Economic Analysis of Animal Agriculture 2005-2015

OREGON

A Report for

United Soybean Board

September 2016

Decision Innovation Solutions™

Bridging Your Research Needs.

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Contents

Oregon Executive Summary

The use of soybean meal as a key feed ingredient is a small part of Oregon'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 Oregon. The success of Oregon animal agriculture in turn has an impact on the rest of the state and regional economies. For example, in the State of Oregon during 2015 animal agriculture contributed:

- $3.5 billion in economic output
- 24,933 jobs
- $745.1 million in earnings
- $218.5 million in income taxes paid at local, state, and federal levels
- $112.8 million in the form of property taxes

Plus, from 2005-2015 animal agriculture in Oregon has increased economic output by over $696.7 million, boosted household earnings by $144.1 million, contributed 4,890 additional jobs and paid $42.3 million in additional tax revenues.

Oregon's animal agriculture consumed almost 57.6 thousand tons of soybean meal in 2015. This soybean meal was fed primarily to:

- Dairy Cows (15.9 thousand tons)
- Turkeys (14.3 thousand tons)
- Egg-Laying Hens (14.1 thousand tons)

This report examines animal agriculture in Oregon 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 Oregon, 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 Oregon and beyond.

Oregon Economic Impact of Animal Agriculture

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

- About $3.5 billion in economic output
- $745.1 million in household earnings
- 24,933 jobs
- $218.5 million in income taxes

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

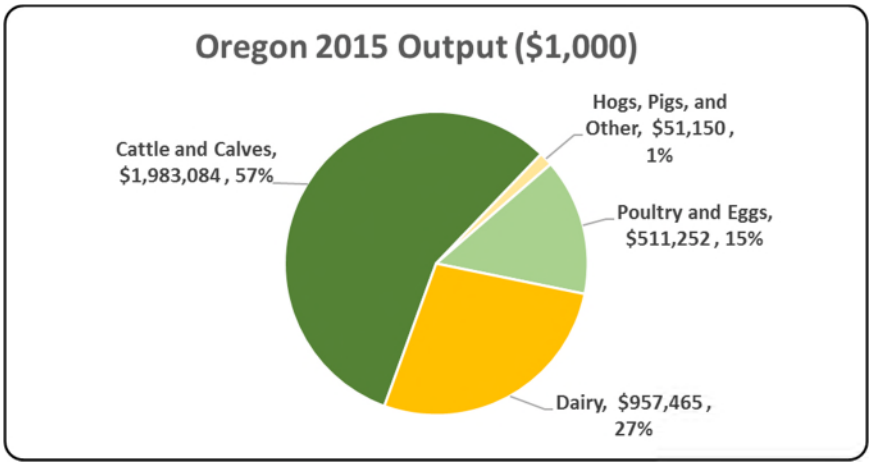
- Increased economic output by $696.7 million
- Boosted household earnings by $144.1 million
- Added 4,890 jobs
- Paid an additional $42.3 million in income taxes

Below is a table which demonstrates this decade of change.

Measure		2015	Change 2005-2015	% Change 2005-2015
Output ($1,000)	$	3,502,951	$ 696,713	24.83%
Earnings ($1,000)	$	745,060	$ 144,091	23.98%
Employment (Jobs)		24,933	4,890	24.40%
Income Taxes Paid ($1,000)	$	218,526	$ 42,262	23.98%
Property Taxes Paid in 2012 ($1,000)	$	112,834		

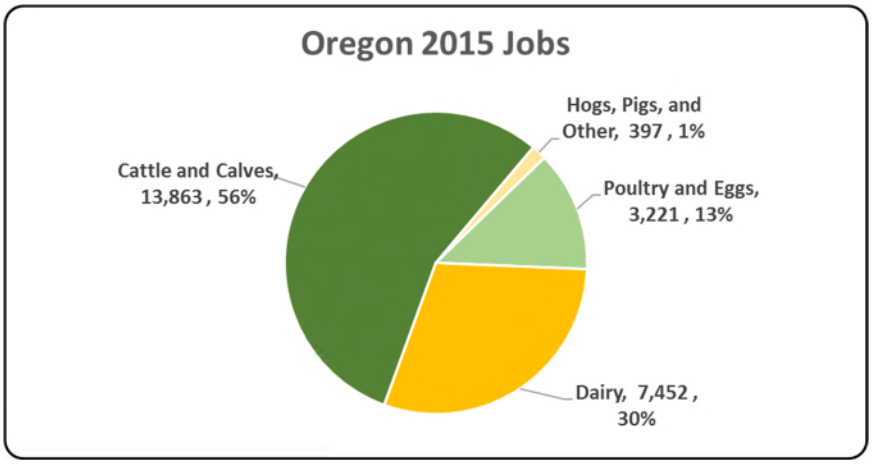
Oregon Output

"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 Oregon economy. Animal agriculture's impact on Oregon total economic output is about $3.5 billion.



