

Economic Analysis of Animal Agriculture 2005-2015

WYOMING

**A Report for
United Soybean Board**



September 2016



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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 the State of Wyoming. The success of Wyoming animal agriculture in turn has an impact on the rest of the state and regional economies. For example, in the State of Wyoming during 2015 animal agriculture contributed:

- \$2.0 billion in economic output
- 12,906 jobs
- \$394.6 million in earnings
- \$80.2 million in income taxes paid at local, state, and federal levels
- \$41.6 million in the form of property taxes

Plus, from 2005-2015 animal agriculture in Wyoming has increased economic output by over \$462.0 million, boosted household earnings by \$89.7 million, contributed 2,940 additional jobs and paid \$18.2 million in additional tax revenues.

Wyoming's animal agriculture consumed almost 44.3 thousand tons of soybean meal in 2015. This soybean meal was fed primarily to:

- Hogs (24.3 thousand tons)
- Beef Cows (9.9 thousand tons)
- Egg-Laying Hens (2.7 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. It is expected that animal agriculture will continue to be a contributor to the economic well-being of the people of Wyoming and beyond.

Wyoming Economic Impact of Animal Agriculture

Animal agriculture is an important part of Wyoming's economy. In 2015, Wyoming's animal agriculture contributed the following to the economy:

- About \$2.0 billion in economic output
- \$394.6 million in household earnings
- 12,906 jobs
- \$80.2 million in income taxes

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

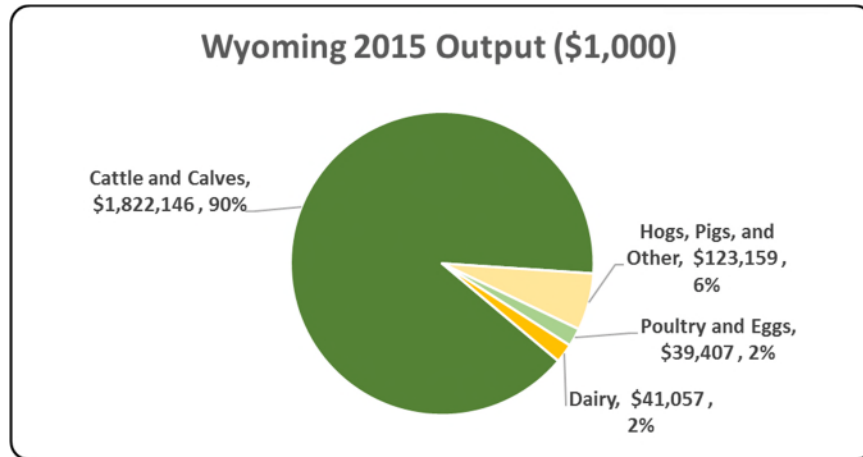
- Increased economic output by \$462.0 million
- Boosted household earnings by \$89.7 million
- Added 2,940 jobs
- Paid an additional \$18.2 million in income taxes

Below is a table which demonstrates this decade of change.

Measure	2015	Change 2005-2015	% Change 2005-2015
Output (\$1,000)	\$ 2,025,769	\$ 462,001	29.54%
Earnings (\$1,000)	\$ 394,638	\$ 89,679	29.41%
Employment (Jobs)	12,906	2,940	29.50%
Income Taxes Paid (\$1,000)	\$ 80,230	\$ 18,232	29.41%
Property Taxes Paid in 2012 (\$1,000)	\$ 41,580		

