

# The Economic Impact of Agriculture on the State of Utah



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## Executive Summary

- This study of the economic impact of agriculture in Utah defines the agricultural sector as composed of production agriculture (NAICS Codes 111, 112, and 115) and food, beverage and tobacco processing/manufacturing (NAICS Codes 311 and 312).
- Economic Impact Analysis captures the direct sales (output) of agriculturally-oriented businesses within the state, as well as the indirect and induced (multiplier) effects of these expenditures. Analysis was conducted using Version 3 of the Impact Analysis for Planning (IMPLAN) model and its 2008 database.
- In 2008, production agriculture, including farming, ranching, dairy, and related support industries, accounted for approximately \$1.5 billion in total direct output (sales), with a total of \$2.3 billion in total economic output after adjustment for multiplier effects.
  - Based on Utah's 2008 Gross State Product of \$109.8 billion (current dollars), production agriculture accounts for 2.1% of total state output.
  - The production agriculture sector employs 14,050 people directly. When including the multiplying effect, production agriculture accounts for 19,500 total jobs with income compensation of \$297.6 million.
  - Total sale of agricultural commodities does not reflect the value of commodities produced and used on the operation, such as hay or corn fed to livestock. If one includes this value, production agriculture accounts for \$3.3 billion in total economic output, or 3.0% of the state economy.
- Total direct output by the agricultural processing sector was approximately \$7.9 billion in 2008.
- The agricultural processing sector and the production agriculture sector together account for \$15.2 billion in total economic output in Utah after adjusting for multiplier effects.
  - Based on Utah's 2008 Gross State Output, production agriculture and its associated processing sector accounts for 13.9% of total state output.
  - Production agriculture and the agricultural processing sector directly employ 22,522 people. They account for another 43,840 jobs due to a multiplying effect for a total of 66,500 people with income compensation of \$2.4 billion.
  - When including the value of agricultural products used on the farm but not sold, total economic output of agricultural production and processing is \$16.3 billion, or 14.8% of the Utah economy.

- The production agriculture and processing sectors generate \$350 million in state and local taxes. This includes \$267 million in indirect business taxes, \$66.1 million in personal taxes, and \$18 million in corporate taxes.
- The production agriculture and processing sectors generate \$269 million in federal taxes (not including Social Security taxes). This includes almost \$40 million in indirect business taxes, \$151 million in personal income taxes, and \$79 million in corporate profits taxes.

# **The Economic Impact of Agriculture on the State of Utah**

## **Introduction**

Production agriculture and the agricultural processing and manufacturing sectors are important elements of the economy in the state of Utah. These economic sectors contribute jobs, income, fiscal revenues, and quality of life to not only rural regions of the state, but also to its more urbanized regions. Indeed, Utah county—part of the highly urbanized Wasatch Front—has the greatest value of agricultural receipts of any county in Utah.

The purpose of this report is to calculate the economic impact of agriculture and agricultural product processing on the economy of the State of Utah. Economic impact analysis captures the direct sales (output) of agriculturally-oriented businesses within the state, as well as the indirect and induced (multiplier) effects of these expenditures. The definition of production agriculture and agricultural processing as used in this report includes NAICS Sectors 111 (Crop Production), 112 (Animal Production), 1151 and 1152 (Support Activities for Crop and Animal Production, respectively), and Sectors 311 and 312 (Food Manufacturing and Beverage and Tobacco Manufacturing, respectively).<sup>1</sup> These sectors include all primary agricultural production in the state, with the exception of forest products, and the industries that either support primary production or further process agricultural products.

Below is a discussion of the agriculture production and processing sectors in Utah. This is followed by an explanation of economic impact analysis followed by the results for the agriculture production sector and the agriculture production and processing sectors combined. At the end is information on the fiscal impacts of the different sectors.

