 Dry, condensed, and evaporated dairy product manufacturing 88 Ice cream and frozen dessert manufacturing
16	Ag manufacturing – meat and seafood	89 Animal, except poultry, slaughtering 90 Meat processed from carcasses 91 Rendering and meat byproduct processing 92 Poultry processing 93 Seafood product preparation and packaging
17	Ag manufacturing – bakery and tortilla	94 Bread and bakery product, except frozen, manufacturing 95 Frozen cakes and other pastries manufacturing 96 Cookie and cracker manufacturing 97 Dry pasta, mixes, and dough manufacturing 98 Tortilla manufacturing
18	Ag manufacturing – other foods	99 Roasted nuts and peanut butter manufacturing 100 Other snack food manufacturing 101 Coffee and tea manufacturing 102 Flavoring syrup and concentrate manufacturing 103 Mayonnaise, dressing, and sauce manufacturing 104 Spice and extract manufacturing 105 All other food manufacturing <sup>58</sup>
19	Ag manufacturing – beverages	106 Bottled and canned soft drinks & water 107 Manufactured ice 108 Breweries 109 Wineries 110 Distilleries
20	Ag manufacturing – fertilizer, chemical, machinery	169 Nitrogenous fertilizer manufacturing 170 Phosphatic fertilizer manufacturing

<b>20 Ag manufacturing – fertilizer, chemical, machinery (continued)</b>	171 Fertilizer mixing 172 Pesticide and other agricultural chemical manufacturing 262 Farm machinery and equipment manufacturing 267 Food product machinery manufacturing
21 Nonfood/ag manufacturing	111 Tobacco product manufacturing 112 Fiber, yarn, and thread mills 113 Broadwoven fabric mills 114 Narrow fabric mills and schiffli machine embroidery 115 Nonwoven fabric mills 116 Knit fabric mills 117 Textile and fabric finishing mills 118 Fabric coating mills 119 Carpet and rug mills 120 Curtain and linen mills 121 Textile bag and canvas mills 122 Rope, cordage, twine, tire cord and tire fabric mills 123 Other textile product mills 124 Hosiery and sock mills 125 Other apparel knitting mills 126 Cut and sew apparel contractors 127 Mens and boys cut and sew apparel manufacturing 128 Womens and girls cut and sew apparel manufacturing 129 Other cut and sew apparel manufacturing 130 Apparel accessories and other apparel manufacturing 131 Leather and hide tanning and finishing 132 Footwear manufacturing 133 Other leather and allied product manufacturing 134 Sawmills 135 Wood preservation 136 Veneer and plywood manufacturing 137 Engineered wood member and truss manufacturing 138 Reconstituted wood product manufacturing 139 Wood windows and door manufacturing 140 Cut stock, resawing lumber, and planing 141 Other millwork, including flooring 142 Wood container and pallet manufacturing 143 Manufactured home (mobile home) manufacturing 144 Prefabricated wood building manufacturing 145 All other miscellaneous wood product manufacturing 146 Pulp mills 147 Paper mills 148 Paperboard mills 149 Paperboard container manufacturing 150 Paper bag and coated and treated paper manufacturing 151 Stationery product manufacturing 152 Sanitary paper product manufacturing 153 All other converted paper product manufacturing 154 Printing 155 Support activities for printing 156 Petroleum refineries 157 Asphalt paving mixture and block manufacturing 158 Asphalt shingle and coating materials manufacturing 159 Petroleum lubricating oil and grease manufacturing 160 All other petroleum and coal products manufacturing 161 Petrochemical manufacturing 162 Industrial gas manufacturing 163 Synthetic dye and pigment manufacturing 164 Other basic inorganic chemical manufacturing 165 Other basic organic chemical manufacturing 166 Plastics material and resin manufacturing



