

Economic Analysis of Animal Agriculture 2004-2014

WYOMING

A Report for
United Soybean Board



September 2015



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Wyoming Executive Summary

The use of soybean meal as a key feed ingredient is a small part of Wyoming's animal agriculture. While the degree to which animal agriculture utilizes this versatile feed ingredient has fluctuated with time, it remains a factor in animal agriculture's success in Wyoming. The success of Wyoming animal agriculture in turn has a large impact on the rest of the state and regional economies. For example, in the state of Wyoming during 2014 animal agriculture contributed:

- \$2.6 billion in economic output
- 12,418 jobs
- \$391.8 million in earnings
- \$79.6 million in income taxes paid at local, state, and federal levels
- \$41.6 million in the form of property taxes

Plus, from 2004-2014 animal agriculture in Wyoming increased economic output by over \$694.2 million, boosted household earnings by \$105.1 million, contributed 3,334 additional jobs and paid \$21.4 million in additional tax revenues.

Wyoming's animal agriculture consumed about 46.9 thousand tons of soybean meal in 2014. This soybean meal was fed primarily to:

- Hogs (27.1 thousand tons)
- Beef Cows (10.2 thousand tons)
- Turkeys (2.5 thousand tons)

This report examines animal agriculture in Wyoming over the last decade. While this analysis is certainly instructive and allows improved understanding of animal agriculture's impact during that time, as the next decade unfolds in Wyoming, many opportunities and challenges will arise. And, if past is prologue, animal agriculture will continue to be a major contributor to the economic well-being of the people of Wyoming and beyond.

Wyoming Economic Impact of Animal Agriculture

Animal agriculture is an integral part of Wyoming's economy. In 2014, Wyoming's animal agriculture contributed the following to the economy:

- About \$2.6 billion in economic output
- \$391.8 million in household earnings
- 12,418 jobs
- \$79.6 million in income taxes

And the animal agriculture sector has shown substantial growth during challenging economic times. During the last decade Wyoming's animal agriculture has:

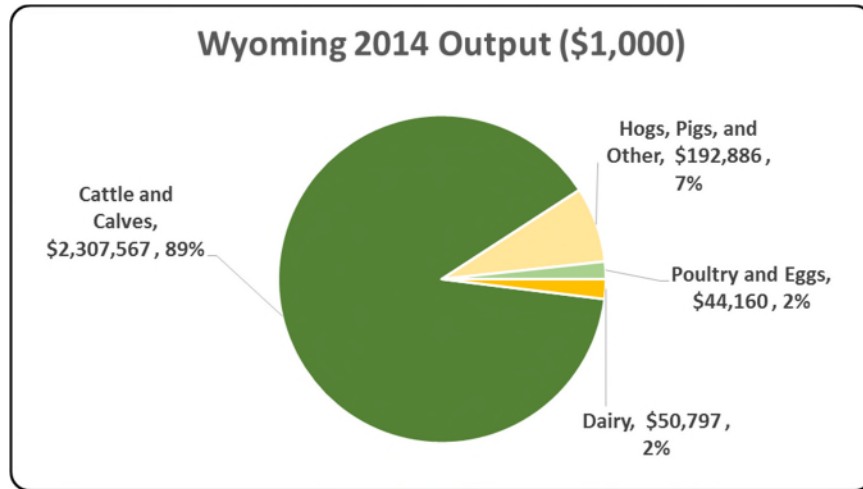
- Increased economic output by \$694.2 million
- Boosted household earnings by \$105.1 million
- Added 3,334 jobs
- Paid an additional \$21.4 million in income taxes

Below is a table which demonstrates this decade of change.

Measure	2014	Change 2004-2014	% Change 2004-2014
Output (\$1,000)	\$ 2,595,409	\$ 694,216	36.51%
Earnings (\$1,000)	\$ 391,775	\$ 105,065	36.64%
Employment (Jobs)	12,418	3,334	36.70%
Income Taxes Paid (\$1,000)	\$ 79,648	\$ 21,360	36.64%
Property Taxes Paid in 2012 (\$1,000)	\$ 41,580		

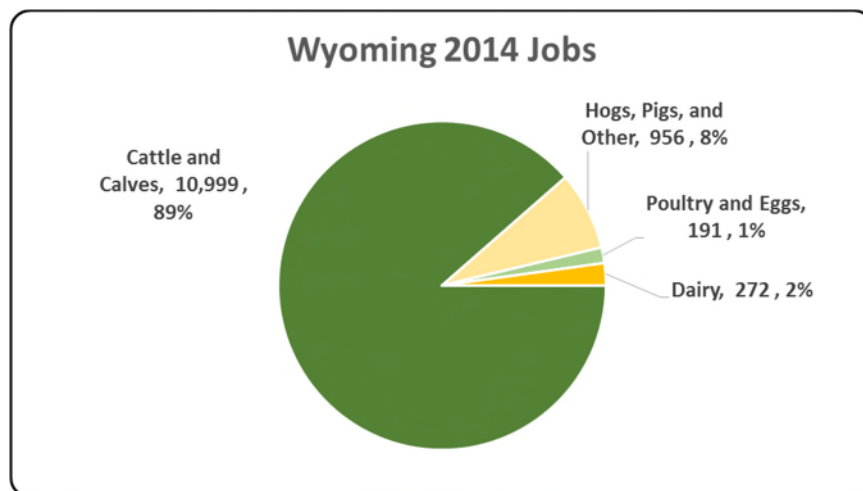
Wyoming Output

“Output” refers to the total value of all the output (production or sales) of a study area and/or industry within a study area and was calculated using RIMS II multipliers. This is a gross number that does not make any deductions for the cost or origination of inputs that were used in the production process. The chart illustrates the impact of animal agriculture to the Wyoming economy. Animal agriculture’s impact on Wyoming total economic output is about \$2.6 billion.



