

The Economic Contribution of Agriculture to the Economy of Utah in 2011

Ruby A. Ward
Associate Professor

Paul M. Jakus
Professor

Lassina Coulibaly
Graduate Student

Dept. of Applied Economics
Utah State University
UMC 4835
Logan, UT 84322-4835

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Executive Summary

- This study of the economic contribution of agriculture to the Utah economy defines the agricultural sector as composed of production agriculture (NAICS Codes 111, 112, and 115) and food (NAICS Codes 311 and 31211).
- Our 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 2011 database.
- In 2011, production agriculture, including farming, ranching, dairy, and related support industries, accounted for approximately \$1.6 billion in total direct output (sales), with a total of \$2.7 billion in total economic output after adjustment for multiplier effects.
 - Based on Utah's 2011 Gross State Product of \$124.5 billion, production agriculture accounts for 2.1% of total state output.
 - The production agriculture sector directly employs 14,200 people in full and part-time positions. When including the multiplying effect, production agriculture accounts for 21,300 total jobs with income compensation of \$365 million.
 - Total sales of agricultural commodities do 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 \$3.8 billion in total economic output, or 3.1% of the state economy.
- Total direct output by the agricultural processing sector was approximately \$8.2 billion in 2011.
- The agricultural processing sector and the production agriculture sector together account for \$17.5 billion in total economic output in Utah after adjusting for multiplier effects.
 - Based on Utah's 2011 Gross State Output, production agriculture and its associated processing sector accounts for 14.1% of total state output.
 - Production agriculture and the agricultural processing sector directly employ 30,100 people in full and part-time positions. They account for another 48,000 jobs due to multiplying effects, for a total of 78,200 people with income compensation of \$2.7 billion.

- When including the value of agricultural products used on the farm but not sold, total economic output of agricultural production and processing is \$18.7 billion.
- The production agriculture and processing sectors generate \$285 million in state and local taxes. This includes \$209 million in indirect business taxes, \$68 million in personal taxes, and \$18 million in corporate taxes.
- The production agriculture and processing sectors generate \$298 million in federal taxes (not including Social Security taxes). This includes \$25 million in indirect business taxes, \$133 million in personal income taxes, and \$140 million in corporate profits taxes.
- Employment in the food processing sector accounts for just under 15% of all manufacturing employment in Utah. Workers in this industry enjoy an average wage in excess of \$18 per hour.
 - Most of these jobs are located in urban areas of the state. Over 30% of the manufacturing jobs in the Logan UT-ID Metropolitan Statistical Area (MSA) are in food manufacturing; close to 20% of manufacturing jobs in the Ogden-Clearfield MSA are in food processing. In the highly urbanized Salt Lake City MSA, food manufacturing accounts for more than 8% of all manufacturing jobs.

The Economic Contribution of Agriculture to the Economy of Utah: 2011

Introduction

Production agriculture and the agricultural processing 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 second greatest value of agricultural receipts of any county in Utah in 2011.

This report calculates the economic contribution of agriculture production and processing to the economy of the state of Utah in 2011. 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 31211 (Food Manufacturing).¹ 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.

We first discuss the agriculture production and processing sectors in Utah, followed by an explanation of economic impact analysis. The economic contribution of the agriculture production sector is then presented, after which the combined results for production agriculture and agricultural processing are shown. We conclude with information on the fiscal revenues associated agricultural production and processing, as well as the impact of food manufacturing on the five Metropolitan statistical Areas in Utah.

Agriculture Production and Processing in Utah

In 2011 the gross state output of Utah increased by 4.4% relative to 2010, to almost \$125 billion (US BEA, 2012). The production agriculture sector of the Utah economy enjoyed a

¹NAICS is an acronym for North American Industry Classification System.

19.0% increase in cash receipts in 2011 relative to 2010 (Figure 1). Relative to the depth of the Great Recession in 2009—when the gross state product and the value of agricultural receipts reached their recent lows—the state’s GSP has grown by 10.8% whereas production agricultural receipts have grown by nearly 49%. Most of this increase is associated with the recovery in the markets for cattle and calves, wholesale milk, and hay.

