

Economic Analysis of Animal Agriculture 2004-2014

CALIFORNIA

A Report for
United Soybean Board



September 2015



Bridging Your Research Needs.

Decision Innovation Solutions, LLC

3315 109th St. Suite B

Urbandale, IA 50322

www.decision-innovation.com

Contents

California Executive Summary	3
California Economic Impact of Animal Agriculture.....	4
California Output.....	5
California Jobs	5
California Earnings.....	6
California Taxes Paid by Animal Agriculture	6
California Animal Agriculture Soybean Meal Consumption	7
California Animal Unit (AU) Trends.....	8
California Additional Information and Methodology	12
California Multipliers.....	13
Appendix	14

California Executive Summary

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

- \$27.3 billion in economic output
- 124,322 jobs
- \$5.2 billion in earnings
- \$1.5 billion in income taxes paid at local, state, and federal levels
- \$827.6 million in the form of property taxes

Plus, from 2004-2014 animal agriculture in California increased economic output by over \$7.8 billion, boosted household earnings by \$1.5 billion, contributed 35,676 additional jobs and paid \$437.7 million in additional tax revenues.

California's animal agriculture consumed about 668.4 thousand tons of soybean meal in 2014. This soybean meal was fed primarily to:

- Dairy Cows (227.8 thousand tons)
- Broilers (163.4 thousand tons)
- Egg-Laying Hens (105.9 thousand tons)

This report examines animal agriculture in California 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 California, many opportunities and challenges will arise. And, if past is prologue, animal agriculture will continue to be a contributor to the economic well-being of the people of California and beyond.

California Economic Impact of Animal Agriculture

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

- About \$27,311.3 million in economic output
- \$5,168.7 million in household earnings
- 124,322 jobs
- \$1,531.5 million in income taxes

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

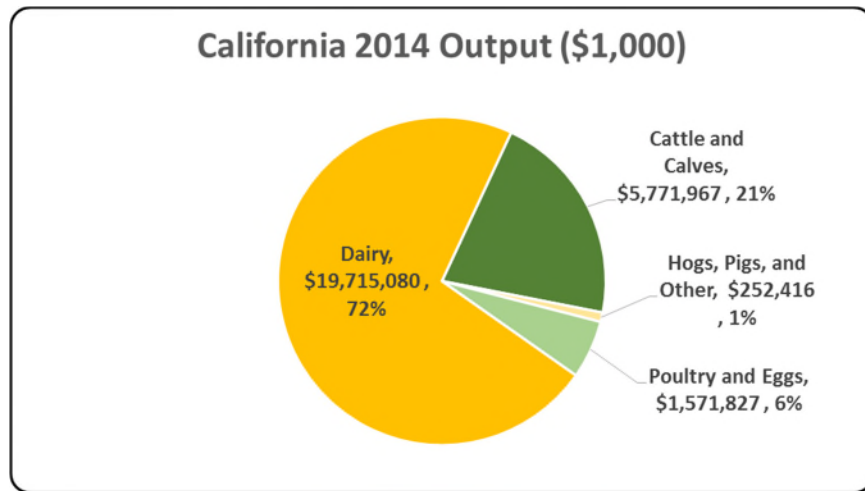
- Increased economic output by \$7,819.5 million
- Boosted household earnings by \$1,477.4 million
- Added 35,676 jobs
- Paid an additional \$437.7 million in income taxes

Below is a table which demonstrates this decade of change.

Measure	2014	Change 2004-2014	% Change 2004-2014
Output (\$1,000)	\$ 27,311,291	\$ 7,819,489	40.12%
Earnings (\$1,000)	\$ 5,168,747	\$ 1,477,365	40.02%
Employment (Jobs)	124,322	35,676	40.25%
Income Taxes Paid (\$1,000)	\$ 1,531,500	\$ 437,743	40.02%
Property Taxes Paid in 2012 (\$1,000)	\$ 827,587		