21 Nonfood/ag manufacturing (continued)

- 167 Synthetic rubber manufacturing
- 168 Artificial and synthetic fibers and filaments manufacturing
- 173 Medicinal and botanical manufacturing
- 174 Pharmaceutical preparation manufacturing
- 175 In-vitro diagnostic substance manufacturing
- 176 Biological product (except diagnostic) manufacturing
- 177 Paint and coating manufacturing
- 178 Adhesive manufacturing
- 179 Soap and other detergent manufacturing
- 180 Polish and other sanitation good manufacturing
- 181 Surface active agent manufacturing
- 182 Toilet preparation manufacturing
- 183 Printing ink manufacturing
- 184 Explosives manufacturing
- 185 Custom compounding of purchased resins
- 186 Photographic film and chemical manufacturing
- 187 Other miscellaneous chemical product manufacturing
- 188 Plastics packaging materials, unlaminated film, sheet mfg
- 189 Unlaminated plastics profile shape manufacturing
- 190 Plastics pipe and pipe fitting manufacturing
- 191 Laminated plastics plate, sheet (ex packaging), shape mfg
- 192 Polystyrene foam product manufacturing
- 193 Urethane, other foam product (ex polystyrene) manufacturing
- 194 Plastics bottle manufacturing
- 195 Other plastics product manufacturing
- 196 Tire manufacturing
- 197 Rubber and plastics hoses and belting manufacturing
- 198 Other rubber product manufacturing
- 199 Pottery, ceramics, and plumbing fixture manufacturing
- 200 Brick, tile, and other structural clay product manufacturing
- 201 Flat glass manufacturing
- 202 Other pressed and blown glass and glassware manufacturing
- 203 Glass container manufacturing
- 204 Glass product manufacturing made of purchased glass
- 205 Cement manufacturing
- 206 Ready-mix concrete manufacturing
- 207 Concrete block and brick manufacturing
- 208 Concrete pipe manufacturing
- 209 Other concrete product manufacturing
- 210 Lime manufacturing
- 211 Gypsum product manufacturing
- 212 Abrasive product manufacturing
- 213 Cut stone and stone product manufacturing
- 214 Ground or treated mineral and earth manufacturing
- 215 Mineral wool manufacturing
- 216 Miscellaneous nonmetallic mineral products manufacturing
- 217 Iron and steel mills and ferroalloy manufacturing
- 218 Iron, steel pipe and tube manufacturing from purchased steel
- 219 Rolled steel shape manufacturing
- 220 Steel wire drawing
- 221 Alumina refining and primary aluminum production
- 222 Secondary smelting and alloying of aluminum
- 223 Aluminum sheet, plate, and foil manufacturing
- 224 Other aluminum rolling, drawing and extruding
- 225 Nonferrous metal (exc aluminum) smelting and refining
- 226 Copper rolling, drawing, extruding and alloying
- 227 Nonferrous metal, except copper and aluminum, shaping
- 228 Secondary processing of other nonferrous metals
- 229 Ferrous metal foundries
- 230 Nonferrous metal foundries

21 Nonfood/ag manufacturing (continued)

- 231 Iron and steel forging
- 232 Nonferrous forging
- 233 Custom roll forming
- 234 Crown and closure manufacturing and metal stamping
- 235 Cutlery, utensil, pot, and pan manufacturing
- 236 Handtool manufacturing
- 237 Prefabricated metal buildings and components manufacturing
- 238 Fabricated structural metal manufacturing
- 239 Plate work manufacturing
- 240 Metal window and door manufacturing
- 241 Sheet metal work manufacturing
- 242 Ornamental and architectural metal work manufacturing
- 243 Power boiler and heat exchanger manufacturing
- 244 Metal tank (heavy gauge) manufacturing
- 245 Metal cans manufacturing
- 246 Metal barrels, drums and pails manufacturing
- 247 Hardware manufacturing
- 248 Spring and wire product manufacturing
- 249 Machine shops
- 250 Turned product and screw, nut, and bolt manufacturing
- 251 Metal heat treating
- 252 Metal coating and nonprecious engraving
- 253 Electroplating, anodizing, and coloring metal
- 254 Valve and fittings, other than plumbing, manufacturing
- 255 Plumbing fixture fitting and trim manufacturing
- 256 Ball and roller bearing manufacturing
- 257 Small arms ammunition manufacturing
- 258 Ammunition, except for small arms, manufacturing
- 259 Small arms, ordnance, and accessories manufacturing
- 260 Fabricated pipe and pipe fitting manufacturing
- 261 Other fabricated metal manufacturing
- 263 Lawn and garden equipment manufacturing
- 264 Construction machinery manufacturing
- 265 Mining machinery and equipment manufacturing
- 266 Oil and gas field machinery and equipment manufacturing
- 268 Semiconductor machinery manufacturing
- 269 Sawmill, woodworking, and paper machinery
- 270 Printing machinery and equipment manufacturing
- 271 All other industrial machinery manufacturing
- 272 Optical instrument and lens manufacturing
- 273 Photographic and photocopying equipment manufacturing
- 274 Other commercial service industry machinery manufacturing
- 275 Air purification and ventilation equipment manufacturing
- 276 Heating equipment (except warm air furnaces) manufacturing
- 277 Air conditioning, refrigeration, warm air heating eq mfg
- 278 Industrial mold manufacturing
- 279 Special tool, die, jig, and fixture manufacturing
- 280 Cutting tool and machine tool accessory manufacturing
- 281 Machine tool manufacturing
- 282 Rolling mill and other metalworking machinery manufacturing
- 283 Turbine and turbine generator set units manufacturing
- 284 Speed changer, industrial high-speed drive, gear manufacturing
- 285 Mechanical power transmission equipment manufacturing
- 286 Other engine equipment manufacturing
- 287 Pump and pumping equipment manufacturing
- 288 Air and gas compressor manufacturing
- 289 Measuring and dispensing pump manufacturing
- 290 Elevator and moving stairway manufacturing
- 291 Conveyor and conveying equipment manufacturing
- 292 Overhead cranes, hoists, and monorail systems manufacturing

