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# The Economic Contributions of Agriculture to the New York State Economy: 2019

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### Abstract

In 2019, agricultural industries, including agricultural production, agricultural support services, and agricultural manufacturing, directly contributed \$43.6 billion in total industry output, 163.1 thousand jobs, and \$12.3 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 \$65.2 billion, 269.7 thousand, and \$26.3 billion, respectively. This implies relatively strong multiplier effects in agriculture for the state, whereby every \$1 in output in agriculture generates an additional \$0.49 in backward linked non-agricultural industries, every job in agriculture generates an additional 0.65 non-agricultural jobs, and every \$1 in gross domestic product generates an additional \$1.14 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 a similar analysis published in 2016 (Schmit 2016), 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 : 2019**

### **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 & 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 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 previous efforts that documented the importance and relationships of the State's major agricultural industries (e.g., Schmit & Bills 2012, Schmit & Boisvert 2014, Schmit 2014, and Schmit 2016). This report provides an updated assessment of the overall contribution of agriculture to the NYS economy based on the framework utilized in Schmit (2016) using economic data from 2019 (the latest available at the time of this publication). Such an assessment aids in the understanding agriculture's total contribution in terms of its direct and backward-linked industry exchanges, and 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. A recent analysis focused on NYS's apple industry specifically is also available (Schmit et al. 2018, 2019). In addition, follow on assessments will denote changes in agricultural activities impacts

during the Covid-19 global health pandemic (2020-2021). How industries responded to the pandemic and what inter-industry linkages changed and persist will be of particular consequence for future study.

### 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 the primary and intermediate input requirements by production sector, the distribution of sales of individual industries throughout an economy, and 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 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 all on-farm agricultural production industries, all agricultural support services industries, all agricultural processing industries, and 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.

<b>Box 1. What are direct, indirect and induced effects?</b>	
Direct effects	The set of expenditures applied to the predictive model for impact analysis. It is a series (or single) of production changes or expenditures made by producers and 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 (direct) change 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) is not a leakage to the regional economy. This money is recirculated through the household spending patterns causing further local economic activity.
Source: IMPLAN 2021	

<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 2021).

The analysis is conducted using 2019 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. 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>2</sup>

Second, within the trade flows data, the Regional Supply Coefficient (RSC) for each commodity contained in the

contribution analysis is set to zero. The RSC indicates the proportion of local net supply of a commodity that goes to meet local 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 industry or institution (including households) 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.

Since all intermediate sales have been changed to final sales, the direct and indirect effects reported 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 have their common interpretation; i.e., additional industry sales due to consumption out of labor income. The contribution concept is illustrated in Figure 1.

<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	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 number of monthly of jobs, both full and part time. Not full-time equivalents.
Source: IMPLAN (2021)	

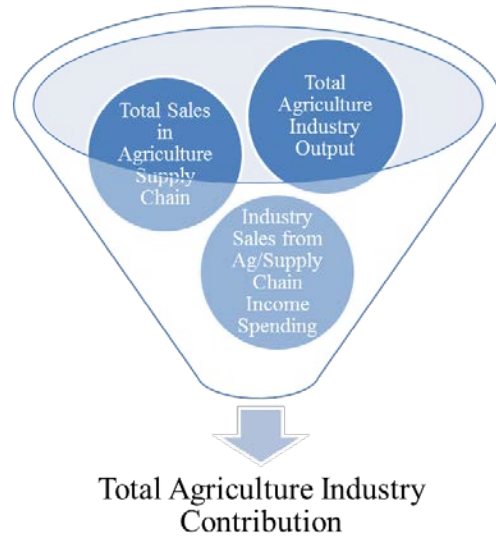
<sup>2</sup> An industry may produce more than one commodity. For example, the industry “dairy cattle and milk production” produces three commodities: “dairy cattle and milk products”, “support activities for agriculture”, and “other amusements and recreation”; the proportional values are 0.98, 0.01, 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.

Using the IMPLAN databases, it is possible to examine transactions among 544 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 NYS based on this 2019 data.<sup>3</sup>

For our purposes, the 544 industries in IMPLAN are aggregated into 36 economic sectors. In this process of aggregation, we define 16 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>4</sup>

### 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 2019 is presented in Table 1. In terms of the relative contributions to the state’s gross domestic product (i.e., total value added of \$1,746 billion), the top five industry aggregates in NYS are finance & insurance (19.4%), real estate & rental (12.1%), professional services (10.1%), government (9.9%), and information & communications (7.8%). Given differences in labor intensities across industries, rankings on employment 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 & social services (14.3%), government (11.0%), professional services (9.0%), retail trade (7.8%), and accommodations & food services (7.8%). 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. Even still, the highest-ranking industry aggregates are consistent with the overall distribution of household expenditures.



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

<sup>3</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>4</sup> The detailed aggregation scheme is shown in Appendix A.

**Table 1. Direct economic activity by industrial sector aggregate, New York State, 2019.**

Industry Aggregate	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: Fruits &amp; vegetables</b>	654	0.0	10,399	0.1	220	0.0	559	0.0
<b>Ag production: Greenhouse &amp; nursery</b>	396	0.0	5,788	0.0	189	0.0	302	0.0
<b>Ag production: Grain, oilseed, &amp; other crops</b>	809	0.0	22,057	0.2	226	0.0	601	0.0
<b>Ag production: Dairy</b>	2,858	0.1	9,239	0.1	268	0.0	727	0.0
<b>Ag production: Beef, poultry, &amp; other animals</b>	529	0.0	4,999	0.0	71	0.0	248	0.0
<b>Agricultural support services</b>	413	0.0	10,588	0.1	367	0.0	323	0.0
Forestry, commercial logging, fishing, & hunting	481	0.0	5,783	0.0	318	0.0	327	0.0
Mining and drilling	3,628	0.1	12,321	0.1	2,942	0.3	869	0.0
Utilities: generation & distribution	50,897	1.9	40,089	0.3	8,358	0.8	23,753	1.4
Construction	100,061	3.8	603,933	4.7	46,100	4.4	59,936	3.4
<b>Ag manufacturing: Animal food</b>	2,601	0.1	2,636	0.0	238	0.0	450	0.0
<b>Ag manufacturing: Grain &amp; oilseed milling</b>	1,201	0.0	1,082	0.0	91	0.0	128	0.0
<b>Ag manufacturing: Sugar &amp; confectionary</b>	1,483	0.1	3,590	0.0	207	0.0	259	0.0
<b>Ag manufacturing: Fruit and vegetables</b>	2,880	0.1	6,606	0.1	464	0.0	579	0.0
<b>Ag manufacturing: Dairy</b>	8,791	0.3	11,970	0.1	952	0.1	1,241	0.1
<b>Ag manufacturing: Bakery &amp; tortilla</b>	6,288	0.2	45,512	0.4	1,956	0.2	2,471	0.1
<b>Ag manufacturing: Meat &amp; seafood</b>	2,401	0.1	5,290	0.0	362	0.0	414	0.0
<b>Ag manufacturing: Other foods</b>	5,193	0.2	10,274	0.1	803	0.1	1,068	0.1
<b>Ag manufacturing: Beverages</b>	6,007	0.2	11,642	0.1	1,431	0.1	2,660	0.2
<b>Ag manufacturing: Fert., chemical, &amp; machinery</b>	1,136	0.0	1,474	0.0	119	0.0	255	0.0
NonAg manufacturing	166,480	6.3	382,661	3.0	34,593	3.3	58,722	3.4
Wholesale trade	123,797	4.7	354,715	2.8	37,898	3.6	74,404	4.3
Retail trade	106,537	4.0	1,001,683	7.8	44,808	4.2	68,992	4.0
Transportation & warehousing	63,271	2.4	564,282	4.4	26,521	2.5	37,873	2.2
Information & communications	224,513	8.5	313,990	2.5	55,938	5.3	135,350	7.8
Finance & insurance	465,928	17.6	923,520	7.2	165,868	15.7	339,563	19.4
Real estate & rental	305,839	11.5	728,505	5.7	30,301	2.9	211,055	12.1
Professional services	250,010	9.4	1,150,819	9.0	140,509	13.3	175,908	10.1
Management of companies	45,328	1.7	166,555	1.3	26,243	2.5	30,151	1.7
Administrative & waste services	74,389	2.8	671,501	5.3	42,815	4.0	50,421	2.9
Educational services	33,076	1.2	366,342	2.9	21,586	2.0	25,578	1.5
Health & social services	204,405	7.7	1,825,251	14.3	120,523	11.4	132,619	7.6
Arts, entertainment, & recreation	42,939	1.6	356,519	2.8	19,275	1.8	30,832	1.8
Accomodations & food services	93,244	3.5	995,216	7.8	38,383	3.6	62,942	3.6
Other services	66,377	2.5	762,440	6.0	37,254	3.5	42,555	2.4
Government	186,839	7.0	1,400,769	11.0	149,729	14.2	172,652	9.9
<b>Total</b>	<b>2,650,627</b>	<b>100.0</b>	<b>12,773,854</b>	<b>100.0</b>	<b>1,057,516</b>	<b>100.0</b>	<b>1,745,925</b>	<b>100.0</b>

