The Contribution of the Dairy Industry to the Idaho Economy: 2011 and 2012

Analysis for

Idaho Dairymen's Association

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Executive Summary

The Idaho dairy industry has experienced significant growth in the past three decades, going from an average milk production state to the third largest milk production state in the nation. Idaho's production gains were due to both an increase in the number of dairy cows in the state and an increase in the productivity of Idaho's dairies over the past three decades. The annual milk production per cow in 1980 was 12,641 pounds per cow, rising to 23,376 pounds per cow in 2012. Milk production per cow increased 85% in 32 years. The number of milk cows was 153,000 head in 1980, increasing by 280% to 581,000 in 2012. However, the dairy industry is not comprised of just milk producers; it is also comprised of a growing milk processing sector that transform the fluid milk into dairy products, as well as the wholesale and logistics businesses that support the dairy products. When taking all of the dairy industry players into account, the dairy industry becomes a major contributor to the Idaho economy. This analysis therefore takes a closer look at the contributions of the dairy industry to the state economy in terms of sales, jobs, earnings, and value-added generated by the dairy industry.

We used a social accounting matrix (SAM) model to measure these contributions. A SAM model captures the cumulative, interdependent nature of expansion or contraction among each industry within an economy. This helps to determine how industries are linked together to measure the effects of each industry on every other industry. These effects are separated into direct and indirect effects. As a base industry, the dairy industry generates a demand for agricultural exports, bringing new money into the economy. The direct effects reflect each dollar of this export demand that creates one dollar of output, whereas the indirect effects capture the rippling that occurs in the economy as each dollar for agricultural exports is spent in the region in sectors linked to agriculture. Overall, the contributions of the dairy industry are propelled by exports, amplified by linkage, and then dampened by leakage of money out of the economy through imports. These contributions can be translated into jobs, output in sales, earnings, and value-added.

It is important to bear in mind throughout the analysis that the raw milk producers are highly integrated with the processed dairy product producers. Over 86% of the sales from raw milk producers go to the state dairy processors, the processed dairy producers export an

overwhelming majority of their sales out of the state, thereby generating the majority of the dairy industry exports. Therefore, the raw milk producers are responsible for little of the overall dairy industry exports. However, without the locally available raw milk supply, the processed dairy producers would have had to import the raw milk, leaking money out of the economy. This highly integrated production regime demonstrates the primary reason for measuring the joint contributions of the raw milk and processed milk producers.

In 2012, the combined dairy industry, including both raw milk producers and processed milk producers, was directly responsible for 10,400 gross jobs (down slightly from 11,000 jobs in 2011), $1.5 billion in value-added, and $5.9 billion in gross sales (Table 1).

Table 1 - Direct economic activity associated with the dairy producers and the milk processors, respectively

	Year	Dairy Producers	Milk Processors	Total
Direct Employment	2011	8,500 jobs	2,600 jobs	11,000 jobs
	2012	7,700 jobs	2,718 jobs	10,400 jobs
Direct Value-Added	2011	$900 million	$270 million	$1.2 billion
	2012	$1.14 billion	$332 million	$1.5 billion
Direct Output (sales)	2011	$2.5 billion	$3 billion	$5.5 billion
	2012	$2.42 billion	$3.5 billion	$5.9 billion

The jobs and economic activity generated in the state by the dairy producers and the milk processors doesn't stop, however, at the dairy farms or at the milk processing facility. The dairy farms, for example, purchase feed from local crop farmers, thereby creating additional jobs. Likewise, the milk processors purchase a variety of inputs from other businesses within the state thus creating additional jobs across the state's economy. The total output of the dairy industry contributes to a total of 15,000 jobs, $1.7 billion in value-added, and $4.1 billion in total sales in the state of Idaho. Likewise, when the total output of the milk processing sector is traced through the state's economy, it is estimated to contribute to 27,100 jobs, $2.4 billion in value-added, and $8.0 billion in total sales (Table 2).

Table 2 - Jobs and economic activity associated with the total sales of the individual components of the dairy industry

		Dairy Producers	Milk Processors
Total Direct and Indirect Employment	2011	19,000 jobs	27,000 jobs
	2012	15,000 jobs	27,100 jobs
Total Direct and Indirect Value-Added	2011	$1.6 billion	$2.2 billion
	2012	$1.7 billion	$2.4 billion
Total Direct and Indirect Output (sales)	2011	$4 billion	$7.8 billion
	2012	$4.1 billion	$8.0 billion

While table 2 indicates how many jobs each sector supports separately by including the backward linked economic activity; the sum total of the jobs and economic output presented in Table 2 is not the best measure of the jobs and economic activity that the combined dairy industry supports in the state of Idaho. When interconnected sectors like dairy producers and milk processors are summed together in this way, the analysis will double count the jobs and economic activity on the dairies as both direct jobs and as indirect jobs from the milk processors. To provide a more conservative estimate of the new jobs that the combined dairy industry contributes to the state, we also employ an economic base impact analysis which serves to net out any double counting. After doing so, we see that in 2012 the dairy industry contributed 23,000 jobs (down slightly from 25,000 in 2011), $6.6 billion in gross sales, and $72 million in tax revenue to the state economy (Table 3). These can also be translated into $2.2 billion, or 3.4%, of state GDP (sum of value added). These numbers represent about one-third of the broader agricultural sector and a significant portion of the total state economy.

Table 3 - Total economic contribution of the dairy producers and milk processors to the state economy, including the direct, indirect, and induced effects of the new dollars brought into the state by the combined dairy and milk processing industry

	Year	Total Economic Contributions
Employment	2011	25,000 jobs
	2012	23,000 jobs
Value-Added (State GDP)	2011	$1.9 billion
	2012	$2.2 billion
Output (Sales)	2011	$6.5 billion
	2012	$6.6 billion
State Tax Revenues	2011	$71 million
	2012	$72 million

In addition to creating jobs and income in the state, the combined dairy industry is also responsible for generating over $72 million in tax revenue in the state. These are tax revenues that are tied to the new dollars which are brought into the state of Idaho by the combined dairy industry and can be considered state tax dollars which would disappear if the combined dairy industry were not present.

