2020 Iowa Pork Industry Report

Prepared for:

IOWA PORK PRODUCERS ASSOCIATION

Successful farmers. Enriched lives.

Prepared by:

Decision Innovation Solutions™

Bridging Your Research Needs.

May 2020

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Table 1, Acronyms

Acronym	Description
Cwt	Hundredweight
DIS	Decision Innovation Solutions
DDGs	Dried Distillers Grains
ERS	Economic Research Service
IDALS	Iowa Department of Agriculture and Land Stewardship
LMIC	Livestock Marketing Information Center
MT	Metric ton
NASS	National Agricultural Statistics Service
PCC	Pork Carcass Cutout
PEDv	Porcine Epidemic Diarrhea virus
RWE	Retail Weight Equivalent
SBM	Soybean meal
USDA	United States Department of Agriculture
USDA-FAS	United States Department of Agriculture – Foreign Agricultural Service
WASDE	World Agricultural Supply and Demand Estimates

Executive Summary

The Iowa pork industry is a robust industry that continues to expand and increasingly contribute to the Iowa economy. Hog inventory numbers reached a new record high with 24.8 million hogs on Iowa farms in December 2019. Iowa holds 32% of the U.S. hog inventory. Iowa's hog breeding herd (1.01 million head) continues to decline despite growth in the U.S. hog breeding herd (6.46 million head). Nationally, the breeding herd grew by 1.2% annually over the past decade, while Iowa's breeding herd declined by 0.1% annually. Iowa's market hog herd (23.79 million head) has increased by 5.51 million head in the past decade, a 3% annual growth rate.

Decision Innovation Solutions (DIS) estimates that in 2019 there were 5,418 hog farms in Iowa. The size of hog farms in Iowa continues to increase. Sixty-nine percent of Iowa's hog inventory is now (2017 Census of Agriculture) on farms with 5,000 or more head. That is up from 54% a decade ago and 26% in 1997.The most common commercial-size hog farm in Iowa is 2,000-4,999 head with 32% of Iowa hog farms in this size category. Farms with 5,000 or more head comprise 20% of all farms, and farms of 1,000-1,999 head account for 13% of hog farms.

The 5 counties in Iowa with more than 1 million hogs hold 25% of Iowa's hog inventory. These are: Washington, Sioux, Lyon, Hamilton, and Plymouth counties. The average county hog inventory was 250,505 head, while the average number of hog farms per county was 55. This results in an average inventory per Iowa hog farm of 4,578 head.

Iowa has 14 commercial hog slaughter facilities with an estimated daily slaughter capacity of 152,050 head and an annual slaughter capacity of 42,695,640 head. In 2019, Iowa's hog slaughter plants operated at 91.6% capacity for all of 2019. Iowa slaughtered 39.117 million hogs in 2019, which represents about 30.11% of the total number (129.915 million) of hogs slaughtered in the U.S. In December 2019, national hog slaughter capacity utilization was nearly 100% of calculated weekly capacity.

The 35 focus counties selected for specific analysis represent 35.2% of the counties in Iowa; however, these 35 counties have hog inventories that account for 59% of the total hog inventory for the state of Iowa. Additionally, these 35 counties represent 53% of the hog farms in Iowa, with an average inventory per farm of 5,022 head, which is more than the statewide average head per farm (4,578 head). All 35 counties saw growth in hog inventory between the years of 2017 and 2019.

Key Findings

In 2020 (brought forward from 2018 estimates), hog production, slaughter, further processing and other related economic activity in Iowa are estimated to contribute:

- $11.9 billion in value-added
- 147,105 in jobs
- $40.8 billion in sales (output)
- $6.84 billion in labor income
- $893 million in state and local taxes
- $1.3 billion in federal taxes

Of the $40.8 billion in output from the hog industry in the state of Iowa:

- Hog production contributed $13.8 billion
- Hog slaughtering contributed $22.3 billion
- Hog processing contributed $4.7 billion

In addition to analyzing hog production, processing, and related economic activity at the state level, an economic impact study for a new 2,400-head finishing unit to a local community would generate the following:

Combined Effect of Construction and Operations for First Year				
Impact Type	Employment	Labor Income	Value-Added	Sales
Direct Effect	7	$347,430	$591,083	$1,473,695
Indirect Effect	3	$178,506	$312,437	$711,754
Induced Effect	3	$110,606	$201,693	$362,444
Total Effect	12	$636,541	$1,105,213	$2,547,892

Construction				
Impact Type	Employment	Labor Income	Value-Added	Sales
Direct Effect	4	$232,666	$325,646	$757,228
Indirect Effect	1	$78,992	$134,342	$269,034
Induced Effect	2	$65,264	$119,070	$213,930
Total Effect	6	$376,921	$579,058	$1,240,193

Operations for First Year				
Impact Type	Employment	Labor Income	Value-Added	Sales
Direct Effect	3	$114,764	$265,437	$716,467
Indirect Effect	2	$99,514	$178,095	$442,719
Induced Effect	1	$45,342	$82,623	$148,513
Total Effect	6	$259,620	$526,155	$1,307,699

Hog Industry Trends

Inventory

Iowa's hog inventory data for the last 20 years has varied, but numbers have consistently increased, particularly since 2015. On December 1, 2019, Iowa's hog inventory reached a record high of 24.8 million head (see Figure 1). Inventory data (on December 1) from 2000 to 2019 shows that, on average, Iowa's hog inventory share of U.S. total inventory was equal to 28.7% (see Figure 1). Hog inventory grew from 15.1 million in 2000 to 24.8 million on December 1, 2019. Hog inventories briefly declined in 2013 to 20.2 million hogs due to PEDv. This outbreak caused significant morbidity and mortality, particularly in young piglets. Iowa's December 1, 2013 inventory of under-50-pound hogs (4.840 million head) was 5.5% below its December 1, 2012 level (see Figure 2). Since then, all weight classes of hogs have experienced significant increases. Over the past ten years, on average, Iowa's inventory of under-50-pound hogs has been 24.7% of Iowa's total hog inventory. Over the past 10 years, U.S. hog inventory has grown at a 1.8% annual average rate, while Iowa hog inventory has increased 2.8% annually.

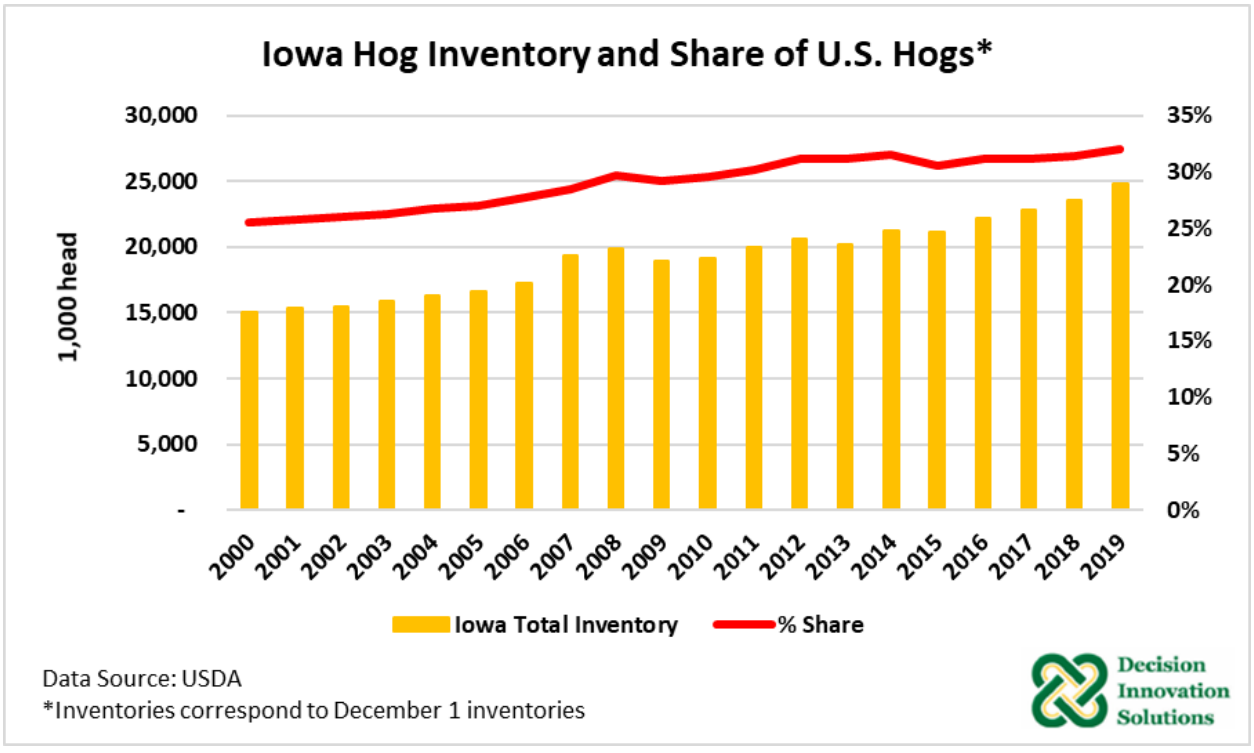

Figure 1, Iowa Hog Inventory and Share of U.S. Hogs

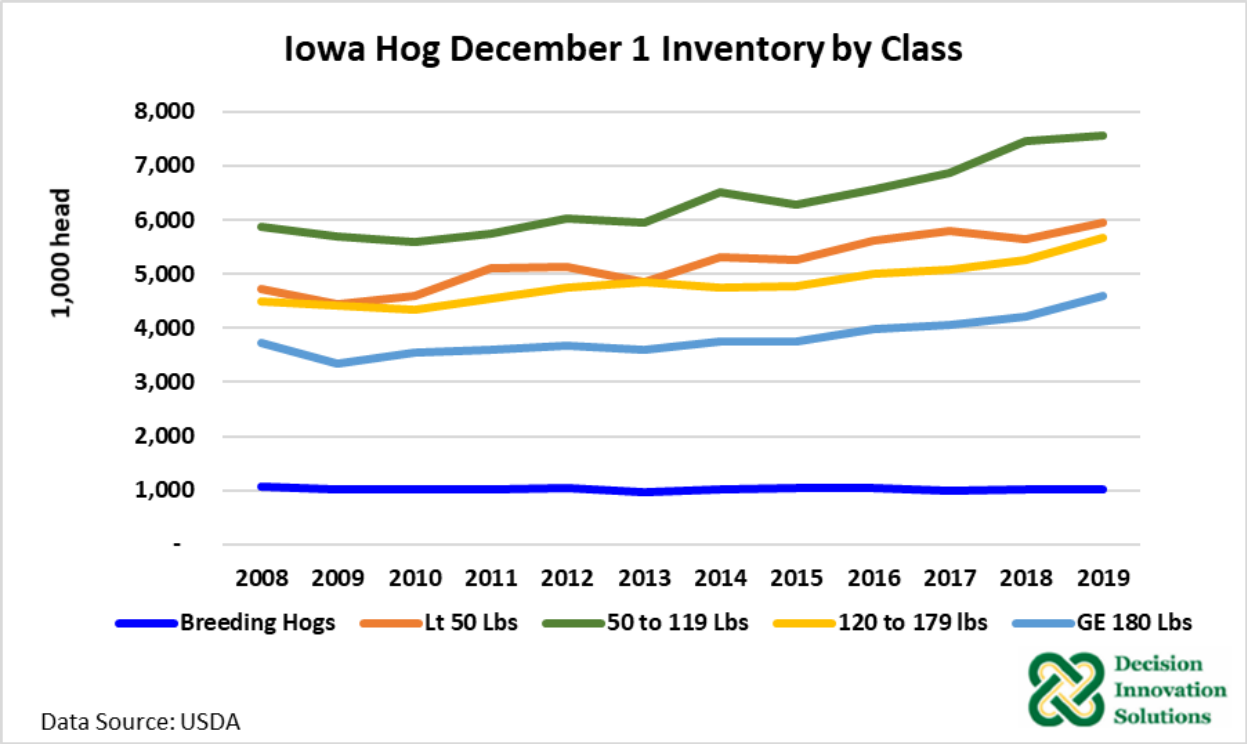

Figure 2, Iowa Hog December 1 Inventory by Class

U.S. and Iowa Inventory (December 1, 2019)

The USDA's Hogs and Pigs data released December 23, 2019, indicated the U.S. inventory of hogs and pigs on December 1, 2019, was 77.3 million head, up 3% year-over-year, but down marginally from the previous quarter (77.6 million head). In the December 2019 survey, Iowa hogs and pigs inventory share of total U.S. hogs and pigs was estimated at 32.1%. For Iowa, total hog inventory was 24.8 million head, up 5.1% from a year ago but unchanged from the September 1, 2019 count (see Figure 3).

The U.S. breeding inventory on December 1, 2019, grew 2.1% to 6.5 million head, relative to the same period last year and slightly up from the count on September 1, 2019. On the other hand, Iowa's breeding inventory was down 1% to 1.0 million head in the latest survey compared with December 1, 2018, but unchanged from the previous quarter (September 1, 2019). Over the past decade, the U.S. hog breeding inventory annual growth rate has averaged 1.2%; the Iowa hog breeding herd has slightly declined. The annual decline has averaged 0.1%.

In addition, the December 2019 report showed the U.S. hog market inventory was 70.9 million head, up 3.1% from the previous year (December 1, 2018), but down less than 0.5% from the previous quarter (71.1 million head). Iowa's market hog inventory was 23.8 million head, an increase of 5.4% from last year (see Figure 2) and unchanged from September 1, 2019. The inventory of market pigs weighing less than 180 pounds climbed 4.5% in Iowa compared to

December 1, 2018. Over the past decade, the U.S. market hog inventory has grown by 2.0% annually; the Iowa market hog inventory has grown by 3.0% annually, on average.

The September-November 2019 Iowa pig crop, at 6.0 million head, was down 6% from last year. Sows farrowing during this period totaled 530,000 head, down 7% from 2018. The sows farrowed during this quarter were 52% of the breeding herd. The average pigs saved per litter was a record high of 11.35 for the September-November period, relative to 11.2 last year.

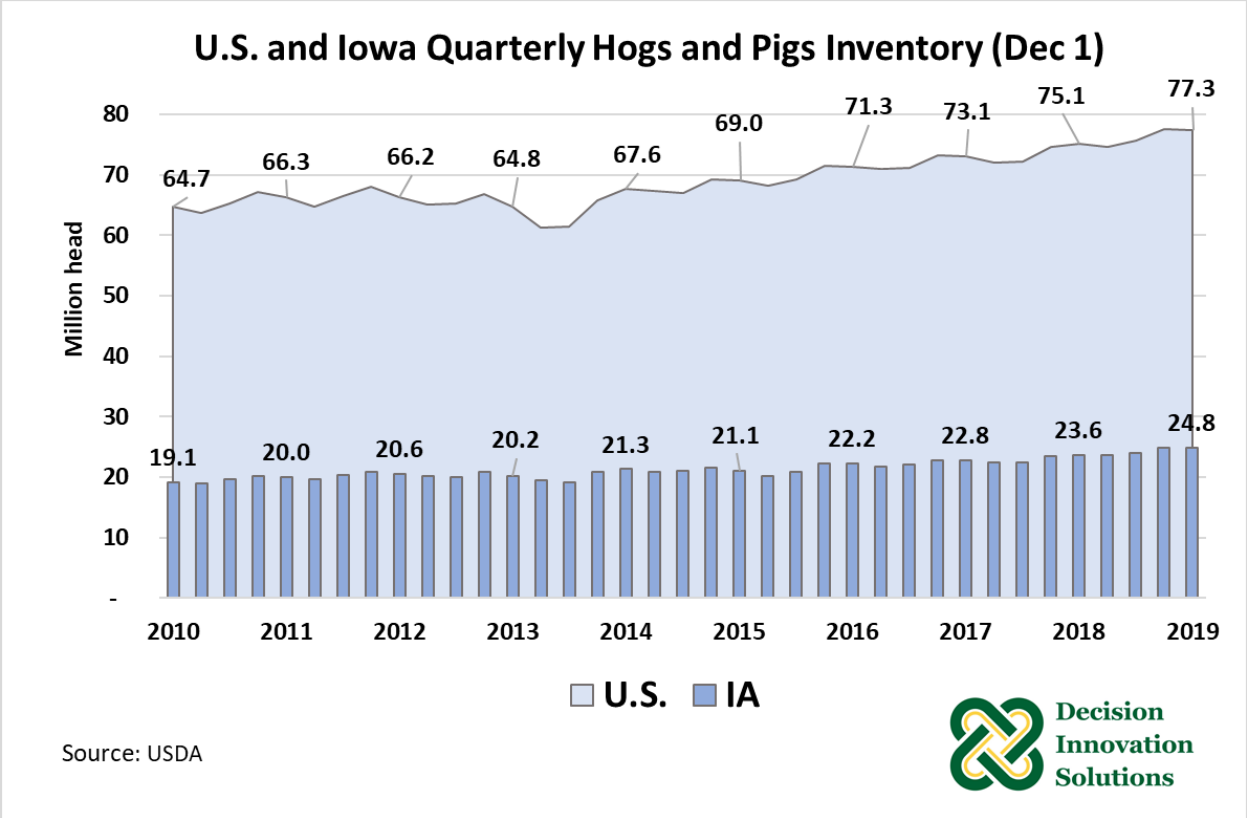

Figure 3, U.S. and Iowa Quarterly Hogs and Pigs Inventories (Dec 1)

As Figure 4 shows, U.S. hog operations are mostly concentrated in the Midwest (Iowa and Southern Minnesota, particularly) and in eastern North Carolina. Among main hog producers, Iowa holds the largest inventories. In 2019, Iowa hog inventory was 2.7 times higher than the inventories in North Carolina and Minnesota. When compared with Illinois and Indiana, Iowa inventory was 4.6 and 5.8 times higher, respectively.