21 Nonfood/ag manufacturing (continued)

- 293 Industrial truck, trailer, and stacker manufacturing
- 294 Power-driven handtool manufacturing
- 295 Welding and soldering equipment manufacturing
- 296 Packaging machinery manufacturing
- 297 Industrial process furnace and oven manufacturing
- 298 Fluid power cylinder and actuator manufacturing
- 299 Fluid power pump and motor manufacturing
- 300 Scales, balances, misc general purpose machinery mfg
- 301 Electronic computer manufacturing
- 302 Computer storage device manufacturing
- 303 Computer terminals, other computer peripheral equipment mfg
- 304 Telephone apparatus manufacturing
- 305 Broadcast and wireless communications equip manufacturing
- 306 Other communications equipment manufacturing
- 307 Audio and video equipment manufacturing
- 308 Bare printed circuit board manufacturing
- 309 Semiconductor and related device manufacturing
- 310 Capacitor, resistor, coil, transformer, other inductor mfg
- 311 Electronic connector manufacturing
- 312 Printed circuit assembly (electronic assembly) manufacturing
- 313 Other electronic component manufacturing
- 314 Electromedical and electrotherapeutic apparatus manufacturing
- 315 Search, detection, and navigation instruments manufacturing
- 316 Automatic environmental control manufacturing
- 317 Industrial process variable instruments manufacturing
- 318 Totalizing fluid meter and counting device manufacturing
- 319 Electricity and signal testing instruments manufacturing
- 320 Analytical laboratory instrument manufacturing
- 321 Irradiation apparatus manufacturing
- 322 Watch, clock, and other measuring and controlling device mfg
- 323 Blank magnetic and optical recording media manufacturing
- 324 Software and other precorded and record reproducing
- 325 Electric lamp bulb and part manufacturing
- 326 Lighting fixture manufacturing
- 327 Small electrical appliance manufacturing
- 328 Household cooking appliance manufacturing
- 329 Household refrigerator and home freezer manufacturing
- 330 Household laundry equipment manufacturing
- 331 Other major household appliance manufacturing
- 332 Power, distribution, and specialty transformer manufacturing
- 333 Motor and generator manufacturing
- 334 Switchgear and switchboard apparatus manufacturing
- 335 Relay and industrial control manufacturing
- 336 Storage battery manufacturing
- 337 Primary battery manufacturing
- 338 Fiber optic cable manufacturing
- 339 Other communication and energy wire manufacturing
- 340 Wiring device manufacturing
- 341 Carbon and graphite product manufacturing
- 342 All other misc electrical equipment and component mfg
- 343 Automobile manufacturing
- 344 Light truck and utility vehicle manufacturing
- 345 Heavy duty truck manufacturing
- 346 Motor vehicle body manufacturing
- 347 Truck trailer manufacturing
- 348 Motor home manufacturing
- 349 Travel trailer and camper manufacturing
- 350 Motor vehicle gasoline engine and engine parts manufacturing
- 351 Motor vehicle electrical and electronic equip manufacturing
- 352 Motor vehicle steering, suspension comp (ex spring), brake mfg