In addition to measuring the dairy industry contributions, we looked at the economic contribution of the new Chobani facility in the Magic Valley which began operating in December of 2012. These contributions were a result of the additional activity injected into the state through an estimated $100 million in construction expenditures in the shorter term and the creation of around 400 jobs for daily plant operations in the longer run. These two effects were measured separately using similar methodology as with the dairy industry contributions. Overall, construction expenditures of the new Chobani facility are estimated to be responsible for 1,400 temporary and part-time jobs. The construction is also estimated to generate $60 million in a one-time injection of income into the Magic Valley economy. While the construction impacts are a short term impact, the ongoing operations of the new facility is estimated to result in almost 1,100 permanent jobs, $50 million in new labor income, and over $70 million in additional gross domestic product within the Magic Valley.

Introduction

The dairy and milk processing sector has been a growing sector of the Idaho economy over the past decade. In an ever changing economic climate, it is crucial to understand the economic contribution of major components of the region's economy. To that end this paper will provide an economic contribution study and economic base analysis of Idaho's dairy production and milk processing sector (hereby refer ed to as the "dairy industry") which will measure the sales, jobs, earnings, and value-added generated by the dairy industry in all segments of the Idaho economy. This paper will also provide an estimate of the total sales from both the dairy production and milk processing sectors that are sold to domestic trade (other states) and foreign trade (other countries).

Overview of the Dairy Industry

The dairy industry is a vertically integrated industrial complex, engaged in production, processing and marketing of milk and milk products. The industry itself consists of the dairies that milk the cows, the milk processors that produce dairy products such as cheese, powder products and yogurt, and the wholesale and logistic businesses that specialize in dairy products. The dairy industry, then, has forward and backward linkages to countless other sectors of the Idaho economy.

This paper will focus its analysis on the number of milk cows, milk production, and the dairy industry and milk processing industries at the national, state, and county levels. The dairy production industry is included within the 112120 NAICS[1] code. Unless otherwise specified, the milk processing industries will be defined by the following NAICS codes:

[1] North American Industry Classification System here shown at the most detailed six-digit level.

Table 4: Definition of milk processing industries

NAICS Code	Description
311511	Fluid Milk and Yogurt Manufacturing
311512	Creamery Butter Manufacturing
311513	Cheese Manufacturing
311514	Dry, Condensed, and Evaporated Dairy Product Manufacturing
311520	Ice Cream and Frozen Dessert Manufacturing

National Trends

California has been the leading state in milk production since it overtook Wisconsin in 1992, producing 41.8 billion pounds of milk in 2012. Since then, Wisconsin has been the second largest milk production state and produced 27.2 billion pounds in 2012. New York was traditionally the third largest milk producing state until Idaho, which had been growing strong and steady since the early 1990s, surpassed it in 2012 at 13.6 billion pounds. These trends can be seen in Figure 1.