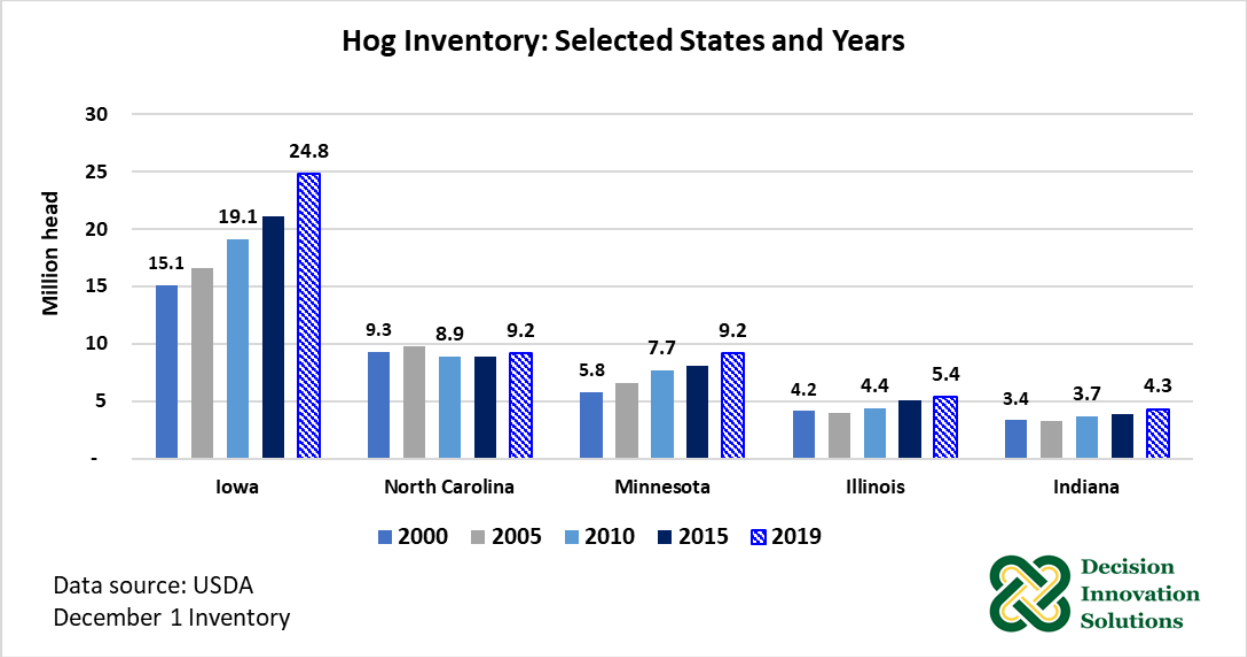

Figure 4, Hog Inventory: Selected States and Years

Inventory and Farm Distribution (State)

Iowa has hog farm inventories in every county with numbers ranging from less than 1,000 head (inventory) in Mills County to more than 1.3 million head in Washington County. USDA Census data indicates Iowa hog inventories have grown 8.2 million head from 14.513 million head in 1997 to 22.730 million head in 2017. Hog inventories on farms with 5,000 or more head have substantially increased during that period, from 3.8 million head in 1997 to 15.6 million head in 2017. On the other hand, inventory on hog farms holding between 1,000 to 1,999 head declined during the same period (see Figure 5). Inventories with 5,000 or more head comprised 69% of total Iowa inventory compared with 26% in 1997 (see Figure 6).

Iowa's overall number of farms with hog inventories fell from 17,585 operations in 1997 to 5,660 in 2017. Note that the number of hog farms holding 1,000 to 1,999 head experienced a 67% decline during that period; however, hog operations holding 2,000 or more head rose during the same time (see Figure 7). Farms with 5,000 or more head represented just 2% of all Iowa hog farms in 1997, whereas they comprise 20% of Iowa hog farms in 2017. Hog farms holding 2,000 to 4,999 head are the most numerous size farms with a 32% share of the total number of Iowa hog farms, according to the last Census of Agriculture (see Figure 8).

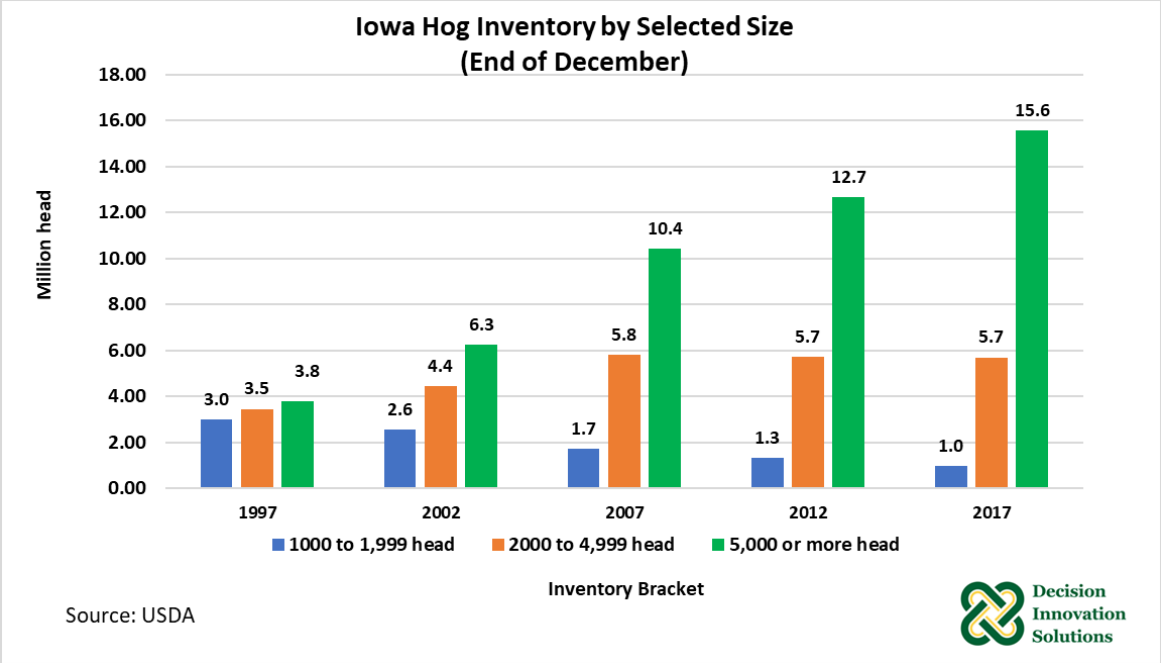

Figure 5, Iowa Hog Inventory by Selected Size (End of December)

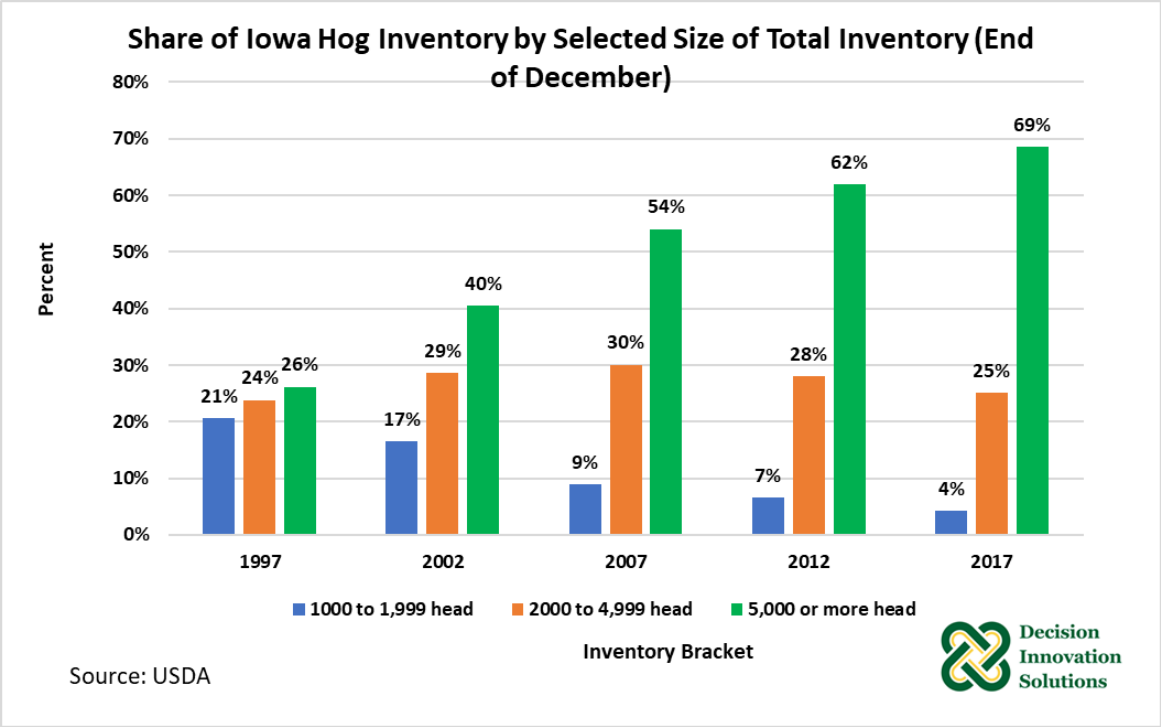

Figure 6, Share of Hog Inventory by Selected Size of Total Inventory (End of December)

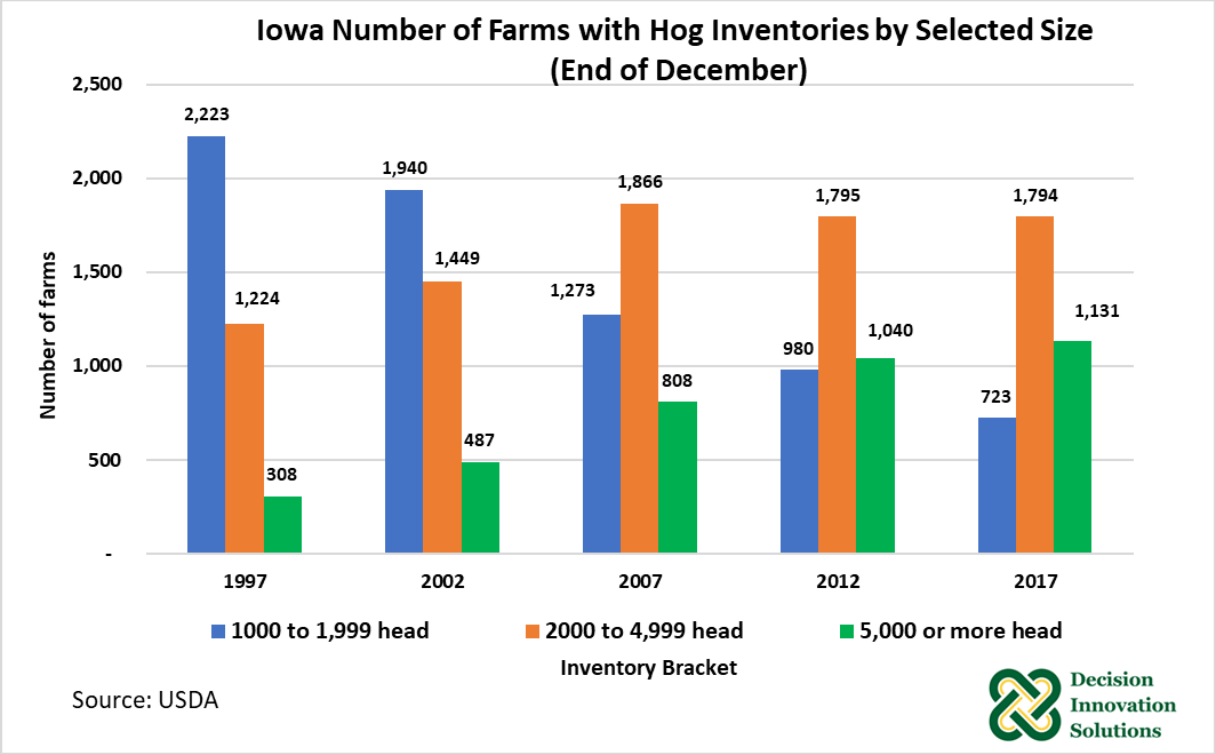

Figure 7, Iowa Number of Farms with Hog Inventories by Selected Size (End of December)

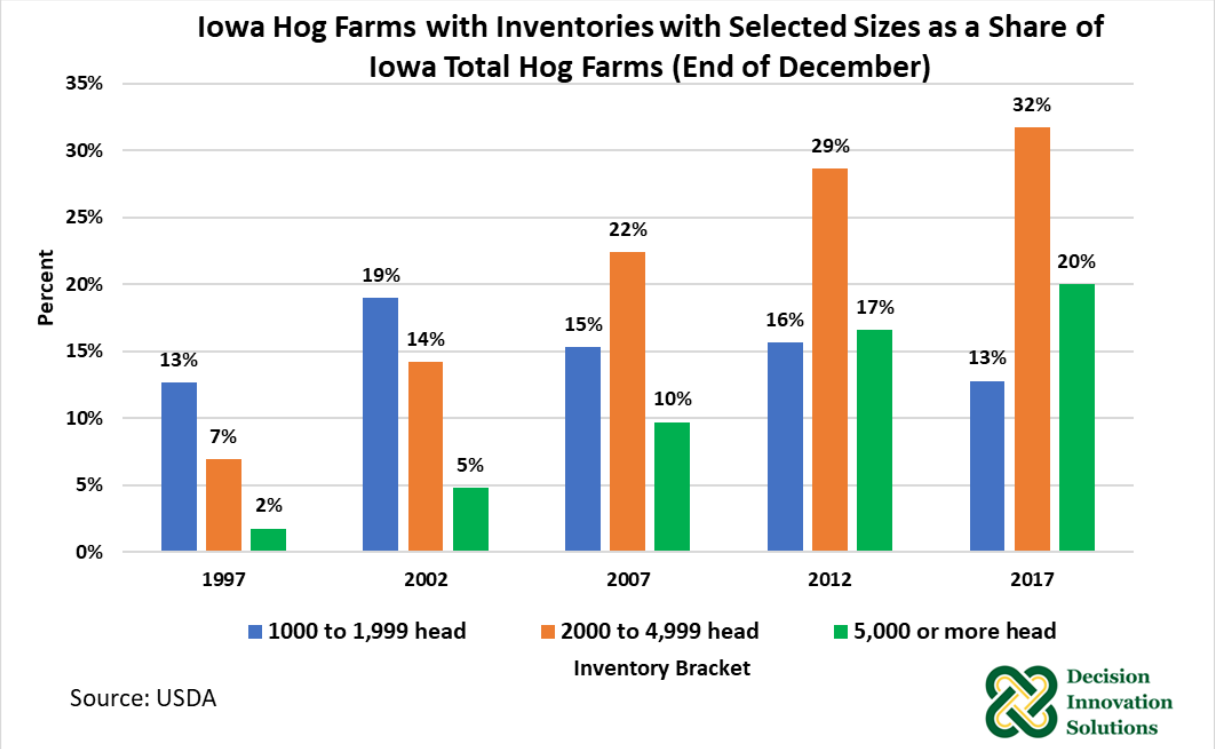

Figure 8, Iowa Hog Farms with Inventories with Selected Sizes as a Share of Iowa Total Hog Farms (End of December)

According to the 2017 USDA Census of Agriculture, Sioux County leads Iowa in the number of hog farms with 435 operations, and Monroe and Fremont counties share the status of having the fewest number of hog operations at 11 operations in each county (see Figure 9).