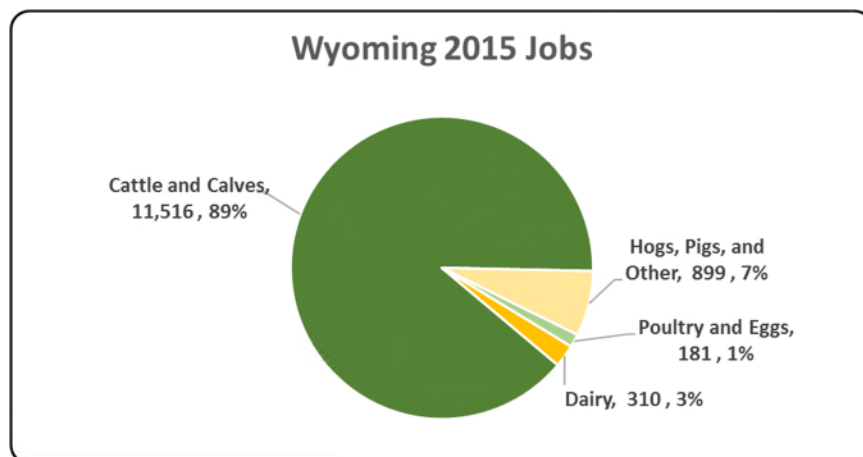
Wyoming Output

“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 \$2.0 billion.



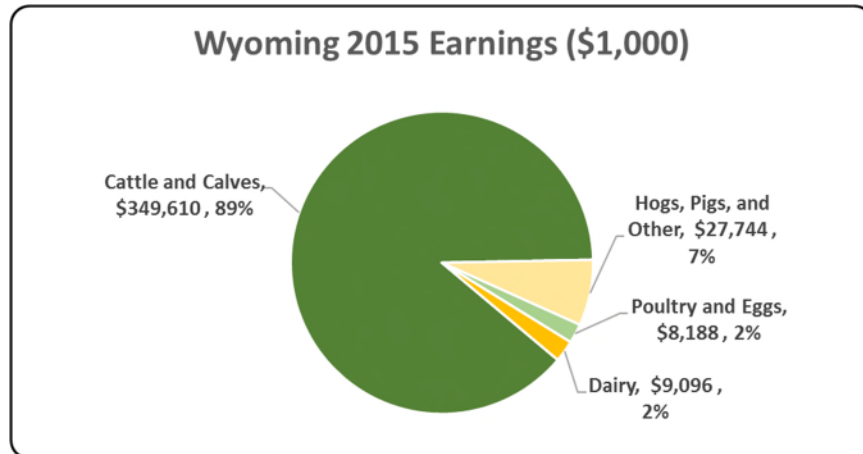
Wyoming Jobs

“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 about 12,906 jobs within and outside of animal agriculture.



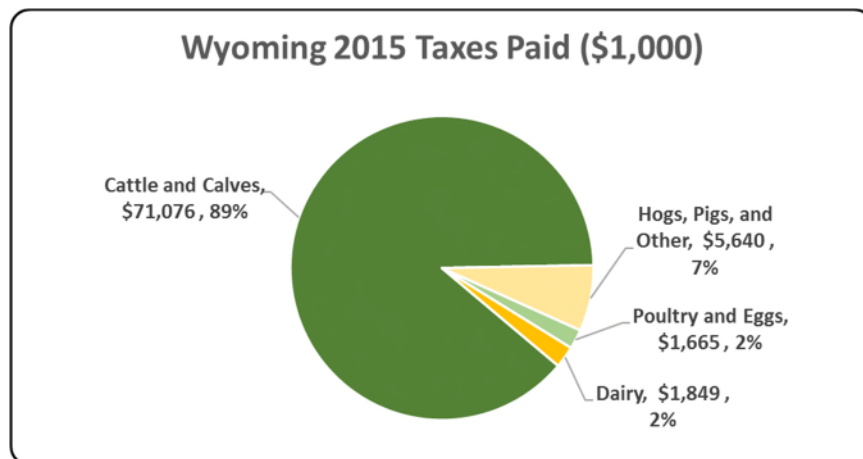
Wyoming Earnings

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 \$394.6 million to household earnings in 2015.



Wyoming Taxes Paid by Animal Agriculture

Wyoming’s animal agriculture is also a source of tax revenue. In 2015, the state’s animal agriculture industry paid about \$80.2 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.