Figure 1: Top milk production states

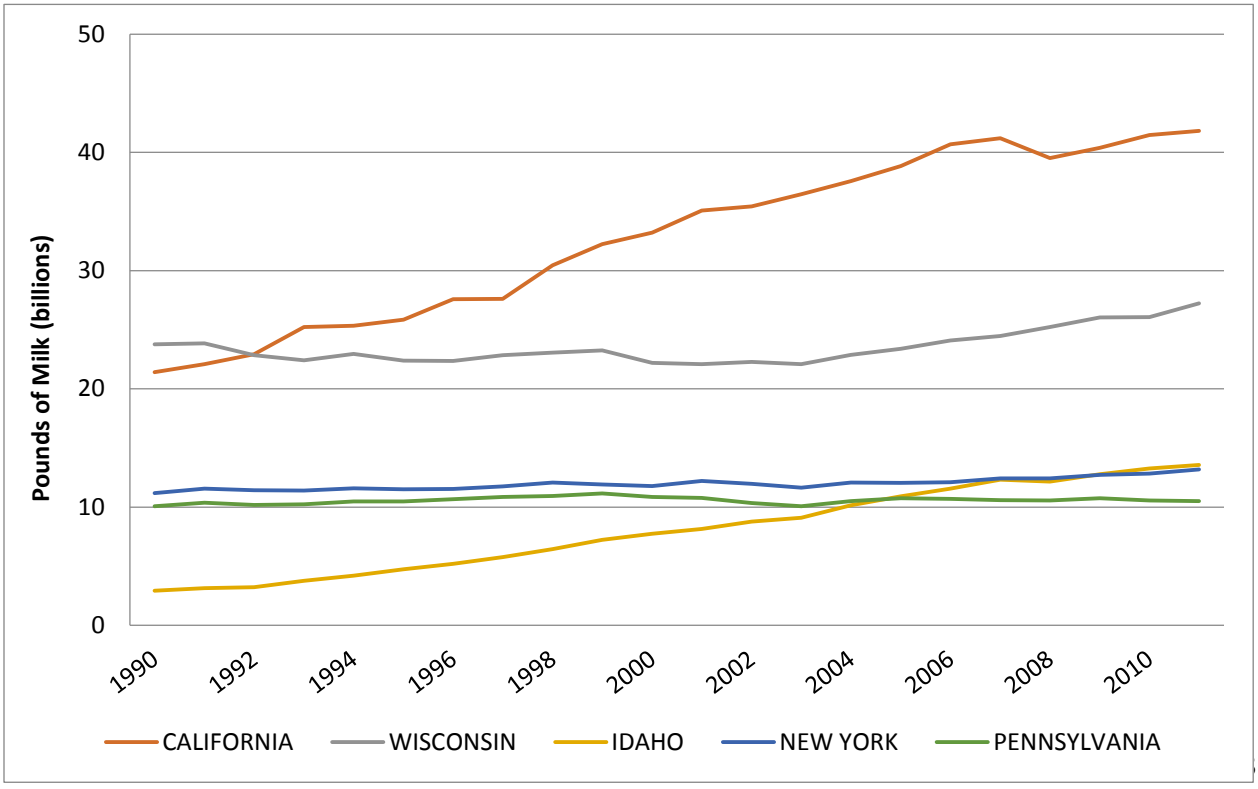
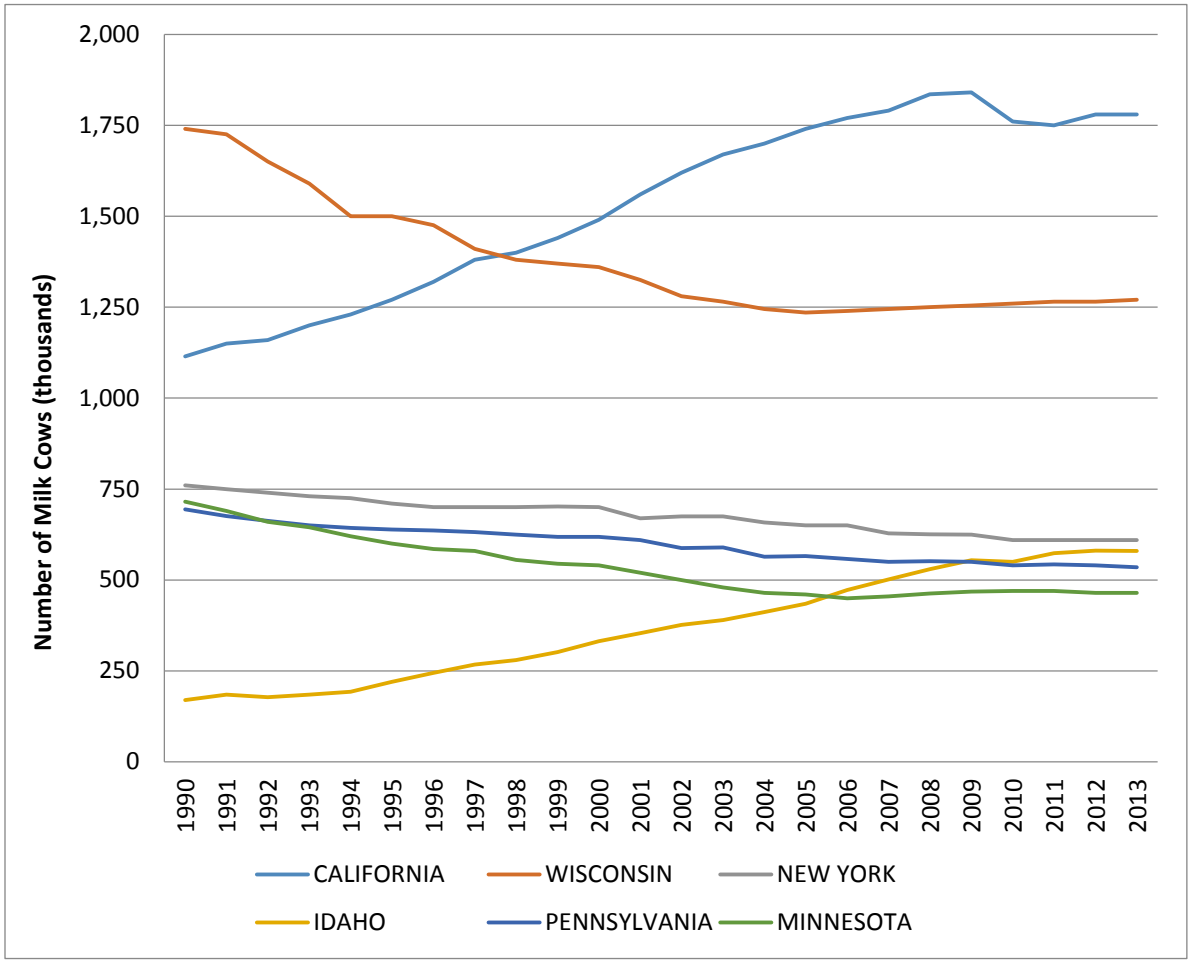
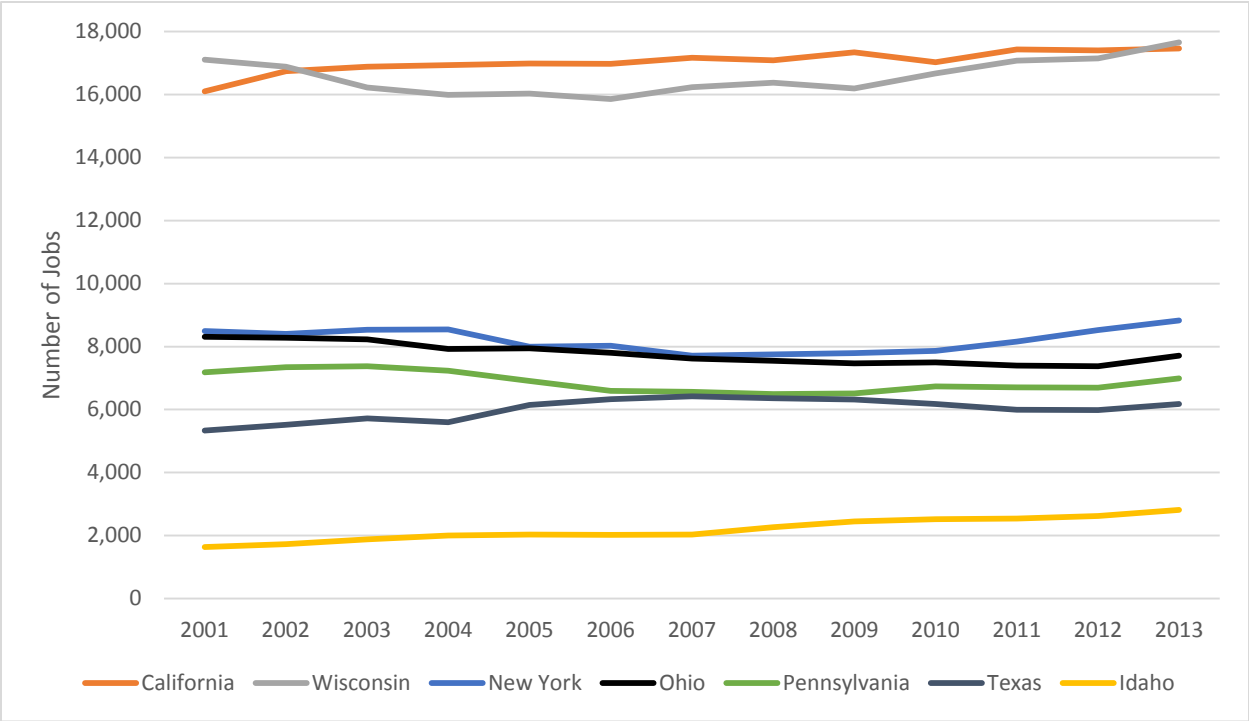