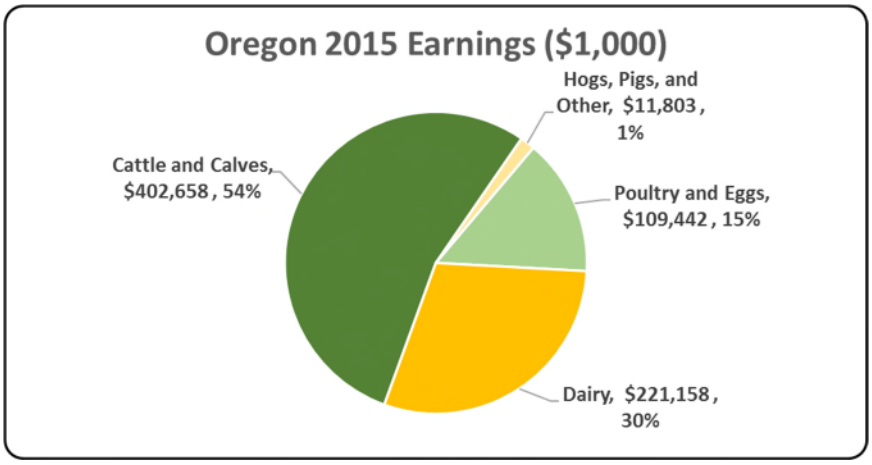
Oregon Jobs

"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 Oregon in terms of animal agriculture jobs. As shown, animal agriculture contributes significantly to Oregon total jobs, contributing 24,933 jobs within and outside of animal agriculture.



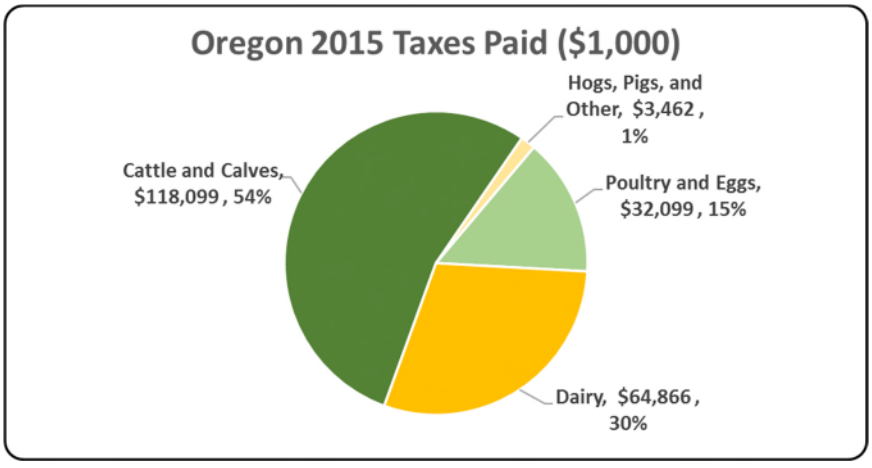
Oregon Earnings

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 Oregon economy in terms of earnings. Oregon's animal agriculture contributed about $745.1 million to household earnings in 2015.



Oregon Taxes Paid by Animal Agriculture

Oregon's animal agriculture is also a source of tax revenue. In 2015, the state's animal agriculture industry paid about $218.5 million in income taxes at local, state, and federal levels. Plus the 2012 Census of Agriculture estimated $112.8 million in property taxes paid by all of Oregon agriculture during 2012. Estimates of income taxes paid by animal agriculture are shown in the following chart.