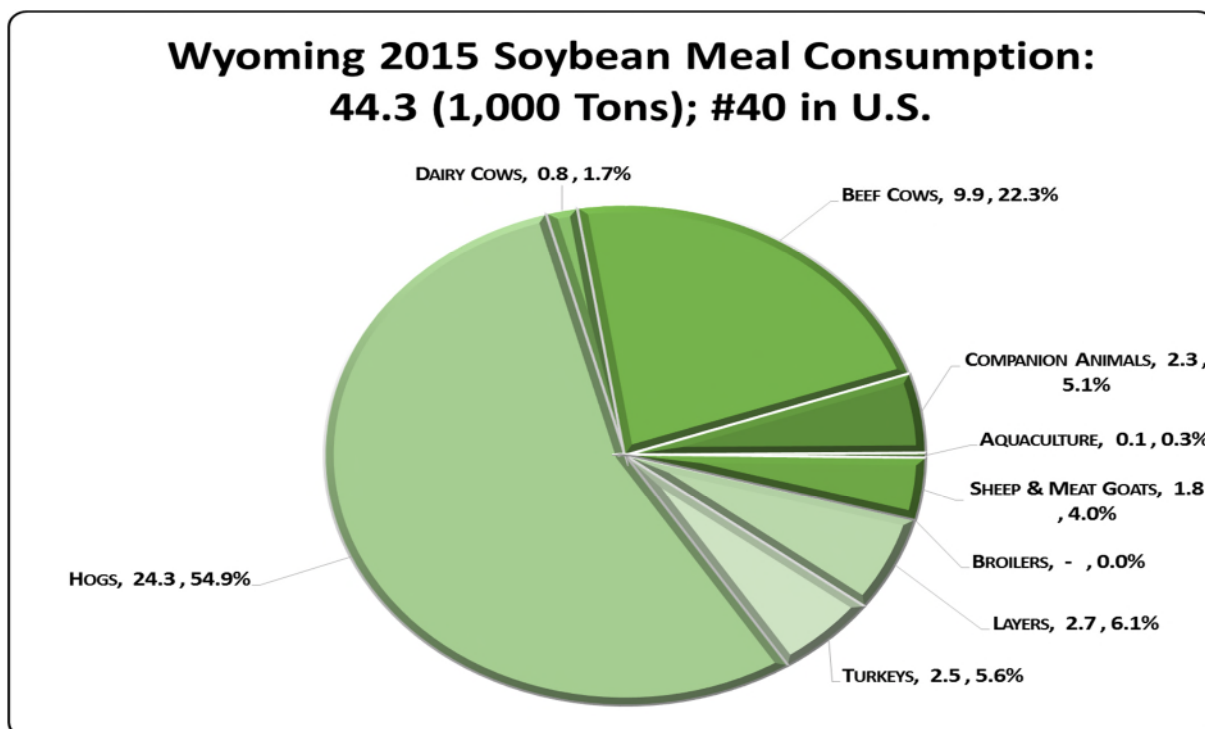
Wyoming Animal Agriculture Soybean Meal Consumption

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 2014-15 soybean marketing year by up to sixteen specific animal species has been estimated.

Wyoming's animal agriculture consumed almost 44.3 thousand tons of soybean meal in 2015, 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 (24.3 thousand tons)
- Beef Cows (9.9 thousand tons)
- Turkeys (2.7 thousand tons)

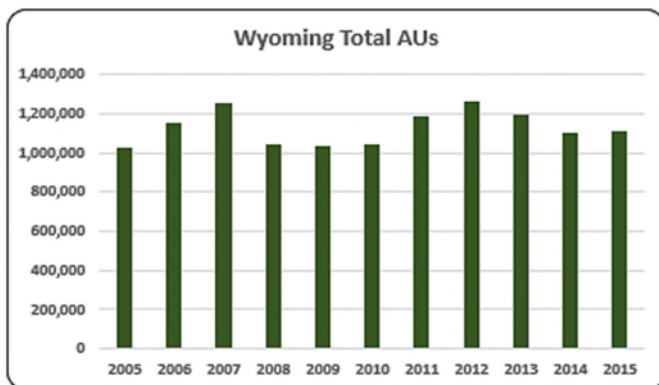
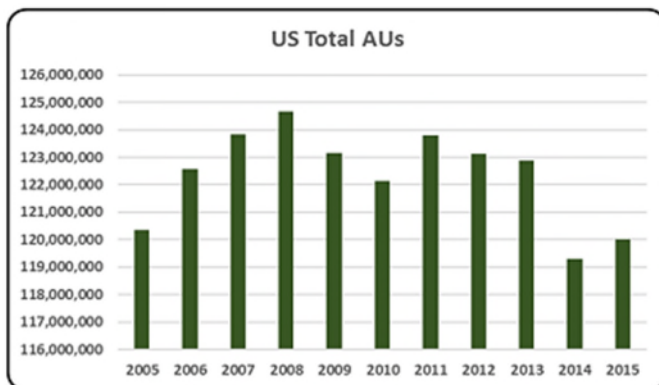