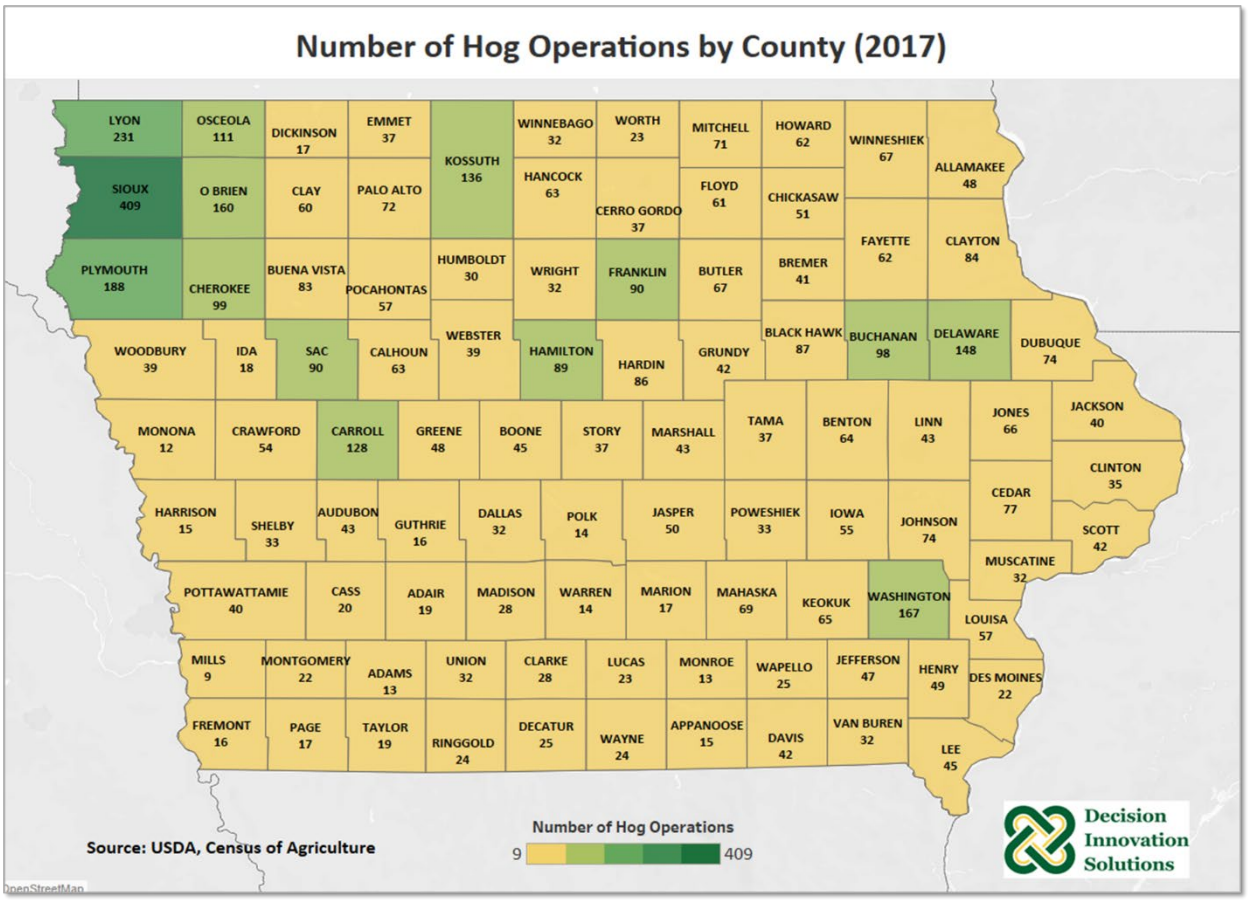

Figure 9, Number of Hog Operations by County (2017)

Based on the percent change in the number of hog operations from 2012 to 2017, the two counties with the largest percentage drop were Guthrie and Ida counties with 58% decline each (Figure 10). On the other hand, Fremont County experienced the largest percentage increase in the number of hog operations during these two census years with a 129% change. Other counties with large percentage increases in the number of hog operations are: Dickinson (113%), Montgomery (83%), Wayne (71%), Decatur (67%), and Monroe (63%).

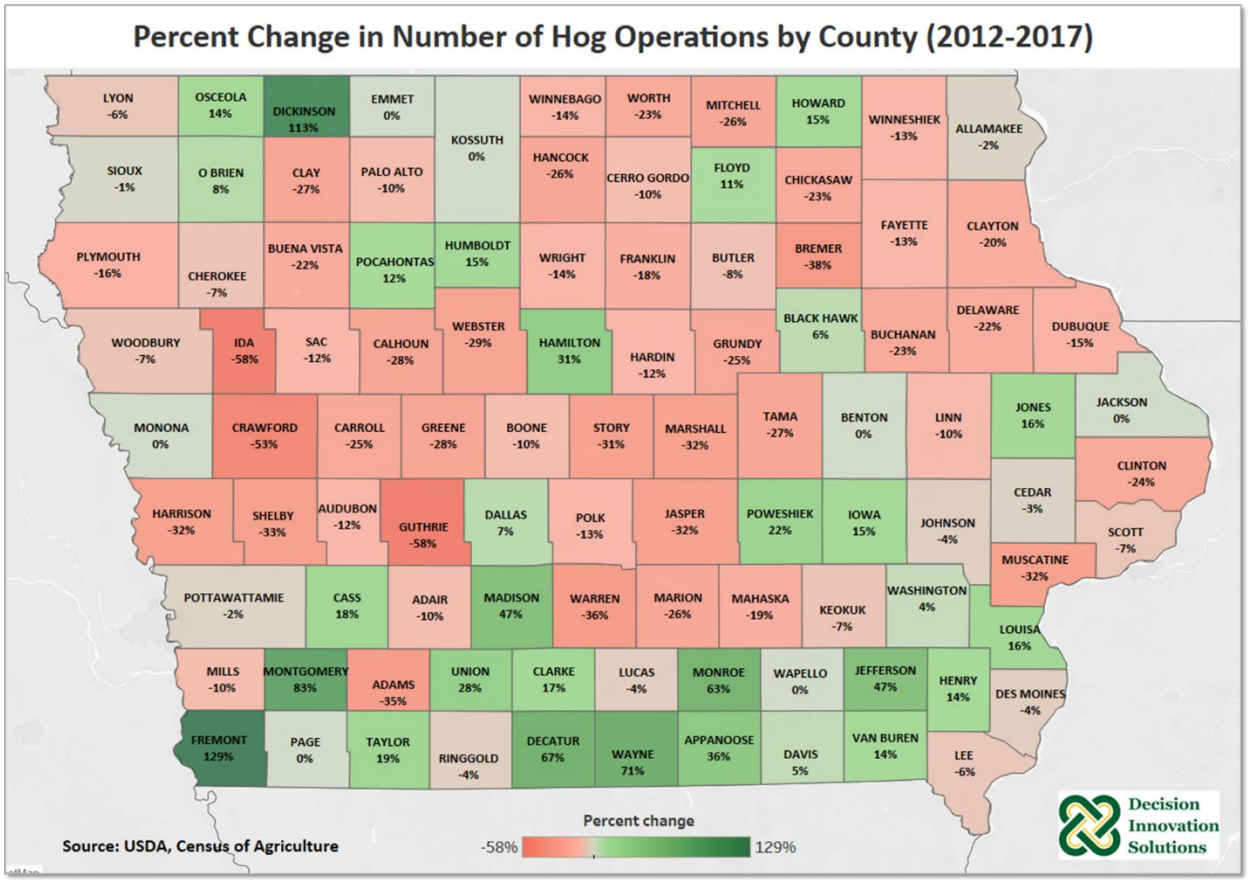

Figure 10, Percent Change in Number of Hog Operations by County (2012-2017)

As Figure 11 indicates, Washington County had the largest value of hog sales with more than $480 million in hog sales, followed by Sioux ($445.7 million) and Lyon ($378.1 million). *Note: Lack of data for a county denotes that due to small number of respondents, data for this county was not disclosed by USDA to protect privacy of respondents.*

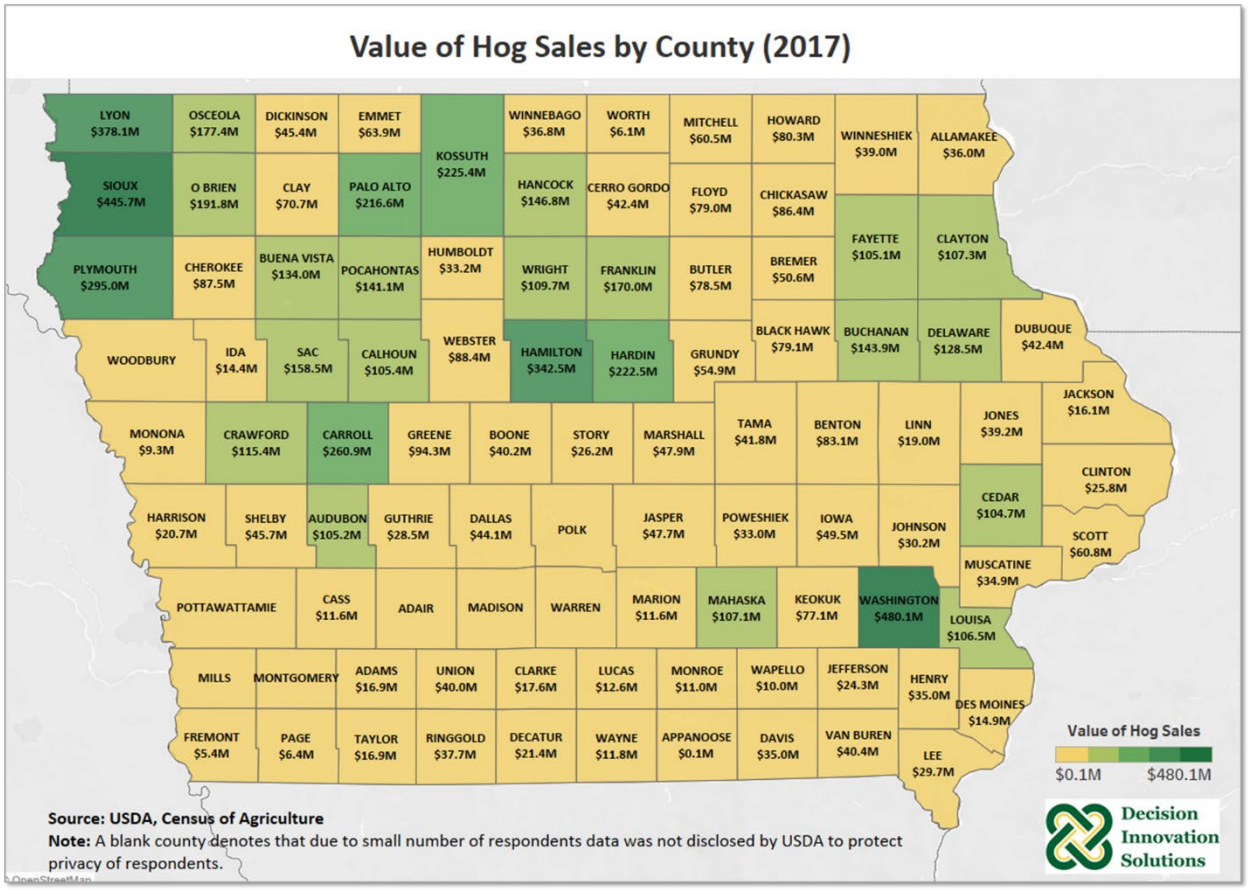

Figure 11, Value of Hog Sales by County (2017)

Washington, Lyon, and Sioux counties each sold more than 3 million hogs (Figure 12). Plymouth and Hamilton counties sold more than 2 million hogs. Counties selling more than 1 million hogs include: Buchanan, Carroll, Delaware, Franklin, Hardin, Kossuth, Osceola, O'Brien, Palo Alto, Pocahontas, and Sac.

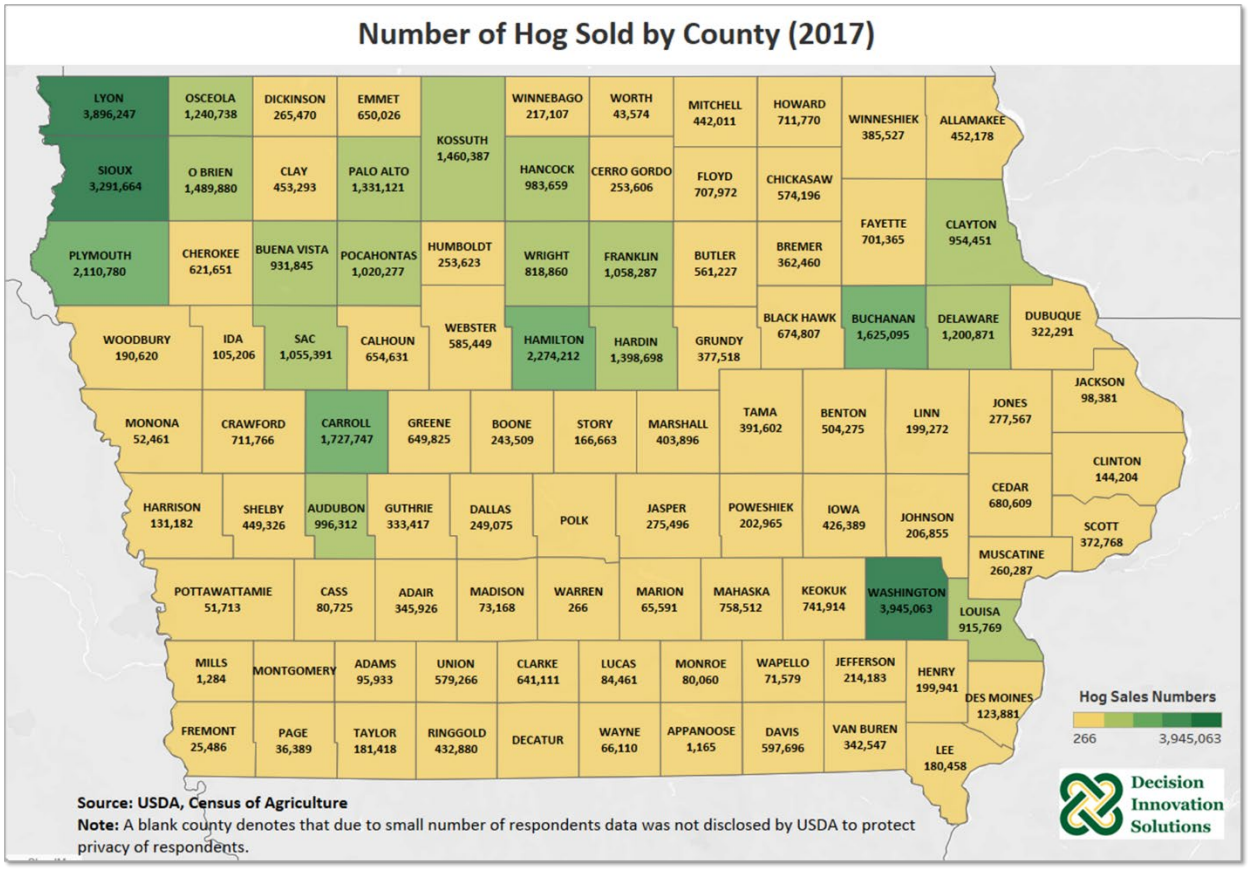

Figure 12, Number of Hogs Sold by County (2017)

As reported by the 2017 USDA Census of Agriculture, there were 113 operations designated as farrow-feeder operations. Of these, 22 operations were in the 1 to 24 head size; 16 had 200 to 499 head; 16 had 5,000 or more head. The smallest number of farrow-to-feeder operations (7) were those with 1,000 to 1,999 head (see Figure 13).

There were 1,217 farrow-to-finish operations in Iowa. Those with 5,000 head or more are the largest category with a total number of 261 operations. The next highest number of operations (221) were those with 1 to 24 head (see Figure 14).In Iowa, 58 percent of the farrow-to-finish operations are less than 1,000 head and 42% are 1,000 head or larger.

There are 217 farrow-to-wean operations in Iowa. Of these, 150 were large farms managing 5,000 or more head. (see Figure 15).

The majority of independent hog growers in Iowa are those with operations ranging in size from 1 to 24 head. In 2017, there were 888 of this type of operation. There were also 689 operations reported as independent growers with 5,000 or more head (see Figure 16). Most of the hog nursery operations in Iowa were managing 5,000 or more head (see Figure 17).