Note: See Appendix A for specific industries included in the industry aggregates. Source: IMPLAN 2021



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). In total, agricultural production activity generated about \$5.2 billion in sales in 2019, which accounted for 0.2% of total industrial sales across the state. In terms of employment, agricultural production had over 52 thousand jobs, which represented about 0.4% of total state-level employment. Not surprisingly, dairy farming 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 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 (\$413 million, Table 1), the labor-intensive nature of this service sector implies relatively strong contributions to overall agricultural employment; i.e., over 10,500 jobs in 2019.

Food (including beverages) and agricultural-based product manufacturers (including fertilizers, chemicals, and food/ag machinery) are represented by over 50 individual sectors in IMPLAN (see Appendix A). For ease of exposition, we aggregated the individual sectors into 10 composite sectors: (i) animal foods, (ii) grain & oilseed milling, (iii) sugar & confectionary (iv) fruit, vegetables, & specialty products, (v) dairy, (vi) meat & seafood, (vii) bakery & tortilla, (viii) other foods, (iv) beverages (both alcoholic and nonalcoholic), and (x) fertilizer, chemicals, & machinery manufacturing (Table 1). In total, agriculturally-based manufacturing industries in the state contributed nearly \$38 billion in sales, representing about 1.4% of all sales in the state, and employed over 100 thousand workers, representing 0.8% of state-wide employment. Over \$9.5 billion in value added contributed to about 0.5% of state totals.

Dairy manufacturing accounted for 23% 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 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 2019 was \$65.2 billion; about 2.5% of NYS's total sales (Table 2). The \$43.6 billion of direct contributions (total gross output) support an additional \$11.7 billion and \$9.8 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 \$14.6 billion in indirect effects includes backward-linkages to agricultural production sectors (i.e., manufacturers purchasing from farms). Thus, when looking at the composite all 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.

**Table 2. Economic contribution of agriculture on the New York State economy, aggregate agricultural industry sectors, 2019.**

	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	5,245	1,860	1,248	8,353	1.59
Agricultural Support Services	413	62	316	791	1.91
Agricultural Manufacturing	37,982	14,597	9,050	61,629	1.62
All Agriculture	43,640	11,716	9,828	65,184	1.49
<b>Employment (jobs)</b>					
Agricultural Production	52,483	8,158	7,241	67,882	1.29
Agricultural Support Services	10,588	236	1,836	12,660	1.20
Agricultural Manufacturing	100,077	72,802	52,802	225,682	2.26
All Agriculture	163,148	49,263	57,273	269,683	1.65
<b>Labor Income (\$ million)</b>					
Agricultural Production	975	573	492	2,039	2.09
Agricultural Support Services	367	21	125	513	1.40
Agricultural Manufacturing	6,621	4,789	3,581	14,991	2.26
All Agriculture	7,963	4,436	3,889	16,289	2.05
<b>Total Value Added (\$ million)</b>					
Agricultural Production	2,437	1,066	834	4,337	1.78
Agricultural Support Services	323	37	211	571	1.77
Agricultural Manufacturing	9,525	8,367	6,077	23,969	2.52
All Agriculture	12,285	7,421	6,599	26,305	2.14

Source: IMPLAN 2021

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

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

<sup>c</sup> Induced effects represent industry activity due to spending out of labor income in the directly and indirectly affected industries.

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

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 1.49, meaning that for every dollar of output generated in agriculture, \$0.49 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 0.27 (from business-to-business activity) and the induced effect is 0.23 (from labor income spending). Individual agricultural sector contributions and output multipliers are also shown in the top section of Table 2.

Total employment contributions in 2019 by New York agriculture was 269,683 jobs, 163,148 jobs through its direct employment and an additional 106,535 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 (2.26) is well above either the agricultural production (1.29) or support services (1.20) sectors and, in part, reflects strong linkages to agricultural production in the state. In total, each job generated in agriculture supports another 0.65 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 \$16.3 billion of labor income, which is 1.5% of all labor income generated in NYS. The overall labor income multiplier is 2.05, which indicates that for every dollar of labor income generated in agriculture, \$1.05 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 \$26.3 billion to the state's total GDP (1.5% of the total), through direct contributions of \$12.3 billion, and indirect and induced contributions of \$7.4 billion and \$6.6 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 & vegetable, greenhouse & nursery and grain, oilseed, & other crop sectors are consistently larger than the indirect effects highlighting more intensive labor inputs required per unit of output and/or of the industries they buy from (i.e., higher payments to labor). In contrast, the indirect effects are relatively larger for the dairy and beef, poultry, & other animal sectors, reflecting relatively stronger business-to-business transactions and lower reliance on labor per unit of output. 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 the respective farm production sectors in the state.

### **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 based on the level of indirect output effects from on-farm agricultural production activity in NYS (i.e., the direct effect). The sizes of the individual indirect and induced effects are shown, along with the total of indirect and induced. 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, 2019.**

	Direct <sup>a</sup>	Indirect <sup>b</sup>	Induced <sup>c</sup>	Total	Implicit Multiplier <sup>d</sup>
<b><u>Industry Output (\$ million)</u></b>					
Fruit and Vegetable	654	68	200	922	1.41
Greenhouse and Nursery	396	58	168	622	1.57
Grain, Oilseed, and Other Crops	809	155	227	1,191	1.47
Dairy	2,858	1,488	569	4,915	1.72
Beef, Poultry, and Other Animals	529	156	98	783	1.48
<b><u>Employment</u></b>					
Fruit and Vegetable	10,399	599	1,161	12,159	1.17
Greenhouse and Nursery	5,788	376	976	7,140	1.23
Grain, Oilseed, and Other Crops	22,057	1,055	1,321	24,433	1.11
Dairy	9,239	6,488	3,309	19,036	2.06
Beef, Poultry, and Other Animals	4,999	775	570	6,344	1.27
<b><u>Labor Income (\$ million)</u></b>					
Fruit and Vegetable	220	29	79	328	1.49
Greenhouse and Nursery	189	22	37	248	1.31
Grain, Oilseed, and Other Crops	226	56	90	371	1.64
Dairy	268	435	224	927	3.45
Beef, Poultry, and Other Animals	71	48	39	158	2.22
<b><u>Total Value Added (\$ million)</u></b>					
Fruit and Vegetable	559	45	134	738	1.32
Greenhouse and Nursery	302	37	112	452	1.49
Grain, Oilseed, and Other Crops	601	102	152	854	1.42
Dairy	727	835	380	1,943	2.67
Beef, Poultry, and Other Animals	248	88	65	401	1.62