## **Agriculture Production and Processing in Utah**

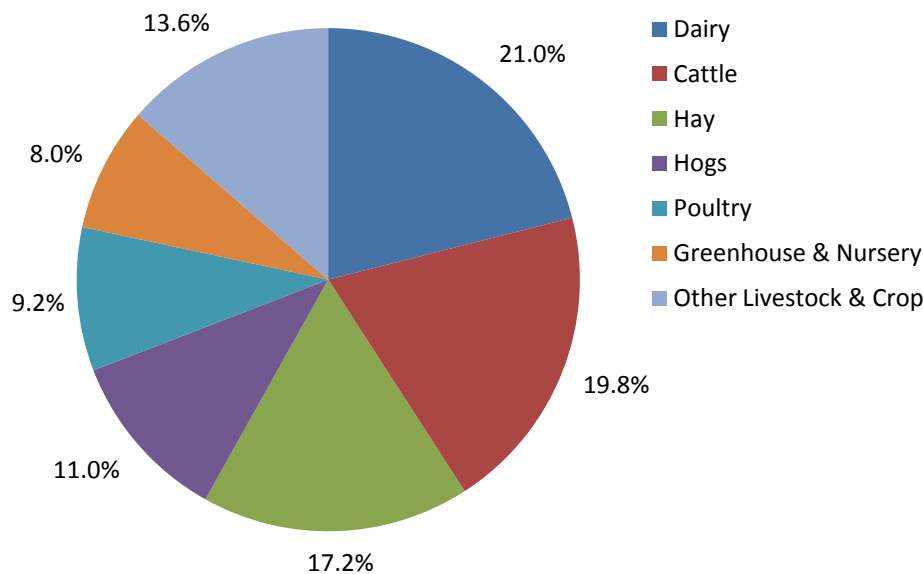
Total cash receipts (direct output) for production agriculture in 2008 were just over \$1.5 billion, a nearly 8% increase over receipts in 2007. About 65% of cash receipts were derived from sales of livestock and dairy products, with the remainder coming from sales of crops. While cattle and dairy production have historically accounted for over 50% of agricultural cash receipts during the current decade, in 2008 the contribution of these two

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<sup>1</sup> NAICS is an acronym for North American Industry Classification System.

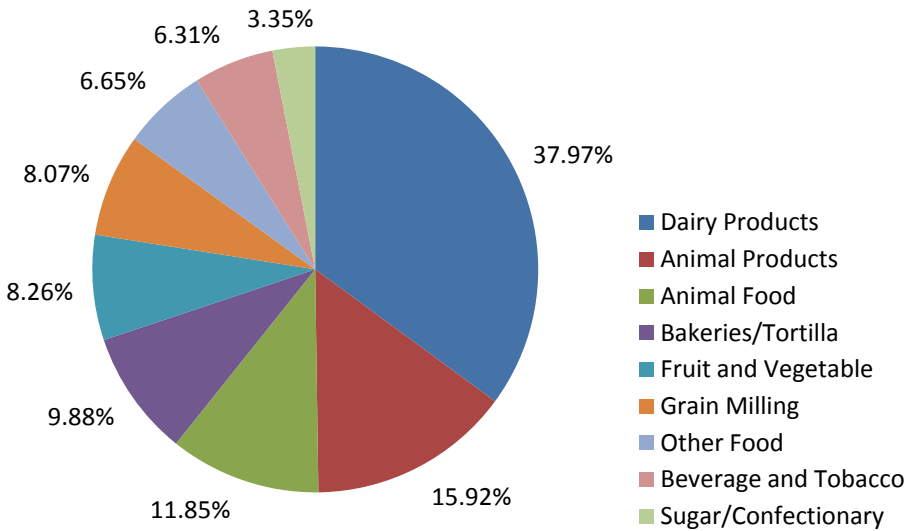
commodities slipped to just over 40% of total receipts (Figure 1).<sup>2</sup> These numbers are based upon receipts for agricultural products produced and sold off the farm. Many livestock operations are integrated firms that produce significant amounts of hay and grain which is subsequently fed to livestock. Hay and grain used in this manner are not sold in a market and are thus not included in the \$1.5 billion in receipts. If one values this output at market prices, the value of the agricultural production is \$2.27 billion according to the 2008 IMPLAN data for Utah.

The agricultural processing and manufacturing sector contributes about \$7.9 billion in total direct output to the Utah economy. The largest components of this sector are Dairy Products (38.0%) and Animal Products (15.9%), accounting for over half of the direct output associated with this sector. A breakout can be found in Figure 2 below.



**Figure 1: Value of Output by Primary Agricultural Product, 2008 (\$1.52 billion total)**  
 (Source: 2009 Utah Agricultural Statistics)

<sup>2</sup> Counties receiving the largest percentage of agricultural cash receipts include Utah, Millard, Beaver, Box Elder, Cache, Sanpete, and Iron counties. These six counties account for almost two-thirds of agricultural cash receipts.



**Figure 2: Value of Output by Agricultural Processing Sector (\$7.85 billion total), 2008**  
 (Source: IMPLAN Data, 2008)

### Economic Impact Analysis

Economic impact analysis combines the value of the total direct sales (output) of the production agriculture and agricultural processing sectors with spending multipliers derived from an input-output model of the Utah economy. We use the state model developed by the Minnesota IMPLAN Group, which is an outgrowth of an input-output model developed by the US Forest Service.<sup>3</sup> An input-output (I-O) model traces the flow of goods and services through the regional economy, where the model is structured to capture the inter-industry relationships within the region.