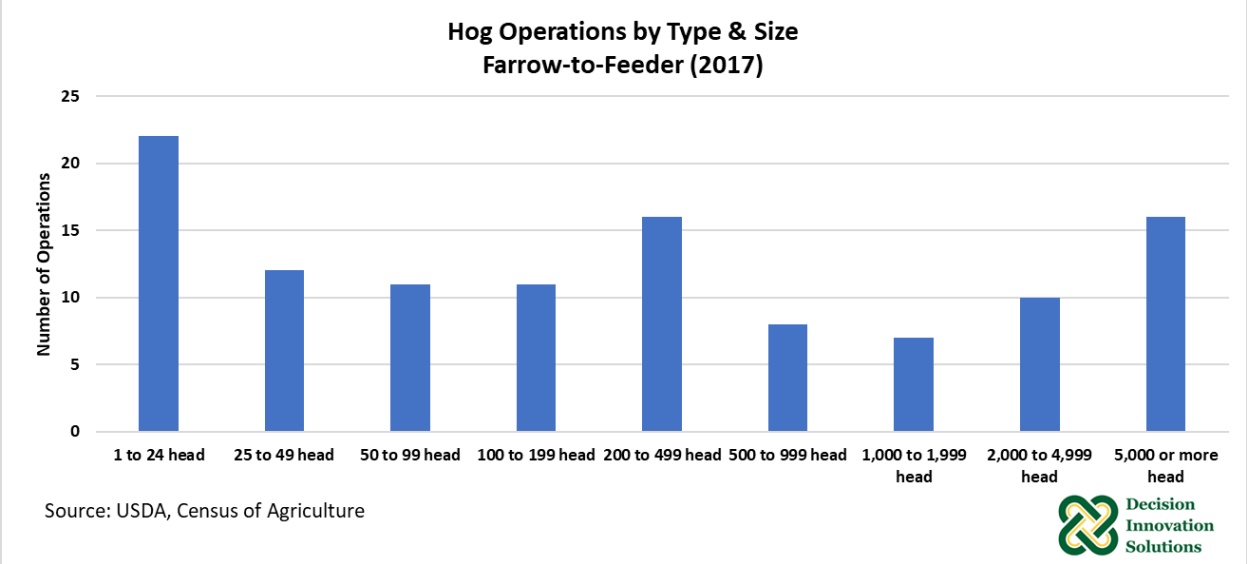

Figure 13, Hog Operations by Type & Size, Farrow-to-Feeder (2017)

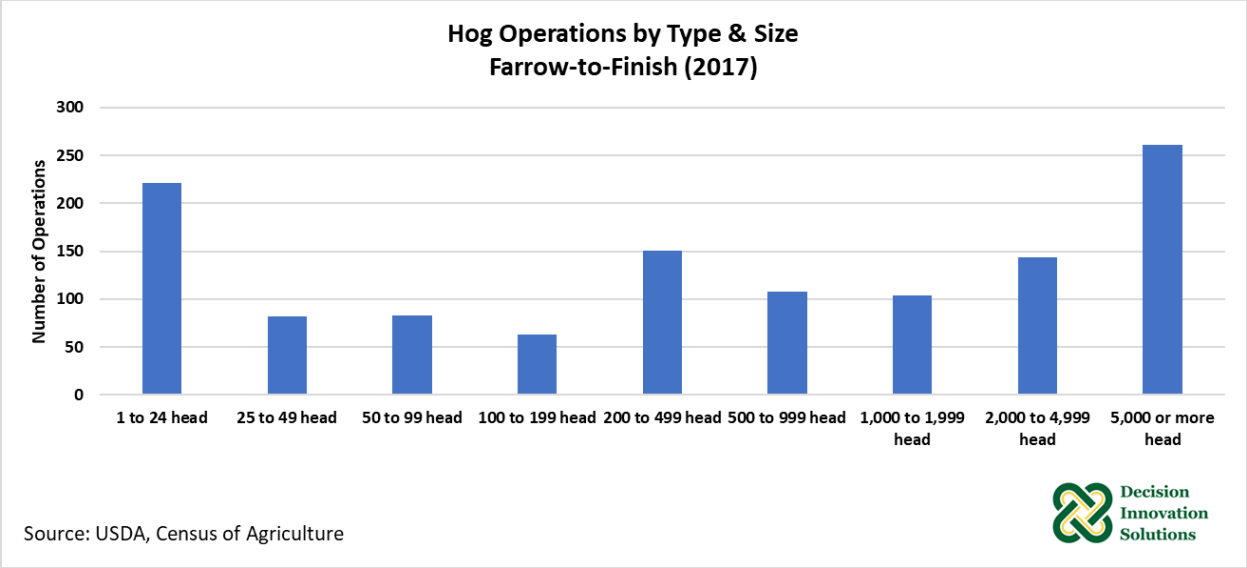

Figure 14, Hog Operations by Type & Size, Farrow-to-Finish (2017)

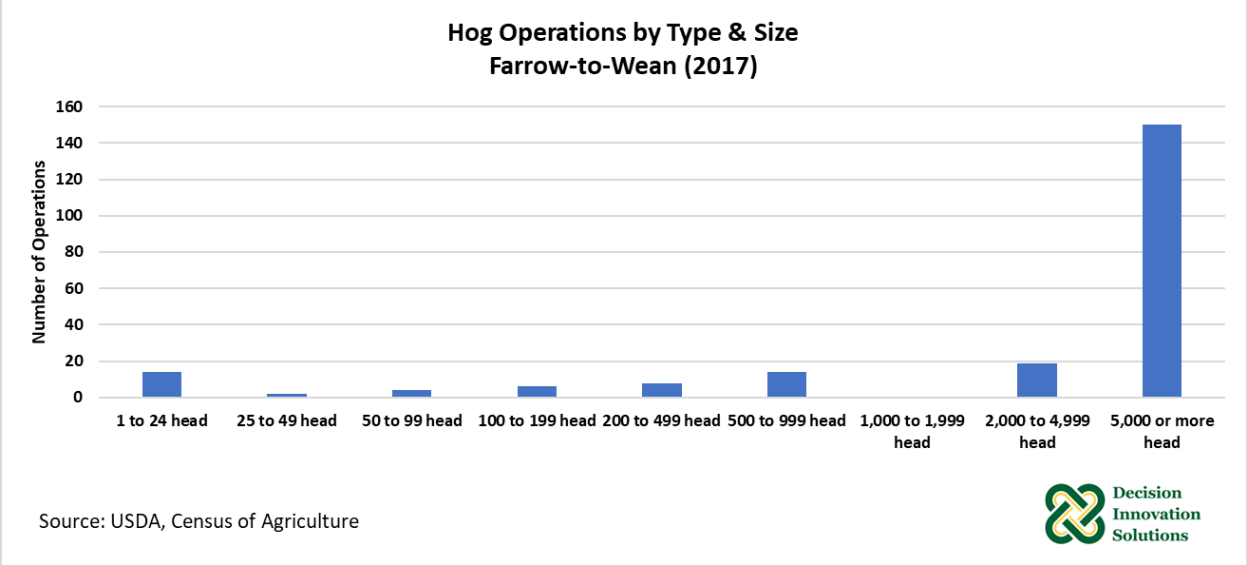

Figure 15, Hog Operations by Type & Size, Farrow-to-Wean (2017)

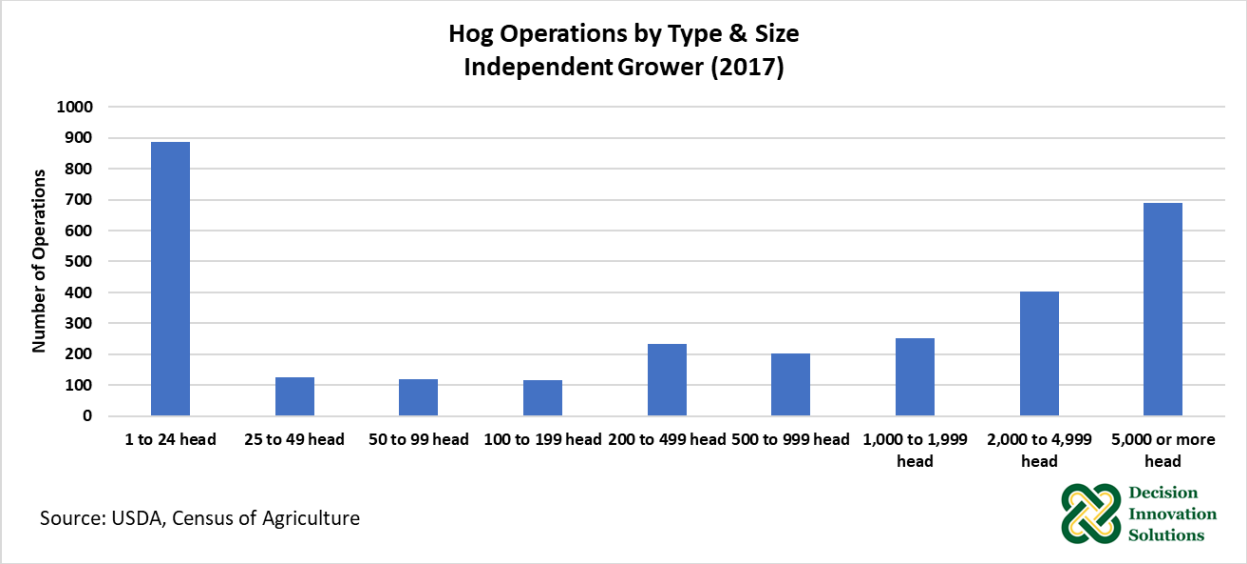

Figure 16, Hog Operations by Type & Size, Independent Grower (2017)

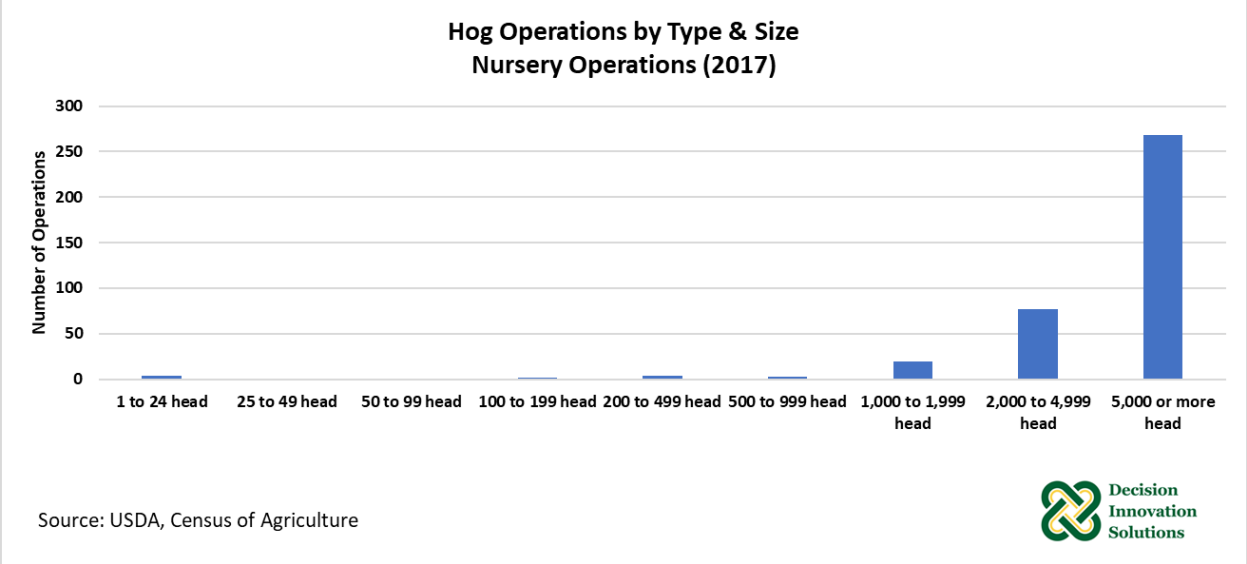

Figure 17, Hog Operations by Type & Size, Nursery Operations (2017)

In 2017, there were 5,660 hog operations of several sizes and types in Iowa compared with 17,585 in 1997. Most of the operations in Iowa were those managing 200 to 499 head in 1997. The number of operations of this size declined from 4,664 in 1997 to 372 in 2017. The majority of hog operations in 2017 were those with 2,000 to 4,999 head. This size grew from 1,224 in 1997 to 1,794 in 2017. The number of hog operations with 5,000 or more head rose to 1,131 in 2017 from 308 in 1997. There was a 93% reduction in the number of hog operations with 100 to 199 head between 1997 and 2017. Hog operations with 500 to 999 head fell from 3,403 in 1997 to 429 in 2017 (see Figure 18).

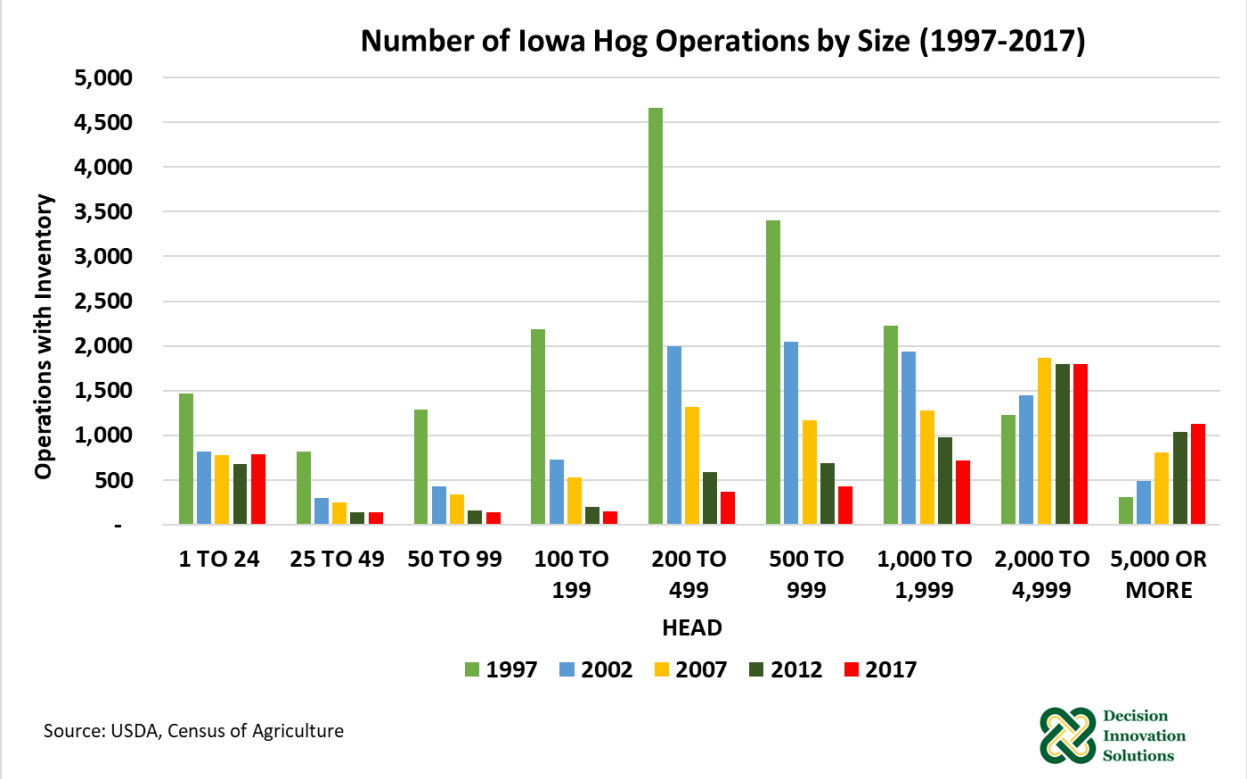

Figure 18, Number of Iowa Hog Operations by Size (1997-2017)

Iowa hog inventory share of U.S. hog inventory by size of operation has increased throughout the years for large hog operations. In particular, the share of hog operations with 5,000 or more head increased from 17% in 1997 to 31% in 2017. However, this share fell between 2012 (35%) and 2017. Iowa's share relative to the national level has stayed fairly steady across the five agricultural censuses for operations with 1 to 24 head, 200 to 499 head, 500 to 999 head, and 1,000 to 1,999 head (see Table 2).

Table 2, Iowa Hog Inventory Share of U.S. Hog Inventory by Size of Operation (Census of Agriculture: 1997, 2002, 2007, 2012, 2017)

Inventory Size (Head)	1997	2002	2007	2012	2017
1 TO 24	3%	2%	2%	2%	2%
25 TO 49	9%	5%	6%	4%	4%
50 TO 99	14%	9%	11%	7%	7%
100 TO 199	21%	16%	20%	13%	12%
200 TO 499	28%	26%	29%	28%	26%
500 TO 999	33%	34%	33%	35%	33%
1,000 TO 1,999	34%	38%	32%	37%	36%
2,000 TO 4,999	28%	32%	35%	38%	38%
5,000 OR MORE	17%	22%	28%	35%	31%

Source: USDA, Census of Agriculture

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2019 county hog inventory was estimated by applying the 2017 county inventory distribution (county share) to the December 1, 2019 Iowa total hog inventory (24.8 million head) as reported by USDA-NASS. Note that 2017 county inventory data contained two counties (Polk and Warren) for which data was withheld to protect individual producer's inventory information. To estimate the 2017 hog inventory for these two counties, the 2012 share of total Iowa inventory by these two counties was applied to the difference between the reported 2017 total Iowa inventory and the sum of inventories for the 97 counties that had reported data (i.e., all Iowa counties excluding Polk and Warren).