Source: IMPLAN 2021

<sup>a</sup> Direct effects represent total activity (sales, employment, labor income, value added) by 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 spending out of labor 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, 2019.**

	Direct <sup>a</sup>	Indirect <sup>b</sup>	Induced <sup>c</sup>	Total	Implicit Multiplier <sup>d</sup>
<b><u>Industry Output (\$ million)</u></b>					
Grain and Oilseed	1,201	412	192	1,805	1.50
Fruit, Vegetable, and Specialty	2,880	1,025	660	4,565	1.58
Dairy	8,791	5,850	1,895	16,536	1.88
Meat and Seafood	2,401	755	489	3,645	1.52
Beverages (alc and nonalc)	6,007	1,614	1,638	9,259	1.54
<b><u>Employment</u></b>					
Grain and Oilseed	1,082	4,672	1,113	6,867	6.34
Fruit, Vegetable, and Specialty	6,606	5,227	3,834	15,667	2.37
Dairy	11,970	22,785	11,019	45,774	3.82
Meat and Seafood	5,290	4,719	2,840	12,849	2.43
Beverages (alc and nonalc)	11,642	7,083	9,541	28,266	2.43
<b><u>Labor Income (\$ million)</u></b>					
Grain and Oilseed	91	148	76	314	3.47
Fruit, Vegetable, and Specialty	464	364	260	1,087	2.35
Dairy	952	1,418	747	3,117	3.27
Meat and Seafood	362	250	193	804	2.22
Beverages (alc and nonalc)	1,431	557	647	2,635	1.84
<b><u>Total Value Added (\$ million)</u></b>					
Grain and Oilseed	128	271	128	527	4.12
Fruit, Vegetable, and Specialty	579	1,025	441	2,045	3.53
Dairy	1,241	2,674	1,267	5,182	4.17
Meat and Seafood	414	442	327	1,183	2.86
Beverages (alc and nonalc)	2,660	974	1,095	4,730	1.78

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. Distribution of indirect and induced output effects, by industry, from agricultural production activities, New York State, 2019.**

Indirect		Direct		Indirect		Induced		Indirect + Induced	
Rank	Description	\$Mill	%	\$Mill	%	\$Mill	%	\$Mill	%
0	Total	5,245	100.0	1,860	100.0	1,248	100.0	3,108	100.0
0	Grain Oilseed Other Crop Farming	809	15.4	-	-	-	-	-	-
0	Fruit and Vege Farming	654	12.5	-	-	-	-	-	-
0	Greenhouse and Nursery	396	7.6	-	-	-	-	-	-
0	Beef Poultry Other Animal Farming	529	10.1	-	-	-	-	-	-
0	Dairy Farming	2,858	54.5	-	-	-	-	-	-
1	Wholesale Trade	-	-	549	29.5	54	4.4	604	19.4
2	Real estate and rental	-	-	321	17.3	232	18.6	553	17.8
3	Ag Manuf - Animal food	-	-	263	14.1	1	0.1	264	8.5
4	Finance and insurance	-	-	111	6.0	163	13.1	274	8.8
5	Transportation and warehousing	-	-	97	5.2	35	2.8	132	4.2
6	Support Activities for Ag and Forestry	-	-	97	5.2	0	0.0	97	3.1
7	Professional services	-	-	88	4.7	65	5.2	153	4.9
8	Admin and waste services	-	-	45	2.4	36	2.9	81	2.6
9	Information	-	-	42	2.3	71	5.7	113	3.6
10	Utilities generation distribution	-	-	42	2.3	21	1.7	63	2.0
11	Management of companies enterprises	-	-	35	1.9	17	1.4	52	1.7
12	Government	-	-	35	1.9	33	2.7	68	2.2
13	NonAg Manuf	-	-	23	1.3	12	0.9	35	1.1
14	Construction	-	-	20	1.1	9	0.8	30	1.0
15	Ag Manuf - fert chem mach	-	-	19	1.0	0	0.0	19	0.6
16	Retail Trade	-	-	14	0.8	98	7.9	113	3.6
17	Accommodations and food services	-	-	12	0.6	67	5.4	79	2.5
18	Ag Manuf - grain oilseed milling	-	-	11	0.6	0	0.0	11	0.4
19	Ag Manuf - beverages	-	-	10	0.6	2	0.2	13	0.4
20	Other services	-	-	10	0.6	62	5.0	72	2.3
21	Arts entertainment recreation	-	-	6	0.3	27	2.1	32	1.0
22	Ag Manuf - meat seafood	-	-	3	0.1	1	0.1	4	0.1
23	Ag Manuf - dairy	-	-	1	0.1	2	0.1	3	0.1
24	Mining and drilling	-	-	1	0.1	0	0.0	1	0.0
25	Educational services	-	-	1	0.0	30	2.4	31	1.0
26	Ag Manuf - Other foods	-	-	1	0.0	1	0.1	2	0.1
27	Ag Manuf - sugar confectionary	-	-	1	0.0	0	0.0	1	0.0
28	Forestry Comm logging fishing hunting	-	-	0	0.0	0	0.0	1	0.0
29	Ag Manuf - fruit vege specialty	-	-	0	0.0	1	0.0	1	0.0
30	Ag Manuf - bakery tortilla	-	-	0	0.0	2	0.2	2	0.1
31	Health and social services	-	-	0	0.0	204	16.4	204	6.6

Note: Industries are ranked on their level of indirect effects (i.e., the strength of their local business-to-business linkages) generated from the (direct) agricultural production activity. Industry aggregation follows from Table 1, with the full sector aggregation scheme outlined in Appendix A.

While all sector effects are shown, note that the top 10 industries represent 89% of all indirect sector contributions. Major household consumption expenditure categories are clearly articulated in the top induced effects; i.e., housing (real estate & rental), health care (health & social services), finance & insurance, 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), real estate & rental (e.g., rented or leased land and equipment), animal food manufacturing (for dairy and other livestock farmings), finance & insurance, transportation & warehousing, and agricultural support services. In fact, these six industries represent 77% of the total indirect effects (i.e., \$1.4 billion of the \$1.9 billion). The total indirect and induced effects from the agricultural production sectors is \$3.1 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 (90.5%) of the total indirect effects. While most of the top 10 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 30.5% of all indirect effects. Strong linkages with wholesale trade, transportation & warehousing, professional services, and administrative services also exist and account for 19.3%, 10.6%, 5.0%, and 4.9% of all indirect effects, respectively. Strong induced employment effects with health care services, retail trade, real estate & rental, accommodations food services, and other service sectors are consistent household spending activities in highly-oriented service 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 85.3% (83.1%) of all indirect sector contributions. As before, major industry expenditures by households are reflected in the highest induced effects, namely real estate & rental, health & social services, finance & insurance, and retail trade.

The strong backward linkages to dairy farming are evident when considering linkages to agricultural manufacturing activity in NYS. Just behind purchases from wholesalers & distributors, the dairy farming sector represents nearly 17% of all indirect output effects (Table 7). Industry sizes, seasonality effects, and relative sourcing volumes by food manufacturing firms for NYS farm produced products is indicative in the rankings of grain, oilseed, & other crop farming (14), beef & other livestock farming (19), fruit & vegetable farming (20), and greenhouse & nursery (29). Strong volumes of business with wholesale trade operations and transportation & warehousing firms reflect strong purchases by ag manufacturing firms for input supplies used in their production and in distribution and storage services.