		353 Motor vehicle transmission and power train parts manufacturing
		354 Motor vehicle seating and interior trim manufacturing
		355 Motor vehicle metal stamping
		356 Other motor vehicle parts manufacturing
		357 Aircraft manufacturing
		358 Aircraft engine and engine parts manufacturing
		359 Other aircraft parts and auxiliary equipment manufacturing
		360 Guided missile and space vehicle manufacturing
		361 Propulsion units, parts for space vehicles, guided missiles mfg
		362 Railroad rolling stock manufacturing
		363 Ship building and repairing
		364 Boat building
		365 Motorcycle, bicycle, and parts manufacturing
		366 Military armored vehicle, tank, tank component manufacturing
		367 All other transportation equipment manufacturing
21	Nonfood/ag manufacturing (continued)	368 Wood kitchen cabinet and countertop manufacturing
		369 Upholstered household furniture manufacturing
		370 Nonupholstered wood household furniture manufacturing
		371 Other household nonupholstered furniture manufacturing
		372 Institutional furniture manufacturing
		373 Wood office furniture manufacturing
		374 Custom architectural woodwork and millwork
		375 Office furniture, except wood, manufacturing
		376 Showcase, partition, shelving, and locker manufacturing
		377 Mattress manufacturing
		378 Blind and shade manufacturing
		379 Surgical and medical instrument manufacturing
		380 Surgical appliance and supplies manufacturing
		381 Dental equipment and supplies manufacturing
		382 Ophthalmic goods manufacturing
		383 Dental laboratories
		384 Jewelry and silverware manufacturing
		385 Sporting and athletic goods manufacturing
		386 Doll, toy, and game manufacturing
		387 Office supplies (except paper) manufacturing
		388 Sign manufacturing
		389 Gasket, packing, and sealing device manufacturing
		390 Musical instrument manufacturing
		391 Fasteners, buttons, needles, and pins manufacturing
		392 Broom, brush, and mop manufacturing
		393 Burial casket manufacturing
		394 All other miscellaneous manufacturing
22	Wholesale trade	395 Wholesale trade
		396 Retail - Motor vehicle and parts dealers
		397 Retail - Furniture and home furnishings stores
		398 Retail - Electronics and appliance stores
		399 Retail - Building material and garden equipment supplies stores
		400 Retail - Food and beverage stores
23	Retail trade	401 Retail - Health and personal care stores
		402 Retail - Gasoline stores
		403 Retail - Clothing and clothing accessories stores
		404 Retail - Sporting goods, hobby, musical instrument, book stores
		405 Retail - General merchandise stores
		406 Retail - Miscellaneous store retailers
		407 Retail - Nonstore retailers
		408 Air transportation
24	Transportation and warehousing	409 Rail transportation
		410 Water transportation
		411 Truck transportation
		412 Transit and ground passenger transportation

24	Transportation and warehousing (continued)	413 Pipeline transportation 414 Scenic, sightseeing transportation, support activities for transp 415 Couriers and messengers 416 Warehousing and storage
25	Information	417 Newspaper publishers 418 Periodical publishers 419 Book publishers 420 Directory, mailing list, and other publishers 421 Greeting card publishing 422 Software publishers 423 Motion picture and video industries 424 Sound recording industries 425 Radio and television broadcasting 426 Cable and other subscription programming 427 Wired telecommunications carriers 428 Wireless telecommunications carriers (except satellite) 429 Satellite, telecomm resellers, and all other telecommunications 430 Data processing, hosting, and related services 431 News syndicates, libraries, archives, all other info services 432 Internet publishing and broadcasting and web search portals
26	Finance and Insurance	433 Monetary authorities and depository credit intermediation 434 Nondepository credit intermediation and related activities 435 Securities and commodity contracts intermed and brokerage 436 Other financial investment activities 437 Insurance carriers 438 Insurance agencies, brokerages, and related activities 439 Funds, trusts, and other financial vehicles
27	Real estate and rental	440 Real estate 441 Owner-occupied dwellings 442 Automotive equipment rental and leasing 443 General and consumer goods rental except video tapes and discs 444 Video tape and disc rental 445 Commercial and industrial machinery, equipment rental, leasing 446 Lessors of nonfinancial intangible assets
28	Professional – scientific and technical services	447 Legal services 448 Accounting, tax preparation, bookkeeping, and payroll services 449 Architectural, engineering, and related services 450 Specialized design services 451 Custom computer programming services 452 Computer systems design services 453 Other computer related services, incl facilities management 454 Management consulting services 455 Environmental and other technical consulting services 456 Scientific research and development services 457 Advertising, public relations, and related services 458 Photographic services 459 Veterinary services 460 Marketing research, all other misc prof, scientific, tech services
29	Management of companies	461 Management of companies and enterprises
30	Administrative and waste services	462 Office administrative services 463 Facilities support services 464 Employment services 465 Business support services 466 Travel arrangement and reservation services 467 Investigation and security services 468 Services to buildings 469 Landscape and horticultural services 470 Other support services 471 Waste management and remediation services