The annual decline in the number of Iowa hog farms (121) between the last two censuses (2012 and 2017) was used to estimate the 2018 and 2019 number of hog farms in Iowa. The 2017 county distribution of the number of hog farms was used to estimate the county distribution of the number of hog farms in 2019.

The counties with inventory over 1.0 million head held 20.6% of total state inventory in 2017 (see Figure 19). These counties include Washington, Sioux, Lyon, and Hamilton (USDA-NASS 2017). In 2019, Plymouth County was added to the 2017 list of counties with inventories above 1.0 million hogs. The share of Iowa hog inventory from these five counties grew to 24.6% (see Figure 20). The number of hog farms in Iowa in 2019 was estimated at 5,418. The average county hog inventory was 250,505 head, while the average number of hog farms per county was 55. This resulted in an average inventory per Iowa hog farm of 4,578 head.

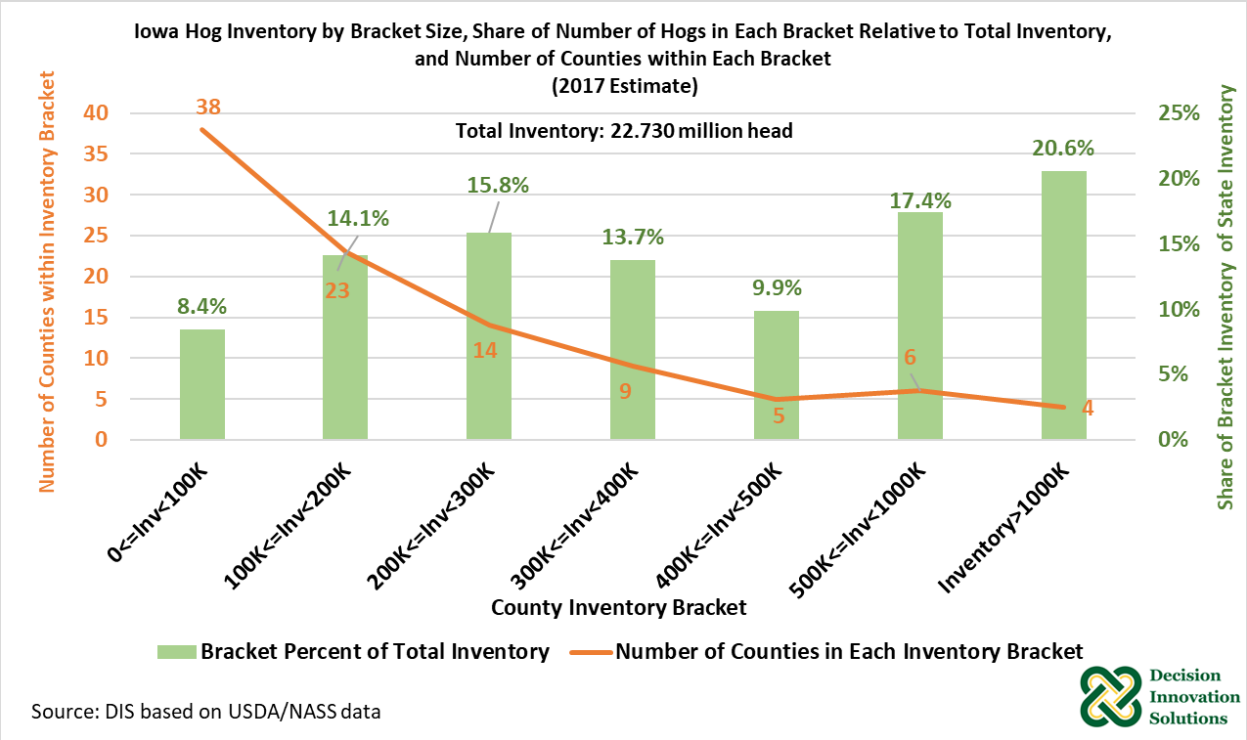


Figure 19, Iowa Hog Inventory by Bracket Size, Share of Number of Hogs in Each Bracket Relative to Total Inventory, and Number of Counties within Each Bracket (2017 Estimate)

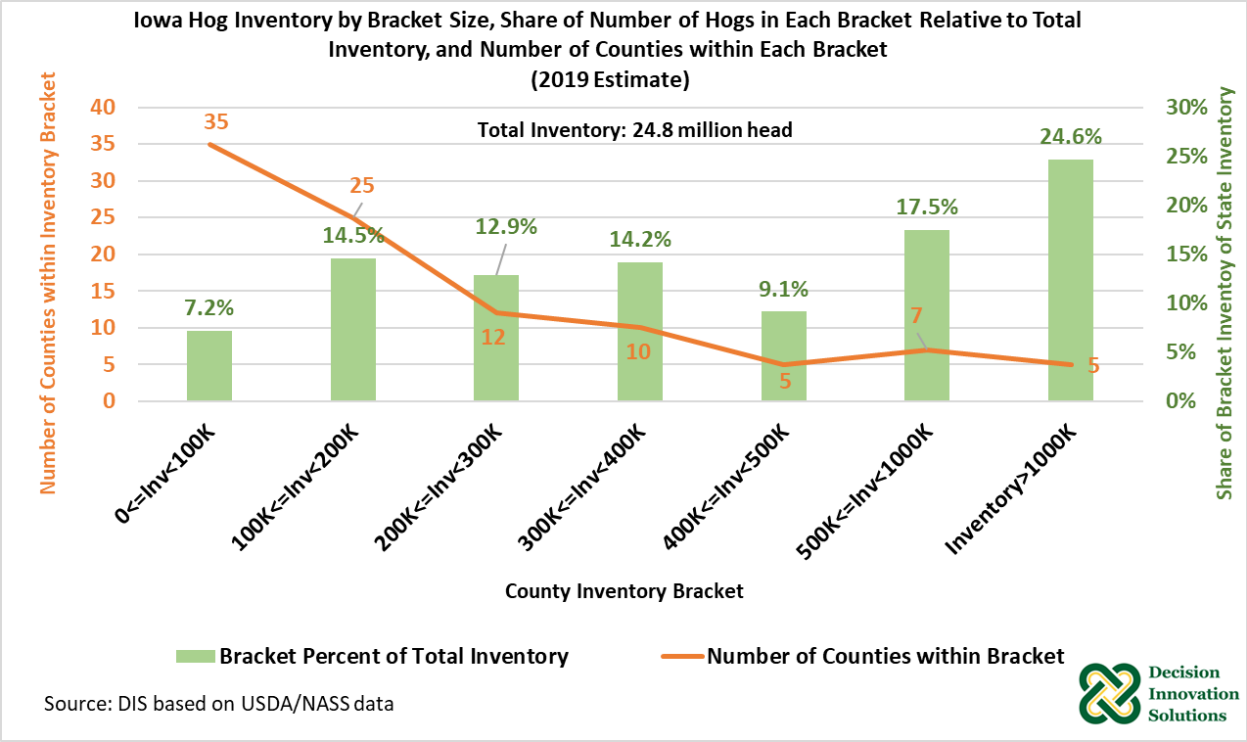


Figure 20, Iowa Hog Inventory by Bracket Size, Share of Number of Hogs in Each Bracket Relative to Total Inventory, and Number of Counties within Each Bracket (2019 Estimate)

Inventory and Farm Distribution and Inventory Size (Selected Counties)

In addition to an overall look at all Iowa counties, 35 have been identified as "focus" counties and will be addressed in more detail here. These counties are:

Allamakee	Dubuque	Kossuth	Scott
Audubon	Fayette	Lucas	Sioux
Buchanan	Floyd	Lyon	Wapello
Buena Vista	Hamilton	Marshall	Washington
Butler	Hardin	Mitchell	Webster
Calhoun	Howard	O'Brien	Winneshiek
Carroll	Iowa	Page	Woodbury
Chickasaw	Jefferson	Plymouth	Wright
Clayton	Jones	Pocahontas	

The 35 focus counties selected for specific analysis represent 35.2% of the counties in Iowa; however, these 35 counties have inventories that account for 59% of the total hog inventory for the state of Iowa. Additionally, these 35 counties represent 53% of the hog farms in Iowa, with an average inventory per farm of 5,022 head, which is more than the statewide average head per farm (4,578 head). All 35 counties saw growth in hog inventory between the years of 2017 and 2019. Washington County's increase in inventory during this period was estimated at

121,274 head, which was up from 1.332 million head in 2017 to 1.453 million head in 2019 (see Figure 21).

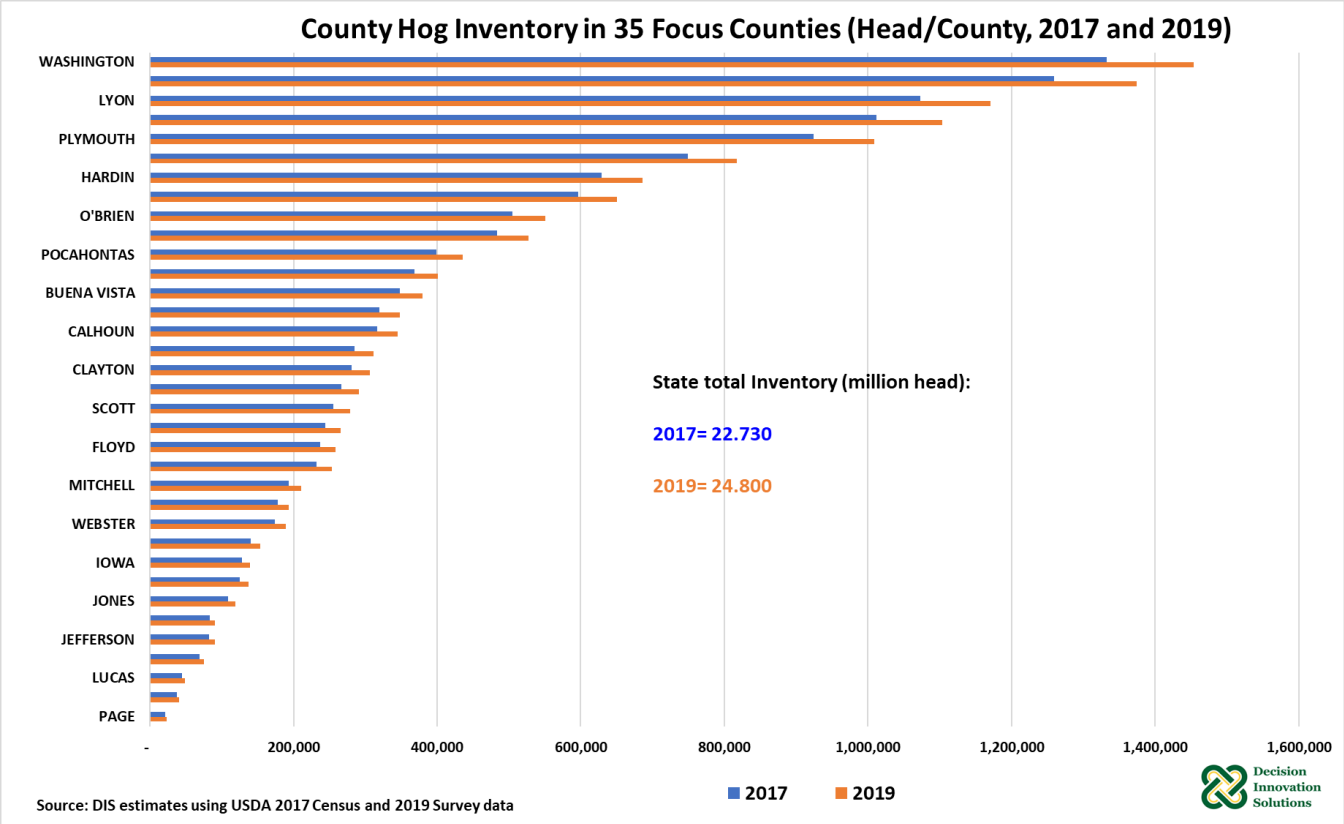


Figure 21, County Hog Inventory in 35 Focus Counties (Head/County, 2017 and 2019)

There was an estimated reduction of 129 hog farms among these 35 counties between 2017 and 2019. The three counties with the largest number of hogs farms are Sioux County, Lyon County and Plymouth County. The number of farms in Sioux County declined from 167 in 2017 to 160 in 2019; Lyon County had a reduction of 10 farms and Plymouth County had a reduction of 8 farms (see Figure 22).

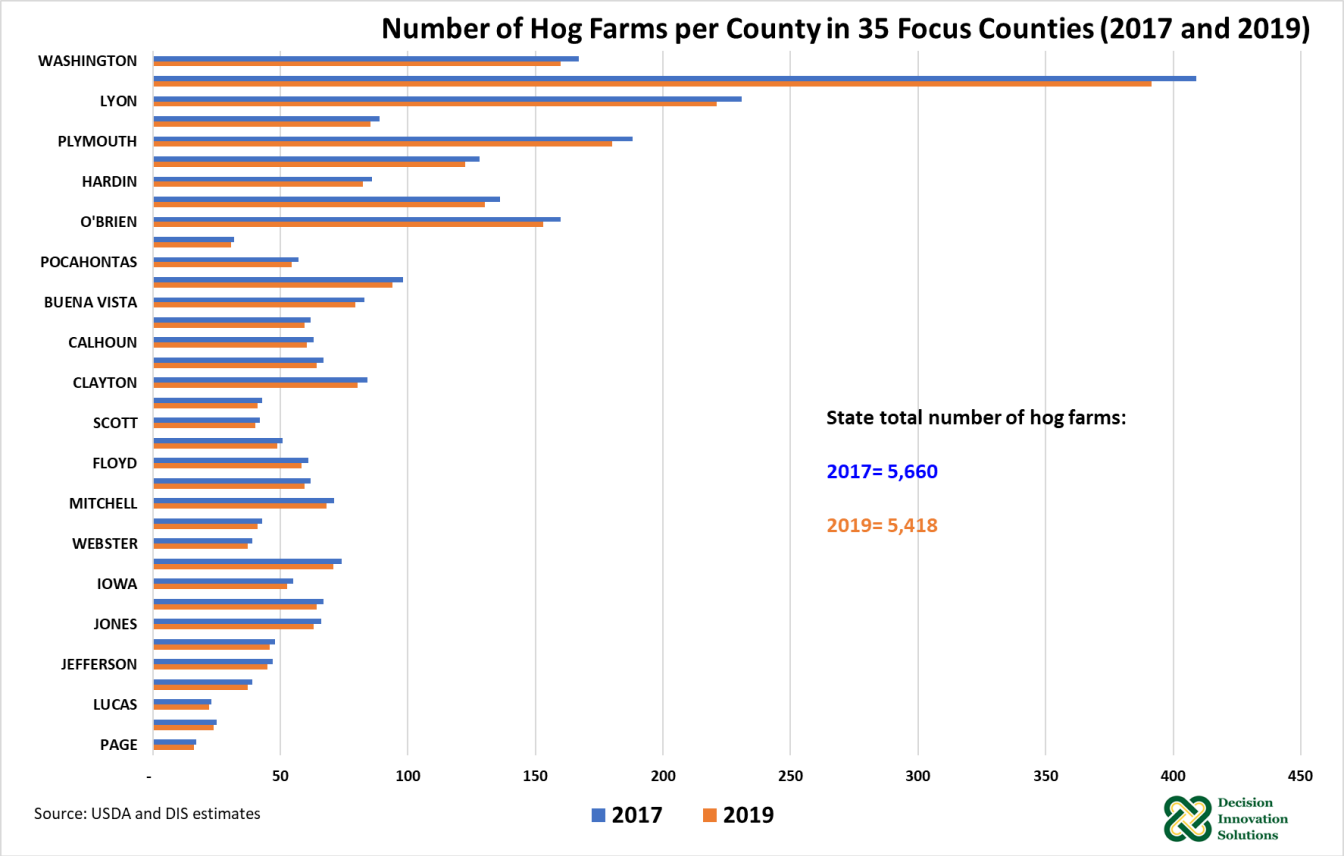


Figure 22, Number of Hog Farms per County in 35 Focus Counties (2017 and 2019)

Hog Slaughter Facility Capacity

Based on the USDA-NASS monthly report, "Livestock Slaughter" (February 2019 to January 2020), Iowa slaughtered 39.117 million hogs in 2019, which represents about 30.11% of the total number (129.915 million) of hogs slaughtered in the U.S. in 2019. Iowa's December 1, 2019 hog inventory was 24.800 million hogs. Assuming each hog space turns 2.2 times per year, an estimated 54.6 million hogs can be raised annually in Iowa. This indicates that 15.4 million (28.3% of production) hogs leave Iowa to be slaughtered elsewhere.