I-O models are constructed to yield estimates of the indirect (backward) and induced (forward) linkages in an economy. Indirect effects, or backward linkages, account for business-to-business purchases where businesses purchase inputs from other businesses, which in turn purchase additional inputs. For production agriculture, backward linkages include effects of agricultural production on the businesses that support these activities: the output of firms that supply agricultural inputs such as seed, machinery and financial

<sup>3</sup> The IMPLAN software and data sets are used by many federal and state agencies in conducting impact analysis. More information about IMPLAN can be found at <http://implan.com/v3/>.

services. Induced effects or forward linkages account for the effects of the increased demands for goods and services because of increased household income from employee compensation and proprietor's income. The induced effects would include the effects of spending by households as household income increases or decreases due to economic activity in the agricultural production sector and its backward linked supply firms. A similar interpretation would hold for outputs produced by the agricultural processing sector. The total impact is the sum of the direct effect, indirect effect, and the induced effect.

Our analysis uses the most conservative estimates of agricultural activity that we could find. For example, the IMPLAN model values 2008 production agriculture output at \$2.27 billion, yet the 2009 Utah Agricultural Statistics Report values 2008 cash receipts at just over \$1.52 billion. The difference is simple to explain: many agricultural products, such as hay or corn, are produced and used in a vertically integrated agribusiness. Hay fed to dairy or beef cattle may never be sold on the market, so its cash value, according to the Utah Agricultural Statistics Report, is zero. While the Utah Agriculture Statistics Report is accurate in reporting receipts, it does not attempt to capture the full value of the production. The basic IMPLAN model recognizes this as a distortion in its economic model—hay clearly has value—and instead assigns a transfer price to all hay produced and used on the agricultural operation, in addition to products sold on the market.

In the interest of generating the most conservative estimate of the economic impact of agriculture on the state's economy we have opted to focus the main portion of our report using only cash receipts for production agriculture. We supplement this analysis by also providing an alternative estimate of economic impacts by using IMPLAN's values for commodities that are not sold on the market (Appendix A).

### **Impact Results for Production Agriculture**

Table 1 shows the output, income and employment impacts of production agriculture (NAICS Codes 111, 112, and 115). As stated above, we use only cash receipts received from primary production of livestock, dairy, crop, and greenhouse products. The more than \$1.5 billion in cash receipts resulted in additional output effects of over \$750 million (a multiplier effect of 1.50). All told, this value of output accounts for just over 2% of Utah's nearly \$110 billion economy. Approximately 14,050 persons were employed directly by production

agriculture. Another 3,500 jobs were generated in other industries because of the indirect multiplying effect accounting for business-to-business purchases. The induced effects of household spending account for an additional 1,900 jobs. The total employment effect of agriculture production on the Utah economy is estimated at 19,500 jobs, with labor income of just under \$300 million.

**Table 1: Economic Impacts of Utah's Production Agriculture on Utah's Economy, 2008**

	<b>Direct Effects</b>	<b>Indirect Effects</b>	<b>Induced Effects</b>	<b>Total</b>
Total Output (\$Million)	\$1,521	\$547	\$212	\$2,281
Labor Income (\$ Million)	\$118	\$115	\$65	\$298
Jobs	14,050	3,519	1,931	19,504

Source: IMPLAN analysis using 2008 agricultural receipts (2009 Utah Agricultural Statistics)

A report recently published by the University of Utah Bureau of Economic Business Research (BEBR) (Downen, 2009) states that production agriculture comprised about 0.5% of the state's economy in 2008, a number much smaller than the 2% of the Utah economy reported here. The explanation for the difference is straightforward. The BEBR report made its calculation solely on the basis of *value added* by production agriculture. This measure nets out all material input costs, with value added determined solely by labor costs, return to capital, firm profit and taxes. The value added figure reported in the BEBR study was based on 2007 data provided by the U.S. Bureau of Economic Analysis (BEA), which estimated value-added by production agriculture as \$573 million. Our IMPLAN analysis calculates value added by production agriculture as \$595 million, for a relatively small error of about 3.8% when compared to the BEA data. Thus, our data and model are entirely consistent with the BEBR report. The reports differ in that we examine the direct, indirect, and induced effects of agricultural receipts, which results in the figures report in Table 1. This approach accounts for the economic activity in both backward and forward industries. While the study methodology used in this report differs from that of Downen's BEBR study, it is exactly the same as that used in other BEBR reports (see, for example, Crespin's 2009 study on the economic impact of research expenditures).