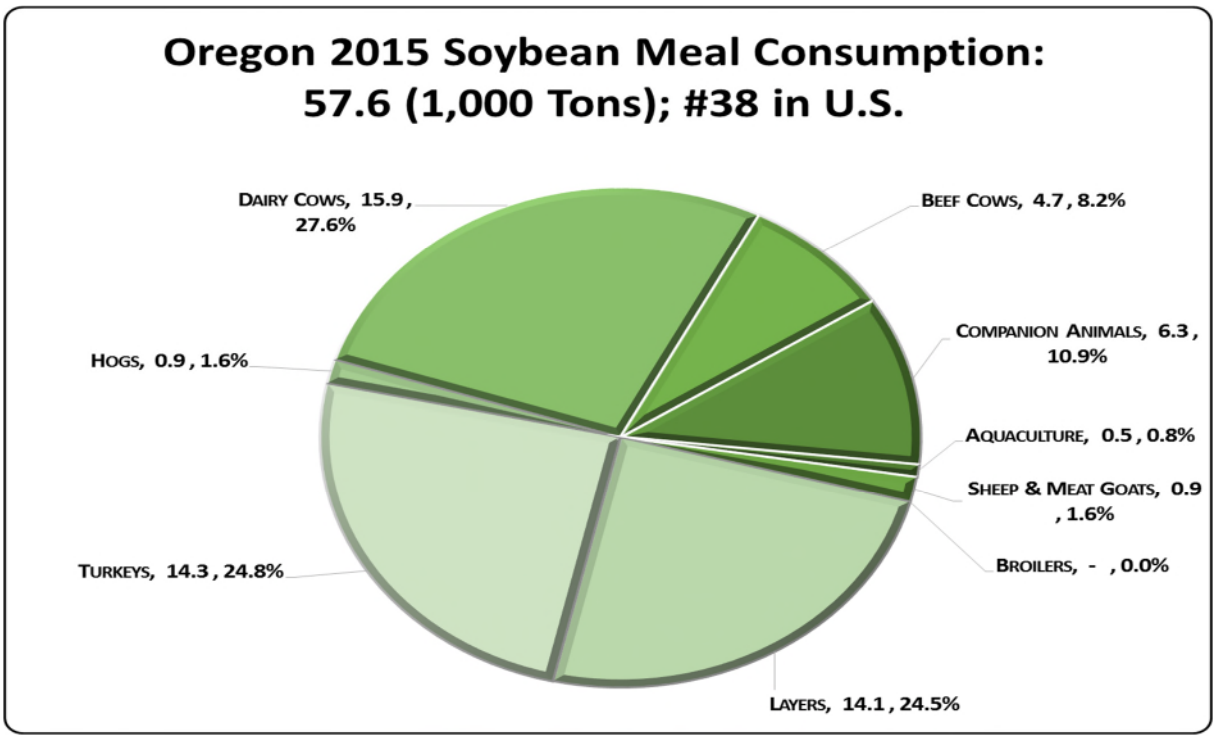
Oregon Animal Agriculture Soybean Meal Consumption

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.

Oregon's animal agriculture consumed almost 57.6 thousand tons of soybean meal in 2015, placing the state as #38 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:

- Dairy Cows (15.9 thousand tons)
- Turkeys (14.3 thousand tons)
- Egg-Laying Hens (14.1 thousand tons)

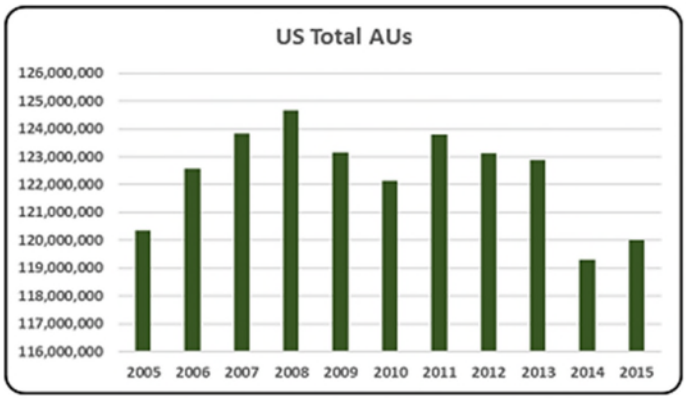


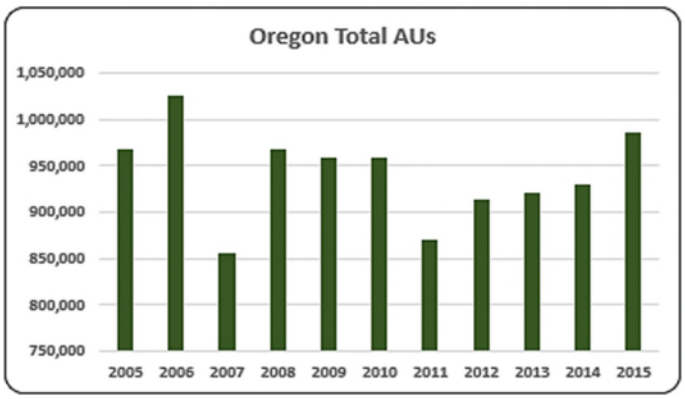
Oregon Animal Unit (AU) Trends

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 Oregon. 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 Oregon and to give perspective on Oregon'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.