Iowa has 14 commercial hog slaughter facilities with an estimated daily slaughter capacity of 152,050 head (see Table 3). If operated 5.4 days per week for 52 weeks per year, this would equal an annual slaughter capacity of 42,695,640 head. Based on USDA's estimate of 39.117 million hogs slaughtered, Iowa's hog slaughter plants operated at 91.6% capacity for all of 2019.

Table 3, Iowa Estimated Daily Hog Slaughter Capacity by Plant (Fall 2019)

Company	City	County	State	Daily Plant Capacity
Farmland (Smithfield)	Denison	Crawford	IA	10,450
Pine Ridge Farms (Smithfield)	Des Moines	Polk	IA	4,000
JBS	Marshalltown	Marshall	IA	21,000
JBS	Ottumwa	Wapello	IA	20,000
Tyson Foods	Waterloo	Black Hawk	IA	19,500
Tyson Foods	Storm Lake	Buena Vista	IA	17,000
Tyson Foods	Columbus Junction	Louisa	IA	10,100
Tyson Foods	Perry	Dallas	IA	8,250
Seaboard Triumph Foods	Sioux City	Plymouth	IA	20,400
Prestage Foods of Iowa	Eagle Grove	Wright	IA	10,000
Sioux-Preme Packing Co	Sioux Center	Sioux	IA	4,600
Premium Iowa Pork	Hospers	Sioux	IA	3,150
Redwood Farms (Farmes Union Industries)	Estherville	Emmet	IA	2,400
Verschoor Meats	Sioux City	Plymouth	IA	1,200
Total				152,050

Source: Pork.org

Decision Innovation Solutions

On a national basis, weekly hog slaughter capacity was about 2.689 million head at the beginning of 2019, and was estimated to be 2.755 million head by the end of 2019. Figure 23 shows weekly national hog slaughter and the percent utilization of national slaughter capacity. As can be seen in the graphic, capacity utilization reached 99.9% in late December 2019. The average for the year was about 91%.

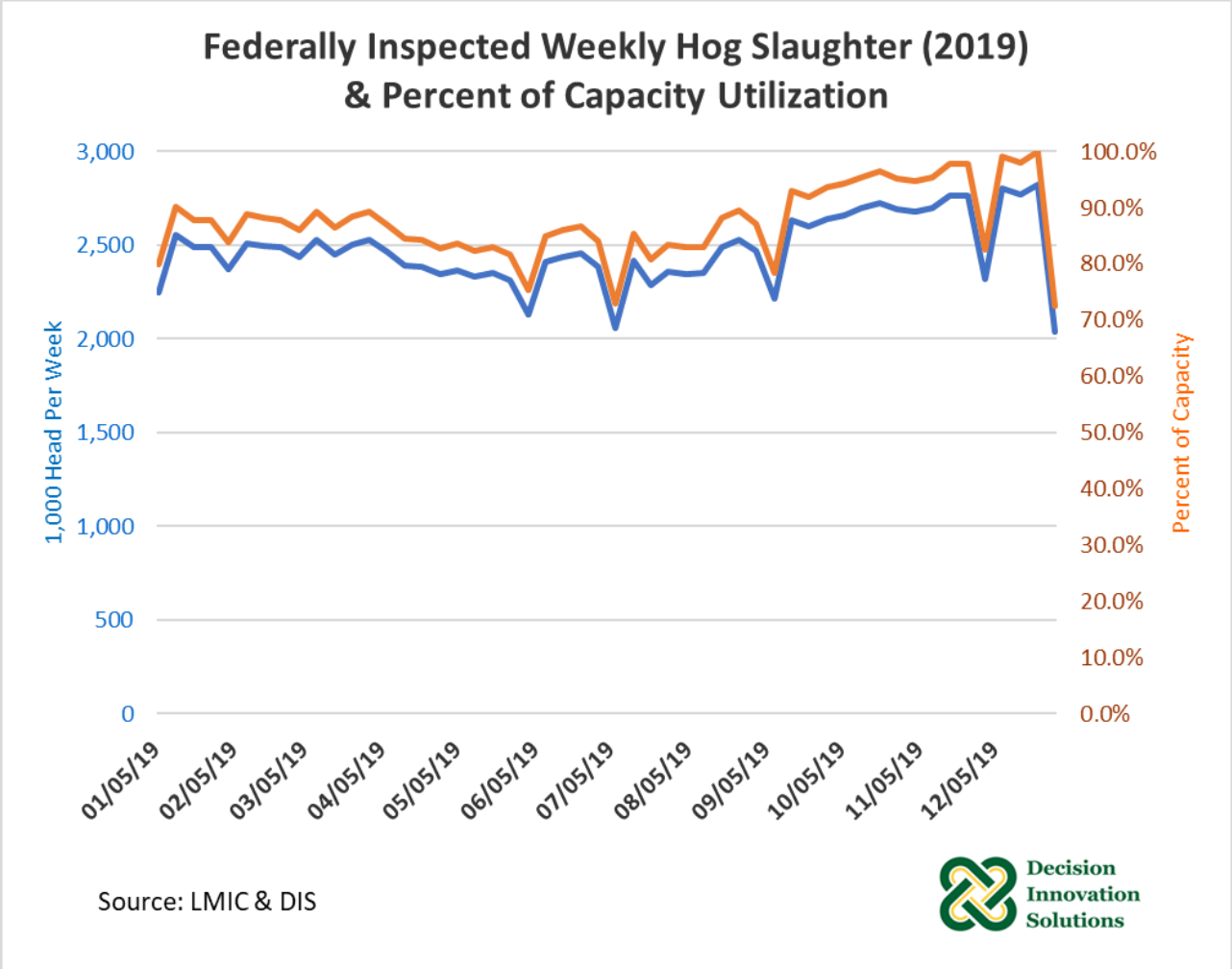


Figure 23, Federally Inspected Weekly Hog Slaughter (2019) & Percent of Capacity Utilization

Hog Production

Iowa is the largest hog producer in the U.S. (see Figure 24). Feed cost is the largest cost component in a hog production enterprise and Iowa's cost-effective situation is supported by its position as a top corn and soybean producer in the country. Hog production in Iowa has increased from 6.48 billion pounds in 2000 to 14.487 billion in 2018 (see Figure 24). Among large hog producers, Iowa's hog production share of total U.S. hog production has consistently increased over the past 20 years, from 25% in 2000 to 37% in 2018 (see Figure 25). For Minnesota, a distant competitor, hog production share of total U.S. production grew from 10% to 12% over the 20-year span (see Figure 26), whereas, for North Carolina, the share of hog production declined from 14% to 11% during the same period (see Figure 27).

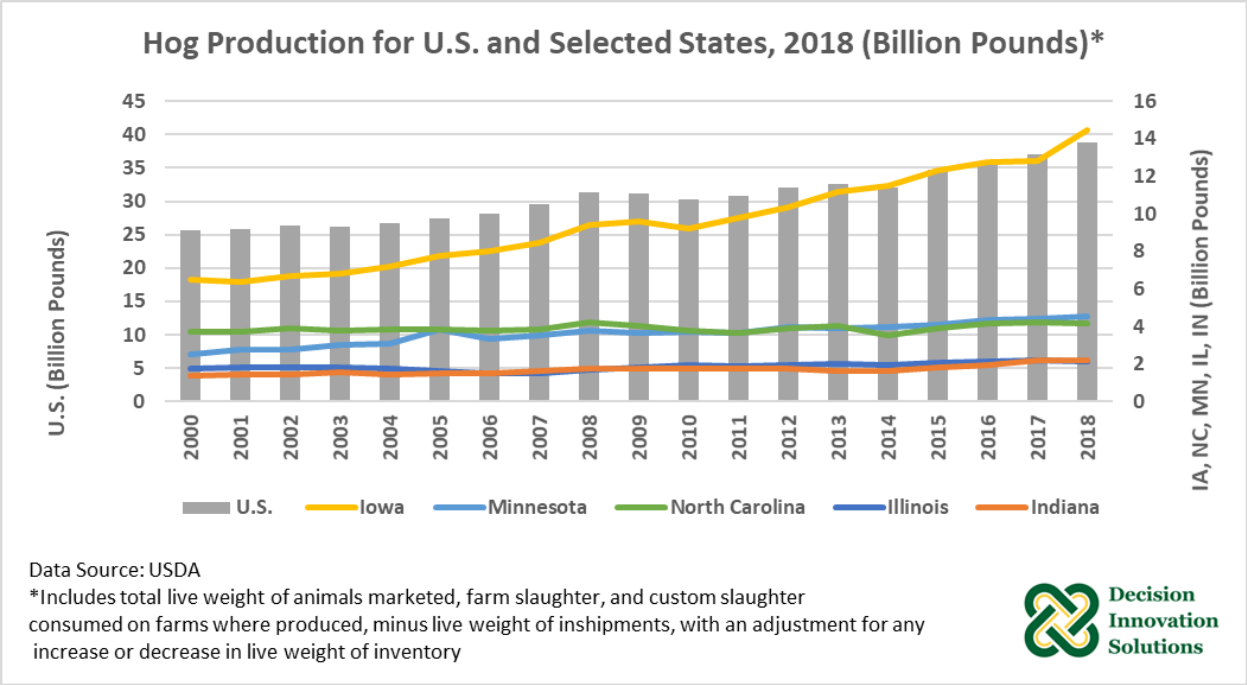


Figure 24, Hog Production for U.S. and Selected States, 2018 (Billion Pounds)