Wyoming Animal Unit (AU) Trends

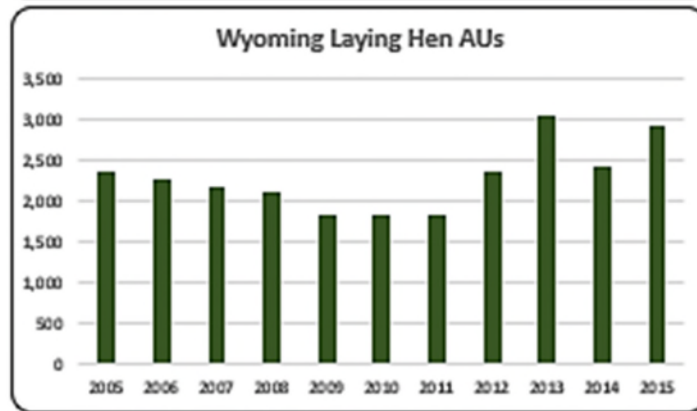
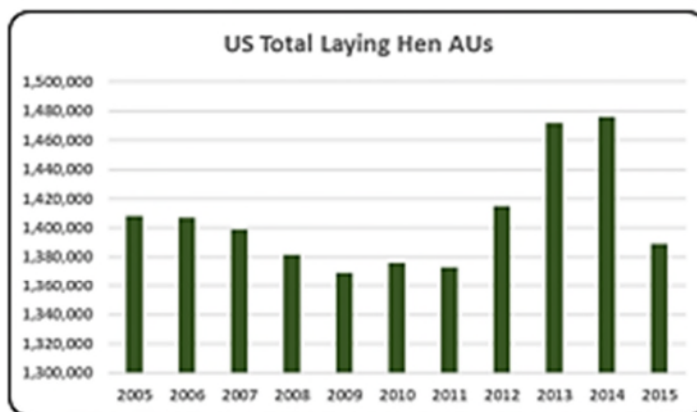
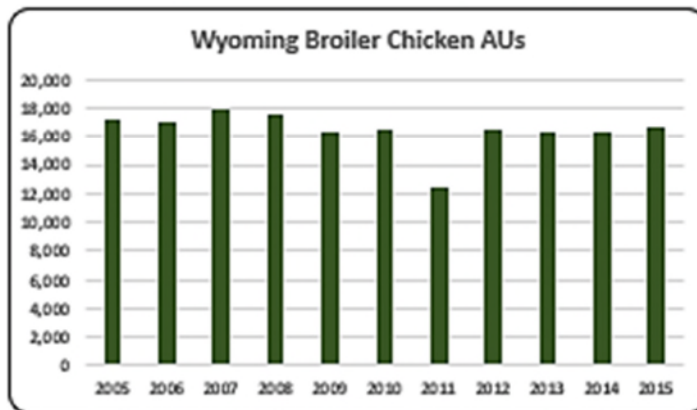
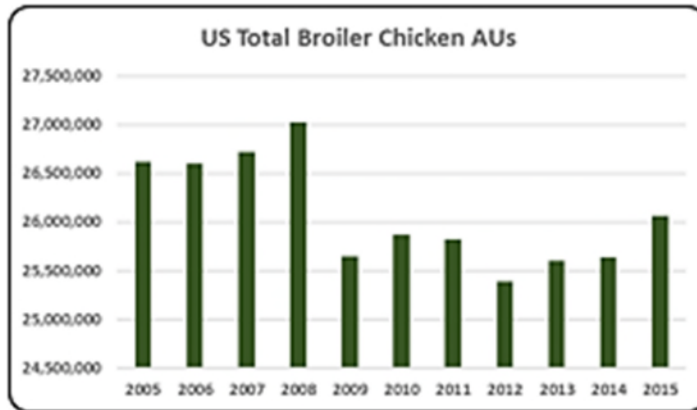
Over time, prices of feed, meat, eggs and milk, as well as levels of demand for these products in the United States and abroad have an impact on the size of animal agriculture in the State of Wyoming. Due to this reality, using a single year as a measure of the presence and strength of a sector can be 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 2015 were: Beef Cows (978,225 AUs), Hogs (97,650 AUs), and Broilers (16,688 AUs). Total animal units in Wyoming during 2015 were 1.1 million AUs.