31 Educational services	472 Elementary and secondary schools 473 Junior colleges, colleges, universities, and professional schools 474 Other educational services
32 Health and social services	475 Offices of physicians 476 Offices of dentists 477 Offices of other health practitioners 478 Outpatient care centers 479 Medical and diagnostic laboratories 480 Home health care services 481 Other ambulatory health care services 482 Hospitals 483 Nursing and community care facilities 484 Resid mental retardation & health, subst abuse, other facilities 485 Individual and family services 486 Community food, housing, other relief, incl rehab services 487 Child day care services
33 Arts, entertainment and recreation	488 Performing arts companies 489 Commercial Sports Except Racing 490 Racing and Track Operation 491 Promoters of performing arts, sports, agents for public figures 492 Independent artists, writers, and performers 493 Museums, historical sites, zoos, and parks 494 Amusement parks and arcades 495 Gambling industries (except casino hotels) 496 Other amusement and recreation industries 497 Fitness and recreational sports centers 498 Bowling centers
34 Accommodations and food services	499 Hotels and motels, including casino hotels 500 Other accommodations 501 Full-service restaurants 502 Limited-service restaurants 503 All other food and drinking places
35 Other services	504 Automotive repair and maintenance, except car washes 505 Car washes 506 Electronic and precision equipment repair and maintenance 507 Comm and industrial machinery and equip repair and maint 508 Personal and household goods repair and maintenance 509 Personal care services 510 Death care services 511 Dry-cleaning and laundry services 512 Other personal services 513 Religious organizations 514 Grantmaking, giving, and social advocacy organizations 515 Business and professional associations 516 Labor and civic organizations 517 Private households
36 Government	518 Postal service 519 Federal electric utilities 520 Other federal government enterprises 521 State government passenger transit 522 State government electric utilities 523 Other state government enterprises 524 Local government passenger transit 525 Local government electric utilities 526 Other local government enterprises 527 Not an industry (Used and secondhand goods) 528 Not an industry (Scrap) 529 Not an industry (Rest of world adjustment) 530 Not an industry (Noncomparable foreign imports) 531 Employment and payroll of state govt, non-education

36 Government (continued)	532 Employment and payroll of state govt, education 533 Employment and payroll of local govt, non-education 534 Employment and payroll of local govt, education 535 Employment and payroll of federal govt, non-military 536 Employment and payroll of federal govt, military
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## OTHER A.E.M. EXTENSION BULLETINS

EB No	Title	Fee (if applicable)	Author(s)
2016-08	Dairy Farm Business Summary, Northern New York Region, 2015	(\$16.00)	Knoblauch, W., Dymond, C., Karszes, J., Howland, B., Murray, P., Manning, J. and Kimmich, R.
2016-07	Dairy Farm Business Summary, Hudson and Central New York Region, 2015	(\$16.00)	Knoblauch, W., Dymond, C., Karszes, J., Howland, B., Buxton, S., Kiraly, M., Kimmich, R., Shoen, K., and Overton, R.
2016-06	An Analysis of Opportunities For Food Hub Development In Northern New York		Severson, R., Schmit, T., and Shin, P.
2016-05	Business Transfer Guide for the Junior Generation		Richards, S., Shipman, L., Welch, D. and Leubner, E.
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2016-03	Dairy Farm Business Summary, New York Large Herd Farms, 300 Cows or Larger, 2015	(\$20.00)	Karszes, J., Knoblauch, W. and Dymond, C.
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2015-13	Workforce Issues: Profiles of Specialty Crop Farms in New York State		Maloney, T., Smith, M., Saputo, R. and B. Rickard
2015-12	Cost of Establishment and Production of Cold Hardy Grapes in the Thousand Islands Region of New York - 2015		Oh, D., Kananizadeh, S., Gómez, M. and T. Martinson
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