Figure 2: States with the highest numbers of milk cows



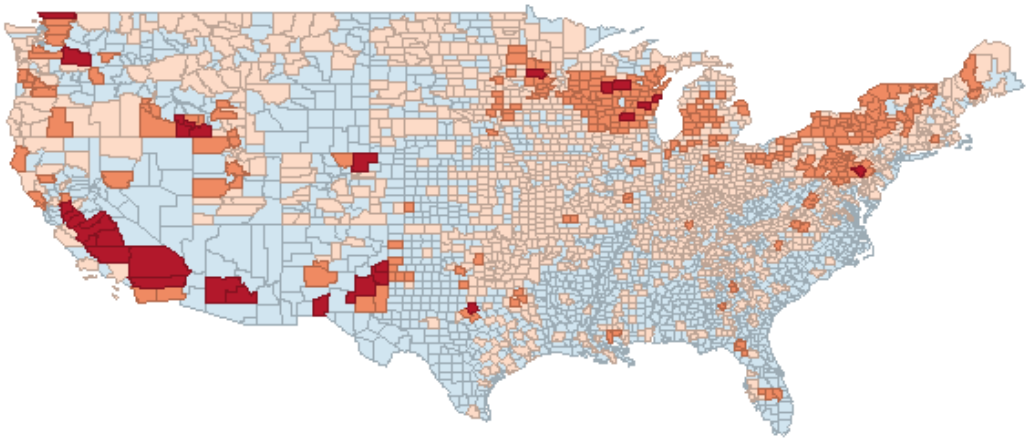
In terms of the number of milk cows, Wisconsin was the leader in the early 1990s until California pulled ahead in 1998 with 1.4 million milk cows. California continued to have increasing numbers of milk cows until 2010 when the numbers decreased slightly, whereas Wisconsin continued to decrease steadily until 2004 when its milk cow numbers leveled off to around 1.3 million milk cows. New York traditionally had the third largest number of milk cows, although it has had a steady level of 610,000 milk cows since 2010. As seen in Figure 2, in general, California, Wisconsin, and New York seem to have experienced decreasing numbers of milk cows while continuing to have steady if not increasing levels of milk production, signaling higher levels of milk production per cow. Idaho's milk cow numbers have been increasing steadily, surpassing Minnesota in 2006 and Pennsylvania in 2009, to 580,000 milk cows in 2012.

Figure 3: Leading milk processing states



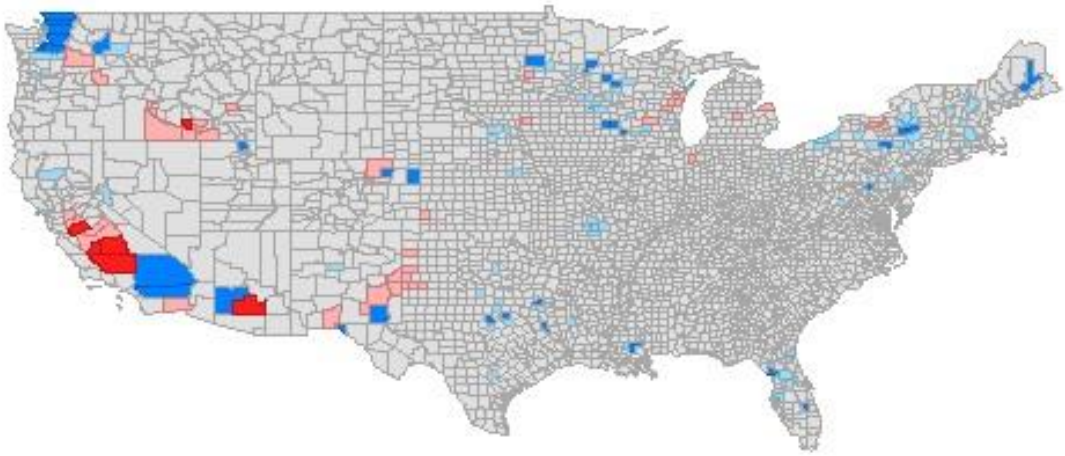
As seen in Figure 4, California and Wisconsin have continued to be dairy industry leaders even in milk processing. California has had around 17,000 jobs in milk processing industries since 2002. Wisconsin remained steady at around 16,000 jobs until 2011, when it increased to 17,000 jobs. New York and Ohio have had the next closest number of milk processing jobs, with around 8,000 jobs each. Although Idaho has been ranked high for milk production and milk cow numbers, it has traditionally ranked around 15th in terms of milk processing jobs. It has been increasing slowly over the years, especially as its milk processing operations have been growing. Its milk processing industries held around 2,800 jobs in 2012, up from 1,600 jobs in 2001. Idaho's concentration of dairy production displays prominently in a map of the distribution of dairy cows from the most recent (2007) census of agriculture (Figure 4). Areas with red indicate higher concentrations of dairy cows whereas blue indicates lower concentrations.

Figure 4: Distribution of dairy cows in 2007. Red represents a high concentration and blue represents a low concentration.



Even more significant is that the percentage of the total number of dairy cows across the nation has been increasing in Idaho over time. While much of the Eastern United States has been losing concentration of dairy production, Idaho has been gaining concentration. Figure 5 displays this trend, where largest gains in concentration are in red and largest losses are in blue.

Figure 5: Percent change from 1997 to 2007 in the concentration of the nation's dairy cows. Blue regions represent the largest losses in concentration and red regions represent the largest gains in concentration.



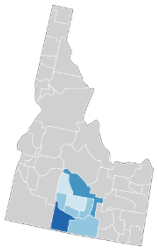
Idaho Trends

Idaho's dairy industry has seen marked change in the past three decades. The annual milk production per cow in 1980 was 12,641 pounds per cow, rising to 23,376 pounds per cow in 2012.[2] Milk production per cow increased 85 percent in 32 years. The number of milk cows was 153,000 head in 1980, increasing by 280% to 581,000 in 2012. With the advent of processing capacity in the early 1990's, Idaho dairy cow numbers have increased an average 17,000 head per year.