- Overall U.S. total AUs have varied from 2005 to 2015. 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 2005-15 time period, total AUs in the nation peaked in 2008.
- There were 1.1 million AUs in Wyoming in 2015 representing 1.1% of all AUs in the U.S. Animal production in the state. Production increased 8% from 2005 to 2015.

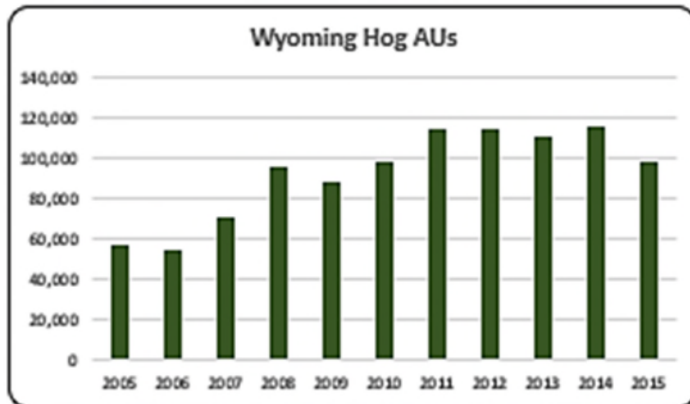
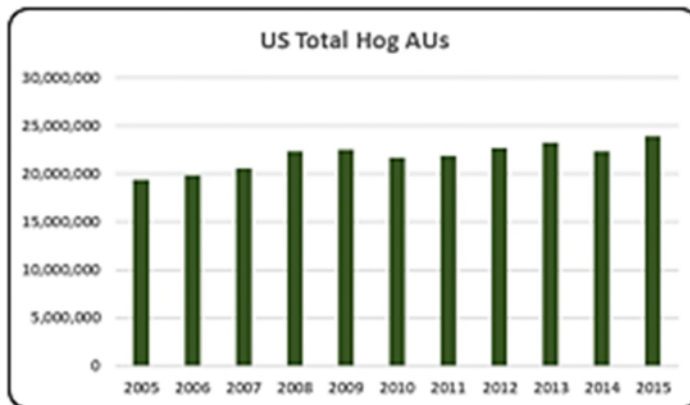
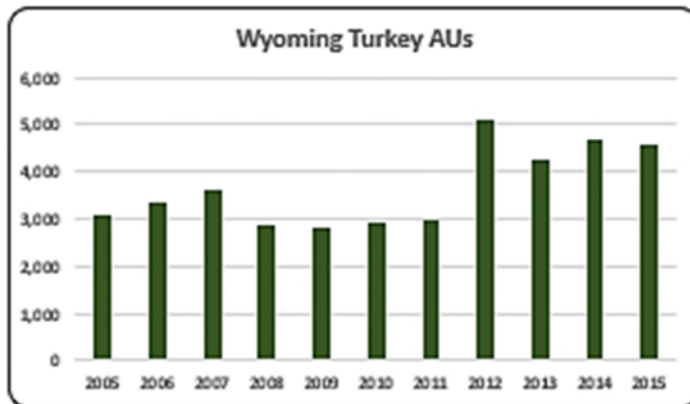
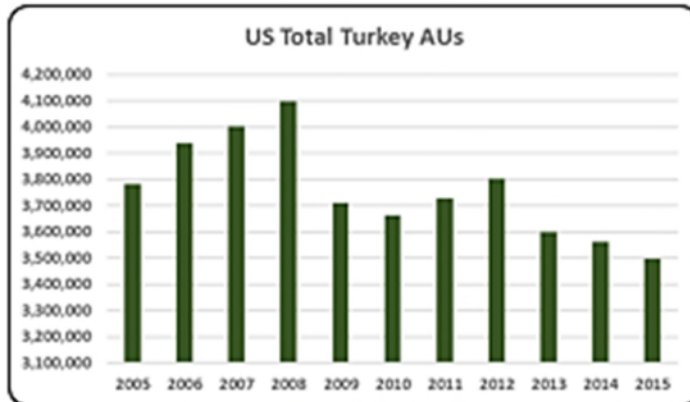