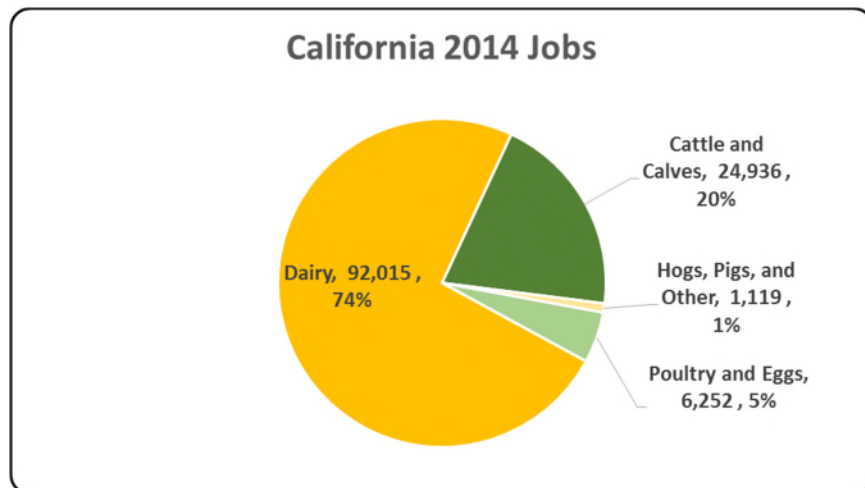
California Output

“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 California economy. Animal agriculture’s impact on California total economic output is about \$27,311.3 million.



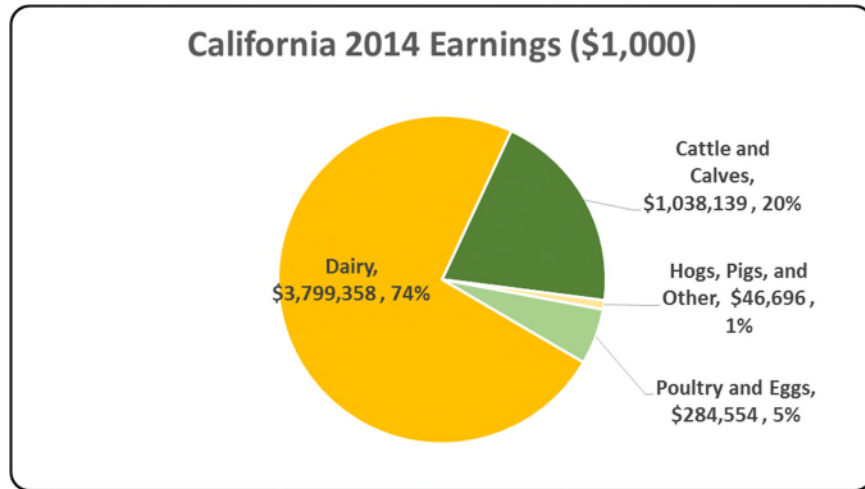
California Jobs

“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 California in terms of animal agriculture jobs. As shown, animal agriculture contributes about 124,322 jobs within and outside of animal agriculture.



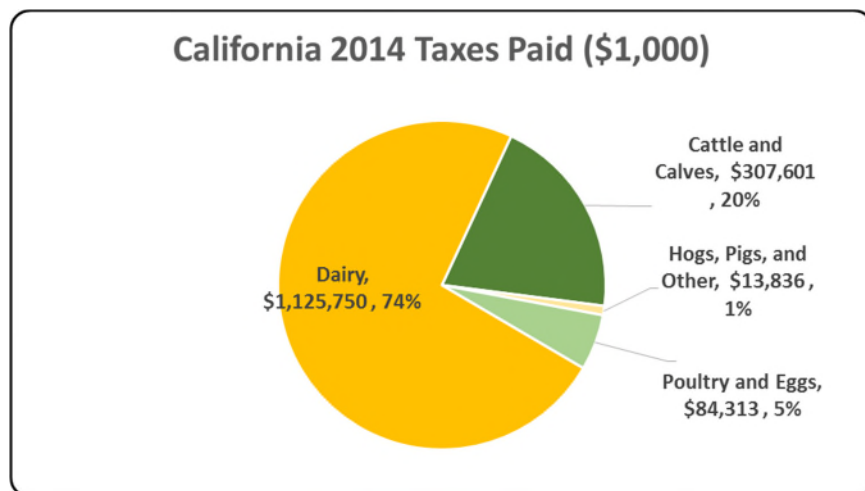
California Earnings

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 California economy in terms of earnings. California's animal agriculture contributed about \$5,168.7 million to household earnings in 2014.



California Taxes Paid by Animal Agriculture

California's animal agriculture is also a significant source of tax revenue. In 2014, the state's animal agriculture industry paid about \$1,531.5 million in income taxes at local, state, and federal levels. Plus the 2012 Census of Agriculture estimated \$827.6 million in property taxes paid by all of California agriculture during 2012. Estimates of income taxes paid by animal agriculture are shown in the following chart.