## Impact Results for Agriculture Production and Processing Sectors Combined

One must exercise care when conducting the analysis for both production agriculture and the processing sector. The problem is one of double counting, and is rooted in a simple issue. For example, does dairy processing "cause" dairy production, or does dairy production cause dairy processing? We do not wish to double-count the indirect effects across the two sectors. Our method for eliminating the problem is as follows: First, we conducted the input-analysis for the processing sector by itself (zeroing out direct production agriculture, or NAICS sectors 111, 112, and 115). This allowed us to estimate the stimulating, indirect (backward) effect that processing has on production agriculture. These indirect effects (about \$680 million) were then subtracted from the direct agricultural receipts (output) of the production sector. The remainder served as our estimate of the agricultural output that would be produced in Utah for processing by firms located outside or Utah. This approach allows us to produce the most conservative estimate of the economic impact of both production agriculture and the agricultural processing sector. Results appear in Table 2.

**Table 2: Economic Impacts of Utah's Production Agriculture and Agricultural Processing on Utah's Economy, 2008**

	<b>Direct Effects</b>	<b>Indirect Effects</b>	<b>Induced Effects</b>	<b>Total</b>
Total Output (\$Million)	\$8,691	\$4,815	\$1,709	\$15,215
Labor Income (\$ Million)	\$798	\$1,085	\$520	\$2,404
Jobs	22,522	28,288	15,552	66,463

Source: IMPLAN analysis using 2008 agricultural receipts (2009 Utah Agricultural Statistics)

The direct effects production agriculture and agricultural processing on the Utah economy total some \$8.7 billion, with a total impact of \$15.2 billion (a multiplier effect of 1.75). This means that in 2008 production and processing of agricultural products in Utah accounted for 13.9% of Utah's Gross State Product in 2008. With the all of the multiplying effects, these

sectors cause over 66,000 people to be employed, providing some \$2.4 billion in labor income.

### **Fiscal Impacts of Agriculture in Utah**

The IMPLAN model also tracks the local, state, and federal income tax effects of changes in economic output. These effects are presented in Table 3. Excluding taxes associated with Social Security, the production agriculture and agricultural processing sectors generate some \$350 million in state and local tax revenues, and about \$151 million in federal tax receipts.

**Table 3: Impacts of Agriculture on Fiscal Revenues for Local, State, and Federal Entities (\$Million)**

	State and Local Revenues	Federal Revenues
Indirect Business Taxes	\$267	\$40
Corporate Profits Taxes	\$18	\$79
Personal (Household) Taxes	\$66	\$151
Total	\$350	\$269

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## Appendix A:

### Including Agricultural Products Produced and Used by an Integrated Agribusiness

Tables A1 and A2 are counterparts to Tables 1 and 2 of the main text. The analysis reported in the main body of the text assigns a value of zero to agricultural products produced and used on an operation (such as growing hay or corn to be fed to livestock). In this appendix, we include the value of all commodities produced, regardless of whether the output is marketed or not. The portion of production that is not sold is valued using IMPLAN's internal transfer pricing, which estimated the annual value of unsold product at about \$750 million.

**Table A1: Economic Impacts of Utah's Production Agriculture on Utah's Economy, 2008**

	<b>Direct Effects</b>	<b>Indirect Effects</b>	<b>Induced Effects</b>	<b>Total</b>
Total Output (\$Million)	\$2,261	\$761	\$312	\$3,334
Labor Income (\$ Million)	\$165	\$178	\$312	\$438
Jobs	17,400	5,350	2,850	25,600

Source: IMPLAN, using 2008 IMPLAN transfer prices.

**Table A2: Economic Impacts of Utah's Production Agriculture and Agricultural Processing on Utah's Economy, 2008**

	<b>Direct Effects</b>	<b>Indirect Effects</b>	<b>Induced Effects</b>	<b>Total</b>
Total Output (\$Million)	\$9,431	\$5,029	\$1,809	\$16,269
Labor Income (\$ Million)	\$846	\$1,148	\$551	\$2,544
Jobs	25,850	30,250	16,450	72,550

Source: IMPLAN, using 2008 IMPLAN transfer prices.

If one includes the value of all primary agricultural production, total direct, indirect and induced effects are about \$3.3 billion, or about 3% of gross state product (Table A1). When the production and processing sectors are both included, total direct, indirect and induced affects are about \$16.3 billion, or about 14.8% of gross state product (Table A2).