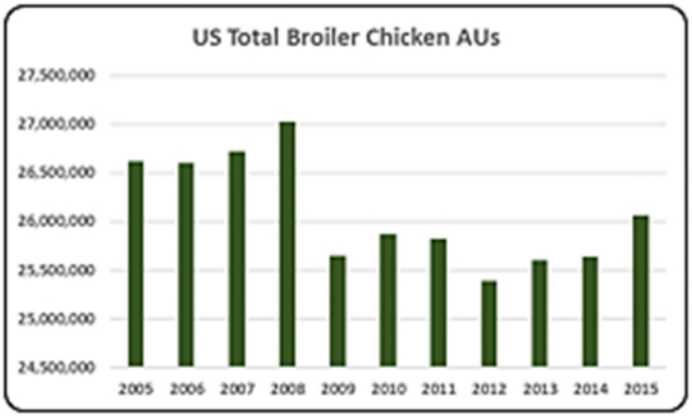
As shown in the accompanying charts and written commentary, certain components of animal agriculture are more present, and therefore more dominant than others. This is due primarily to geography (i.e., weather patterns and access to certain transportation hubs), proximity to high quality, relevant feed ingredients, and the local animal agriculture regulatory framework. In Oregon, the largest three segments of animal agriculture in terms of AUs during 2015 were: Beef Cows (682,650 AUs), Dairy Cows (175,000 AUs), and Broilers (90,300 AUs). Total animal units in Oregon during 2015 were 985,598 AUs.



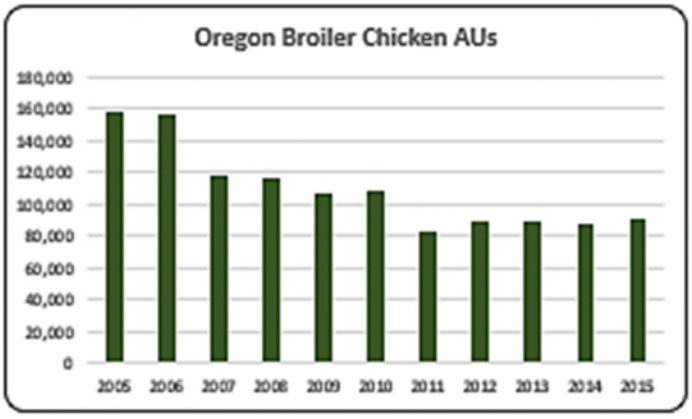


- Overall U.S. total AUs have varied from 2005 to 2015. In 2014 AUs were at an all-time low reflecting, in part, the impact of severe weather on cattle production in some parts of country. During the 2005-15 time period, total AUs in the nation peaked in 2008.

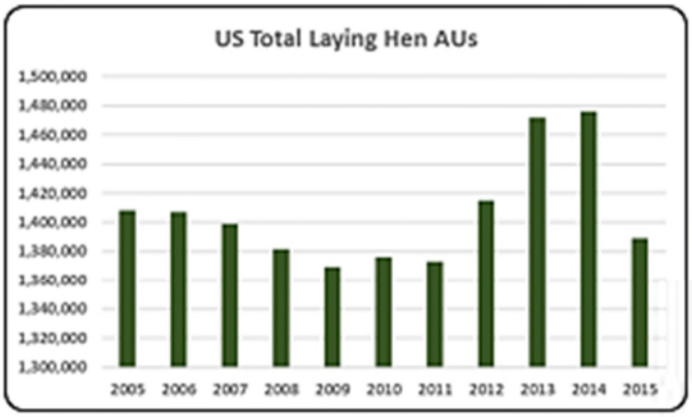
- Animal production in Oregon fluctuated during last decade from record high in 2006 (1.0 million AUs) to record low (855,798) the following year. Overall animal units increased 2% during 2005-2015.