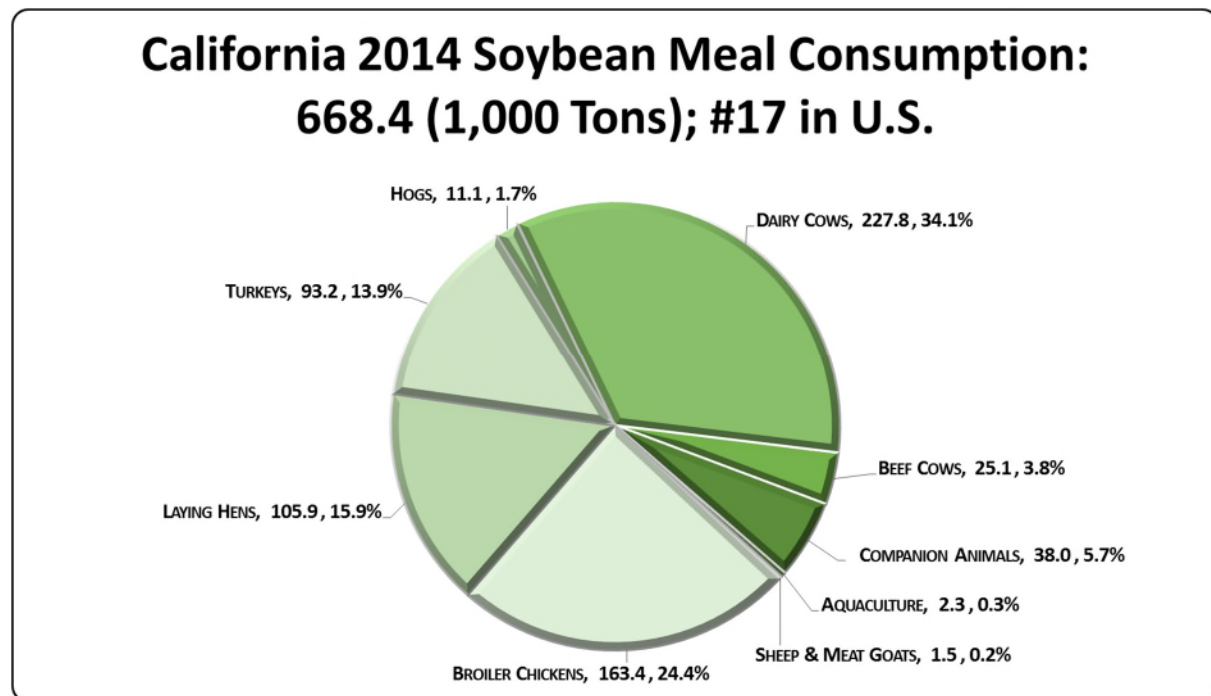
California Animal Agriculture Soybean Meal Consumption

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.

California’s animal agriculture consumed almost 668.4 thousand tons of soybean meal in 2014, placing the state as #17 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 (227.8 thousand tons)
- Broilers (163.4 thousand tons)
- Egg-Laying Hens (105.9 thousand tons)

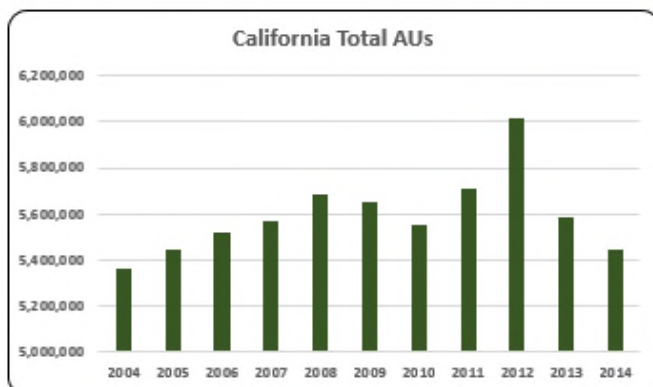
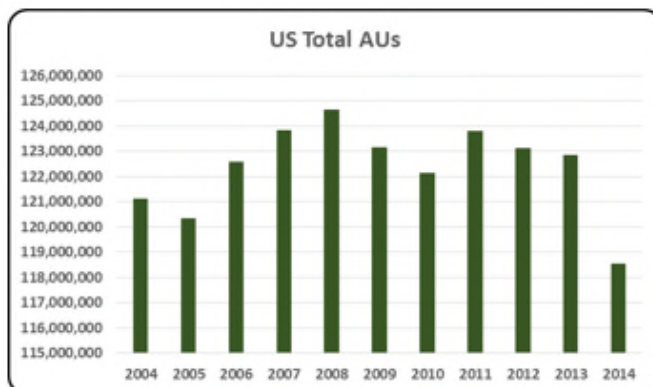