- U.S. broiler production is clustered in a number of states, with Georgia being the largest producer. On average from 2005 to 2015, broiler chicken AUs were about 26.0 million. In 2015, AUs rebounded 3% from the low AUs numbers in 2012 (25.4 million AUs).

- The average number of broiler AUs in Wyoming was 16,443 during last decade. Broiler production fell 3% in 2015 (16,688 broiler AUs) from 2005.

- On average, the layer AUs during 2005-2015 were 1.4 million. In 2015 layer AUs were 1.3 million, down 6% from the 2014 decade high (1.4 million AUs). This drastic decrease in 2015 was due to the losses in major egg laying states from the avian influenza outbreak.

- Layer production represented only 0.26% (2,912 layer AUs) of all animal production in the state in 2015.

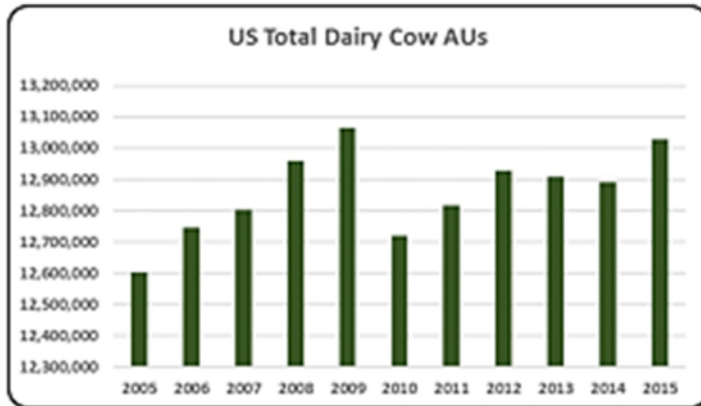


- In 2015 turkey AUs were the lowest of the decade at 3.5 million, decreasing 15% compared to 2008 (4.1 million turkey AUs) the largest turkey AUs of the decade. The most recent contributor to this decline has been avian influenza.

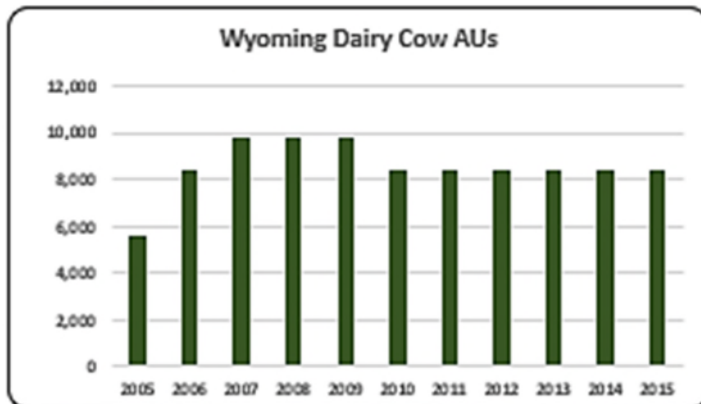
- There were 4,590 turkey AUs in 2015. Turkey production increased 3% in 2015 relative to 2013, but turkey production stayed 10% below 2012 (5,095 turkey AUs).

- On average from 2005 to 2015, hog AUs were about 21.8 million. Hog AUs in 2015 increased 24% to 23.9 million AUs compared to the decade low in 2005 (19.4 million AUs). Despite the fluctuation in AUs, the pork supply was relatively stable.