Given differences in labor intensities in agricultural production sectors mentioned previously, it is not surprising that indirect employment effects to ag production industries rank higher than that for employment. Specific rankings are grain, oilseed & other crop farming (1), dairy farming (4), beef & other livestock farming (9), fruit & vegetable farming (10), and greenhouse & nursery (23). Collectively, they make up over 32% of indirect effects generated by agricultural manufacturing in the state.

**Table 6. Distribution of indirect and induced employment effects, by industry, from agricultural production activities, New York State, 2019.**

Indirect		Direct		Indirect		Induced		Indirect + Induced	
Rank	Description	Jobs	%	Jobs	%	Jobs	%	Jobs	%
0	Total	52,483	100.0	8,158	100.0	7,241	100.0	15,399	100.0
0	Grain Oilseed Other Crop Farming	22,057	42.0	-	-	-	-	-	-
0	Fruit and Vege Farming	10,399	19.8	-	-	-	-	-	-
0	Greenhouse and Nursery	5,788	11.0	-	-	-	-	-	-
0	Beef Poultry Other Animal Farming	4,999	9.5	-	-	-	-	-	-
0	Dairy Farming	9,239	17.6	-	-	-	-	-	-
1	Support Activities for Ag and Forestry	-	-	2,487	30.5	1	0.0	2,488	16.2
2	Wholesale Trade	-	-	1,574	19.3	156	2.2	1,730	11.2
3	Transportation and warehousing	-	-	867	10.6	311	4.3	1,178	7.6
4	Real estate and rental	-	-	765	9.4	553	7.6	1,318	8.6
5	Professional services	-	-	405	5.0	297	4.1	703	4.6
6	Admin and waste services	-	-	404	4.9	324	4.5	728	4.7
7	Ag Manuf - Animal food	-	-	267	3.3	1	0.0	267	1.7
8	Government	-	-	261	3.2	250	3.5	511	3.3
9	Finance and insurance	-	-	220	2.7	324	4.5	544	3.5
10	Retail Trade	-	-	136	1.7	923	12.8	1,059	6.9
11	Management of companies enterprises	-	-	130	1.6	62	0.9	191	1.2
12	Accommodations and food services	-	-	124	1.5	714	9.9	838	5.4
13	Construction	-	-	123	1.5	57	0.8	180	1.2
14	Other services	-	-	118	1.4	714	9.9	832	5.4
15	Information	-	-	59	0.7	99	1.4	158	1.0
16	NonAg Manuf	-	-	54	0.7	27	0.4	81	0.5
17	Arts entertainment recreation	-	-	49	0.6	221	3.0	270	1.8
18	Utilities generation distribution	-	-	33	0.4	17	0.2	50	0.3
19	Ag Manuf - fert chem mach	-	-	25	0.3	0	0.0	25	0.2
20	Ag Manuf - beverages	-	-	20	0.2	5	0.1	25	0.2
21	Ag Manuf - grain oilseed milling	-	-	10	0.1	0	0.0	10	0.1
22	Educational services	-	-	8	0.1	332	4.6	341	2.2
23	Ag Manuf - meat seafood	-	-	6	0.1	2	0.0	8	0.1
24	Forestry Comm logging fishing hunting	-	-	5	0.1	3	0.0	8	0.1
25	Mining and drilling	-	-	4	0.0	1	0.0	4	0.0
26	Ag Manuf - dairy	-	-	2	0.0	2	0.0	4	0.0
27	Ag Manuf - sugar confectionary	-	-	1	0.0	1	0.0	2	0.0
28	Ag Manuf - Other foods	-	-	1	0.0	2	0.0	3	0.0
29	Ag Manuf - bakery tortilla	-	-	1	0.0	16	0.2	16	0.1
30	Ag Manuf - fruit vege specialty	-	-	1	0.0	1	0.0	2	0.0
31	Health and social services	-	-	0	0.0	1,825	25.2	1,825	11.9

Note: Industries are ranked on their level of indirect effects (i.e., the strength of their local business-to-business linkages) generated from the (direct) agricultural production activity. Industry aggregation follows from Table 1, with the full sector aggregation scheme outlined in Appendix A.



**Table 7. Distribution of indirect and induced output effects, by industry, from agricultural manufacturing activities, New York State, 2019.**

Indirect		Direct		Indirect		Induced		Indirect + Induced	
Rank	Description	\$Mill	%	\$Mill	%	\$Mill	%	\$Mill	%
0	Total	39,319	100.0	15,014	100.0	9,275	100.0	24,289	100.0
0	AgManuf – Animal food	2,750	7.0	-	-	-	-	-	-
0	AgManuf - grain oilseed milling	1,290	3.3	-	-	-	-	-	-
0	AgManuf - sugar confectionary	1,547	3.9	-	-	-	-	-	-
0	AgManuf - fruit vege specialty	2,995	7.6	-	-	-	-	-	-
0	AgManuf - dairy	9,106	23.2	-	-	-	-	-	-
0	AgManuf – bakery tortilla	6,437	16.4	-	-	-	-	-	-
0	AgManuf – meat seafood	2,504	6.4	-	-	-	-	-	-
0	AgManuf - Other foods	5,334	13.6	-	-	-	-	-	-
0	AgManuf - beverages	6,158	15.7	-	-	-	-	-	-
0	AgManuf – fert chem mach	1,197	3.0	-	-	-	-	-	-
1	Wholesale Trade	-	-	3,679	24.5	402	4.3	4,081	16.8
2	Dairy Farming	-	-	2,529	16.8	0	0.0	2,529	10.4
3	Transportation and warehousing	-	-	1,243	8.3	261	2.8	1,504	6.2
4	Management of companies enterprises	-	-	1,165	7.8	124	1.3	1,289	5.3
5	Professional services	-	-	1,082	7.2	483	5.2	1,565	6.4
6	Realestate and rental	-	-	893	5.9	1,747	18.8	2,641	10.9
7	Finance and insurance	-	-	765	5.1	1,204	13.0	1,970	8.1
8	Admin and waste services	-	-	519	3.5	270	2.9	789	3.2
9	Information	-	-	479	3.2	530	5.7	1,009	4.2
10	Non Ag Manuf	-	-	449	3.0	88	0.9	537	2.2
11	Utilities generation distribution	-	-	428	2.8	161	1.7	589	2.4
12	Grain Oilseed Other Crop Farming	-	-	420	2.8	1	0.0	421	1.7
13	Government	-	-	350	2.3	250	2.7	600	2.5
14	Beef Poultry Other Animal Farming	-	-	245	1.6	1	0.0	247	1.0
15	Fruit and Vege Farming	-	-	142	0.9	3	0.0	145	0.6
16	Retail Trade	-	-	136	0.9	736	7.9	872	3.6
17	Other services	-	-	121	0.8	469	5.1	590	2.4
18	Accommodations and food services	-	-	111	0.7	508	5.5	619	2.5
19	Construction	-	-	98	0.7	71	0.8	169	0.7
20	Support Activities for Ag and Forestry	-	-	59	0.4	0	0.0	59	0.2
21	Arts entertainment recreation	-	-	38	0.3	199	2.1	237	1.0
22	Forestry Comm logging fishing hunting	-	-	36	0.2	2	0.0	37	0.2
23	Mining and drilling	-	-	11	0.1	1	0.0	13	0.1
24	Greenhouse and Nursery	-	-	9	0.1	1	0.0	10	0.0
25	Educational services	-	-	6	0.0	225	2.4	230	0.9
26	Health and social services	-	-	0	0.0	1,536	16.6	1,536	6.3

Note: Industries are ranked on their level of indirect effects (i.e., the strength of their local business-to-business linkages) generated from the (direct) agricultural manufacturing activity. Industry aggregation follows from Table 1, with the full sector aggregation scheme outlined in Appendix A.