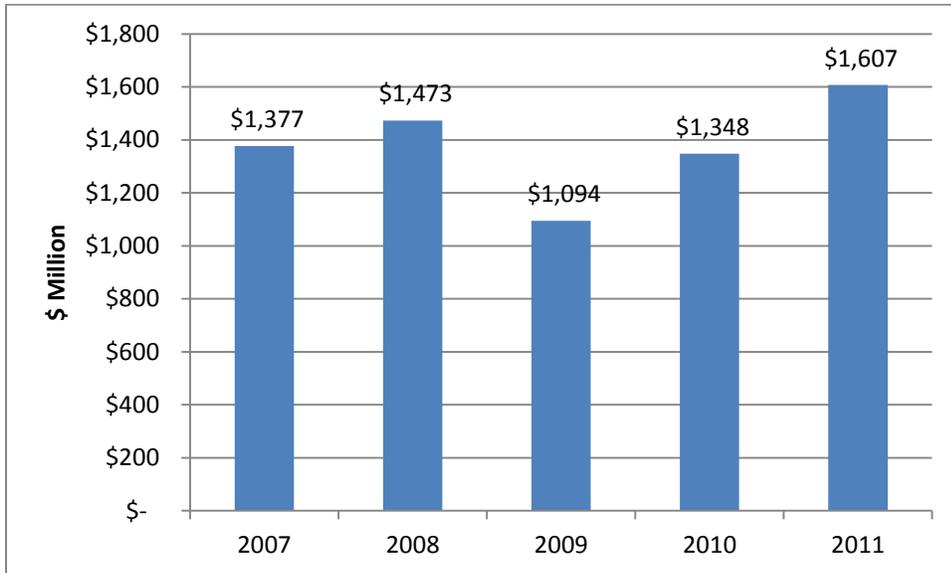


Figure 1. Farm Cash Receipts (current dollars), 2007-2011
(Source: 2012 Utah Agricultural Statistics)

Total cash receipts (direct output) for production agriculture in 2011 were just over \$1.6 billion. About 68% of cash receipts were derived from sales of livestock products, with the remainder coming from sales of crops. In 2011 cattle and dairy production returned to their historically high proportion of cash receipts, accounting for almost 55% of cash agricultural sales. The above numbers are based upon receipts for only those agricultural products produced and sold off the farm. Many livestock operations are integrated firms that produce significant amounts of hay and grain which are subsequently fed to livestock. Hay and grain used in this manner are not sold in a market and are thus not included in the \$1.6 billion in receipts. If one values this output at market prices, the value of the agricultural production is closer to \$2.3 billion.

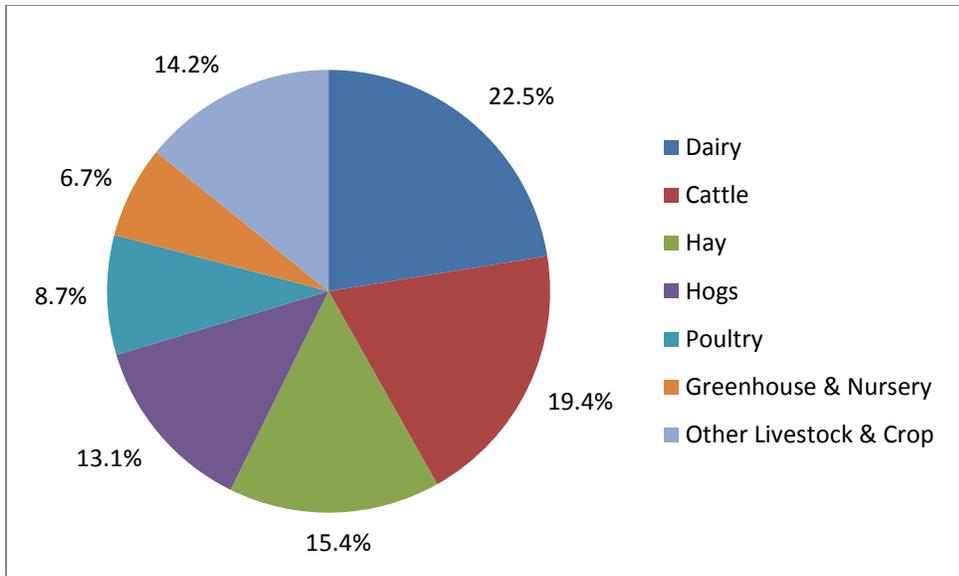


Figure 2: Cash Receipts by Primary Agricultural Product, 2011 (\$1.61 billion total)
 (Source: 2012 Utah Agricultural Statistics)

The agricultural processing and manufacturing sector contributes about \$8.2 billion in total direct output to the Utah economy. The agricultural processing sector saw 2.5% growth in value of output relative to 2010 (\$8.0 billion). The largest processing activities by value of output are associated with dairies: cheese manufacturing (\$1.5 billion, or nearly 18% of the total) and fluid milk and butter manufacturing (\$0.9 billion, or 11%). Other relatively large processing activities are those associated with animal slaughter (9%), frozen food manufacturing (8%), pet foods (7%), and cookie, cracker and pasta manufacturing (7%).

Using Regional Economic Models to Determine Economic Contribution

Regional economic 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 model for Utah developed by the Minnesota IMPLAN Group.² 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.

²The 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/>.