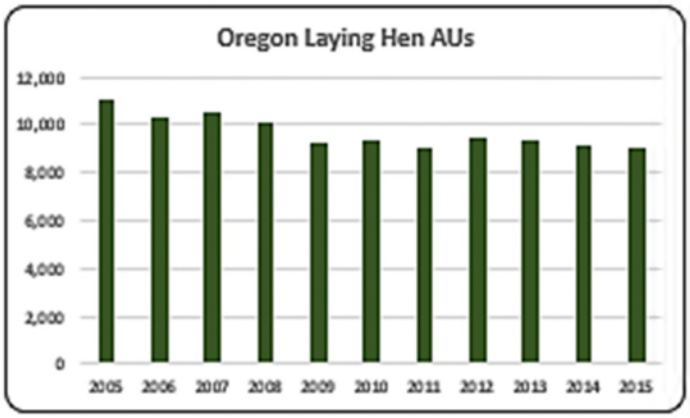
- U.S. broiler production is clustered in a number of states, with Georgia being the largest producer. On average from 2005 to 2015, broiler chicken AUs were about 26.0 million. In 2015, AUs rebounded 3% from the low AUs numbers in 2012 (25.4 million AUs).



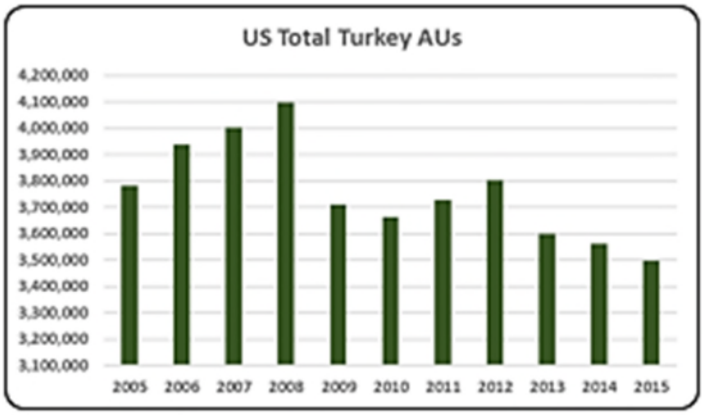
- Broiler animal units represented 9.2% (90,300 broiler AUs) of all animal units in Oregon in 2015.



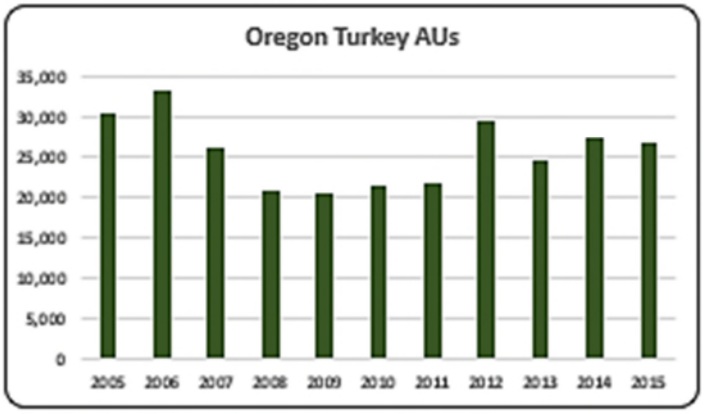
- On average, the layer AUs during 2005-2015 were 1.4 million. In 2015 layer AUs were 1.3 million, down 6% from the 2014 decade high (1.4 million AUs). This drastic decrease in 2015 was due to the losses in major egg laying states from the avian influenza outbreak.



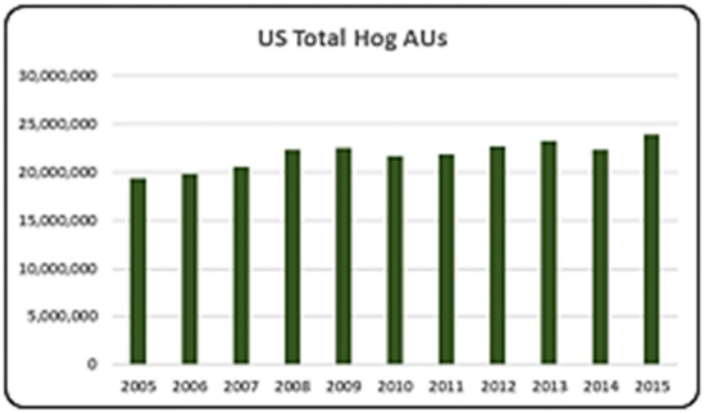
- There were 9,012 layer AUs in Oregon in 2015. Less than 1% of total AUs came from layer production in 2015. Layer AUs fell 19% from 2005 to 2015.