**Table 8. Distribution of indirect and induced employment effects, by industry, from agricultural manufacturing activities, New York State, 2019.**

Indirect Rank	Description	Direct		Indirect		Induced		Indirect + Induced	
		Jobs	%	Jobs	%	Jobs	%	Jobs	%
0	Total	100,077	100.0	72,802	100.0	52,802	100.0	125,605	100.0
0	Ag Manuf - Animal food	2,636	2.6	-	-	-	-	-	-
0	Ag Manuf - grain oilseed milling	1,082	1.1	-	-	-	-	-	-
0	Ag Manuf - sugar confectionary	3,590	3.6	-	-	-	-	-	-
0	Ag Manuf - fruit vege specialty	6,606	6.6	-	-	-	-	-	-
0	Ag Manuf - dairy	11,970	12.0	-	-	-	-	-	-
0	Ag Manuf - bakery tortilla	45,512	45.5	-	-	-	-	-	-
0	Ag Manuf - meat seafood	5,290	5.3	-	-	-	-	-	-
0	Ag Manuf - Other foods	10,274	10.3	-	-	-	-	-	-
0	Ag Manuf - beverages	11,642	11.6	-	-	-	-	-	-
0	Ag Manuf - fert chem mach	1,474	1.5	-	-	-	-	-	-
1	Grain Oilseed Other Crop Farming	-	-	11,078	15.2	17	0.0	11,095	8.8
2	Transportation and warehousing	-	-	10,714	14.7	2,254	4.3	12,969	10.3
3	Wholesale Trade	-	-	10,305	14.2	1,126	2.1	11,431	9.1
4	Dairy Farming	-	-	7,845	10.8	0	0.0	7,846	6.2
5	Professional services	-	-	4,858	6.7	2,169	4.1	7,026	5.6
6	Admin and waste services	-	-	4,541	6.2	2,367	4.5	6,908	5.5
7	Management of companies enterprises	-	-	4,196	5.8	445	0.8	4,641	3.7
8	Government	-	-	2,559	3.5	1,825	3.5	4,384	3.5
9	Beef Poultry Other Animal Farming	-	-	2,227	3.1	12	0.0	2,238	1.8
10	Fruit and Vege Farming	-	-	2,183	3.0	45	0.1	2,229	1.8
11	Real estate and rental	-	-	2,072	2.8	4,053	7.7	6,124	4.9
12	Finance and insurance	-	-	1,503	2.1	2,365	4.5	3,869	3.1
13	Support Activities for Ag and Forestry	-	-	1,472	2.0	12	0.0	1,483	1.2
14	Other services	-	-	1,348	1.9	5,223	9.9	6,572	5.2
15	Retail Trade	-	-	1,251	1.7	6,771	12.8	8,022	6.4
16	Accommodations and food services	-	-	1,143	1.6	5,223	9.9	6,366	5.1
17	NonAg Manuf	-	-	1,005	1.4	196	0.4	1,202	1.0
18	Information	-	-	658	0.9	728	1.4	1,386	1.1
19	Construction	-	-	568	0.8	415	0.8	983	0.8
20	Forestry Comm logging fishing hunting	-	-	421	0.6	18	0.0	439	0.3
21	Utilities generation distribution	-	-	323	0.4	122	0.2	445	0.4
22	Arts entertainment recreation	-	-	311	0.4	1,612	3.1	1,923	1.5
23	Greenhouse and Nursery	-	-	126	0.2	20	0.0	145	0.1
24	Educational services	-	-	60	0.1	2,416	4.6	2,476	2.0
25	Mining and drilling	-	-	36	0.0	4	0.0	40	0.0
26	Health and social services	-	-	0	0.0	13,363	25.3	13,363	10.6

Note: Industries are ranked on their level of indirect effects (i.e., the strength of their local business-to-business linkages) generated from the (direct) agricultural manufacturing activity. Industry aggregation follows from Table 1, with the full sector aggregation scheme outlined in Appendix A.

## 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 \$65.2 billion industry in NYS and supporting over 269,000 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 (2.5%), employment (2.1%), and contributions to GDP (1.5%), the 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.

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 or can be expanded. In addition, expansionary effects can be induced by policy or other means to increase the size of existing multipliers (i.e., a focus on expansion of backward linked industry capacity). In any event, the likelihood of expansion of 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, 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 problematic to base estimates of the economic impacts on current estimates of economic multipliers.

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## Appendix A

**Table A1. Mapping of 2019 New York model (bolded industries included as agricultural industries) to IMPLAN industries.**

New York model	Implan industry
<b>1 Ag production – fruits &amp; vegetables</b>	3 Vegetable and melon farming 4 Fruit farming 5 Tree nut farming
<b>2 Ag production – greenhouse and nursery</b>	6 Greenhouse, nursery, and floriculture production
<b>3 Ag production – grain, oilseed, &amp; other crops</b>	1 Oilseed farming 2 Grain 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 Ag production – dairy</b>	12 Dairy cattle and milk production
<b>5 Ag production – beef, poultry, &amp; other animal</b>	11 Beef cattle ranching and farming 13 Poultry and egg production 14 Animal production, except cattle and poultry and eggs
<b>6 Ag support services</b>	19 Support activities for agriculture and forestry
7 Forestry and commercial logging, fishing, & hunting	15 Forestry, forest products, and timber tract production 16 Commercial logging 17 Commercial fishing 18 Commercial hunting and trapping
8 Mining & drilling	20 Oil and gas extraction 21 Coal mining (no industry in NYS) 22 Copper, nickel, lead, and zinc mining 23 Iron ore mining (no industry in NYS) 24 Gold ore mining 25 Silver ore mining (no industry in NYS) 26 Uranium-radium-vanadium ore mining (no industry in NYS) 27 Other metal ore mining (no industry in NYS) 28 Stone mining and quarrying 29 Sand and gravel mining 30 Other clay, ceramic, refractory minerals mining 31 Potash, soda, and borate mineral mining (no industry in NYS) 32 Phosphate rock mining (no industry in NYS) 33 Other chemical and fertilizer mineral mining 34 Other nonmetallic minerals 35 Drilling oil and gas wells 36 Support activities for oil and gas operations 37 Metal mining services 38 Other nonmetallic minerals services
9 Utilities – generation & distribution	39 Electric power generation - Hydroelectric 40 Electric power generation - Fossil fuel 41 Electric power generation - Nuclear 42 Electric power generation - Solar 43 Electric power generation - Wind 44 Electric power generation – Geothermal (no industry in NYS) 45 Electric power generation - Biomass 46 Electric power generation - All other 47 Electric power transmission and distribution 48 Natural gas distribution 49 Water, sewage and other systems
10 Construction	50 Construction of new health care structures 51 Construction of new manufacturing structures