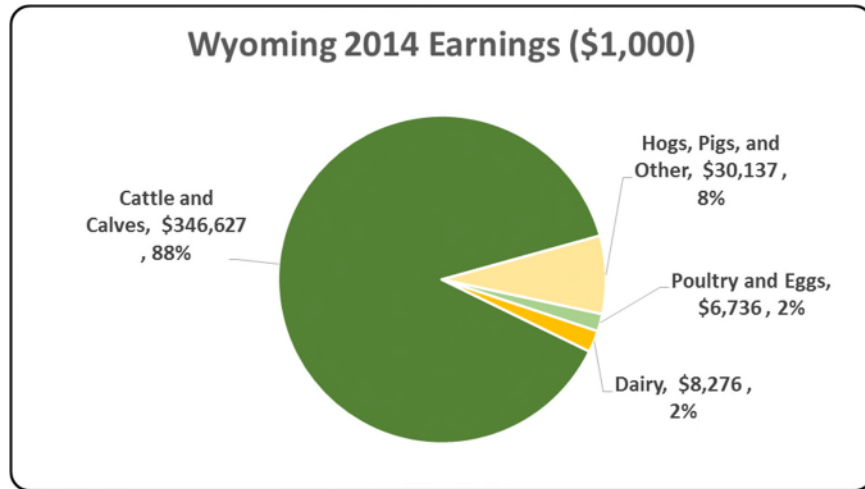
Wyoming Jobs

“Jobs” represents an estimate of the number of full or part-time positions (jobs) currently filled in an area and/or industry. The chart illustrates the contribution to Wyoming in terms of animal agriculture jobs. As shown, animal agriculture contributes significantly to Wyoming total jobs, contributing 12,418 jobs within and outside of animal agriculture.



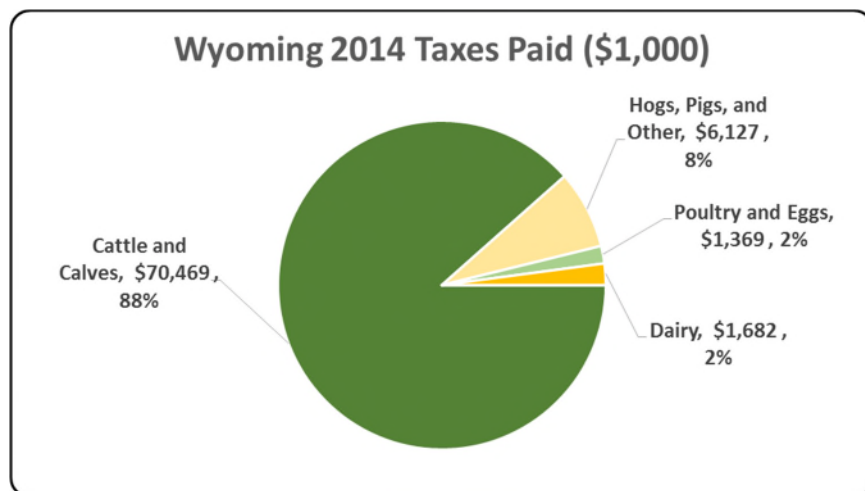
Wyoming Earnings

Earnings includes wages and salaries plus proprietors' income, which is the net earnings of sole-proprietors and partnerships. The chart illustrates the impact of animal agriculture to the Wyoming economy in terms of earnings. Wyoming's animal agriculture contributed about \$391.8 million to household earnings in 2014.



Wyoming Taxes Paid by Animal Agriculture

Wyoming's animal agriculture is also a significant source of tax revenue. In 2014, the state's animal agriculture industry paid about \$79.6 million in income taxes at local, state, and federal levels. Plus the 2012 Census of Agriculture estimated \$41.6 million in property taxes paid by all of Wyoming agriculture during 2012. Estimates of income taxes paid by animal agriculture are shown in the following chart.