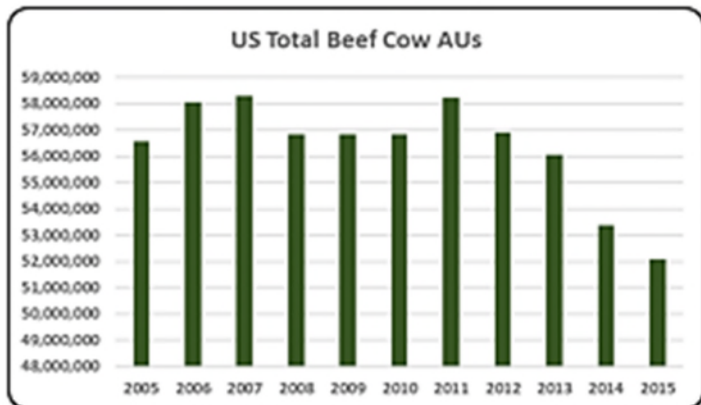
- Hog production averaged 92,108 hog AUs during the 2005-2015 decade. 2015 hog production (97,650 hog AUs) was 71% above 2005 hog production (57,045 hog AUs).



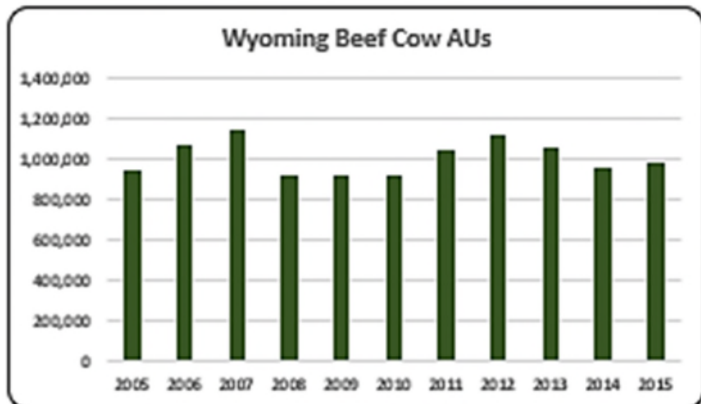
- From 2005 to 2015 dairy cow AUs averaged 12.8 million. In 2015, dairy cow AUs (13.0 million) finally reached near the 2009 high of 13.1 million AUs. Milk supplies have steadily risen.



- Wyoming 2015 dairy cow production rose 50.0% to 8,400 compared to 2005 production (5,600 hog AUs).



- From 2005 to 2015 beef cow AUs averaged 56.3 million. In 2015 beef cow AUs decreased to 52.0 million, the lowest of the decade. States that traditionally raise a lot of cattle like Texas and Oklahoma continue to work through the lingering effects of the drought of the last several years.



- Beef cow production accounted for 88.25% (978,225 beef cow AUs) of all animal production in Wyoming in 2015, but beef cow AUs in 2015 were down 7% 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 2005-2015 time period
- Soybean meal usage by animal species during the 2014/15 soybean marketing year
- Animal Unit (AU) trends from 2005-2015

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 2005-2015 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 2014-15 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, \$1.43 to \$2.03 million in total economic activity, \$0.31 to \$0.39 in household wages and 7 to 13 additional jobs are generated in the economy at large.

	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)
RIMS II Multipliers	Cattle and Calves	\$ 2.034	\$ 0.390	12.9
	Hogs, Pigs, and Other	\$ 1.433	\$ 0.323	10.5
	Poultry and Eggs	\$ 1.492	\$ 0.310	6.8
	Dairy	\$ 1.657	\$ 0.367	12.5