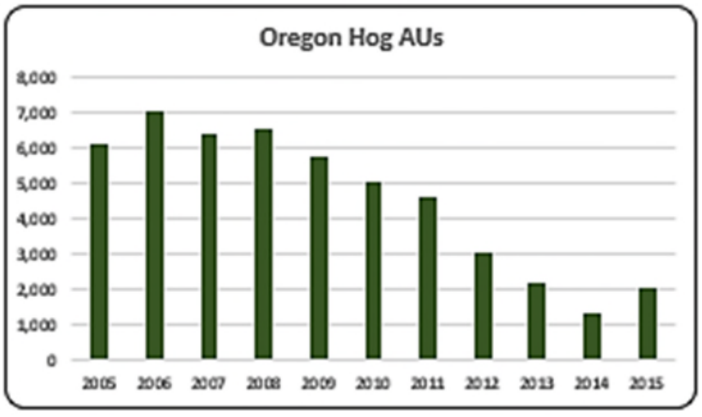
- In 2015 turkey AUs were the lowest of the decade at 3.5 million, decreasing 15% compared to 2008 (4.1 million turkey AUs) the largest turkey AUs of the decade. The most recent contributor to this decline has been avian influenza.



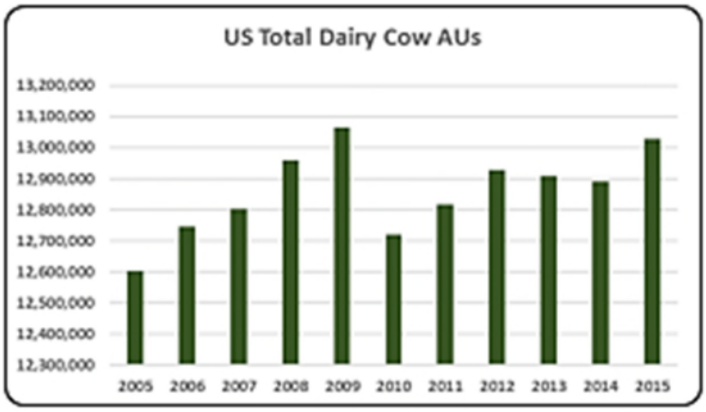
- Turkey numbers also declined 13% throughout the decade. There were 25,642 turkey AUs on average from 2005 to 2015.



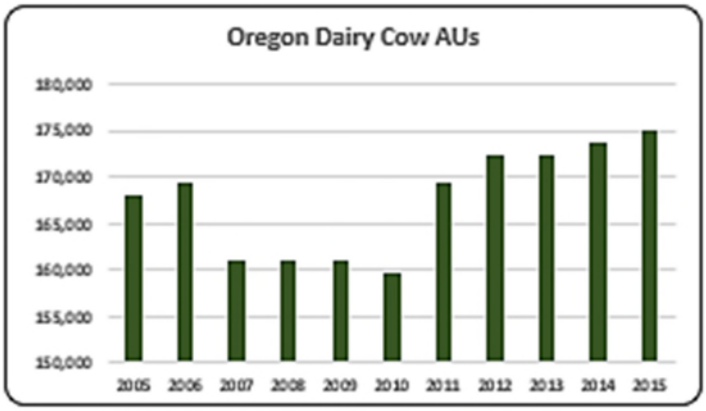
- On average from 2005 to 2015, hog AUs were about 21.8 million. Hog AUs in 2015 increased 24% to 23.9 million AUs compared to the decade low in 2005 (19.4 million AUs). Despite the fluctuation in AUs, the pork supply was relatively stable.



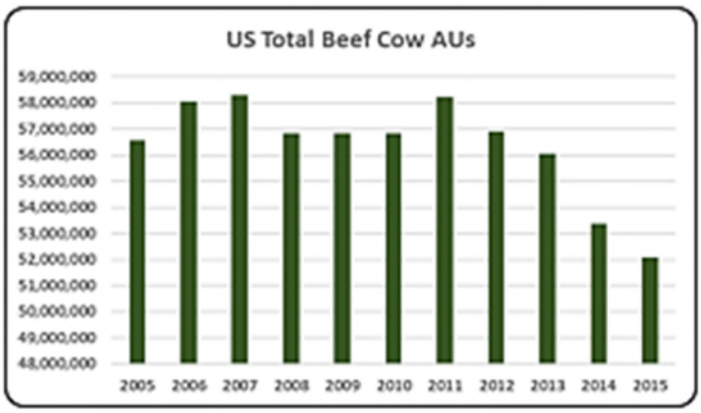
- Hog animal numbers declined the most in Oregon during last decade, with a 66% decline. The total number of hog AUs in 2015 was 2,070.