California Animal Unit (AU) Trends

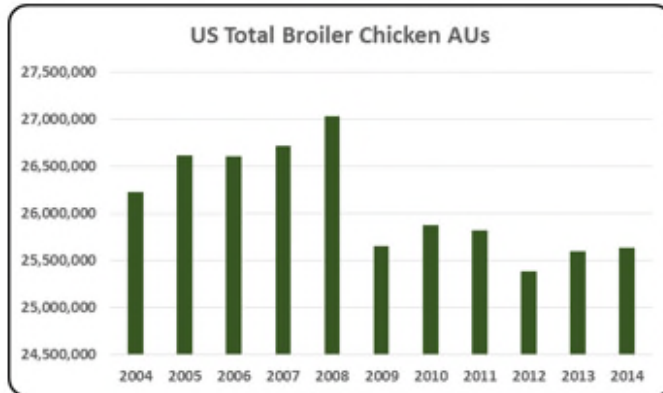
Over time, prices of feed, meat, eggs and milk, as well as levels of demand for these products in the United States and abroad have an impact on the size of animal agriculture in the State of California. Due to this reality, using a single year as a measure of the presence and strength of a sector can 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 California and to give perspective on California'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.

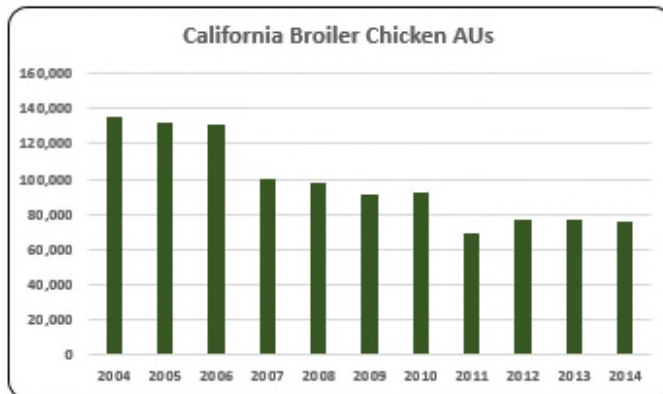
As shown in the accompanying charts and written commentary, certain components of animal agriculture are more present, and therefore more dominant than others. This is due primarily to geography (i.e., weather patterns and access to certain transportation hubs), proximity to high quality, relevant feed ingredients, and the local animal agriculture regulatory framework. In California, the largest three segments of animal agriculture in terms of AUs during 2014 were: Beef Cows (2,623.4 thousand AUs), Dairy Cows (2,492.0 thousand AUs), and Turkeys (164.9 thousand AUs). Total animal units in California during 2014 were 5,441.8 thousand AUs.



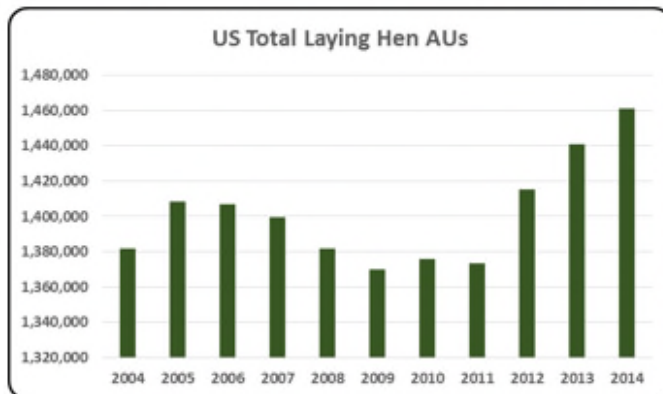
- Overall U.S. total AUs have varied from 2004 to 2014. In 2014 AUs were at an all-time low reflecting, in part, the impact of severe weather on cattle production in some parts of country. During the 2004-14 time period, total AUs in the nation peaked in 2008.
- California's total AUs in 2014 reached a level of 5,441.8 thousand representing 4.6% of all AUs in the U.S. during that year. From 2004 to 2014 AUs in California averaged 5,593.4 thousand.



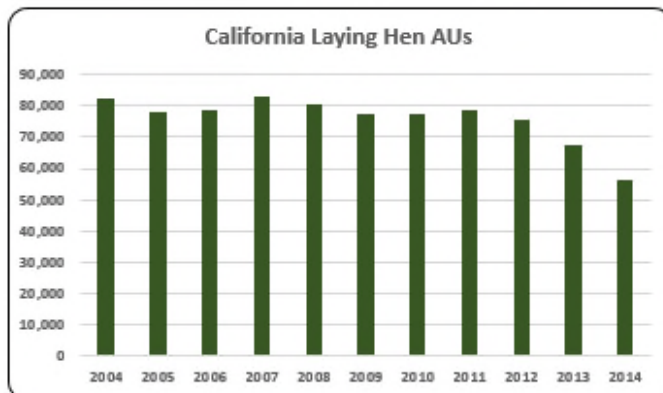
- U.S. broiler production is clustered in a number of states, with Georgia being the largest producer. On average from 2004 to 2014, broiler chicken AUs were about 26.1 million. In 2014, AUs rebounded 1% from the low AUs numbers in 2012 (25.4 million AUs).