New York model	Implan industry
	52 Construction of new power and communication structures 53 Construction of new educational and vocational structures 54 Construction of new highways and streets 55 Construction of new comm. structures, incl. farm structures 56 Construction of other new nonresidential structures 57 Construction of new single-family residential structures 58 Construction of new multifamily residential structures 59 Construction of other new residential structures 60 Maintenance and repair construction of nonres. structures 61 Maintenance and repair construction of residential structures 62 Maint. & rep. constr. of highways, streets, bridges, tunnels
<b>11 Ag manufacturing – animal foods</b>	63 Dog and cat food manufacturing 64 Other animal food manufacturing
<b>12 Ag manufacturing – grain &amp; oilseed milling</b>	65 Flour milling 66 Rice milling (no industry in NYS) 67 Malt manufacturing 68 Wet corn milling (no industry in NYS) 69 Soybean and other oilseed processing 70 Fats and oils refining and blending 71 Breakfast cereal manufacturing
<b>13 Ag manufacturing – sugar &amp; confectionary</b>	72 Beet sugar manufacturing (no industry in NYS) 73 Sugar cane mills and refining 74 Nonchocolate confectionery manufacturing 75 Chocolate & confectionery mfg. from cacao beans 76 Confectionery manufacturing from purchased chocolate
<b>14 Ag manufacturing – fruit, vegetable, &amp; specialty</b>	77 Frozen fruits, juices and vegetables manufacturing 78 Frozen specialties manufacturing 79 Canned fruits and vegetables manufacturing 80 Canned specialties 81 Dehydrated food products manufacturing
<b>15 Ag manufacturing – dairy</b>	82 Cheese manufacturing 83 Dry, condensed, & evaporated dairy product mfg 84 Fluid milk manufacturing 85 Creamery butter manufacturing 86 Ice cream and frozen dessert manufacturing
<b>16 Ag manufacturing – bakery and tortilla</b>	87 Frozen cakes and other pastries manufacturing 93 Bread and bakery product, except frozen, manufacturing 94 Cookie and cracker manufacturing 95 Dry pasta, mixes, and dough manufacturing 96 Tortilla manufacturing
<b>17 Ag manufacturing – meat and seafood</b>	88 Poultry processing 89 Animal, except poultry, slaughtering 90 Meat processed from carcasses 91 Rendering and meat byproduct processing 92 Seafood product preparation and packaging
<b>18 Ag manufacturing – other foods</b>	97 Roasted nuts and peanut butter manufacturing 98 Other snack food manufacturing 99 Coffee and tea manufacturing 100 Flavoring syrup and concentrate manufacturing 101 Mayonnaise, dressing, and sauce manufacturing 102 Spice and extract manufacturing 103 All other food manufacturing <sup>58</sup>
<b>19 Ag manufacturing – beverages</b>	104 Bottled and canned soft drinks & water 105 Manufactured ice 106 Breweries

New York model	Implan industry
	107 Wineries 108 Distilleries
20 Ag manufacturing – fertilizer, chemical, machinery	167 Nitrogenous fertilizer manufacturing 168 Phosphatic fertilizer manufacturing (no industry in NYS) 169 Fertilizer mixing 170 Pesticide and other agricultural chemical manufacturing 208 Lime manufacturing (no industry in NYS) 260 Farm machinery and equipment manufacturing 266 Food product machinery manufacturing
21 NonAg manufacturing	109 Tobacco product manufacturing 110 Fiber, yarn, and thread mills 111 Broadwoven fabric mills 112 Narrow fabric mills and schiffli machine embroidery 113 Nonwoven fabric mills 114 Knit fabric mills 115 Textile and fabric finishing mills 116 Fabric coating mills 117 Carpet and rug mills 118 Curtain and linen mills 119 Textile bag and canvas mills 120 Rope, cordage, twine, tire cord and tire fabric mills 121 Other textile product mills 122 Hosiery and sock mills 123 Other apparel knitting mills 124 Cut and sew apparel contractors 125 Mens and boys cut and sew apparel manufacturing 126 Womens and girls cut and sew apparel manufacturing 127 Other cut and sew apparel manufacturing 128 Apparel accessories and other apparel manufacturing 129 Leather and hide tanning and finishing 130 Footwear manufacturing 131 Other leather and allied product manufacturing 132 Sawmills 133 Wood preservation 134 Veneer and plywood manufacturing 135 Engineered wood member and truss manufacturing 136 Reconstituted wood product manufacturing 137 Wood windows and door manufacturing 138 Cut stock, resawing lumber, and planing 139 Other millwork, including flooring 140 Wood container and pallet manufacturing 141 Manufactured home (mobile home) manufacturing 142 Prefabricated wood building manufacturing 143 All other miscellaneous wood product manufacturing 144 Pulp mills 145 Paper mills 146 Paperboard mills 147 Paperboard container manufacturing 148 Paper bag and coated and treated paper manufacturing 149 Stationery product manufacturing 150 Sanitary paper product manufacturing 151 All other converted paper product manufacturing 152 Printing 153 Support activities for printing 154 Petroleum refineries

New York model	Implan industry
	155 Asphalt paving mixture and block manufacturing
	156 Asphalt shingle and coating materials manufacturing
	157 Petroleum lubricating oil and grease manufacturing
	158 All other petroleum & coal products mfg. (no industry in NYS)
	159 Petrochemical manufacturing
	160 Industrial gas manufacturing
	161 Synthetic dye and pigment manufacturing
	162 Other basic inorganic chemical manufacturing
	163 Other basic organic chemical manufacturing
	164 Plastics material and resin manufacturing
	165 Synthetic rubber manufacturing
	166 Artificial and synthetic fibers and filaments manufacturing
	171 Medicinal and botanical manufacturing
	172 Pharmaceutical preparation manufacturing
	173 In-vitro diagnostic substance manufacturing
	174 Biological product (except diagnostic) manufacturing
	175 Paint and coating manufacturing
	176 Adhesive manufacturing
	177 Soap and other detergent manufacturing
	178 Polish and other sanitation good manufacturing
	179 Surface active agent manufacturing
	180 Toilet preparation manufacturing
	181 Printing ink manufacturing
	182 Explosives manufacturing
	183 Custom compounding of purchased resins
	184 Photographic film and chemical manufacturing
	185 Other miscellaneous chemical product manufacturing
	186 Plastics packaging materials & unlaminated film & sheet mfg
	187 Unlaminated plastics profile shape manufacturing
	188 Plastics pipe and pipe fitting manufacturing
	189 Laminated plastics plate, sheet (exc. packaging), & shape mfg
	190 Polystyrene foam product manufacturing
	191 Urethane & other foam product (exc. polystyrene) mfg
	192 Plastics bottle manufacturing
	193 Other plastics product manufacturing
	194 Tire manufacturing
	195 Rubber and plastics hoses and belting manufacturing
	196 Other rubber product manufacturing
	197 Pottery, ceramics, and plumbing fixture manufacturing
	198 Brick, tile, and other structural clay product manufacturing
	199 Flat glass manufacturing
	200 Other pressed and blown glass and glassware manufacturing
	201 Glass container manufacturing
	202 Glass product manufacturing made of purchased glass
	203 Cement manufacturing
	204 Ready-mix concrete manufacturing
	205 Concrete block and brick manufacturing
	206 Concrete pipe manufacturing
	207 Other concrete product manufacturing
	209 Gypsum product manufacturing
	210 Abrasive product manufacturing
	211 Cut stone and stone product manufacturing
	212 Ground or treated mineral and earth manufacturing
	213 Mineral wool manufacturing
	214 Miscellaneous nonmetallic mineral products manufacturing