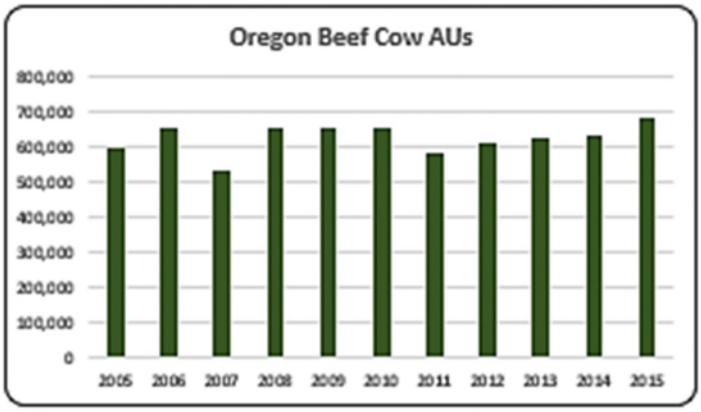
- From 2005 to 2015 dairy cow AUs averaged 12.8 million. In 2015, dairy cow AUs (13.0 million) finally reached near the 2009 high of 13.1 million AUs. Milk supplies have steadily risen.



- Numbers increased from 168,000 dairy cow AUs in 2005 to 175,000 dairy cow AUs in 2015. The largest increase in dairy cow production occurred from 2011 to 2015.



- 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 was the most important animal production in the state of Oregon from 2005 to 2015. The average number of beef cow AUs during the decade was 624,545.

Oregon Additional Information and Methodology

Animal agriculture is an important part of Oregon'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 Oregon, of interest is the degree to which the industry impacts the Oregon economy. Estimates of output, jobs, earnings, taxes paid, and multipliers for Oregon 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 Oregon'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 Oregon which have occurred. As shown in this state report, Oregon 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 Oregon. 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.

Oregon 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 Oregon'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 Oregon, $1.56 to $2.22 million in total economic activity, $0.36 to $0.47 in household wages and 12 to 16 additional jobs are generated in the economy at large.

	Animal Type	Output($)	Earnings ($)	Employment (Jobs)
RIMS II Multipliers	Cattle and Calves	$ 2.219	$ 0.451	15.5
	Hogs, Pigs, and Other	$ 1.565	$ 0.361	12.1
	Poultry and Eggs	$ 1.959	$ 0.419	12.3
	Dairy	$ 2.018	$ 0.466	15.7

Appendix

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Animal Units (AUs)	Beef Cattle AUs	593,850	649,050	534,150	654,300	654,300	654,300	583,350	609,900	624,300	629,850	682,650
	Hog and Pig AUs	6,090	7,050	6,375	6,525	5,775	5,025	4,605	3,075	2,220	1,365	2,070
	Broiler AUs	157,661	156,597	117,601	115,767	107,637	109,084	82,196	88,841	88,531	88,028	90,300
	Turkey AUs	30,504	33,145	26,163	20,913	20,485	21,337	21,718	29,484	24,595	27,152	26,566
	Egg Layer AUs	11,084	10,332	10,508	10,052	9,264	9,400	9,028	9,499	9,337	9,127	9,012
	Dairy AUs	168,000	169,400	161,000	161,000	161,000	159,600	169,400	172,200	172,200	173,600	175,000
	Total Animal Units	**967,189**	**1,025,574**	**855,798**	**968,557**	**958,460**	**958,747**	**870,297**	**912,999**	**921,183**	**929,122**	**985,598**
Value of Production ($1,000)	Cattle and Calves ($1,000)	$ 524,765	$ 475,852	$ 458,389	$ 432,677	$ 427,549	$ 490,900	$ 634,386	$ 675,073	$ 712,765	$ 922,031	$ 893,603
	Hogs and Pigs ($1,000)	$ 5,013	$ 5,300	$ 5,154	$ 5,809	$ 4,239	$ 4,968	$ 5,169	$ 3,322	$ 2,122	$ 2,017	$ 2,156
	Broilers ($1,000)	$ 132,488	$ 102,638	$ 90,758	$ 92,722	$ 79,999	$ 83,602	$ 73,193	$ 88,522	$ 107,863	$ 113,156	$ 98,719
	Turkeys ($1,000)	$ 28,976	$ 34,256	$ 29,758	$ 25,682	$ 23,391	$ 29,433	$ 32,736	$ 48,290	$ 38,236	$ 43,265	$ 46,070
	Eggs ($1,000)	$ 30,626	$ 34,444	$ 47,379	$ 64,775	$ 47,765	$ 51,756	$ 52,462	$ 54,128	$ 56,228	$ 65,778	$ 116,161
	Milk ($1,000)	$ 358,588	$ 329,574	$ 408,639	$ 412,482	$ 307,976	$ 415,027	$ 530,506	$ 497,574	$ 532,968	$ 655,350	$ 474,486
	Other	$ 25,553	$ 21,965	$ 23,103	$ 23,715	$ 25,095	$ 28,971	$ 27,442	$ 28,216	$ 28,990	$ 29,764	$ 30,538
	Sheep and Lambs ($1,000)	$ 13,075	$ 9,531	$ 10,713	$ 11,369	$ 12,792	$ 16,712	$ 15,228	$ 16,046	$ 16,863	$ 17,681	$ 18,499
	Aquaculture ($1,000)	$ 12,478	$ 12,434	$ 12,390	$ 12,346	$ 12,303	$ 12,259	$ 12,215	$ 12,171	$ 12,127	$ 12,083	$ 12,039
	Total ($1,000)	**$ 1,106,009**	**$ 1,004,029**	**$ 1,063,180**	**$ 1,057,863**	**$ 916,013**	**$ 1,104,657**	**$ 1,355,895**	**$ 1,395,125**	**$ 1,479,172**	**$ 1,831,361**	**$ 1,661,733**