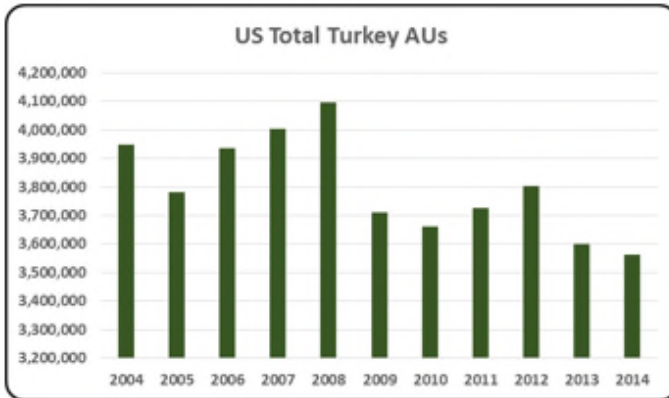
- Over the last decade there were, on average, 98,140 broiler AUs in California. Overall, broiler production in California declined since 2006, but broiler AUs over the last three years has been steady at about 76,477.



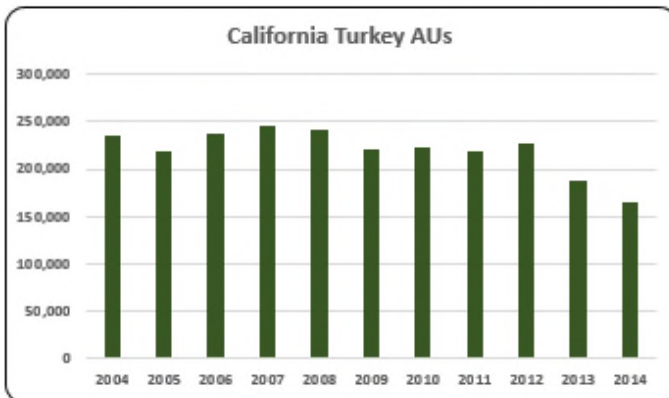
- On average, the layer AUs during 2004-2014 were 1.4 million. In 2014 layer AUs were 1.5 million, up 7% from the lowest number in 2009 (1.4 million AUs).



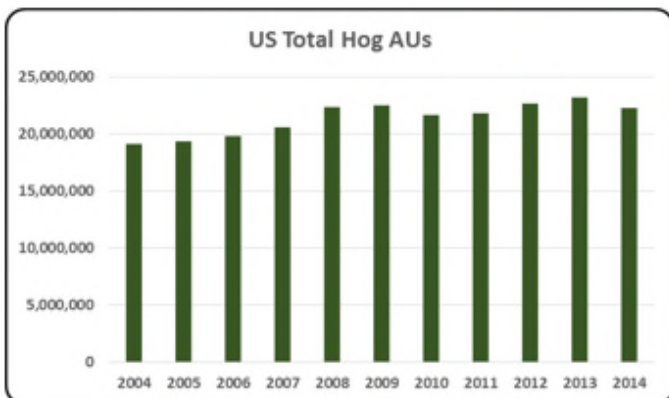
- In 2014, 1.0% of all AUs in California were in the layers production (76,098). Layer AUs have consistently decreased since the beginning of the decade, from 82,096 in 2004 to 56,286 in 2014, but the reduction has been more pronounced since 2012.



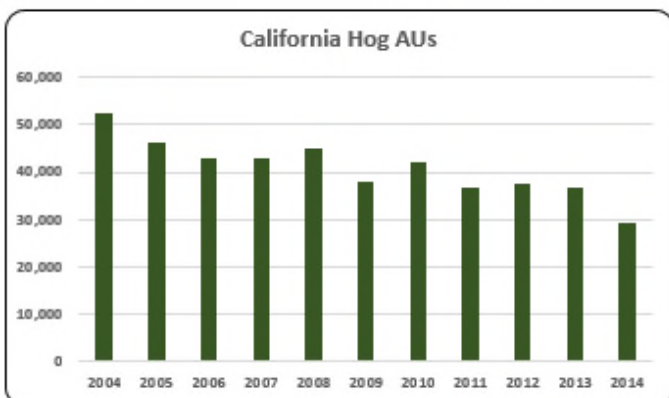
- From 2004 to 2014, the U.S. accounted for 50% of the world’s turkey production. However, in 2014 turkey AUs were the lowest of the decade at 3.5 million, decreasing 13% compared to 2008 (4.1 million turkey AUs) the largest turkey AUs of the decade.