In contrast, the real price of milk (adjusted for inflation) has dropped from $26.24 (per cwt) in 1980 (in 2008 dollars) to a record low of $11.57 in 2009 and rising to $14.11 in 2010 (46% below the 1980 level in real dollars). Sales of $2.4 billion make dairy Idaho's largest farm commodity. Dairy sales now constitute over one-third of Idaho's farm gate cash receipts. Dairy is also a portion of Idaho's second largest farm product, livestock, when taking account of sales of dairy heifers, bull calves and cull animals. The growth of the milk processing has seen expanding operations for cheese as well as powder products and now yogurt in the state.

Idaho's dairy industry currently ranks third behind California and Wisconsin for milk production. What gives Idaho's dairy industry its contribution is not simply its size, but also the magnitude of linkages to many other sectors of the Idaho economy. Furthermore, certain regions within Idaho have more dairy industry activity than others. This next section will discuss trends within five regions: Magic Valley, Treasure Valley, Eastern Idaho, Northern Idaho, and Central Idaho.

[2] USDA NASS. Released February 20, 2013.

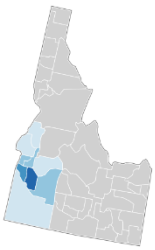


Magic Valley

The Magic Valley, located in South Central Idaho, sees the most dairy industry activity in Idaho in terms of both milk processing jobs and the number of milk cows (Table 5). In 2012, there were over 1,300 jobs in milk processing industries, up 60% since 2001. Jerome County and Gooding County held the most milk processing jobs in 2012 at around 520 and 390, respectively. They also had the most milk cows, at 150,000 and 83,000, respectively. Furthermore, the Magic Valley had over 4,100 jobs in the dairy cattle and milk production industry in 2012.

Table 5: Magic Valley dairy industry overview

	Number of Milk Processing Jobs				Number of Milk Cows			
County Name	*2009*	*2010*	*2011*	*2012*	*2009*	*2010*	*2011*	*2012*
Blaine	0	0	4	4	0	0	0	0
Camas	0	0	0	0	0	0	0	0
Cassia	40	46	45	38	56,000	55,000	58,000	58,000
Gooding	383	394	396	389	145,000	145,000	150,000	150,000
Jerome	473	512	532	522	79,000	78,000	81,000	83,000
Lincoln	77	82	92	112	27,000	27,500	28,500	29,000
Minidoka	98	111	113	117	10,700	10,600	11,100	11,300
Twin Falls	107	134	151	151	72,000	72,000	75,000	77,000
Total	*1,178*	*1,279*	*1,333*	*1,333*	*389,700*	*388,100*	*403,600*	*408,300*

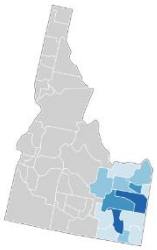


Treasure Valley

The Treasure Valley, located in the South West region of Idaho, sees the second most dairy industry activity in Idaho. As displayed in Table 6, the dairy cattle and milk production industry held 2,811 jobs in 2012. Milk processing jobs increased 91% during 2001 to 2012, from approximately 640 jobs to 1,200 jobs. The number of milk cows increased even more, up from 41,000 milk cows to over 126,000 cows in 2012. Canyon County is by far the leading county for both milk processing jobs and the number of milk cows, with almost 650 jobs and over 45,000 milk cows. Ada County has the second highest number of milk processing jobs and the third highest milk cow numbers. Elmore County is next in terms of milk processing jobs, and Owyhee County ranks above Ada County in terms of the number of milk cows.

Table 6: Treasure Valley dairy industry overview

	Number of Milk Processing Jobs				**Number of Milk Cows**			
County Name	*2009*	*2010*	*2011*	*2012*	*2009*	*2010*	*2011*	*2012*
Ada	230	244	237	257	19,000	18,800	19,700	19,900
Adams	0	0	0	0	0	0	0	0
Boise	0	0	0	0	0	0	0	0
Canyon	628	594	607	600	43,000	42,500	44,500	45,000
Elmore	257	245	244	239	17,900	17,700	18,500	18,800
Gem	8	12	12	12	2,000	1,900	2,000	2,100
Owyhee	0	0	0	0	24,000	23,500	25,000	25,500
Payette	0	12	4	8	14,200	14,000	14,700	15,000
Washington	0	0	0	0	0	0	0	0
Total	*1,123*	*1,107*	*1,104*	*1,116*	*120,100*	*118,400*	*124,400*	*126,300*

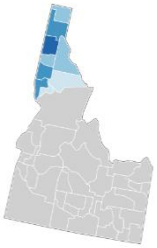


Eastern Idaho

The Eastern Idaho region is the largest region, covering the Southeast portion of Idaho and ranking third in terms of dairy industry activity. The region peaked in terms of milk processing jobs in 2004 at 192 jobs, decreasing to around 135 jobs in 2012 (Table 7). The majority of these jobs were located in Bonneville County. Jefferson County and Franklin County, on the other hand, were the leaders in terms of the number of milk cows in 2012, with 14,900 and 13,000 milk cows, respectively. Eastern Idaho had around 42,000 milk cows in 1990, dipping down to around 35,000 milk cows in 2001, and increasing again to over 43,000 milk cows in 2012. The dairy cattle and milk production industry held just over 1,000 jobs in 2012.

Table 7: Eastern Idaho dairy industry overview

	Number of Milk Processing Jobs				**Number of Milk Cows**			
County Name	*2009*	*2010*	*2011*	*2012*	*2009*	*2010*	*2011*	*2012*
Bannock	0	0	0	0	900	800	900	900
Bear Lake	0	0	0	0	1,100	1,000	1,100	1,100
Bingham	44	33	27	27	10,100	10,000	10,400	10,600
Bonneville	36	30	41	77	600	600	700	700
Butte	0	0	0	0	0	0	0	0
Caribou	0	0	0	0	1,400	1,400	1,500	1,500
Clark	0	0	0	0	0	0	0	0
Franklin	0	0	0	0	12,400	12,300	12,900	13,000
Fremont	0	12	12	12	0	0	0	0
Jefferson	0	0	0	0	14,200	14,100	14,700	14,900
Madison	20	17	10	4	0	0	0	0
Oneida	0	0	0	0	0	0	0	0
Power	12	12	12	12	0	0	0	0
Teton	0	4	4	4	500	500	500	500
Total	*112*	*108*	*106*	*136*	*40,700*	*40,200*	*42,700*	*43,200*

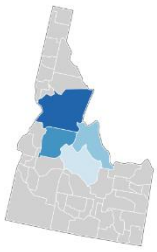


Northern Idaho

The Northern Idaho region had around 2,000 milk cows in 1990, namely in Bonner County and Boundary County. However, the number of milk cows decreased steadily until 2007, and there have been no recorded milk cow numbers by NASS since then. The dairy cattle and milk production industry held around 438 jobs in 2012, although there were few jobs in milk processing industries with only 8 jobs in 2012 (Table 8).