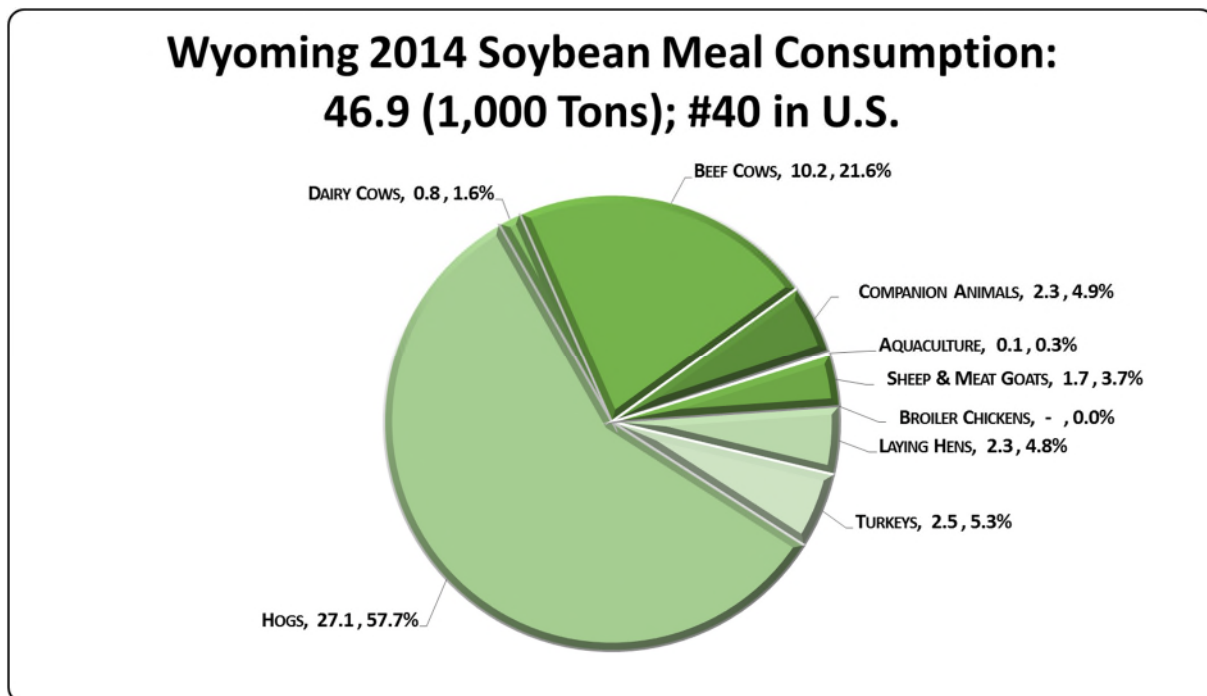
Wyoming Animal Agriculture Soybean Meal Consumption

The choice to use soybean meal in animal agriculture is highly dependent upon nutritional requirements of animals (which would encompass varying life stages within an animal species), accessibility to various feed ingredients capable of competing with soybean meal (from both a nutritional and price standpoint), and consumer preferences which have influence on production practices.

Through in-depth conversations with many of the nation’s top nutritionists and researchers from both private industry and public institutions, “bottom up” estimates of soybean meal usage by animal type were determined. Using the input from these conversations and additional analysis performed by Decision Innovation Solutions, the quantity of soybean meal used during the 2013-14 soybean marketing year by up to sixteen specific animal species has been estimated.

Wyoming’s animal agriculture consumed almost 46.9 thousand tons of soybean meal in 2014, placing the state as #40 in the nation in terms of soybean meal consumption (see figure below). The three segments of animal agriculture that led the state in estimated soybean meal consumption are:

- Hogs (27.1 thousand tons)
- Beef Cows (10.2 thousand tons)
- Turkeys (2.5 thousand tons)

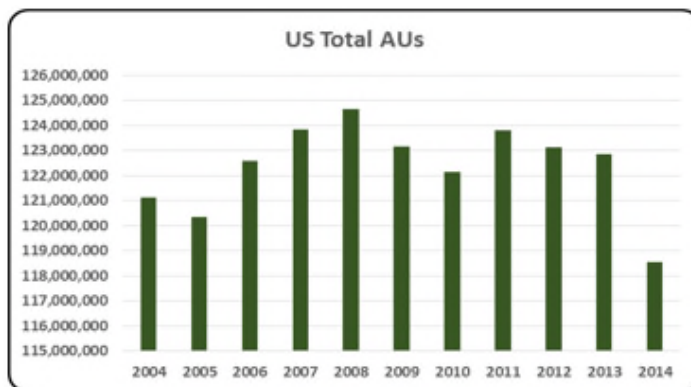


Wyoming Animal Unit (AU) Trends

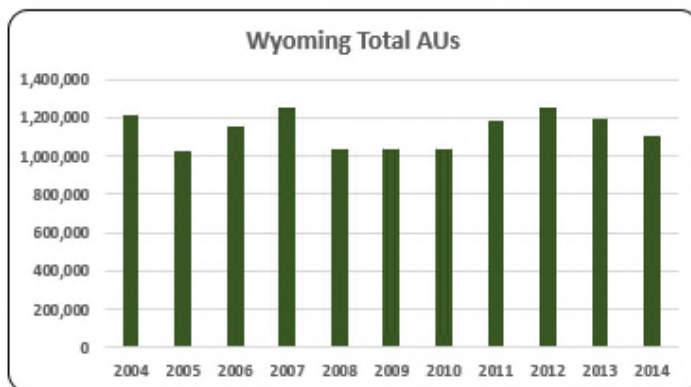
Over time, prices of feed, meat, eggs and milk, as well as levels of demand for these products in the United States and abroad have an impact on the size of animal agriculture in the State of Wyoming. Due to this reality, using a single year as a measure of the presence and strength of a sector can be misleading. The use of animal units allows for a more accurate comparison of differing sizes of livestock and poultry. This section is included to bring context to the question of what animal agriculture means to Wyoming and to give perspective on Wyoming’s contribution to the nation’s animal agriculture industry and beyond.