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 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 proprietors' 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 contribution is the sum of the direct effect, indirect effect, and the induced effect.

Our analysis uses conservative estimates of agricultural activity. For example, the IMPLAN model values 2011 production agriculture output at \$2.3 billion, yet the 2012 Utah Agricultural Statistics Report values 2011 cash receipts at \$1.6 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).

Results for Production Agriculture

Table 1 shows the output, income and employment effects of production agriculture (NAICS Codes 111, 112, and 115) on the Utah economy. As stated above, we use only cash receipts received from primary production of livestock, dairy, crop, and greenhouse products. The \$1.61 billion in cash receipts resulted in additional output effects of \$1.06 billion (a multiplier effect of 1.66). All told, this value of output accounts for 2.1% of Utah's \$124.5 billion economy. The estimate of value-added by agriculture—\$1 billion—accounts for just under 1% of the Utah economy. Approximately 14,200 persons were employed directly by production agriculture in either full-time or part-time positions. Almost 5,300 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 just over 1,800 additional jobs. The total employment effect of agriculture production on the Utah economy is estimated at 21,254 jobs, with labor income of \$356 million.

Table 1: Economic Contribution of Utah's Production Agriculture to Utah's Economy, 2011

	Direct Effects	Indirect Effects	Induced Effects	Total
Total Output (\$Million)	\$1,607	\$840	\$223	\$2,670
Value Added (\$ Million)	\$551	\$322	\$123	\$996
Labor Income (\$ Million)	\$145	\$143	\$68	\$356
Jobs	14,157	5,289	1,808	21,254

Source: IMPLAN analysis using 2011 agricultural receipts (2012 Utah Agricultural Statistics)

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 to prevent the processing sector from purchasing locally produced raw agricultural commodities. Setting the "regional purchase coefficient" equal to zero removes double-counting by eliminating the processing sector's backward linkage to Utah producers—which is already accounted for in agricultural receipts. 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 Contribution of Utah's Production Agriculture and Agricultural Processing Sectors to Utah's Economy, 2011

	Direct Effects	Indirect Effects	Induced Effects	Total
Total Output (\$Million)	\$9,832	\$6,042	\$1,675	\$17,549
Value Added (\$ Million)	\$1,755	\$2,305	\$921	\$4,982
Labor Income (\$ Million)	\$904	\$1,249	\$507	\$2,659
Jobs	30,192	34,408	13,569	\$78,169

Source: IMPLAN analysis using 2011 agricultural receipts (2012 Utah Agricultural Statistics)

The direct effects of production agriculture and agricultural processing on the Utah economy total some \$9.8 billion, with a total impact of \$17.5 billion (a multiplier effect of 1.78). This means that in 2011 production and processing of agricultural products in Utah accounted for 14.0% of Utah's Gross State Product. The estimate of value-added by agriculture—approximately \$5 billion—represents approximately 4% of the Utah economy.

With the all of the multiplying effects, these sectors provide employment for more than 78,000 people, yielding some \$2.7 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 \$285 million in state and local tax revenues, and about \$298 million in federal tax receipts.

Table 3: Contribution of Agriculture to Fiscal Revenues for Local, State, and Federal Entities (\$ Million)

	State and Local Revenues	Federal Revenues
Indirect Business Taxes	\$209	\$25
Corporate Profits Taxes	\$18	\$133
Personal (Household) Taxes	\$68	\$140
Total	\$285	\$298

A Closer Look at Food Manufacturing in Utah

Agriculture has long been associated with rural regions and, for production agriculture, this perception is correct. As the previous tables have shown though, the economic contribution of agriculture to the state’s economy is not limited to primary agricultural production but also includes processing of primary products. As it turns out, the vast majority of processing activity occurs in the more metropolitan areas of the state.

Analysis of the County Business Patterns database (maintained by the U.S. Census Bureau) reveals the degree to which agricultural processing contributes to the economic vitality of

the urban centers of Utah. Our analysis focuses on the two-digit NAICS codes for All Manufacturing (31) and the three digit sub-code for Food Manufacturing (311) for the most recent year for which data are available, 2010. Table 4 shows employment and payroll information for all manufacturing and for food manufacturing in Utah and its five metropolitan statistical areas (MSAs).

Table 4: All Manufacturing and Food Manufacturing in Utah and Utah Metropolitan Statistical Areas (U.S. Census Bureau, 2010)

Region	All Manufacturing	Food Manufacturing	Food, as % of All Manufacturing
Utah			
# Employees	106,959	15,608	14.6%
Annual Payroll*	\$5,245,785	\$575,074	11.0%
Logan UT-ID MSA			
# Employees	10,998	3,543	32.2%
Annual Payroll	\$414,543	\$143,119	34.5%
Ogden-Clearfield UT MSA			
# Employees	19,862	3,695	18.6%
Annual Payroll	\$878,521	\$113,579	12.9%
Provo-Orem UT MSA			
# Employees	14,758	1000-2499**	—
Annual Payroll	\$694,317	—**	—
St. George UT MSA			
# Employees	1,762	100-249**	—
Annual Payroll	\$63,356	—**	—
Salt Lake City UT MSA			
# Employees	47,952	3,928	8.2%
Annual Payroll	\$250,9001	\$154,788	6.2%

*Annual payroll measured in \$1000.