Table 8: Northern Idaho dairy industry overview

	Number of Milk Processing Jobs				**Number of Milk Cows**			
County Name	*2009*	*2010*	*2011*	*2012*	*2009*	*2010*	*2011*	*2012*
Kootenai	0	12	4	4	0	0	0	0
Latah	0	12	4	4	0	0	0	0
Benewah	0	0	0	0	0	0	0	0
Bonner	0	0	0	0	0	0	0	0
Boundary	0	0	0	0	0	0	0	0
Clearwater	0	0	0	0	0	0	0	0
Lewis	0	0	0	0	0	0	0	0
Nez Perce	0	0	0	0	0	0	0	0
Shoshone	0	0	0	0	0	0	0	0
Total	*0*	*24*	*8*	*8*	*0*	*0*	*0*	*0*



Central Idaho

The final region is Central Idaho. Similar to the Northern Idaho region above, the Central Idaho region does not have a strong dairy industry presence. Its milk cow numbers have decreased from 1,600 in 1990 to 0 in 2012. There were no jobs reported in milk processing industries in 2012. However, there were around 50 jobs reported in the dairy cattle and milk production industry in 2012.

Trade Analysis

The vast majority of the raw milk produced in Idaho is sold to local milk processors (Table 9). The processed milk products, such as cheese, yogurt, dehydrated milk, and fluid milk are primarily exported out of the state (Table 10). However, about one-quarter of the processed milk products are sold to consumers or other businesses (i.e. other food processors, grocery stores, restaurants) in Idaho. The exports of milk products out of the state represent new dollars brought into the state which then support other non-exporting businesses in the state. For example, the new dollars brought into the state from the exports of processed milk products allow for wages to be paid to the workers. These workers then spend that money on a variety of goods and services, including restaurants. So those restaurants are indirectly supported by the injection of new dollars into Idaho's economy from the export sales of processed milk products.

Table 9: Gross sales of the raw milk sector in 2012 (rounded)

Raw milk sales	**Value ($Millions)**
Foreign Exports	$0
Domestic Exports (out of Idaho)	$360
Sales to Local Processors	$2,300
Local Final Demand (sales to local households and local institutions for consumption)	$0
Percent of Total Sales From Out of State Exports	10%

Table 10: Gross sales of the processed milk sector in 2012 (rounded)

Processed milk sales	**Value ($Millions)**
Foreign Exports	$100
Domestic Exports (out of Idaho)	$2,400
Total Exports	$2,500
Local Final Demand (sales to local households and local institutions for consumption)	$300
Sales to other local processing facilities and local businesses (i.e potato chippers, restaurants)	$700
Total Sales (to both local and nonlocal sources)	*$3,500*
Percent of Total Sales From Out of State Exports	71%

Similarly, the purchases of local raw milk by dairy processors help keep money in the state's economy and allow for the exports from the dairy industry to support more jobs. Together the dairy producers and the dairy processors constitute a symbiotic industry cluster which support and augment one another. Without the local dairy production, the state's dairy processors would not enjoy some of their competitive advantages and would likely not exist in the state at nearly the level that they do. Because of the important linkages between the raw milk producers and the milk processors, the two sectors of the economy should be regarded as one complex.

Economic Contribution Analysis

Brief Overview

The economic contribution of Idaho's dairy industry provides insights as to how many jobs and how much income in the state's economy can be tied to the money brought into the state by the dairy industry. This information allows us to determine agriculture's output, employment, and income multipliers.

The total economic contribution of the dairy industry on the state's economy is apportioned into the direct and indirect effects. The direct effects can be translated into the sales, jobs, labor income, or value added from the demand for agricultural exports as a base (export) industry. Each dollar of export demand creates one dollar of output in the exporting agricultural sector. The indirect effects can also be translated into the sales, jobs, labor income, or value added created by non-basic (linked) industries providing goods or services to the agribusinesses as they respond to the changes in export demand. Each dollar of agricultural export demand creates a few pennies of output in each of many input sectors linked to agriculture.

Exports bring outside income into an economy, which creates a ripple effect as each business seeks to fulfill the demands of its customers. An increase in agricultural commodities for exports has an impact on farms, input suppliers, and households in the region. When farm exports increase, farmers purchase more fuel, fertilizer, machinery, livestock, and labor to meet the increased demand for agricultural exports. Similarly, these businesses create an indirect demand for goods and services from other businesses in the economy to be able to supply inputs to farms. The additional wages paid to provide the additional services to agriculture find their way to households who put money into the hands of firms that produce and sell goods to consumers. These reverberations wane as a portion of each round of spending leaks out to savings, taxes, and imports. The greater the "leakage" the faster the effects die out and the smaller the multiplier. The contribution of an industry upon the economy is thus the product of the industry's multiplier and its exports.

In summary, agricultural contributions are propelled by exports, amplified by linkage, and dampened by leakage (imports). For example, the dairy industry sells a majority of the fluid

milk to Idaho processors, not to export markets. If exports were minimal, the dairy industry would contribute little to the Idaho economy. Rather, the dairy industry contribution to Idaho's economy is recorded through the forward linked processor, whose sales are almost entirely to export markets.

A social accounting matrix (SAM) model comprises both a system of economic accounts for a region as well as a tool for economic analysis and forecasting. A social account is a way to make the connection between agents in production and those in consumption. The accounts of a SAM model are displayed in matrix form as the transactions-among-sectors table, which depicts the economic structure and interdependencies among industries and agencies of the Idaho economy. A SAM matrix shows customers and input needs for each industry. The focus of SAM analysis is the cumulative interdependent nature of expansion or contraction of an economy. By accounting for each industry's intermediate demands from other industries, we can then ascertain the linked or indirect effects of each industry on every other industry. The economic agents are represented as labor, capital, taxes, and imports on the production side and households, government, and exports on the consumption side.