New York model	Implan industry
	215 Iron and steel mills and ferroalloy manufacturing
	216 Iron, steel pipe and tube manufacturing from purchased steel
	217 Rolled steel shape manufacturing
	218 Steel wire drawing
	219 Alumina refining and primary aluminum production
	220 Secondary smelting and alloying of aluminum
	221 Aluminum sheet, plate, and foil manufacturing
	222 Other aluminum rolling, drawing and extruding
	223 Nonferrous metal (exc aluminum) smelting and refining
	224 Copper rolling, drawing, extruding and alloying
	225 Nonferrous metal, except copper and aluminum, shaping
	226 Secondary processing of other nonferrous metals
	227 Ferrous metal foundries
	228 Nonferrous metal foundries
	229 Custom roll forming
	230 Crown and closure manufacturing and metal stamping
	231 Iron and steel forging
	232 Nonferrous forging
	233 Cutlery, utensil, pot, and pan manufacturing
	234 Handtool manufacturing
	235 Prefabricated metal buildings and components manufacturing
	236 Fabricated structural metal manufacturing
	237 Plate work manufacturing
	238 Metal window and door manufacturing
	239 Sheet metal work manufacturing
	240 Ornamental and architectural metal work manufacturing
	241 Power boiler and heat exchanger manufacturing
	242 Metal tank (heavy gauge) manufacturing
	243 Metal cans manufacturing
	244 Metal barrels, drums and pails manufacturing
	245 Hardware manufacturing
	246 Spring and wire product manufacturing
	247 Machine shops
	248 Turned product and screw, nut, and bolt manufacturing
	249 Metal heat treating
	250 Metal coating and nonprecious engraving
	251 Electroplating, anodizing, and coloring metal
	252 Valve and fittings, other than plumbing, manufacturing
	253 Plumbing fixture fitting and trim manufacturing
	254 Ball and roller bearing manufacturing
	255 Small arms ammunition manufacturing (no industry in NYS)
	256 Ammunition, except for small arms, manufacturing
	257 Small arms, ordnance, and accessories manufacturing
	258 Fabricated pipe and pipe fitting manufacturing
	259 Other fabricated metal manufacturing
	261 Lawn and garden equipment manufacturing
	262 Construction machinery manufacturing
	263 Mining machinery and equipment manufacturing
	264 Oil and gas field machinery and equipment manufacturing
	265 Semiconductor machinery manufacturing
	267 Sawmill, woodworking, and paper machinery
	268 Printing machinery and equipment manufacturing
	269 All other industrial machinery manufacturing
	270 Optical instrument and lens manufacturing
	271 Photographic and photocopying equipment manufacturing

New York model	Implan industry
	272 Other commercial service industry machinery manufacturing
	273 Air purification and ventilation equipment manufacturing
	274 Heating equipment (except warm air furnaces) manufacturing
	275 Air conditioning, refrigeration, & warm air heating equip. mfg
	276 Industrial mold manufacturing
	277 Special tool, die, jig, and fixture manufacturing
	278 Cutting tool and machine tool accessory manufacturing
	279 Machine tool manufacturing
	280 Rolling mill and other metalworking machinery manufacturing
	281 Turbine and turbine generator set units manufacturing
	282 Speed changer, industrial high-speed drive, & gear mfg
	283 Mechanical power transmission equipment manufacturing
	284 Other engine equipment manufacturing
	285 Pump and pumping equipment manufacturing
	286 Air and gas compressor manufacturing
	287 Elevator and moving stairway manufacturing
	288 Conveyor and conveying equipment manufacturing
	289 Overhead cranes, hoists, and monorail systems manufacturing
	290 Industrial truck, trailer, and stacker manufacturing
	291 Power-driven handtool manufacturing
	292 Welding and soldering equipment manufacturing
	293 Packaging machinery manufacturing
	294 Industrial process furnace and oven manufacturing
	295 Fluid power cylinder and actuator manufacturing
	296 Fluid power pump and motor manufacturing
	297 Scales, balances, & misc. general purpose machinery mfg
	298 Electronic computer manufacturing
	299 Computer storage device manufacturing
	300 Computer terminals & other computer peripheral equip. mfg
	301 Telephone apparatus manufacturing
	302 Broadcast & wireless communications equipment mfg
	303 Other communications equipment manufacturing
	304 Audio and video equipment manufacturing
	305 Printed circuit assembly (electronic assembly) manufacturing
	306 Bare printed circuit board manufacturing
	307 Semiconductor and related device manufacturing
	308 Capacitor, resistor, coil, transformer, & other inductor mfg
	309 Electronic connector manufacturing
	310 Other electronic component manufacturing
	311 Electromedical & electrotherapeutic apparatus manufacturing
	312 Search, detection, and navigation instruments manufacturing
	313 Automatic environmental control manufacturing
	314 Industrial process variable instruments manufacturing
	315 Totalizing fluid meter and counting device manufacturing
	316 Electricity and signal testing instruments manufacturing
	317 Analytical laboratory instrument manufacturing
	318 Irradiation apparatus manufacturing
	319 Watch, clock, & other measuring and controlling device mfg
	320 Blank magnetic and optical recording media manufacturing
	321 Software and other prerecorded and record reproducing
	322 Electric lamp bulb and part manufacturing
	323 Lighting fixture manufacturing
	324 Small electrical appliance manufacturing
	325 Household cooking appliance manufacturing
	326 Household refrigerator and home freezer manufacturing

New York model	Implan industry
	327 Household laundry equipment manufacturing
	328 Other major household appliance manufacturing
	329 Power, distribution, and specialty transformer manufacturing
	330 Motor and generator manufacturing
	331 Switchgear and switchboard apparatus manufacturing
	332 Relay and industrial control manufacturing
	333 Storage battery manufacturing
	334 Primary battery manufacturing
	335 Fiber optic cable manufacturing
	336 Other communication and energy wire manufacturing
	337 Wiring device manufacturing
	338 Carbon and graphite product manufacturing
	339 All other miscellaneous electrical equipment & component mfg
	340 Automobile manufacturing
	341 Light truck and utility vehicle manufacturing
	342 Heavy duty truck manufacturing
	343 Motor vehicle body manufacturing
	344 Truck trailer manufacturing (no industry in NYS)
	345 Motor home manufacturing (no industry in NYS)
	346 Travel trailer and camper manufacturing
	347 Motor vehicle gasoline engine and engine parts manufacturing
	348 Motor vehicle electrical & electronic equipment manufacturing
	349 Motor vehicle transmission & power train parts manufacturing
	350 Motor vehicle seating and interior trim manufacturing
	351 Motor vehicle metal stamping
	352 Other motor vehicle parts manufacturing
	353 Motor veh. steering, susp. (exc. spring), & brake sys. mfg
	354 Aircraft manufacturing
	355 Aircraft engine and engine parts manufacturing
	356 Other aircraft parts and auxiliary equipment manufacturing
	357 Guided missile & space vehicle manuf. (no industry in NYS)
	358 Prop. units & parts for space vehicles and guided missiles mfg
	359 Railroad rolling stock manufacturing
	360 Ship building and repairing
	361 Boat building
	362 Motorcycle, bicycle, and parts manufacturing
	363 Military vehicle, tank, & tank comp. mfg (no industry in NYS)
	364 All other transportation equipment manufacturing
	365 Wood kitchen cabinet and countertop manufacturing
	366 Upholstered household furniture manufacturing
	367 Nonupholstered wood household furniture manufacturing
	368 Other household nonupholstered furniture manufacturing
	369 Institutional furniture manufacturing
	370 Wood office furniture manufacturing
	371 Custom architectural woodwork and millwork
	372 Office furniture, except wood, manufacturing
	373 Showcase, partition, shelving, and locker manufacturing
	374 Mattress manufacturing
	375 Blind and shade manufacturing
	376 Surgical and medical instrument manufacturing
	377 Surgical appliance and supplies manufacturing
	378 Dental equipment and supplies manufacturing
	379 Ophthalmic goods manufacturing
	380 Dental laboratories
	381 Jewelry and silverware manufacturing