Similar to using a single year to measure the presence and strength of a sector, in some circumstances AUs can be misleading. This is because AUs do not reflect important considerations like increased weights, improved livability, increased laying potential, etc.

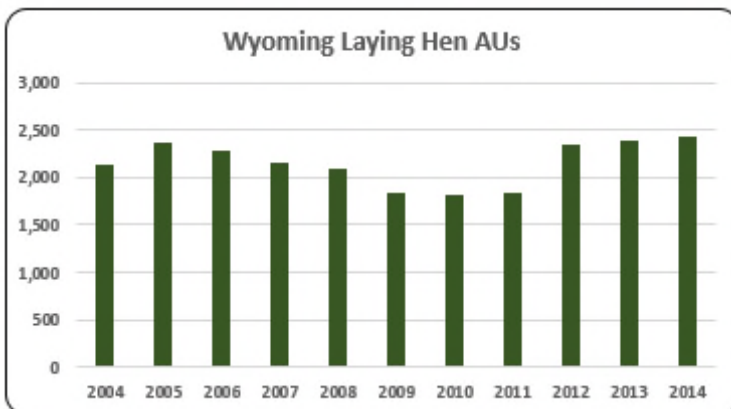
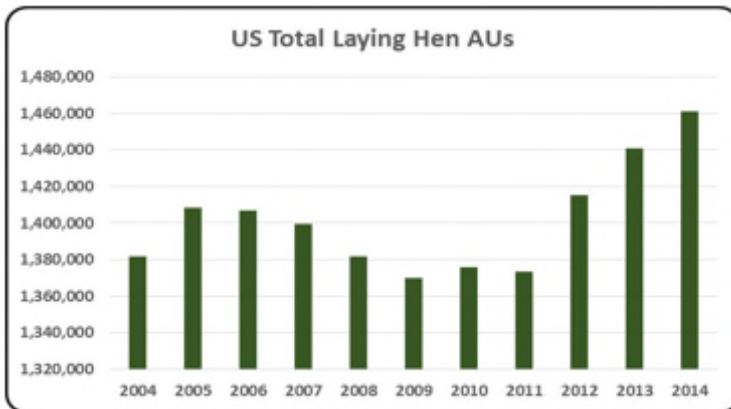
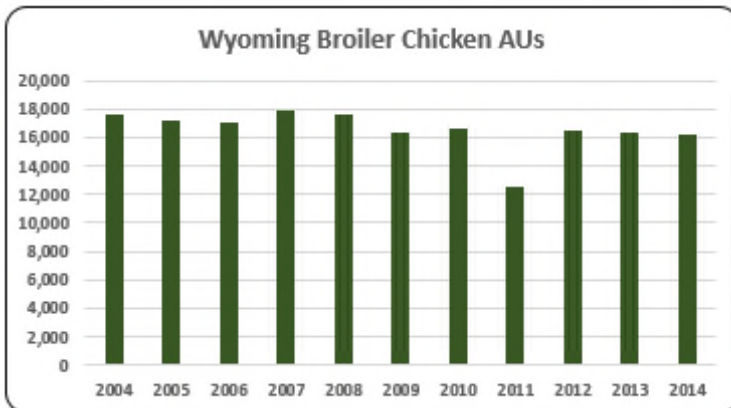
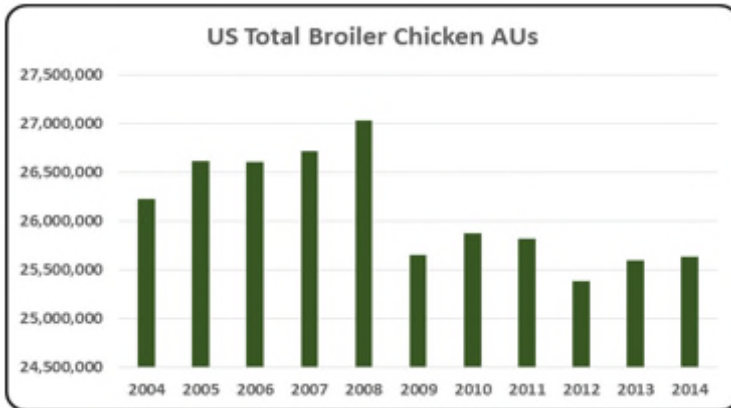
As shown in the accompanying charts and written commentary, certain components of animal agriculture are more present, and therefore more dominant than others. This is due primarily to geography (i.e., weather patterns and access to certain transportation hubs), proximity to high quality, relevant feed ingredients, and the local animal agriculture regulatory framework. In Wyoming, the largest three segments of animal agriculture in terms of AUs during 2014 were: Beef Cows (956.3 thousand AUs), Hogs (115.1 thousand AUs), and Broilers (16.3 thousand AUs). Total animal units in Wyoming during 2014 were 1,102.9 thousand AUs.