Ag Census Data Category	Animal Type		1997	2002	2007	2012
Number of Farms by NAICS	Beef cattle ranching and farming (112111)		12,037	11,231	12,071	11,420
	Cattle feedlots (112112)		1,111	1,593	778	140
	Dairy cattle and milk production (11212)		469	521	432	344
	Hog and pig farming (1122)		415	534	425	447
	Poultry and egg production (1123)		304	622	891	965
	Sheep and goat farming (1124)		1,488	1,816	2,103	1,871
	Animal aquaculture and other animal production (1125,1129)		3,358	6,781	5,403	3,892
Value of Sales ($1,000)	Cattle and Calves		474,804	543,231	800,336	894,485
	Hogs and Pigs		6,161	3,540	5,662	3,195
	Poultry and Eggs		99,551	86,506	119,812	127,481
	Milk and Other Dairy Products		207,240	293,927	401,786	519,790
	Aquaculture		-	17,054	16,270	22,490
	Other (calculated)		68,599	56,328	66,189	55,405
		Total	856,355	1,000,586	1,410,055	1,622,846
Input Purchases	Livestock and poultry purchased	(Farms)	9,806	11,223	9,557	10,191
		$1,000	144,065	201,604	281,444	293,739
	Breeding livestock purchased	(Farms)	*n/a*	5,484	4,840	4,937
		$1,000	*n/a*	22,334	33,064	42,659
	Other livestock and poultry purchased	(Farms)	*n/a*	7,244	6,048	6,774
		$1,000	*n/a*	179,270	248,380	251,080
	Feed purchased	(Farms)	18,390	24,322	21,691	21,341
		$1,000	229,748	259,418	454,733	628,524

	Animal Type	Output ($1,000)	Earnings ($1,000)	Employment (Jobs)	Taxes Paid ($1,000)
2015 Animal Agriculture	Cattle and Calves	$ 1,983,084	$ 402,658	13,863	$ 118,099
	Hogs, Pigs, and Other	$ 51,150	$ 11,803	397	$ 3,462
	Poultry and Eggs	$ 511,252	$ 109,442	3,221	$ 32,099
	Dairy	$ 957,465	$ 221,158	7,452	$ 64,866
	Total	$ 3,502,951	$ 745,060	24,933	$ 218,526
Change from 2005 to 2015	Cattle and Calves	$ 569,770	$ 115,690	3,983	$ 33,932
	Hogs, Pigs, and Other	$ (6,885)	$ (1,589)	(53)	$ (466)
	Poultry and Eggs	$ 54,521	$ 11,671	344	$ 3,423
	Dairy	$ 79,307	$ 18,319	617	$ 5,373
	Total	$ 696,713	$ 144,091	4,890	$ 42,262

	Animal Type	Output($)	Earnings ($)	Employment (Jobs)
RIMS II Multipliers	Cattle and Calves	$ 2.219	$ 0.451	15.5
	Hogs, Pigs, and Other	$ 1.565	$ 0.361	12.1
	Poultry and Eggs	$ 1.959	$ 0.419	12.3
	Dairy	$ 2.018	$ 0.466	15.7

Tax Rates	Federal effective income tax rate	12.7%
	Federal Social Security tax rate	7.7%
	State Effective Rate	9.0%
	Total	29.3%

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.