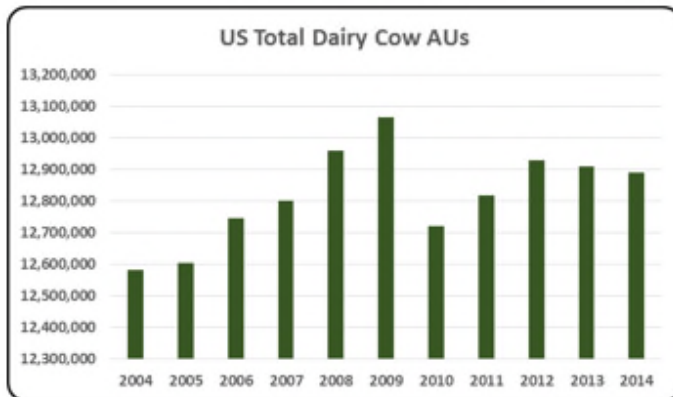
- There were 164,947 turkey AUs in California in 2014 which was 4.6% of all turkey AUs in the U.S. (3,562.5) during last year. Turkey AUs dropped 12.4% from the previous year (188,277).



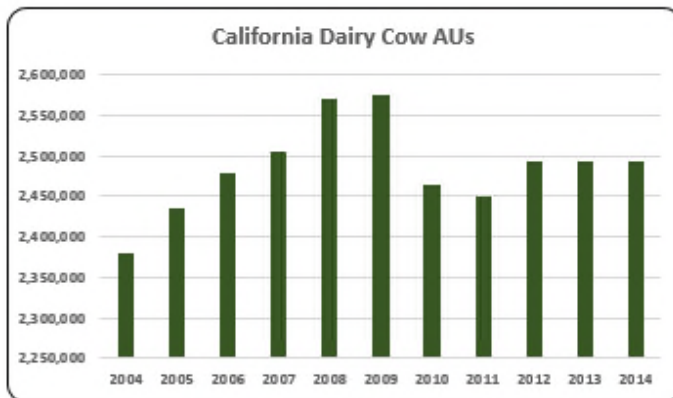
- On average from 2004 to 2014, hog AUs were about 21.4 million. In 2013 hog AUs reached a high of 23.2 million AUs as prices of main feed ingredients, particularly corn, decreased to pre-2010 price levels. Hog AUs in 2014 decreased 4.4% to 22.3 million AUs year-over-year, primarily due to the porcine epidemic diarrhea virus (PEDv) outbreak. Despite the fluctuation in AUs, the pork supply was relatively stable.



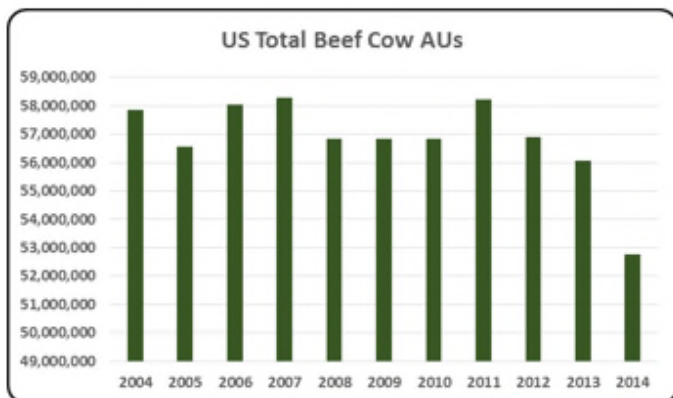
- California’s hog AUs dwindled 20.5% to 29,100 AUs, and these were the lowest of the decade. In contrast, 2004 hog AUs (52,500) were the highest of the period.