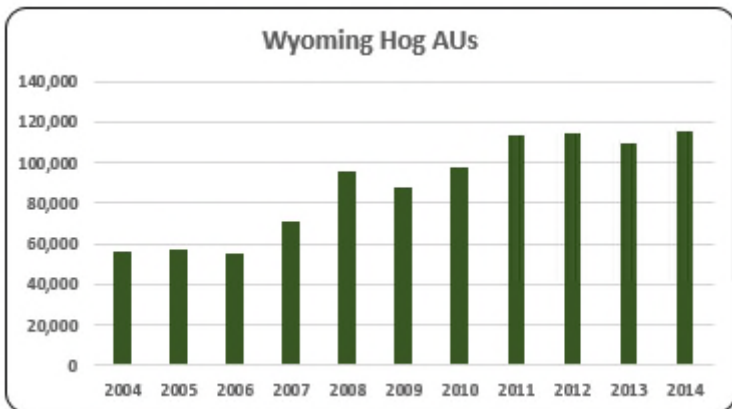
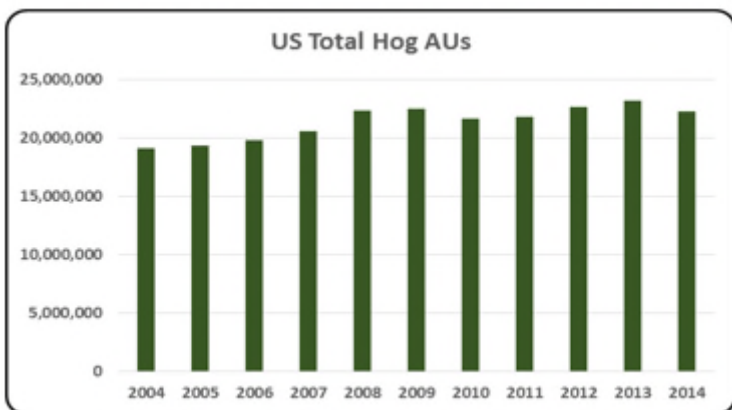
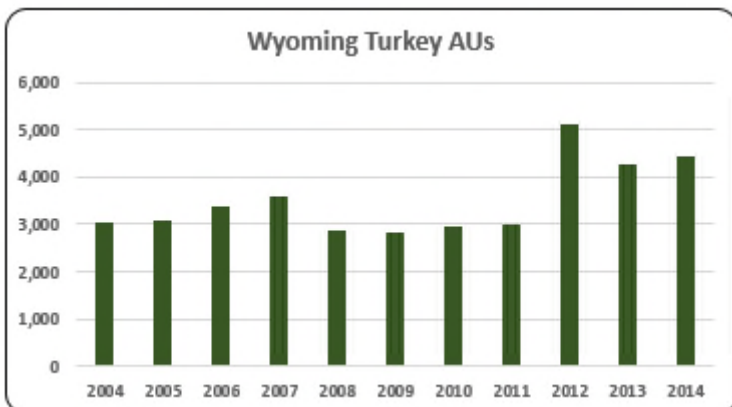
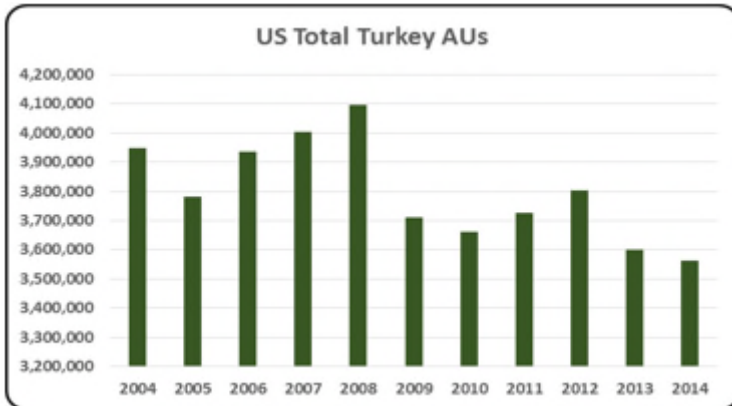
- Overall U.S. total AUs have varied from 2004 to 2014. In 2014 AUs were at an all-time low reflecting, in part, the impact of severe weather on cattle production in some parts of country. During the 2004-14 time period, total AUs in the nation peaked in 2008.



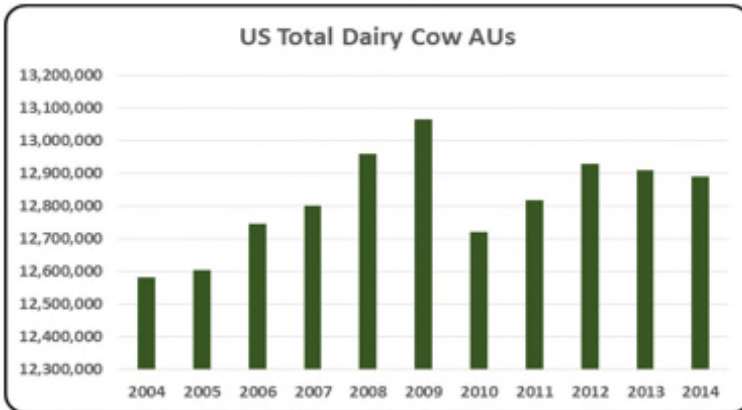
- There were 1,102.9 thousand AUs in Wyoming in 2014 representing less than 1% (0.93%) of all AUs in the U.S. Animal production in the state declined 7.7% year-over-year, and 9.0% from 2004 to 2014.



