The Contribution of Agriculture to the New York Economy

By Todd Schmit, Cornell University

What is the Issue?
Structural changes in New York’s farm and food industry continue as agricultural producers and agribusiness firms adapt to changing economic conditions and consumer preferences, and to technological advancements. These initiatives underscore the importance of expanding farm-to-food activities on the farm, as well as fostering greater interaction with the agribusiness industry. In order to define appropriate firm, industry, and public policy strategies to strengthen opportunities for economic development and improve the competitiveness of the New York State (NYS) 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.

Measuring the Economic Impact of Agriculture
One approach to assessing agriculture’s impacts 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 identifying all backward linkages in the study area; i.e., it identifies the total direct, indirect, and induced effects. In a contribution analysis, existing total output by the industry or industries of interest provides the initial (direct) effects of the analysis. The indirect effects represent all sales by the backward-linked supply chain industries, while the induced effects represent additional industry sales due to consumption out of the labor income generated in agriculture.

In our particular application, we define agriculture as including all on-farm agricultural production, all agricultural support services, and all agricultural processing. The analysis proceeds by examining the contributions of each of these components, as well as their contribution in aggregate. Input-output analysis is used to assess how the value of agriculturally-related production, support services, and processing permeate throughout the state’s economy; i.e., their relationships to other backward-linked industries. There are several metrics in which to measure the size of an economy; here, we consider industry sales (output) and total employment. The analysis utilizes data for NYS and modeling software provided by IMPLAN, LLC (http://implan.com).

Direct Impacts of Agriculture
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 (Figure 1). In total, on-farm agricultural production activity generated about $5.5 billion in sales in 2011, accounting for 0.30% of total industrial sales across NYS. Agricultural production accounted for over 46 thousand jobs, representing about 0.42% of total state-level employment. Not surprisingly, on-farm dairy production contributes to roughly one half of the total on-farm agricultural output and employment.

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. While overall sales contributions are relatively small ($212 million in 2011), the relatively labor-intensive nature of the sector implies relatively strong contributions to overall agricultural employment; i.e., nearly 9,000 jobs in 2011.

Food (including beverages) and agricultural-based (including fertilizers, chemicals, and machinery) product manufacturers are represented by nearly 40 distinct sectors in IMPLAN. For ease of exposition and to highlight key agriculturally-based manufacturing contributions, we aggregated the individual

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Figure 1: New York State Agricultural Production and Manufacturing Output, by Category, 2011.

Agricultural Production ($Million)

- Fruits & vegetables $886
- Greenhouse & nursery $399
- Grain, oilseed, & other crops $941
- Dairy $2,804
- Beef, poultry, & other animal $470

Agricultural Manufacturing ($Million)

- Dairy $7,618
- Fruits & vegetables $2,972
- Meat & animal products $1,202
- Alcoholic beverages $3,861
- Other $14,835
- Fertilizer, chemicals, & machinery $1,411

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induced effects represent additional industry activity due to consumption out of labor income. Indirect effects represent all activity by the backward-linked supply chain industries. Direct effects represent total activity (sales, employment) by the respective industries. Source: IMPLAN (2014)

### Table 1: Economic Contribution of Agriculture on the New York State Economy, 2011

<table>
<thead>
<tr>
<th>Industry Output ($ million)</th>
<th>Direct*</th>
<th>Indirectb</th>
<th>Inducedc</th>
<th>Total</th>
<th>Implicit Multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Production</td>
<td>5,500</td>
<td>1,935</td>
<td>1,425</td>
<td>8,861</td>
<td>1.61</td>
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<tr>
<td>Agricultural Support Services</td>
<td>212</td>
<td>37</td>
<td>139</td>
<td>388</td>
<td>1.83</td>
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<tr>
<td>Agricultural Manufacturing</td>
<td>31,898</td>
<td>12,700</td>
<td>5,086</td>
<td>49,684</td>
<td>1.56</td>
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<tr>
<td>All Agriculture</td>
<td>37,611</td>
<td>10,094</td>
<td>6,014</td>
<td>53,719</td>
<td>1.43</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Employment</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Production</td>
<td>46,180</td>
<td>11,092</td>
<td>9,898</td>
<td>67,171</td>
<td>1.45</td>
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<td>Agricultural Support Services</td>
<td>8,877</td>
<td>142</td>
<td>962</td>
<td>9,981</td>
<td>1.12</td>
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<tr>
<td>Agricultural Manufacturing</td>
<td>59,946</td>
<td>73,766</td>
<td>35,781</td>
<td>169,492</td>
<td>2.83</td>
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<tr>
<td>All Agriculture</td>
<td>115,003</td>
<td>49,295</td>
<td>42,306</td>
<td>206,604</td>
<td>1.80</td>
</tr>
</tbody>
</table>

Source: IMPLAN (2014)

* Direct effects represent total activity (sales, employment) by the respective industries.

* Indirect effects represent all activity by the backward-linked supply chain industries.

* Induced effects represent additional industry activity due to consumption out of labor income.

### 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 $53.7 billion industry in NYS, with over 200,000 jobs when the value of inter-industry linkages is considered. While total agriculturally-related industry activity may represent a relatively small proportion of total state output (3%) and employment (2%) given the large metropolitan populations in the state, relative contributions for smaller area rural economies will vary. This exercise provides a better understanding of agricultural's total contribution to the NYS economy and demonstrates its significant ripple (multiplier) effects.