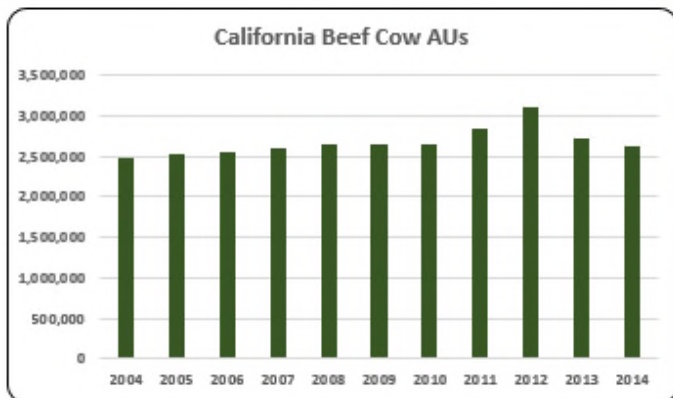
- From 2004 to 2014 dairy cow AUs averaged 12.8 million. In 2014, dairy cow AUs (12.9 million) remained about the same as the previous year but still below the high of 13.1 million AUs, the level in 2009. Despite the fluctuation in AUs, milk supplied has steadily risen.



- California had 19.3% (2,492 thousand) of all dairy cow AUs in the U.S. in 2014; however, California's dairy cow AUs in 2014 were the lowest of the decade since 2004 (2,380 thousand).



- 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.



- California's beef cow AUs in 2014 represented about 5% of all beef cow AUs in the U.S. in 2014. Beef cow AUs decreased 3.6% from the previous year and were the lowest since 2010 (2,650.5 thousand).

California Additional Information and Methodology

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

California 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 California'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 California, \$1.790 to \$2.195 million in total economic activity, \$0.331 to \$0.406 in household wages and 8 to 10 additional jobs are generated in the economy at large.

	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)
RIMS II Multipliers	Cattle and Calves	\$ 2.1945	\$ 0.3947	9.5
	Hogs, Pigs, and Other	\$ 1.7903	\$ 0.3312	7.9
	Poultry and Eggs	\$ 2.1101	\$ 0.3820	8.4
	Dairy	\$ 2.1052	\$ 0.4057	9.8

Appendix

		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Animal Units (AUs)	Beef Cattle AUs	2,475,600	2,535,750	2,551,950	2,592,750	2,650,500	2,650,500	2,650,500	2,852,250	3,103,050	2,722,650	2,623,350
	Hog and Pig AUs	52,500	46,350	42,750	42,750	45,000	37,950	42,000	36,900	37,350	36,600	29,100
	Broiler AUs	135,075	132,232	131,339	99,743	98,188	91,292	92,520	69,714	76,801	76,533	76,098
	Turkey AUs	235,500	218,648	238,306	244,607	241,554	219,798	222,355	219,102	226,420	188,277	164,947
	Egg Layer AUs	82,096	78,304	78,460	82,796	80,580	77,092	77,372	78,876	75,806	67,207	56,286
	Dairy AUs	2,380,000	2,436,000	2,478,000	2,506,000	2,569,000	2,576,000	2,464,000	2,450,000	2,492,000	2,492,000	2,492,000
	Total Animal Units	5,360,771	5,447,284	5,520,805	5,568,647	5,684,822	5,652,631	5,548,747	5,706,843	6,011,427	5,583,267	5,441,781
Value of Production (\$1,000)	Cattle and Calves (\$1,000)	\$ 1,267,226	\$ 1,210,259	\$ 1,173,275	\$ 1,289,346	\$ 1,369,626	\$ 1,097,174	\$ 1,318,469	\$ 2,005,694	\$ 2,319,343	\$ 2,275,348	\$ 2,630,197
	Hogs and Pigs (\$1,000)	\$ 38,615	\$ 33,553	\$ 31,409	\$ 32,955	\$ 26,177	\$ 18,979	\$ 23,925	\$ 28,859	\$ 24,991	\$ 21,269	\$ 22,747
	Broilers (\$1,000)	\$ 113,610	\$ 107,616	\$ 83,164	\$ 75,035	\$ 77,224	\$ 66,892	\$ 70,406	\$ 62,032	\$ 76,507	\$ 93,205	\$ 97,775
	Turkeys (\$1,000)	\$ 169,937	\$ 170,216	\$ 196,963	\$ 211,669	\$ 252,416	\$ 202,800	\$ 262,910	\$ 287,463	\$ 307,326	\$ 242,925	\$ 227,997
	Eggs (\$1,000)	\$ 287,392	\$ 181,655	\$ 212,889	\$ 346,426	\$ 440,438	\$ 319,805	\$ 367,788	\$ 387,522	\$ 392,950	\$ 382,690	\$ 419,135
	Milk (\$1,000)	\$ 5,371,295	\$ 5,228,909	\$ 4,496,514	\$ 7,343,282	\$ 6,930,345	\$ 4,539,929	\$ 5,932,557	\$ 7,687,055	\$ 6,905,525	\$ 7,624,109	\$ 9,364,944
	Other	\$ 106,545	\$ 110,067	\$ 103,964	\$ 100,841	\$ 100,670	\$ 106,821	\$ 124,046	\$ 113,667	\$ 115,193	\$ 116,719	\$ 118,244
	Sheep and Lambs (\$1,000)	\$ 38,685	\$ 40,460	\$ 32,610	\$ 27,740	\$ 25,822	\$ 30,226	\$ 45,704	\$ 33,578	\$ 33,357	\$ 33,136	\$ 32,914
	Aquaculture (\$1,000)	\$ 67,860	\$ 69,607	\$ 71,354	\$ 73,101	\$ 74,848	\$ 76,595	\$ 78,342	\$ 80,089	\$ 81,836	\$ 83,583	\$ 85,330
	Total (\$1,000)	\$ 7,354,620	\$ 7,042,275	\$ 6,298,178	\$ 9,399,554	\$ 9,196,896	\$ 6,352,400	\$ 8,100,101	\$ 10,572,292	\$ 10,141,835	\$ 10,756,264	\$ 12,881,039