**Confidentiality rules prevent disclosure of detailed data.

The table reports that of 107,000 manufacturing jobs in the state of Utah, just under 15% are located in the food manufacturing sector. Food manufacturing jobs account for approximately 11% of all income paid to manufacturing employees. These last two figures suggest that employees in the food manufacturing sector are not as well-paid as those in other manufacturing sectors. This should not be a surprise as many manufacturing jobs in

other sectors are likely to require more highly-skilled labor than the food processing sector. However, employees in the food manufacturing sector remain well-compensated: assuming a standard 40 hour work week and two weeks of vacation per year, food manufacturing workers earn an average hourly wage of approximately \$18.42.³

The food manufacturing sector makes its largest proportional contribution to the economy of the Logan UT-ID MSA, where it provides approximately 32% of all manufacturing employment and 35% of all manufacturing income. The economy of the Ogden-Clearfield UT MSA also has a relatively large food manufacturing sector, with almost 19% of all manufacturing jobs and 13% of manufacturing income derived from food manufacturing. Even in the highly urbanized MSA of Salt Lake City—the MSA with the largest manufacturing base—food manufacturing contributes some 8% of all manufacturing jobs and 6% of manufacturing income. Confidentiality restrictions prevent the calculation of similar figures for the Provo-Orem and St. George MSAs, though we can say that employment in food manufacturing is at least 6.8% of the Provo-Orem manufacturing base and 5.7% of the St. George manufacturing base.

³ The only available data for food manufacturing labor in Utah come from the County Business Patterns database. Employment numbers are reported for the week of March 12. The calculated wage rate assumes a full-time equivalent of 2000 hours per year. It also assumes there is no seasonality in employment, *i.e.*, employment on March 12 is representative of employment during the remainder of the year.

References

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Appendix A:

Including Agricultural Products Produced and Used by an Integrated Agribusiness

Tables A-1 and A-2 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 product used on the farm at about \$402 million.

Table A-1: Economic Contribution of Production Agriculture on Utah's Economy (Including Non-marketed Product), 2011

	Direct Effects	Indirect Effects	Induced Effects	Total
Total Output (\$Million)	\$2,303	\$1,228	\$323	\$3,853
Labor Income (\$ Million)	\$199	\$218	\$98	\$514
Jobs	17,265	7,628	2,616	27,509

Source: IMPLAN, using 2011 IMPLAN transfer prices.

Table A-2: Economic Contribution of Production Agriculture and Agricultural Processing on Utah's Economy (Including Non-marketed Product), 2011

	Direct Effects	Indirect Effects	Induced Effects	Total
Total Output (\$Million)	\$10,527	\$6,430	\$1,775	\$18,732
Labor Income (\$ Million)	\$957	\$1,324	\$537	\$2,818
Jobs	33,300	36,748	14,376	84,424

Source: IMPLAN, using 2011 IMPLAN transfer prices.

If one includes the value of all primary agricultural production, total direct, indirect and induced effects are about \$3.8 billion, or about 3.1% of gross state product (Table A1).

When the production and processing sectors are both included, total direct, indirect and induced effects are about \$18.7 billion, or about 14.1% of gross state product (Table A2).

**APPENDIX B:
Comparing Production Agriculture and Agricultural Processing, 2010 and 2011**

Table B-1: Economic Impacts of Utah's Production Agriculture and Agricultural Processing on Utah's Economy, 2010-2011. (Constant \$2011)

	2010	2011
Total Output (\$ Million)		
Direct Effect	\$9,629	\$9,832
Indirect Effect	\$4,153	\$6,042
Induced Effect	\$1,655	\$1,675
Total	\$15,437	\$17,549
Labor Income (\$ Million)		
Direct Effect	\$ 845	\$904
Indirect Effect	\$ 976	\$1,249
Induced Effect	\$ 449	\$507
Total	\$2,269	\$2,659
Jobs		
Direct Effect	30,895	30,192
Indirect Effect	23,233	34,408
Induced Effect	14,607	13,569
Total	68,735	78,169

Source: IMPLAN analysis using 2010 and 2011 agricultural receipts and the corresponding IMPLAN model for the given year. (Ward et al., 2011 and this report.)

All values converted to 2011 constant dollars.