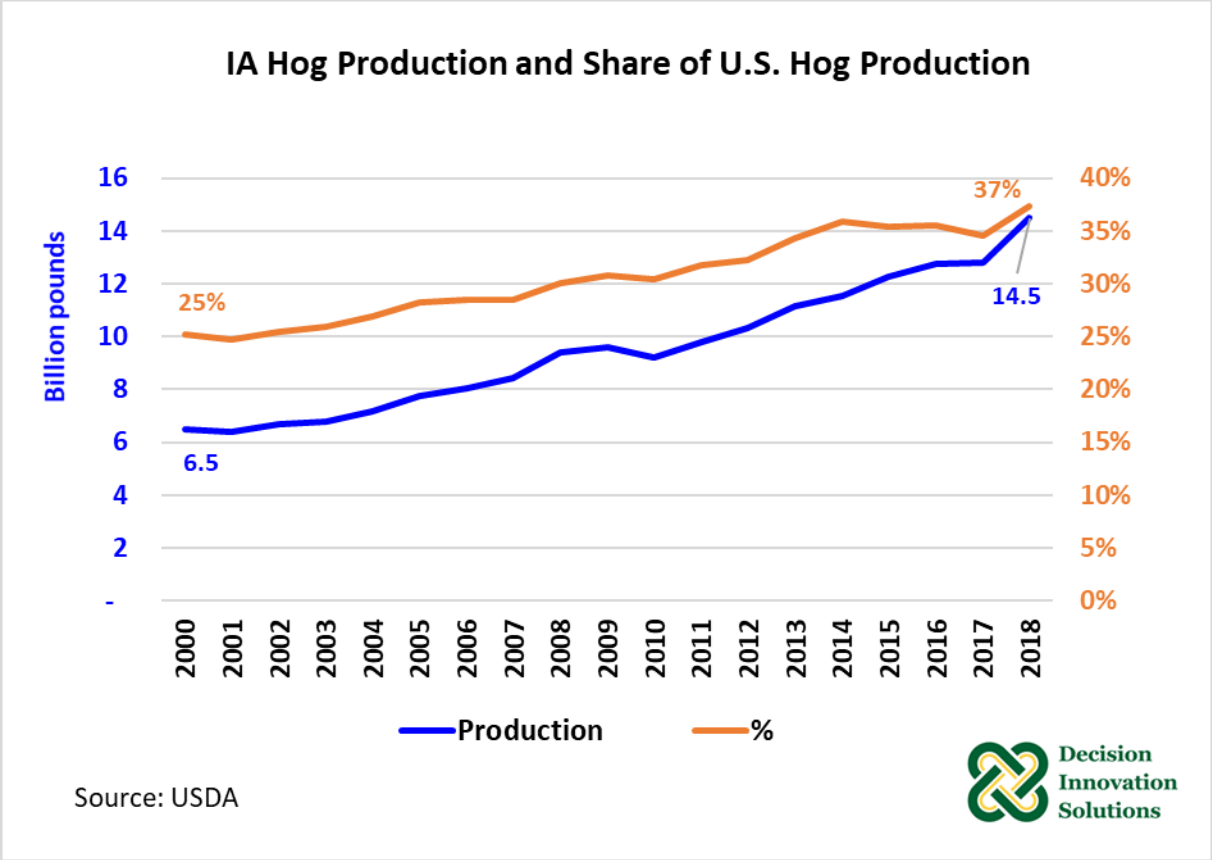


Figure 25, IA Hog Production and Share of U.S. Hog Production

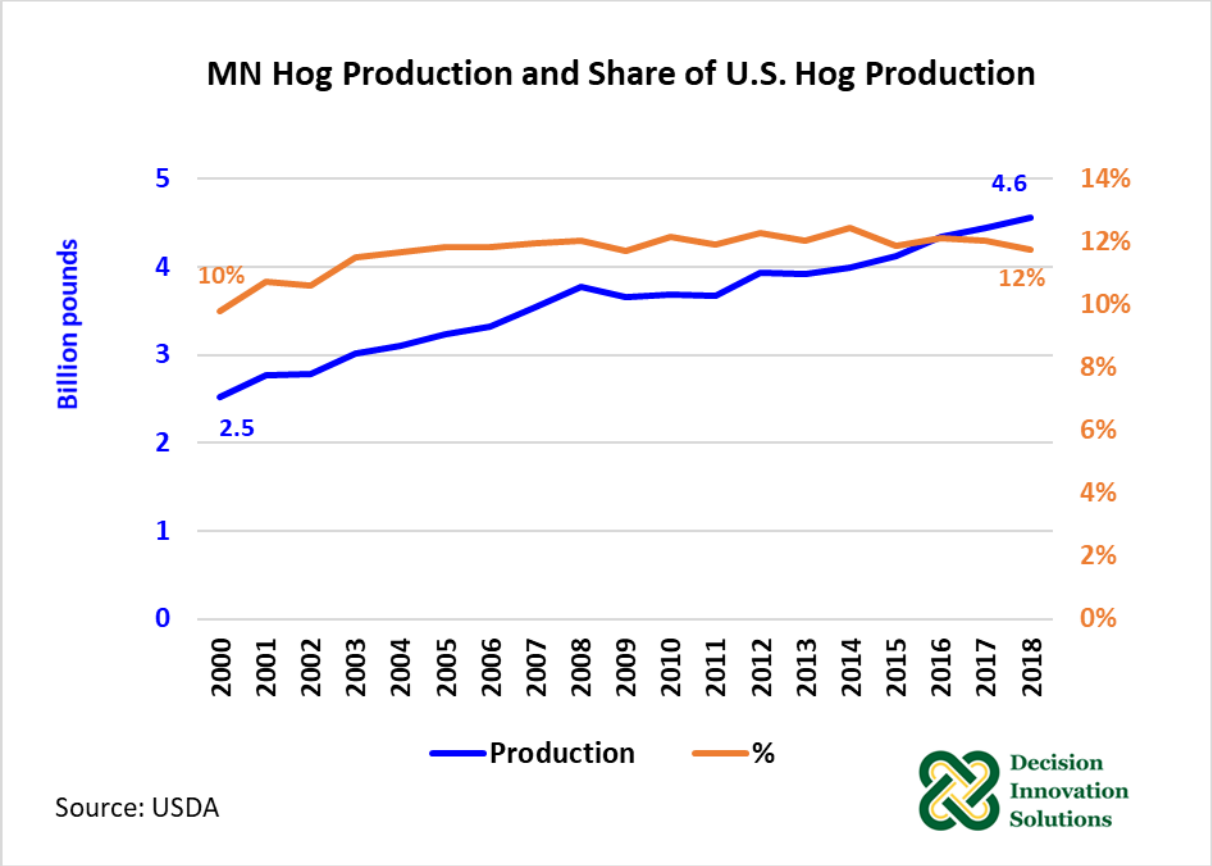


Figure 26, MN Hog Production and Share of U.S. Hog Production

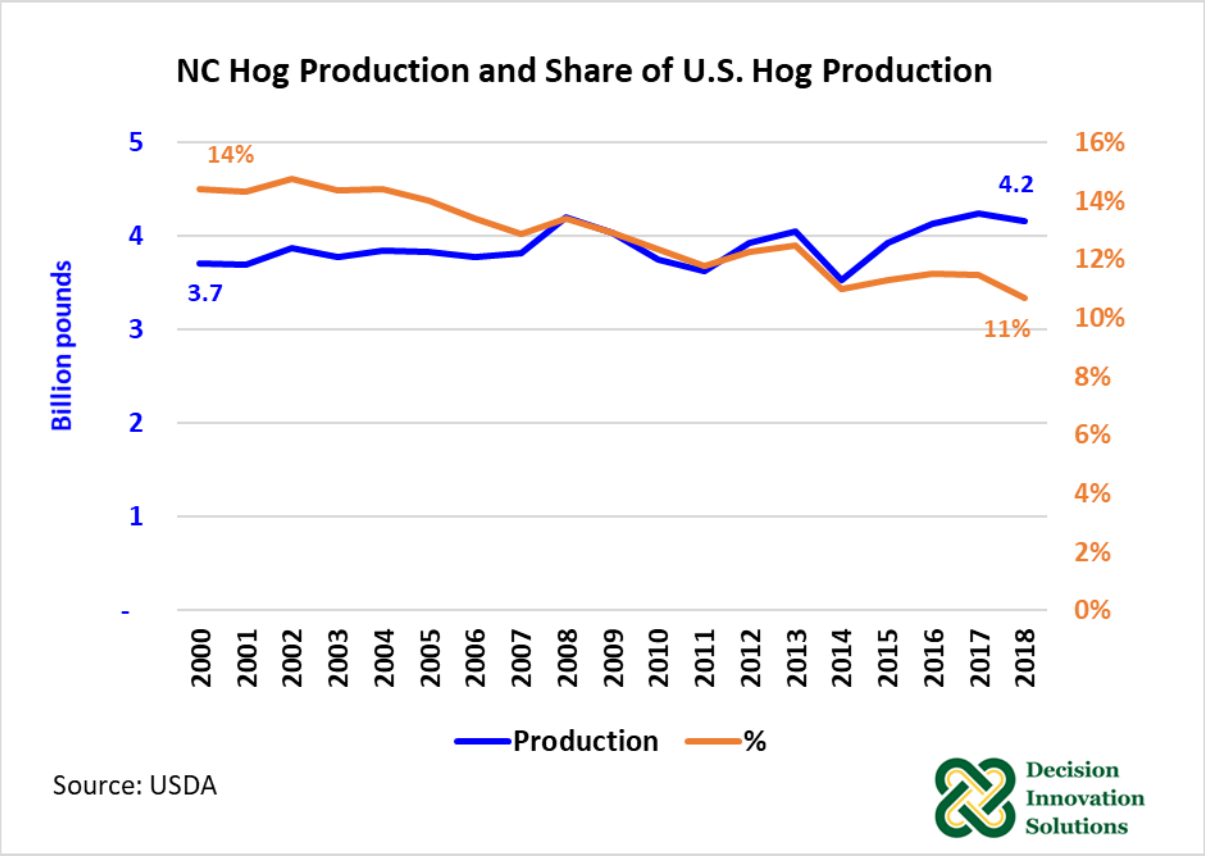


Figure 27, NC Hog Production and Share of U.S. Hog Production

Hog Prices

Hog prices substantially increased in 2014 (see Figure 28) due to concern over PEDv. July 2014 Iowa-Minnesota barrow and gilt price (carcass basis) reached a record high average price of $122.51/hundredweight (cwt). This resulted in high profits for portions of the industry with hogs to sell, but losses for producers of young pigs since these animals were vulnerable to PEDv. After the industry recovered and a large supply returned to the market, Iowa hog prices fell and have remained below pre-PEDv levels.

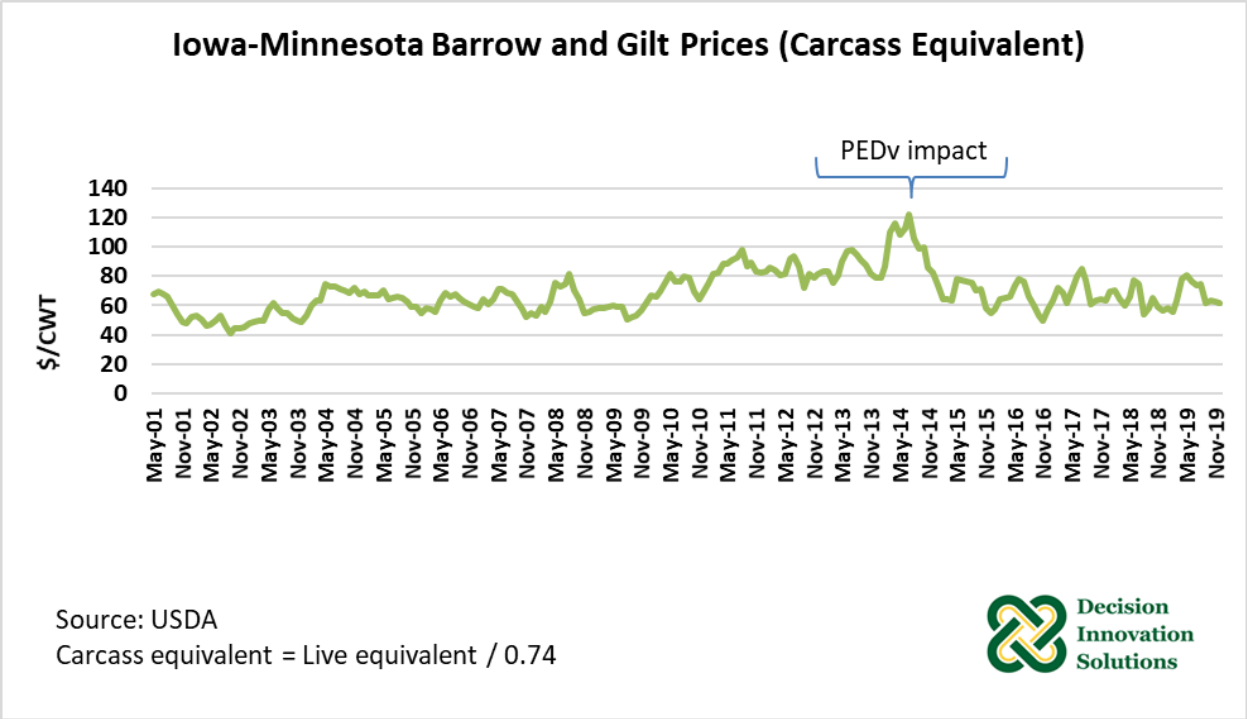


Figure 28, Iowa-Minnesota Barrow and Gilt Prices (Carcass Equivalent)

Figure 29 shows 2019 Iowa-Minnesota barrow and gilt prices averaged $67.58/cwt and were up 4.7% year-over-year but down 33% from 2014 ($100.67/cwt).

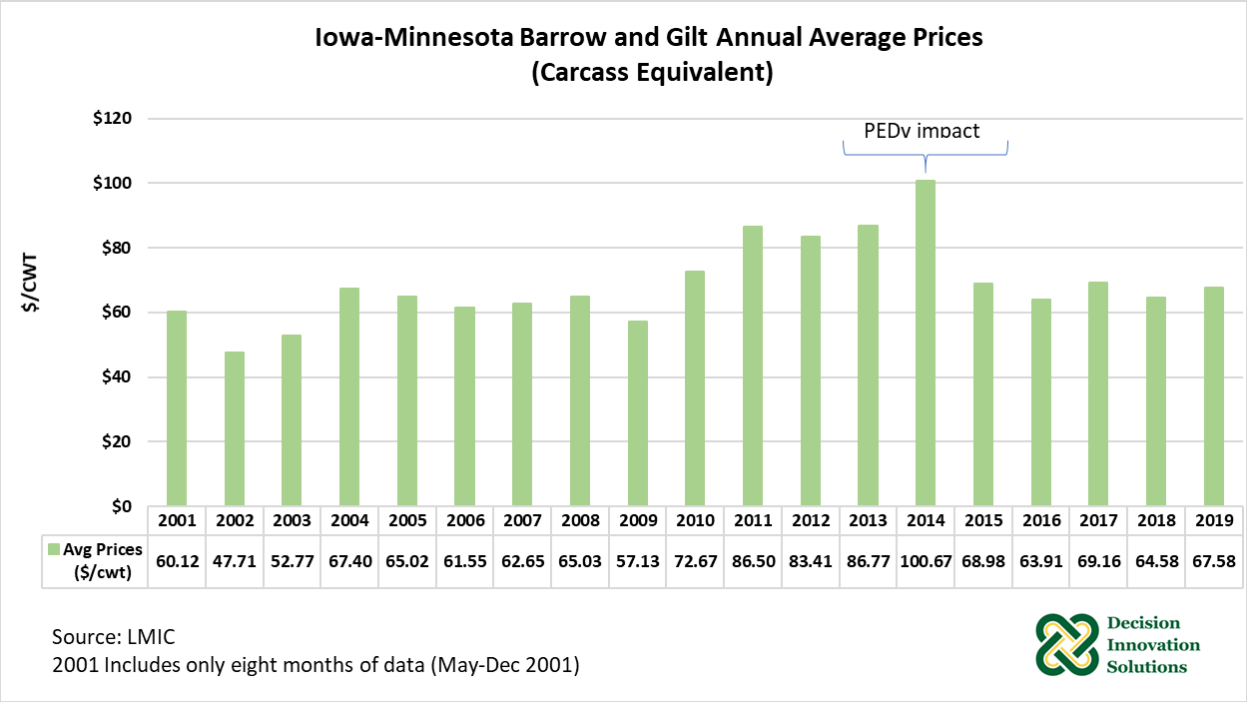


Figure 29, Iowa- Minnesota Barrow and Gilt Annual Average Prices (Carcass Equivalent)

Demand for hams increased in November 2019 reflecting expanded demand for export and for domestic holiday consumption. As Figure 30 shows, in response to the increased demand, average November 2019 ham price ($90.53/cwt) was up 40% from the previous months and up 63% year-over-year. November 2019 ham average price was the highest of the year as well. In addition, as Figure 31 and Figure 32 indicate, other pork cuts also experienced improved prices in November 2019.

USDA-ERS pork price spread data indicates pork net farm value declined 5.2% from October to November 2019 to $73.6/pound retail weight equivalent (RWE) due to seasonally large supplies of slaughter hogs. At the same time, the wholesale pork value increased 5.6% to $153.1/pound RWE, indicating a strong pork demand (particularly hams). The effect of November 2019 price changes at the farm and wholesale level, led to the widest farm-wholesale spread of the year. The farm-wholesale value in November (2019) was estimated at $79.5/cwt RWE which was up 18.1% month-over-month and 39.8% compared with November 2018 ($56.8/cwt RWE) (see Figure 33).