Ag Census Data Category	Animal Type	1997	2002	2007	2012	
Number of Farms by NAICS	Beef cattle ranching and farming (112111)	11,840	11,259	11,153	11,767	
	Cattle feedlots (112112)	528	553	404	156	
	Dairy cattle and milk production (11212)	2,122	2,361	1,839	1,594	
	Hog and pig farming (1122)	522	626	425	446	
	Poultry and egg production (1123)	1,046	914	1,798	1,202	
	Sheep and goat farming (1124)	1,533	2,485	3,041	3,246	
	Animal aquaculture and other animal production (1125,1129)	5,739	10,035	11,096	7,809	
Value of Sales (\$1,000)	Cattle and Calves	1,447,849	1,582,334	2,536,571	3,259,325	
	Hogs and Pigs	41,288	27,488	34,188	51,526	
	Poultry and Eggs	1,195,967	1,017,968	1,536,763	1,663,919	
	Milk and Other Dairy Products	3,184,363	3,739,213	6,569,172	6,945,102	
	Aquaculture	43,509	64,557	102,228	103,016	
	Other (calculated)	165,398	152,891	203,121	175,445	
	Total	6,078,374	6,584,451	10,982,043	12,198,333	
Input Purchases	Livestock and poultry purchased	(Farms) 10,957	10,745	10,881	12,585	
		\$1,000	759,223	949,697	1,264,818	1,254,286
	Breeding livestock purchased	(Farms) <i>n/a</i>	6,070	5,951	6,850	
		\$1,000	<i>n/a</i>	114,594	186,901	255,730
	Other livestock and poultry purchased	(Farms) <i>n/a</i>	6,404	6,356	7,673	
		\$1,000	<i>n/a</i>	835,104	1,077,917	998,556
Feed purchased	(Farms)	20,385	28,663	29,596	30,014	
	\$1,000	2,588,982	2,494,806	4,274,263	6,069,374	

	Animal Type	Output (\$1,000)	Earnings (\$1,000)	Employment (Jobs)	Taxes Paid (\$1,000)
2014 Animal Agriculture	Cattle and Calves	\$ 5,771,967	\$ 1,038,139	24,936	\$ 307,601
	Hogs, Pigs, and Other	\$ 252,416	\$ 46,696	1,119	\$ 13,836
	Poultry and Eggs	\$ 1,571,827	\$ 284,554	6,252	\$ 84,313
	Dairy	\$ 19,715,080	\$ 3,799,358	92,015	\$ 1,125,750
	Total	\$ 27,311,291	\$ 5,168,747	124,322	\$ 1,531,500
Change from 2004 to 2014	Cattle and Calves	\$ 2,286,813	\$ 411,303	9,879	\$ 121,869
	Hogs, Pigs, and Other	\$ (73,274)	\$ (13,555)	(325)	\$ (4,016)
	Poultry and Eggs	\$ 62,008	\$ 11,226	247	\$ 3,326
	Dairy	\$ 5,543,942	\$ 1,068,391	25,875	\$ 316,564
	Total	\$ 7,819,489	\$ 1,477,365	35,676	\$ 437,743
RIMS II Multipliers	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)	
	Cattle and Calves	\$ 2.1945	\$ 0.3947	9.5	
	Hogs, Pigs, and Other	\$ 1.7903	\$ 0.3312	7.9	
	Poultry and Eggs	\$ 2.1101	\$ 0.3820	8.4	
	Dairy	\$ 2.1052	\$ 0.4057	9.8	
Tax Rates	Federal effective income tax rate				12.7%
	Federal Social Security tax rate				7.7%
	State Effective Rate				9.3%
	Total				29.6%

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.