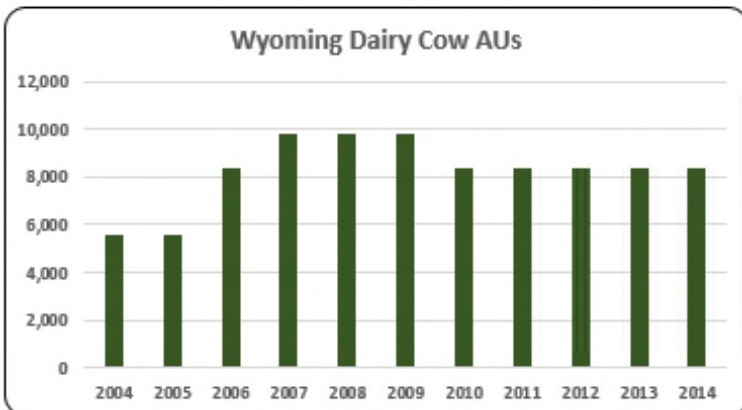
- U.S. broiler production is clustered in a number of states, with Georgia being the largest producer. On average from 2004 to 2014, broiler chicken AUs were about 26.1 million. In 2014, AUs rebounded 1% from the low AUs numbers in 2012 (25.4 million AUs).
- The average number of broiler AUs in Wyoming was 16,525 during last decade. Broiler production fell 7.5% in 2014 (16,268 broiler AUs) from 2004.
- On average, the layer AUs during 2004-2014 were 1.4 million. In 2014 layer AUs were 1.5 million, up 7% from the lowest number in 2009 (1.4 million AUs).
- Layer production represented only 0.22% (2,421 layer AUs) of all animal production in the state in 2014.



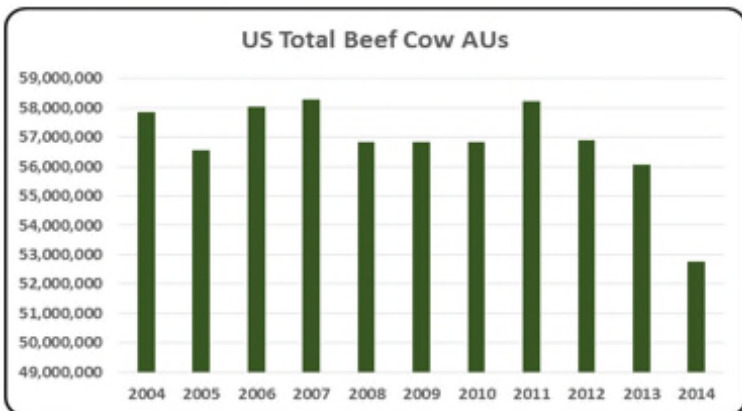
- From 2004 to 2014, the U.S. accounted for 50% of the world’s turkey production. However, in 2014 turkey AUs were the lowest of the decade at 3.5 million, decreasing 13% compared to 2008 (4.1 million turkey AUs) the largest turkey AUs of the decade.
- There were 4,439 turkey AUs in 2014. Turkey production increased 4.4% in 2014 relative to 2013, but turkey production stayed 13.0% below 2012 (5,095 turkey AUs.).
- On average from 2004 to 2014, hog AUs were about 21.4 million. In 2013 hog AUs reached a high of 23.2 million AUs as prices of main feed ingredients, particularly corn, decreased to pre-2010 price levels. Hog AUs in 2014 decreased 4.4% to 22.3 million AUs year-over-year, primarily due to the porcine epidemic diarrhea virus (PEDv) outbreak. Despite the fluctuation in AUs, the pork supply was relatively stable.
- Hog production averaged 88,351 hog AUs during the 2004-2014 decade. 2014 hog production (115,050 hog AUs) was 104.8% above 2004 hog production (56,175 hog AUs).



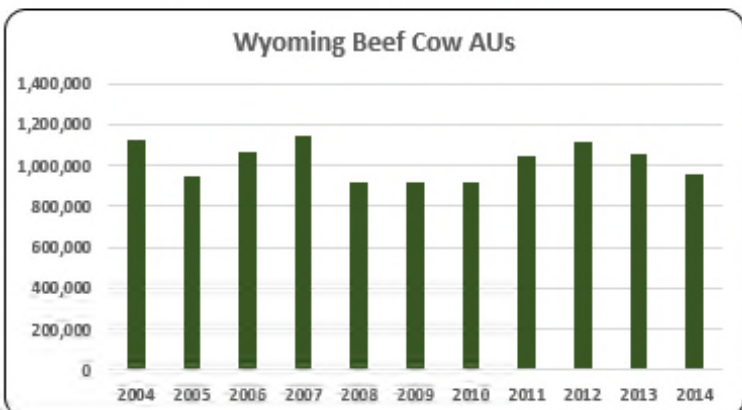
- From 2004 to 2014 dairy cow AUs averaged 12.8 million. In 2014, dairy cow AUs (12.9 million) remained about the same as the previous year but still below the high of 13.1 million AUs, the level in 2009. Despite the fluctuation in AUs, milk supplied has steadily risen.



- Wyoming 2014 dairy cow production rose 50.0% to 8,400 compared to 2004 production (5,600 hog AUs).