New York model	Implan industry
	382 Sporting and athletic goods manufacturing 383 Doll, toy, and game manufacturing 384 Office supplies (except paper) manufacturing 385 Sign manufacturing 386 Gasket, packing, and sealing device manufacturing 387 Musical instrument manufacturing 388 Fasteners, buttons, needles, and pins manufacturing 389 Broom, brush, and mop manufacturing 390 Burial casket manufacturing 391 All other miscellaneous manufacturing
22 Wholesale trade	392 Wholesale - Motor vehicle and motor vehicle parts and supplies 393 Wholesale - Professional & commercial equipment and supplies 394 Wholesale - Household appliances & electrical & elec. goods 395 Wholesale - Machinery, equipment, and supplies 396 Wholesale - Other durable goods merchant wholesalers 397 Wholesale - Drugs and druggists' sundries 398 Wholesale - Grocery and related product wholesalers 399 Wholesale - Petroleum and petroleum products 400 Wholesale - Other nondurable goods merchant wholesalers 401 Wholesale - Wholesale elec. markets & agents and brokers
23 Retail trade	402 Retail - Motor vehicle and parts dealers 403 Retail - Furniture and home furnishings stores 404 Retail - Electronics and appliance stores 405 Retail - Building material and garden equipment supplies stores 406 Retail - Food and beverage stores 407 Retail - Health and personal care stores 408 Retail - Gasoline stores 409 Retail - Clothing and clothing accessories stores 410 Retail - Sporting goods, hobby, musical instrument, book stores 411 Retail - General merchandise stores 412 Retail - Miscellaneous store retailers 413 Retail - Nonstore retailers
24 Transportation and warehousing	414 Air transportation 415 Rail transportation 416 Water transportation 417 Truck transportation 418 Transit and ground passenger transportation 419 Pipeline transportation 420 Scenic, sightseeing transportation, support activities for transp 421 Couriers and messengers 422 Warehousing and storage
25 Information	423 Newspaper publishers 424 Periodical publishers 425 Book publishers 426 Directory, mailing list, and other publishers 427 Greeting card publishing 428 Software publishers 429 Motion picture and video industries 430 Sound recording industries 431 Radio and television broadcasting 432 Cable and other subscription programming 433 Wired telecommunications carriers 434 Wireless telecommunications carriers (except satellite) 435 Satellite, telecomm resellers, and all other telecommunications 436 Data processing, hosting, and related services

New York model	Implan industry
	437 News syndicates, libraries, archives, all other info services 438 Internet publishing and broadcasting and web search portals
26 Finance and Insurance	439 Nondepository credit intermediation and related activities 440 Securities & commodity contracts intermediation & brokerage 441 Monetary authorities and depository credit intermediation 442 Other financial investment activities 443 Direct life insurance carriers 444 Insurance carriers, except direct life 445 Insurance agencies, brokerages, and related activities 446 Funds, trusts, and other financial vehicles
27 Real estate and rental	447 Other real estate 448 Tenant-occupied housing 449 Owner-occupied dwellings 450 Automotive equipment rental and leasing 451 General & consumer goods rental except video tapes & discs 452 Video tape and disc rental 453 Comm. & industrial machinery & equipment rental & leasing 454 Lessors of nonfinancial intangible assets
28 Professional – scientific and technical services	455 Legal services 456 Accounting, tax preparation, bookkeeping, and payroll services 457 Architectural, engineering, and related services 458 Specialized design services 459 Custom computer programming services 460 Computer systems design services 461 Other computer related services, incl facilities management 462 Management consulting services 463 Environmental and other technical consulting services 464 Scientific research and development services 465 Advertising, public relations, and related services 466 Photographic services 467 Veterinary services 468 Marketing research, all other misc prof, scientific, tech services
29 Management of companies	469 Management of companies and enterprises
30 Administrative and waste services	470 Office administrative services 471 Facilities support services 472 Employment services 473 Business support services 474 Travel arrangement and reservation services 475 Investigation and security services 476 Services to buildings 477 Landscape and horticultural services 478 Other support services 479 Waste management and remediation services
31 Educational services	480 Elementary and secondary schools 481 Junior colleges, colleges, universities, and professional schools 482 Other educational services
32 Health and social services	483 Offices of physicians 484 Offices of dentists 485 Offices of other health practitioners 486 Outpatient care centers 487 Medical and diagnostic laboratories 488 Home health care services 489 Other ambulatory health care services 490 Hospitals 491 Nursing and community care facilities

New York model	Implan industry
33 Arts, entertainment and recreation	492 Res. mental retardation & health, subst abuse, other facilities 493 Individual and family services 494 Child day care services 495 Community food, housing, other relief, incl rehab services 496 Performing arts companies 497 Commercial Sports Except Racing 498 Racing and Track Operation 499 Independent artists, writers, and performers 500 Promoters of performing arts, sports, agents for public figures 501 Museums, historical sites, zoos, and parks 502 Amusement parks and arcades 503 Gambling industries (except casino hotels) 504 Other amusement and recreation industries 505 Fitness and recreational sports centers 506 Bowling centers
34 Accommodations and food services	507 Hotels and motels, including casino hotels 508 Other accommodations 509 Full-service restaurants 510 Limited-service restaurants 511 All other food and drinking places
35 Other services	512 Automotive repair and maintenance, except car washes 513 Car washes 514 Electronic and precision equipment repair and maintenance 515 Comm. & industrial machinery & equip. repair and maint. 516 Personal and household goods repair and maintenance 517 Personal care services 518 Death care services 519 Dry-cleaning and laundry services 520 Other personal services 521 Religious organizations 522 Grantmaking, giving, and social advocacy organizations 523 Business and professional associations 524 Labor and civic organizations 525 Private households
36 Government	526 Postal service 527 Federal electric utilities (no industry in NYS) 528 Other federal government enterprises 529 State government passenger transit 530 State government electric utilities 531 Other state government enterprises 532 Local government passenger transit 533 Local government electric utilities 534 Other local government enterprises 535 Not an industry (Used and secondhand goods) 536 Not an industry (Scrap) 537 Not an industry (Rest of world adjustment) 538 Not an industry (Noncomparable foreign imports) 539 Employment and payroll of state govt, non-education 540 Employment and payroll of state govt, education 541 Employment and payroll of local govt, non-education 542 Employment and payroll of local govt, education 543 Employment and payroll of federal govt, non-military 544 Employment and payroll of federal govt, military

**OTHER A.E.M. EXTENSION BULLETINS**

<b>EB No</b>	<b>Title</b>	<b>Fee (if applicable)</b>	<b>Author(s)</b>
2021-04	The Economic Contributions of Agriculture to the New York State Economy: 2019		T. Schmit
2021-03	2020 New York Berry Price Information		Yang, Z., Park, K.S., and Gómez, M.I.
2021-02	Central NY Farmland Cash Rental Rate Survey Findings		Ifft, J., and Tommell, N.
2021-01	“Six Year Trend Analysis 2019, New York State Dairy Farms, Selected Financial and Production Factors”, Dairy Farm Business Summary		Karszes, J. and Augello, L.
2020-17	Potential Economic Benefits of Using Certified Clean Hop Plants vs. Hop Stunt Viroid Disease		Davis, T. J., Gómez, M.I., and Twomey, M.
2020-16	The Covid-19 Shopper: Food Preparation Changes		Park, K., Brumberg, A., and Yonezawa, K.
2020-15	The Covid-19 Shopper: Shopping Habits during Covid-19		Park, K., Brumberg, A., and Yonezawa, K.
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