Appendix

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Animal Units (AUs)	Beef Cattle AUs	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	978,225
	Hog and Pig AUs	57,045	54,765	70,560	95,220	87,450	97,500	113,550	114,750	109,800	114,900	97,650
	Broiler AUs	17,214	17,097	17,858	17,580	16,345	16,565	12,482	16,418	16,361	16,268	16,688
	Turkey AUs	3,100	3,368	3,603	2,880	2,821	2,939	2,991	5,095	4,250	4,692	4,590
	Egg Layer AUs	2,357	2,274	2,161	2,099	1,836	1,824	1,834	2,346	3,038	2,421	2,912
	Dairy AUs	5,600	8,400	9,800	9,800	9,800	8,400	8,400	8,400	8,400	8,400	8,400
	Total Animal Units	1,028,215	1,155,105	1,251,032	1,040,179	1,030,852	1,039,827	1,184,457	1,257,609	1,195,074	1,103,005	1,108,466
Value of Production (\$1,000)	Cattle and Calves (\$1,000)	\$ 566,158	\$ 525,294	\$ 436,790	\$ 462,933	\$ 404,132	\$ 495,666	\$ 603,619	\$ 618,850	\$ 698,529	\$ 937,083	\$ 895,976
	Hogs and Pigs (\$1,000)	\$ 27,685	\$ 28,083	\$ 40,614	\$ 60,704	\$ 50,231	\$ 71,259	\$ 118,416	\$ 103,837	\$ 76,255	\$ 87,032	\$ 57,437
	Broilers (\$1,000)	\$ 14,465	\$ 11,206	\$ 13,782	\$ 14,080	\$ 12,148	\$ 12,695	\$ 11,114	\$ 16,359	\$ 19,934	\$ 20,912	\$ 18,244
	Turkeys (\$1,000)	\$ 2,945	\$ 3,481	\$ 4,098	\$ 3,537	\$ 3,221	\$ 4,054	\$ 4,509	\$ 8,344	\$ 6,607	\$ 7,476	\$ 7,961
	Eggs (\$1,000)	\$ 119	\$ 138	\$ 242	\$ 193	\$ 134	\$ 167	\$ 175	\$ 190	\$ 191	\$ 196	\$ 201
	Milk (\$1,000)	\$ 10,789	\$ 15,104	\$ 24,735	\$ 23,612	\$ 14,449	\$ 19,866	\$ 24,128	\$ 23,417	\$ 25,768	\$ 30,303	\$ 24,778
	Other	\$ 37,264	\$ 34,783	\$ 32,103	\$ 31,376	\$ 32,136	\$ 34,184	\$ 31,234	\$ 30,546	\$ 29,859	\$ 29,171	\$ 28,484
	Sheep and Lambs (\$1,000)	\$ 37,055	\$ 34,575	\$ 31,896	\$ 31,170	\$ 31,931	\$ 33,981	\$ 31,032	\$ 30,345	\$ 29,659	\$ 28,972	\$ 28,286
	Aquaculture (\$1,000)	\$ 209	\$ 208	\$ 207	\$ 206	\$ 205	\$ 203	\$ 202	\$ 201	\$ 200	\$ 199	\$ 198
	Total (\$1,000)	\$ 659,425	\$ 618,089	\$ 552,364	\$ 596,435	\$ 516,451	\$ 637,891	\$ 793,195	\$ 801,544	\$ 857,142	\$ 1,112,173	\$ 1,033,079

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)	<i>n/a</i>	2,565	2,354	2,837
		\$1,000	<i>n/a</i>	21,091	38,436	55,056
	Other livestock and poultry purchased	(Farms)	<i>n/a</i>	1,747	1,803	2,260
		\$1,000	<i>n/a</i>	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)
2015 Animal Agriculture	Cattle and Calves	\$ 1,822,146	\$ 349,610	11,516	\$ 71,076
	Hogs, Pigs, and Other	\$ 123,159	\$ 27,744	899	\$ 5,640
	Poultry and Eggs	\$ 39,407	\$ 8,188	181	\$ 1,665
	Dairy	\$ 41,057	\$ 9,096	310	\$ 1,849
	Total	\$ 2,025,769	\$ 394,638	12,906	\$ 80,230
Change from 2005 to 2015	Cattle and Calves	\$ 424,807	\$ 81,507	2,685	\$ 16,570
	Hogs, Pigs, and Other	\$ 10,174	\$ 2,292	74	\$ 466
	Poultry and Eggs	\$ 7,658	\$ 1,591	35	\$ 324
	Dairy	\$ 19,361	\$ 4,289	146	\$ 872
	Total	\$ 462,001	\$ 89,679	2,940	\$ 18,232
RIMS II Multipliers	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)	
	Cattle and Calves	\$ 2.034	\$ 0.390	12.9	
	Hogs, Pigs, and Other	\$ 1.433	\$ 0.323	10.5	
	Poultry and Eggs	\$ 1.492	\$ 0.310	6.8	
	Dairy	\$ 1.657	\$ 0.367	12.5	
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.