- From 2004 to 2014 beef cow AUs averaged 56.8 million. In 2014 beef cow AUs decreased to 52.8 million, the lowest of the decade. States that raise a large number of cattle and calves like Texas and Oklahoma were plagued with drought conditions during 2014.



- Beef cow production accounted for 86.71% (956,325 beef cow AUs) of all animal production in Wyoming in 2014, but beef cow AUs in 2014 were down 9.2% relative to 2013.

Wyoming Additional Information and Methodology

Animal agriculture is an important part of Wyoming's current and future economic health. To quantify the connection between animal agriculture and local economies, the United Soybean Board commissioned [Decision Innovation Solutions](#), an economic research firm in Urbandale, Iowa, to conduct an in-depth analysis of several aspects of animal agriculture. This analysis includes the following components:

- Economic impact of animal agriculture to local (state) economies during the 2004-2014 time period
- Soybean meal usage by animal species during the 2013/14 soybean marketing year
- Animal Unit (AU) trends from 2004-2014

Given the long-term presence of animal agriculture in Wyoming, of interest is the degree to which the industry impacts the Wyoming economy. Estimates of output, jobs, earnings, taxes paid, and multipliers for Wyoming animal agriculture are presented in this report. Methodology for this section of the report closely mirrors that followed in years' past. Also presented are estimates of the change in how animal agriculture has impacted Wyoming's economy over the last decade. Differences, to the extent they are present, are noted within the larger national report which accompanies this state report.

As with any industry across the economic spectrum, there are ebbs and flows in activity that have implications for other parts of the economy. Again using the same 2004-2014 time period as with the economic impact section of this state report, the "Animal Unit Trends" seeks to quantify production changes in animal agriculture in Wyoming which have occurred. As shown in this state report, Wyoming has seen changes within its animal agriculture industry. Expectations are that animal agriculture will continue to evolve over the next decade.

Animal agriculture is the single largest user of soybean meal in Wyoming. Through in-depth conversations with many of the nation's top nutritionists and researchers, "bottom up" estimates of soybean meal usage by animal type were determined. Using the input from these conversations and additional analysis performed by Decision Innovation Solutions, the quantity of soybean meal used during the 2013-14 soybean marketing year for up to sixteen specific animal species has been estimated.

Should readers have comments or questions regarding methodology, results and interpretation, please contact the authors at info@decision-innovation.com or 515.257.6077.

Wyoming Multipliers

Economic multipliers give a sense for how economic activity in a given industry is related to other industries in the same study area. To estimate the impact of animal agriculture on Wyoming's economy, we applied RIMS II multipliers from the Department of Commerce, Bureau of Economic Analysis for cattle ranching and farming, dairy cattle and milk production, poultry and egg production, and other animal production (primarily hogs and pigs), where applicable.

Multipliers are generally stated in the form of "per million dollars" of output. As it relates to this analysis, multipliers are stated as the activity related to every million dollars of economic output in animal agriculture. Referring to the multipliers below, for every million dollars in output generated by the various segments of animal agriculture in Wyoming, \$1.511 to \$2.463 million in total economic activity, \$0.230 to \$0.370 in household wages and 7 to 12 additional jobs are generated in the economy at large.

	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)
RIMS II Multipliers	Cattle and Calves	\$ 2.4625	\$ 0.3699	11.7
	Hogs, Pigs, and Other	\$ 1.6449	\$ 0.2570	8.2
	Poultry and Eggs	\$ 1.5105	\$ 0.2304	6.5
	Dairy	\$ 1.6763	\$ 0.2731	9.0