We used the IMPLAN SAM databases for 2011 and 2012. The database uses secondary data, meaning that national data is calibrated or adjusted to approximate the SAM accounts for a given regional economy. The SAM in IMPLAN allows for editing to improve the accuracy of estimates from the model. This means we were able to edit key economic accounts to estimate the contribution of a specific industry in a specific region. Accuracy of these accounts is critical to the unique marketing and production accounts that characterize the dairy industry in Idaho.

Results

State Wide Contribution

The dairy producers in Idaho directly employed 8,500 people and the processed milk producers held just over 3,500 direct jobs in 2011. In 2012 7,700 people were employed on dairy farms and 2,718 were employed at dairy processing facilities (Table 11). Dairy producers generated close to $2.5 billion in gross sales while the milk processors generated close to $3

billion in gross sales. Idaho's dairy producers also paid over $127 million in gross wages while the milk processors together paid over $179 million in gross wages.

Table 11: Summary of the gross employment of the subsectors of the Idaho dairy industry

	Dairy Producers	Milk Processors	Total
2011 Gross Employment	8,500 jobs	2,600 jobs	11,100 jobs
2012 Gross Employment	7,700 jobs	2,700 jobs	10,400 jobs

However, this gross employment measure does not tell the whole story. When looking at what jobs the dairy industry is responsible for generating in Idaho, we must look at the base jobs. The base employment measures the number of jobs that the new dollars brought into the state by the dairy industry in both the dairy industry itself and in other sectors of the state's economy.

In 2011, the new dollars brought into Idaho's economy by the raw milk producing dairies and the milk processing sector combined to generate 25,000 jobs in the state of Idaho. Additionally the combined dairy industry generated $715 million in labor income, 1.9 billion in value added (which is a measure of the industry's contribution to the state's GDP) and was responsible for almost $6.5 billion in sales across the state. In 2012 the total contribution of the dairy industry was 23,000 jobs, $650 million in labor income, $6.6 billion in sales, and $2.2 billion in value added (Table 12).

Table 12: Summary of the economic contributions of the combined Idaho dairy and milk processing industries

Contribution Type	Employment	Labor Income	Output in Sales	Value Added
2011 Total Contribution	*25,000*	*$715 million*	*$6.5 billion*	*$1.9 billion*
2012 Total Contribution	23,000	*$650 million*	*$6.6 billion*	*$2.2 billion*

The new dollars brought into the state by the dairy industry support jobs in many other sectors of the state's economy as well. For example, the dairy industry was responsible for supporting jobs in a broad mix of industries across the state; including over 1,000 jobs in wholesale trade, over 1,100 jobs in the transportation sector, and almost 800 jobs in the professional services sector.

In addition to supporting many jobs in the state, the dairy and milk processing sectors also generate income and value added. All told, as Table 12 shows, the dairy and milk processing sectors generated $715 million dollars in wages and $1.9 billion in state GDP (as measured by the sum of values added). In comparison to the size of the state's economy as a whole, Idaho's dairies and milk processors were responsible for creating 2.7% of the total jobs in the state, generating 2.3% of the total wages paid, and supporting 3.2% of the state's GDP. These numbers represent about one-third of the broader agricultural sector and a significant portion of the total state's economy.

The combined dairy industry also contributes significantly to the state's tax base. The new dollars that the dairy industry generates in the state of Idaho contributes a total of $71 million to the state's tax revenues. These tax revenues are dollars that would be lost to the state if the dairy industry were not present.

Contribution of the New Processing Facility

Brief Overview

As a supplement to measuring the economic contribution of Idaho's dairy industry, we have measured the economic contribution of the new Chobani facility in the Magic Valley which began operations in December of 2012. This analysis measures the contribution that can be tied to the money brought into the state by the construction and operations of the new facility. It was estimated that around $100 million would be spent on the construction of the new facility, and that the new facility would create 400 new jobs.[3] This information allows us to determine the new plants' output, employment, earnings, and income multipliers as a result of the construction of the new facility in the short run and of the plant's operations in the longer run. These two contributions will be measured separately.

Similar to the methodology used above, the total economic contribution of the plant on the Magic Valley's economy can be apportioned into the direct and indirect effects. The direct effects include those created from the initial activity for the plant; in other words, they are the $100 million spent on the construction of the facility and the creation of 400 jobs once the plant's doors open. They can also be translated into the sales, jobs, earnings, or value added from the demand for exports as a base (export) industry. Again, each dollar of export demand creates one dollar of output in the exporting sector. The indirect effects can also be translated into the sales, jobs, earnings, or value added created by non-basic (linked) industries providing goods or services to the construction and operations of the new Chobani plant. As seen with the dairy industry contribution analysis above, each dollar of export demand creates a few pennies of output in each of many input sectors linked to the construction and operations of the Chobani plant, rippling through the state economy.

We used the EMSI SAM database for the calendar year 2012 to determine the economic contributions of the new Chobani plant. As with IMPLAN, the database uses secondary data calibrated for the regional economy, and allows for editing to improve the accuracy of

[3] http://www.prnewswire.com/news-releases/chobani-to-invest-over-100-million-to-open-new-facility-in-idaho-133144283.html

estimates from the model, meaning we were able to edit key economic accounts critical to estimating the contribution of a specific industry in a specific region. The adjustments we made to the model were adding $100 million in construction spending to the commercial and industrial building construction industry and adding 400 jobs to the dairy processing industry. Results are discussed in the next section.

Results

This section presents the economic contribution results attributable to the construction and operations of the new Chobani plant in Twin Falls. The results are measured by four metrics: sales (output), employment, earnings, and value added. As discussed above, each metric has two different effects, the direct effect and the indirect effect. The direct effect represents the injection of money into the Magic Valley for the construction of the plant, as well as the new jobs it will take to operate the new plant. It also measures how the construction and new plant operations will result in the first round of economic activity within their closely linked backward and forward industries. The indirect effect then measures how that economic activity can be translated into spending in other industries, and how that spending results in multiplier effects as those sales ripple throughout the regional economy. Note that these results reflect gross contributions, meaning that no counterfactual adjustments, such as how the money would have otherwise been spent or jobs been distributed, have been made.