Appendix

		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Animal Units (AUs)	Beef Cattle AUs	1,127,850	942,900	1,069,200	1,147,050	912,600	912,600	912,600	1,045,200	1,110,600	1,053,225	956,325
	Hog and Pig AUs	56,175	57,045	54,765	70,560	95,220	87,450	97,500	113,550	114,750	109,800	115,050
	Broiler AUs	17,584	17,214	17,097	17,858	17,580	16,345	16,565	12,482	16,418	16,361	16,268
	Turkey AUs	3,023	3,100	3,368	3,603	2,880	2,821	2,939	2,991	5,095	4,250	4,439
	Egg Layer AUs	2,140	2,357	2,274	2,161	2,099	1,836	1,824	1,834	2,346	2,383	2,421
	Dairy AUs	5,600	5,600	8,400	9,800	9,800	9,800	8,400	8,400	8,400	8,400	8,400
	Total Animal Units	1,212,371	1,028,215	1,155,105	1,251,032	1,040,179	1,030,852	1,039,827	1,184,457	1,257,609	1,194,418	1,102,902
Value of Production (\$1,000)	Cattle and Calves (\$1,000)	\$ 556,374	\$ 566,158	\$ 525,294	\$ 436,790	\$ 462,933	\$ 404,132	\$ 495,666	\$ 603,619	\$ 618,850	\$ 698,529	\$ 937,083
	Hogs and Pigs (\$1,000)	\$ 28,508	\$ 27,685	\$ 28,083	\$ 40,614	\$ 60,704	\$ 50,231	\$ 71,259	\$ 118,416	\$ 103,837	\$ 76,255	\$ 87,032
	Broilers (\$1,000)	\$ 14,789	\$ 14,009	\$ 10,826	\$ 13,434	\$ 13,826	\$ 11,976	\$ 12,606	\$ 11,106	\$ 16,355	\$ 19,925	\$ 20,902
	Turkeys (\$1,000)	\$ 2,805	\$ 2,974	\$ 3,515	\$ 4,156	\$ 3,890	\$ 2,609	\$ 3,495	\$ 3,920	\$ 7,389	\$ 4,866	\$ 8,147
	Eggs (\$1,000)	\$ 182	\$ 119	\$ 138	\$ 242	\$ 193	\$ 134	\$ 167	\$ 175	\$ 190	\$ 184	\$ 186
	Milk (\$1,000)	\$ 10,017	\$ 10,789	\$ 15,104	\$ 24,735	\$ 23,612	\$ 14,449	\$ 19,866	\$ 24,128	\$ 23,417	\$ 25,768	\$ 30,303
	Other	\$ 34,302	\$ 37,264	\$ 34,783	\$ 32,103	\$ 31,376	\$ 32,136	\$ 34,184	\$ 31,733	\$ 31,232	\$ 30,732	\$ 30,231
	Sheep and Lambs (\$1,000)	\$ 34,092	\$ 37,055	\$ 34,575	\$ 31,896	\$ 31,170	\$ 31,931	\$ 33,981	\$ 31,531	\$ 31,031	\$ 30,532	\$ 30,032
	Aquaculture (\$1,000)	\$ 210	\$ 209	\$ 208	\$ 207	\$ 206	\$ 205	\$ 203	\$ 202	\$ 201	\$ 200	\$ 199
	Total (\$1,000)	\$ 646,977	\$ 658,998	\$ 617,743	\$ 552,074	\$ 596,534	\$ 515,667	\$ 637,243	\$ 793,097	\$ 801,271	\$ 856,258	\$ 1,113,884

Ag Census Data Category	Animal Type	1997	2002	2007	2012
Number of Farms by NAICS	Beef cattle ranching and farming (112111)	5,236	4,290	3,910	4,365
	Cattle feedlots (112112)	158	269	108	69
	Dairy cattle and milk production (11212)	59	51	26	36
	Hog and pig farming (1122)	74	61	133	96
	Poultry and egg production (1123)	32	41	83	112
	Sheep and goat farming (1124)	494	387	382	293
	Animal aquaculture and other animal production (1125,1129)	942	1,891	3,264	3,140
Value of Sales (\$1,000)	Cattle and Calves	604,793	643,123	801,833	1,101,195
	Hogs and Pigs	24,088	23,057	41,923	35,101
	Poultry and Eggs	238	663	997	602
	Milk and Other Dairy Products	9,882	7,473	22,331	22,904
	Aquaculture	317	3,213	7,157	5,586
	Other (calculated)	84,231	48,582	69,487	67,202
	Total	723,549	726,111	943,728	1,232,590
Input Purchases	Livestock and poultry purchased	(Farms) 4,279	3,673	3,493	4,349
		\$1,000 180,847	199,326	215,888	316,034
	Breeding livestock purchased	(Farms) n/a	2,565	2,354	2,837
		\$1,000 n/a	21,091	38,436	55,056
	Other livestock and poultry purchased	(Farms) n/a	1,747	1,803	2,260
		\$1,000 n/a	178,035	177,453	260,977
	Feed purchased	(Farms) 6,125	6,761	6,398	8,484
	\$1,000 110,332	137,943	150,962	320,457	

	Animal Type	Output (\$1,000)	Earnings (\$1,000)	Employment (Jobs)	Taxes Paid (\$1,000)
2014 Animal Agriculture	Cattle and Calves	\$ 2,307,567	\$ 346,627	10,999	\$ 70,469
	Hogs, Pigs, and Other	\$ 192,886	\$ 30,137	956	\$ 6,127
	Poultry and Eggs	\$ 44,160	\$ 6,736	191	\$ 1,369
	Dairy	\$ 50,797	\$ 8,276	272	\$ 1,682
	Total	\$ 2,595,409	\$ 391,775	12,418	\$ 79,648
Change from 2004 to 2014	Cattle and Calves	\$ 590,547	\$ 88,708	2,815	\$ 18,034
	Hogs, Pigs, and Other	\$ 63,406	\$ 9,907	314	\$ 2,014
	Poultry and Eggs	\$ 10,509	\$ 1,603	45	\$ 326
	Dairy	\$ 29,753	\$ 4,847	159	\$ 985
	Total	\$ 694,216	\$ 105,065	3,334	\$ 21,360
	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)	
RIMS II Multipliers	Cattle and Calves	\$ 2.4625	\$ 0.3699	11.7	
	Hogs, Pigs, and Other	\$ 1.6449	\$ 0.2570	8.2	
	Poultry and Eggs	\$ 1.5105	\$ 0.2304	6.5	
	Dairy	\$ 1.6763	\$ 0.2731	9.0	
Tax Rates	Federal effective income tax rate				12.7%
	Federal Social Security tax rate				7.7%
	State Effective Rate				0.0%
	Total				20.3%

Sources: 1997, 2002, 2007 and 2012 Census of Agriculture, USDA/NASS Survey Data, RIMS II Multipliers (U.S. Bureau of Economic Analysis), Tax Policy Institute and Tax Foundation.