Construction Contributions

Table 13 displays the total effect of the $100 million spent in the Magic Valley for the construction of the new facility. This $100 million is included under the direct sales effect within the commercial and industrial building construction industry. The sales effect is then translated into jobs, earnings, and value added effects. Note that the jobs numbers represent both full- and part-time jobs, and the earnings results reflect the labor income added to the economy. While sales demonstrate the total contribution of the construction activities to the Magic Valley, value added measures only the income that remains within the Magic Valley.

Table 13: Summary of the economic contributions of the new facility construction

Contribution Type	Employment	Labor Income	Output in Sales	Value Added
Direct Effect	1,108	$51 million	$110 million	$57 million
Indirect Effect	293	$9 million	$23 million	$13 million
Total Effect	*1,402*	*$60 million*	*$133 million*	*$70 million*

In looking at more detailed results at the three-digit NAICS code level, we see that the majority of the economic activity occurs in the construction of buildings sector. This is expected since it is the primary sector responsible for the activity, and since construction activities are largely interlinked with each other. The next sector comprising a high level of economic activity is the professional, scientific, and technical services sector. This demonstrates the reliance of the construction industry on skilled labor (for example, engineers), as well as the types of technology to build a state-of-the-art facility.

Overall, the spending of $100 million for the construction of the new building will result in $132 million in spending within the Magic Valley. This can be translated into 1,402 average wage jobs and $60 million in labor income, or around $42,812 in earnings per worker. Finally, around $70 million of the $132 million in sales will remain within the Magic Valley as value added contributions.

Operations Contributions

While the Table 13 showed the short-run contributions as a result of the injection of money into the Magic Valley to build the new Chobani plant, Table 14 shows the contributions that will remain in the region in the longer term as a result of the operations of the plant. The initial effect is the 400 jobs in the dairy processing sector that Chobani expected the new plant would create, and the table shows how those 400 new jobs will ripple throughout the regional economy through the direct and indirect effects.

Table 14: Summary of the economic contributions of the new facility operations

Contribution Type	Employment	Labor Income	Output in Sales	Value Added
Direct Effect	616	$33 million	$450 million	$48 million
Indirect Effect	439	$15 million	$56 million	$22 million
Total Effect	*1,055*	*$48 million*	*$506 million*	*$70 million*

In looking at the detailed results at the sector level, we see that the largest amount of economic activity will result in the food manufacturing sector. Again, this is to be expected given the nature of the contributions we are looking at. The industry comprising the second largest percentage of economic activity is the truck transportation industry. This demonstrates the reliance of the dairy processing sector on shipping inputs to the facility, as well as shipping its finished product out of the facility.

In terms of the total effects, we can see that the 400 new jobs added for the Chobani plant will contribute toward 1,055 full- and part-time jobs within the Magic Valley. The average earnings per job will be around $45,394, higher than the average earnings from the construction of the plant. In fact, we see a much higher level of sales for the operations of the plant than for the construction of the plant. This demonstrates the export-based nature of the dairy processing industry compared to the construction sector. Overall, the operations of the new Chobani plant will contribute toward adding $70.1 million in income to the Magic Valley.

Appendix 1:

Multiregional Analysis

Multipliers

Own region and cross-region multipliers capture both the inter-industry linkages within the Magic Valley and feedback effects from changes in activity in the other regions induced by a shock in the Magic Valley. For example, the own-region effect in 2011 of a $1 increase in dairy product exports in the Magic Valley is a $1.84 increase in total output in the Magic Valley's economy (Table 15). Simultaneously, because the cross-regional multiplier for Eastern Idaho is 0.021, this means there would be a $0.021 increase in total output in Eastern Idaho resulting from a $1 increase in dairy products exports from the Magic Valley. The total effect on Idaho's economy of the increase in exports is the sum of the own-region and the cross-region effects. Thus, a $1 increase in Magic Valley dairy product exports generates a $1.93 increase in output in Idaho.

Table 15: Own and cross-region multipliers for the Magic Valley dairy industry

Region	Employment	Value Added	Output in Sales
Magic Valley	3.203	2.266	1.845
Eastern Idaho	0.088	0.047	0.032
Treasure Valley	0.111	0.054	0.045
Northern Idaho	0.004	0.002	0.001
Central Idaho	0.001	0.001	0.000
Total	*3.407*	*2.371*	*1.923*

A similar analysis as done above was also performed for the Treasure Valley (Table 16). The magnitude of the cross-regional output multiplier is a rough indication of the dairy industry's backward linkage (input purchases) with the economies of the other regions. The small numerical value of these multipliers reflects weak backward linkages from the dairy industry in the Magic Valley or the Treasure Valley to the rest of Idaho.

Table 16: Own and cross-region multipliers for the Treasure Valley dairy industry

Region	Employment	Value Added	Output in Sales
Treasure Valley	4.041	3.751	2.121
Magic Valley	0.257	0.298	0.159
Eastern Idaho	0.042	0.039	0.021
Northern Idaho	0.005	0.004	0.002
Central Idaho	0.004	0.004	0.001
Total	*4.349*	*4.095*	*2.304*

Spillover Coefficients

In a multi-regional trade model, the spillover coefficient shows the portion of total indirect and induced effects that occur in the opposite region. For example, the spillover coefficient for the dairy industry in Eastern Idaho is 0.0343. This means that 3.43 cents of every dollar of indirect and induced effect associated with the Magic Valley dairy industry exports "spills over" into Eastern Idaho. The spillover coefficient measures the strength of the cross-regional impact associated with the expansion or contraction of an own-region industry.

The small numerical value of these spillover coefficients displayed in Table 17 and Table 18 shows that the dairy industry in the Magic Valley or Treasure Valley (respectively) did not serve as a growth pole to the rest of the state.

Table 17: Spillover coefficients for the Magic Valley dairy industry

Region	Employment	Value Added	Output in Sales
Treasure Valley	0.0462	0.0397	0.0484
Eastern Idaho	0.0366	0.0346	0.0343
Northern Idaho	0.0018	0.0013	0.0014
Central Idaho	0.0004	0.0004	0.0003

Table 18: Spillover coefficients for the Treasure Valley dairy industry

Region	Employment	Value Added	Output in Sales
Magic Valley	0.077	0.096	0.122
Eastern Idaho	0.012	0.013	0.016
Northern Idaho	0.001	0.001	0.001
Central Idaho	0.001	0.001	0.001