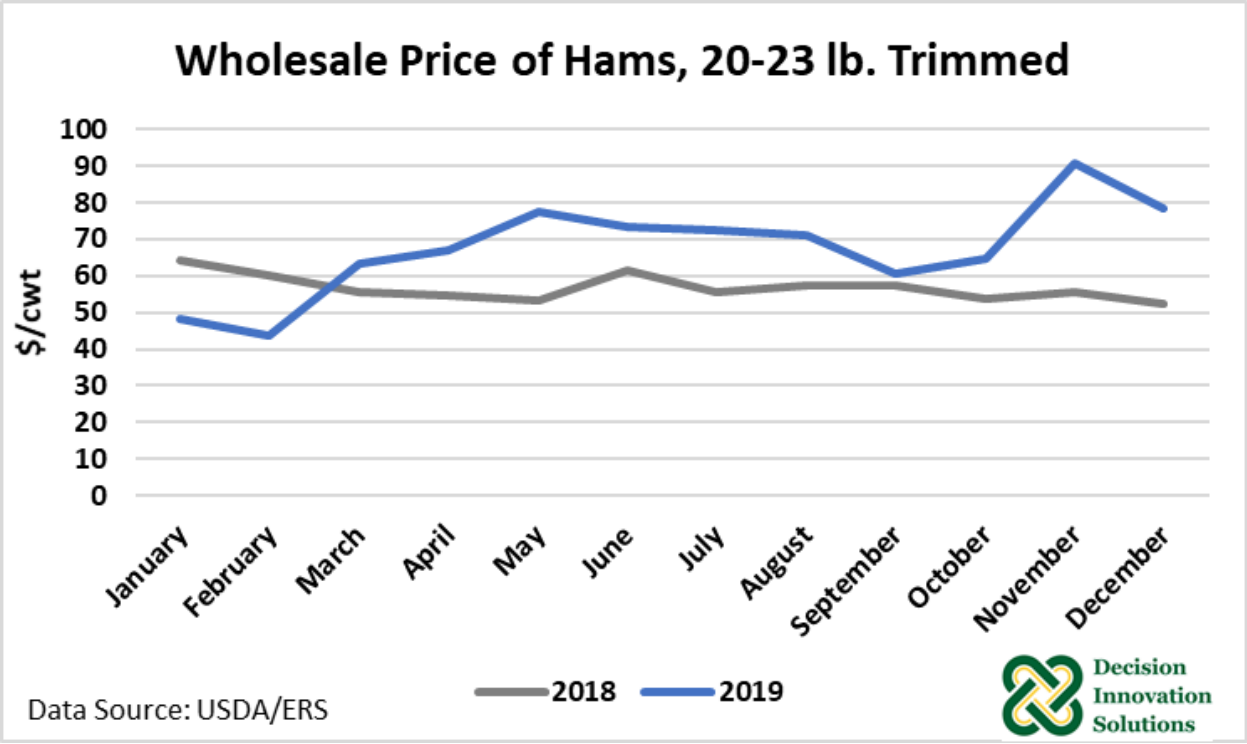


Figure 30, Wholesale Price of Hams, 20-23 lb. Trimmed

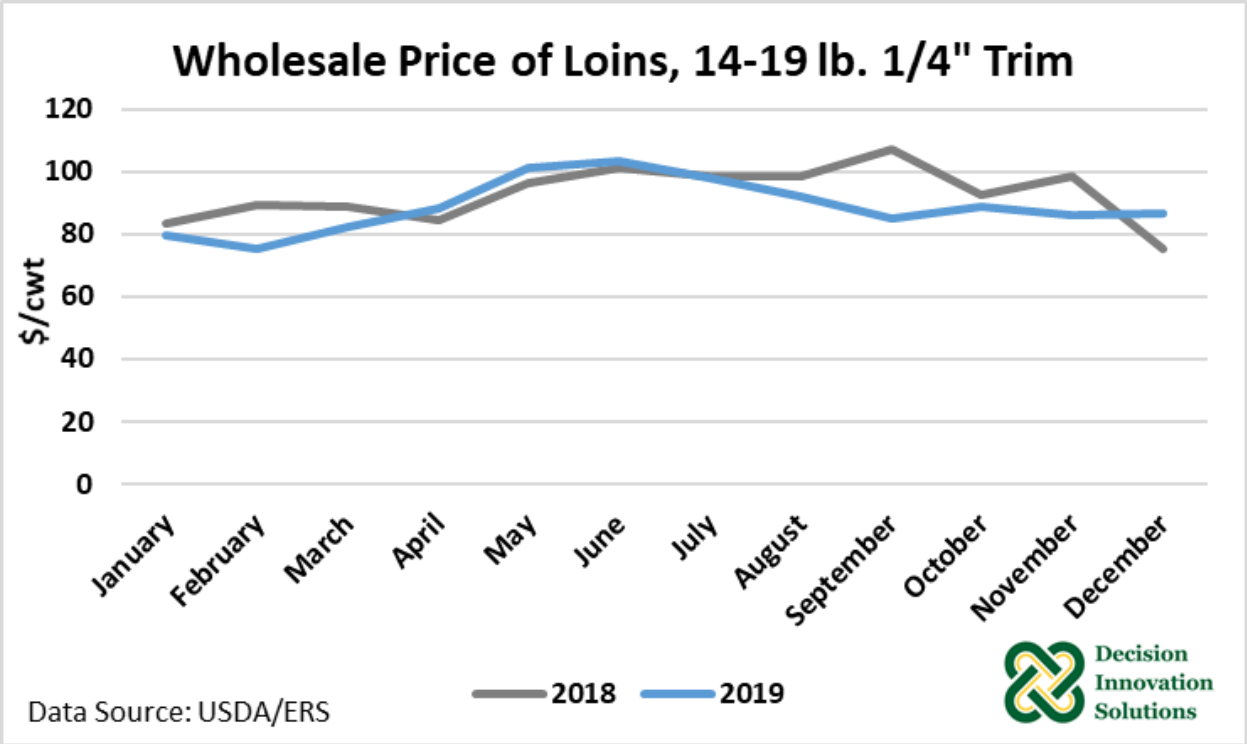


Figure 31, Wholesale Price of Loins, 14-19 lb. ¼" Trim

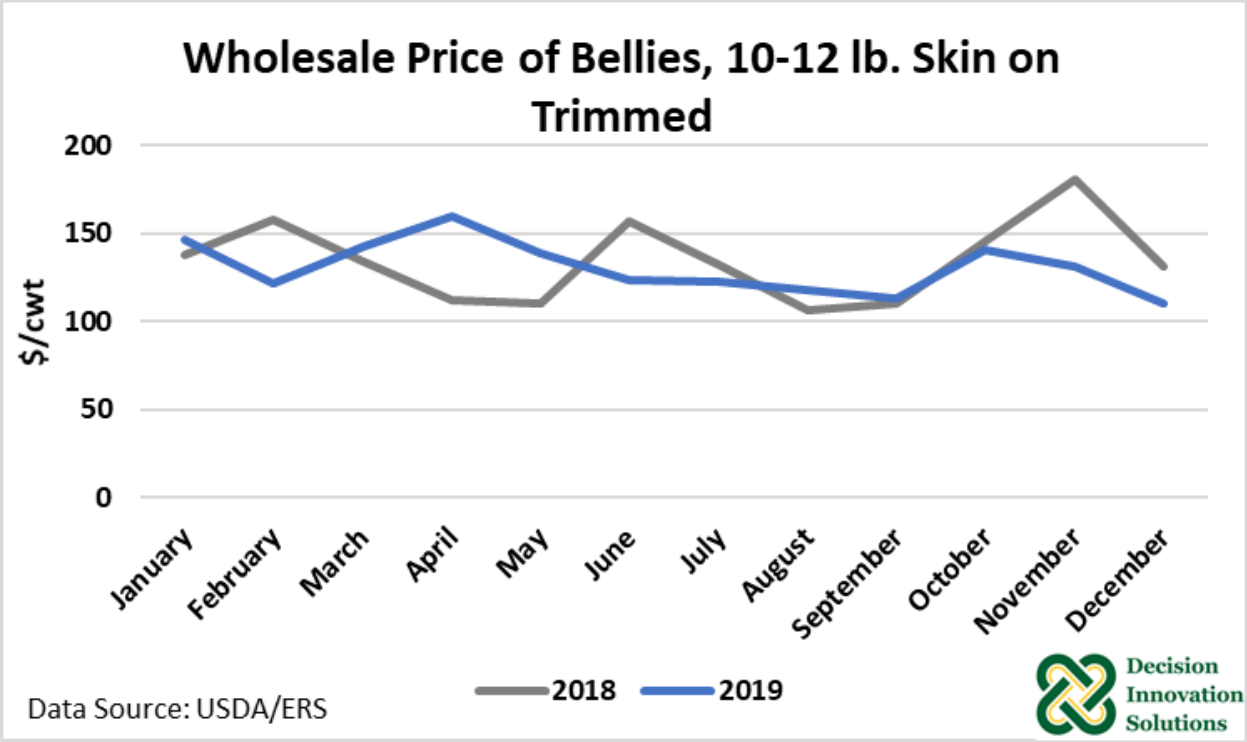


Figure 32, Wholesale Price of Bellies, 10-12 lb. Skin on Trimmed

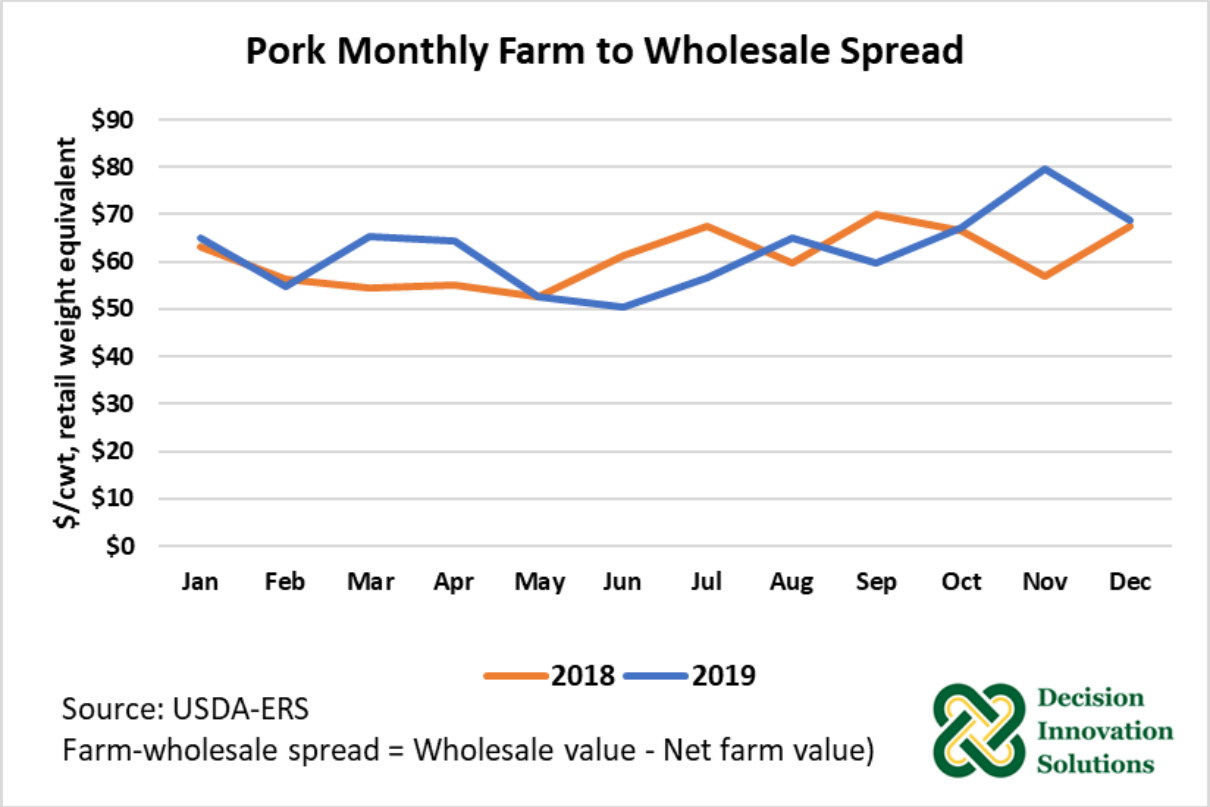


Figure 33, Pork Monthly Farm to Wholesale Spread

A plant cutout value of an individual pork carcass is based on the amounts of the various cuts produced by that carcass and the prices of those cuts. According to USDA, a plant's cutout value is confidential, proprietary information and is the single most important determinant of the price the plant will pay for hogs.

USDA's estimated pork carcass cutout (PCC) is the estimated value of a standardized pork carcass (currently 55-56% lean, 215 lbs.) and it is based on industry-average cut yields and average market prices of sub-primal pork cuts (i.e., PCC is the value of a 55-56% lean, 215 lb. hog based on current wholesale prices being paid for sub-primal pork cuts). USDA updates the industry-average cut yields in January of each year. The update is based on a survey of packers conducted the preceding July. Market prices are published by USDA in wholesale pork, lard, and meat and bone meal price reports. The PCC indicates the overall supply and demand condition for wholesale pork cuts. Figure 34 shows the PCC values for 2018 and 2019. On average, 2019 PCC values were 1.4% up from a year earlier.

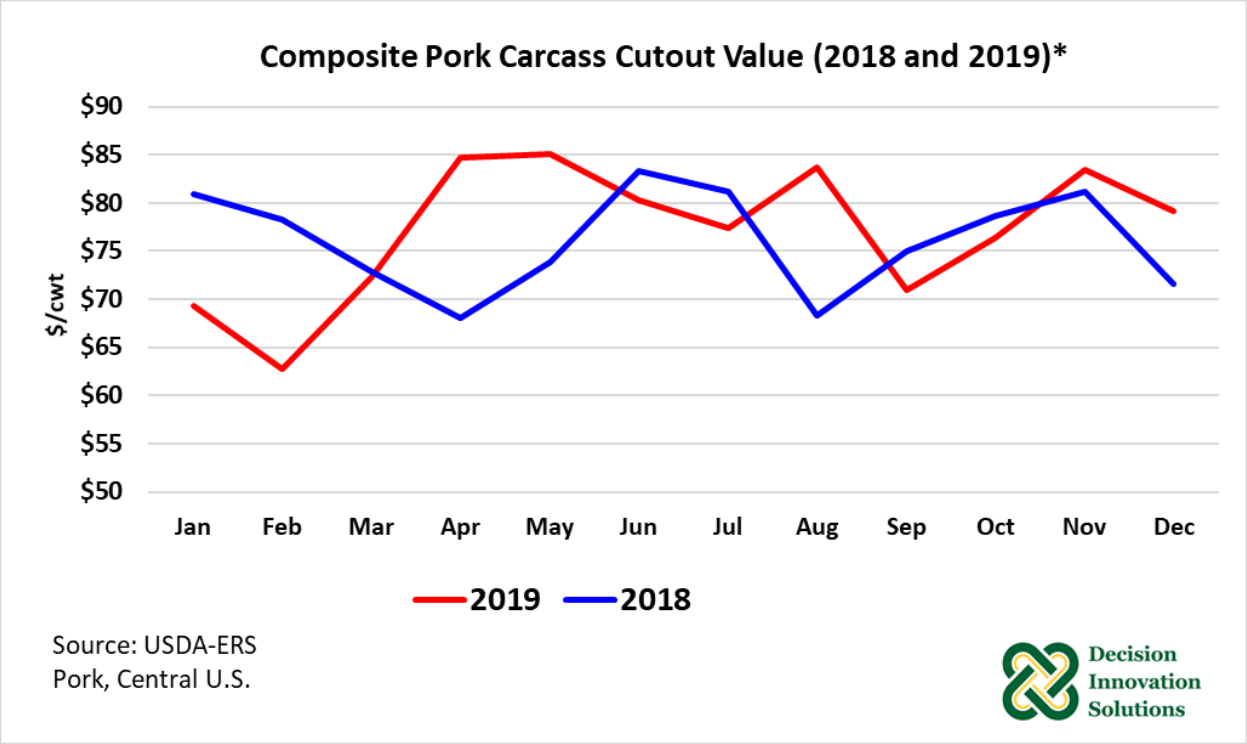


Figure 34, Composite Pork Carcass Cutout Value (2018 and 2019)

In its March 2020 pork price projections, USDA indicated even with stronger-than-expected numbers of slaughter-ready hogs in January and February 2020, and the anticipation of this trend to continue throughout the end of March, first-quarter prices (national base cost, 51-52% lean, live equivalent) are projected to average $42/cwt, which are about 3.3% above year-ago average ($40.67/cwt) due to robust domestic and export demand. As indicated by USDA, despite the expansion in hog prices, they remain below most producers' cost of production breakeven (as per ISU estimates), an indication that many hog producers will not have covered first-quarter 2020 costs of production by the end of March.

USDA's March forecast indicated U.S. pork exports during the first quarter of 2020 would grow 31% to 1.9 billion pounds compared with the previous year on account of large import demand from China, whose pork production has dropped due to African swine fever. First-quarter exports are also expected to increase because of robust shipments to Mexico during the first two months of 2020. Overall, annual pork exports are forecast to grow 22.6% to 7.750 billion pounds (carcass weight equivalent) year-over-year.

Cash Receipts

Hog sales (cash receipts[1]) in Iowa grew 7% to $7.62 billion in 2018 from the previous year (see Figure 35), while Iowa hog marketings[2] (expressed in pounds, not in U.S. dollars) in 2018 increased 13% to 15.07 billion pounds year-over-year. In contrast, 2018 sales for Minnesota and North Carolina declined 3% and 9%, respectively. Minnesota's volume of hogs marketed experienced a 1% increase, while for North Carolina the volume fell 3%.

As the No. 1 hog producer in the U.S., Iowa continued retaining the largest share of the market (36%) in 2018 from a cash receipt perspective. Minnesota and North Carolina sales represented 12.0% and 10%, respectively, of the total U.S. hog sales in 2018 ($21.10 billion) (see Figure 35). Overall, U.S. hog marketings totaled 40.07 billion pounds in 2018 and were up 5.3% from the previous year. On the other hand, 2018 U.S. cash from hogs slightly increased (0.3%) to $21.10 billion year-over-year (see Figure 35). This reflects that among the 10 states that generated 87% of 2018 hog receipts, only for Iowa and Oklahoma, which had 6% of the market, sales were above the previous year, with Iowa having the largest contribution to the U.S. hog cash receipts.

USDA-ERS's latest Farm Income and Wealth Statistics data published on February 5, 2020, indicated 2019 U.S. hog cash receipts increased 8% to $22.859 billion as national hog prices rose 4.4%. USDA has not published yet the 2019 state cash receipt data. 2019 hog cash receipts for Iowa, Minnesota, and North Carolina were estimated based on the five-year average share of U.S. hog receipts for each of these states multiplied by the 2019 U.S. sales estimated by USDA. 2019 Iowa hog receipts for Iowa, Minnesota, and North Carolina were estimated at $7.94 billion, $2.84 billion, and $2.48, correspondingly. This estimate pegs 2019 Iowa hog sales up 4.2% from last year (see Figure 35).

Since 2011, Iowa's hog sales have generated the second-largest cash receipts in the state (after cash receipts from corn sales), and in 2014 cash receipts from hogs temporarily exceeded those from corn. In 2018, hog cash receipts ($7.62 billion) made up 53.3% of all cash receipts from animals and products ($14.29 billion) in the state and 27.7% of cash receipts from all agricultural commodities cash receipts ($27.47 billion) in Iowa.

As state cash receipt data is available through 2018, 2019 data was estimated by using Iowa five-year share average of U.S. cash receipts for hogs, cattle & calves, corn, and soybeans, and applied those shares to USDA 2019 cash receipt estimates for each of those commodities in

[1] Cash receipts are the receipts from marketings and any sale of farm-slaughtered hogs and pigs, including an allowance for feeder pig out-shipments.

[2] Marketings (includes animals for slaughter market and younger animals shipped to other states for feeding and breeding purposes, and excludes inter-farm sales within the same state and farm slaughter. Data for marketings is in pounds not in U.S. dollars.

2019. The results indicate Iowa hog sales ($7.935 billion) would be about 96% of corn cash receipts ($8.23 billion) (see Figure 36).

The results indicate that the gap between Iowa corn cash receipts and hog cash receipts has been narrowing particularly since 2017, making hogs a more prominent commodity in the state, in terms of cash receipts generation. As Figure 37 shows, the largest gap between hogs and corn cash receipts happened in 2012 when corn prices were record high.

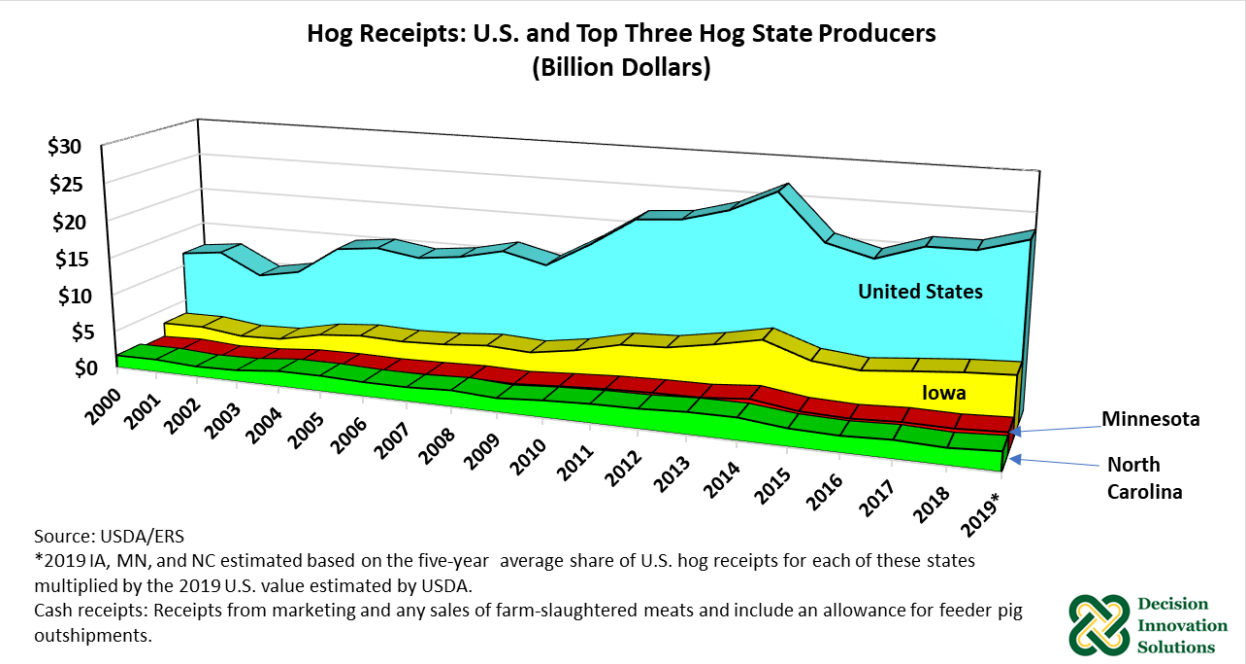


Figure 35, Hog Receipts: U.S. and Top Three Hog State Producers (Billion Dollars)

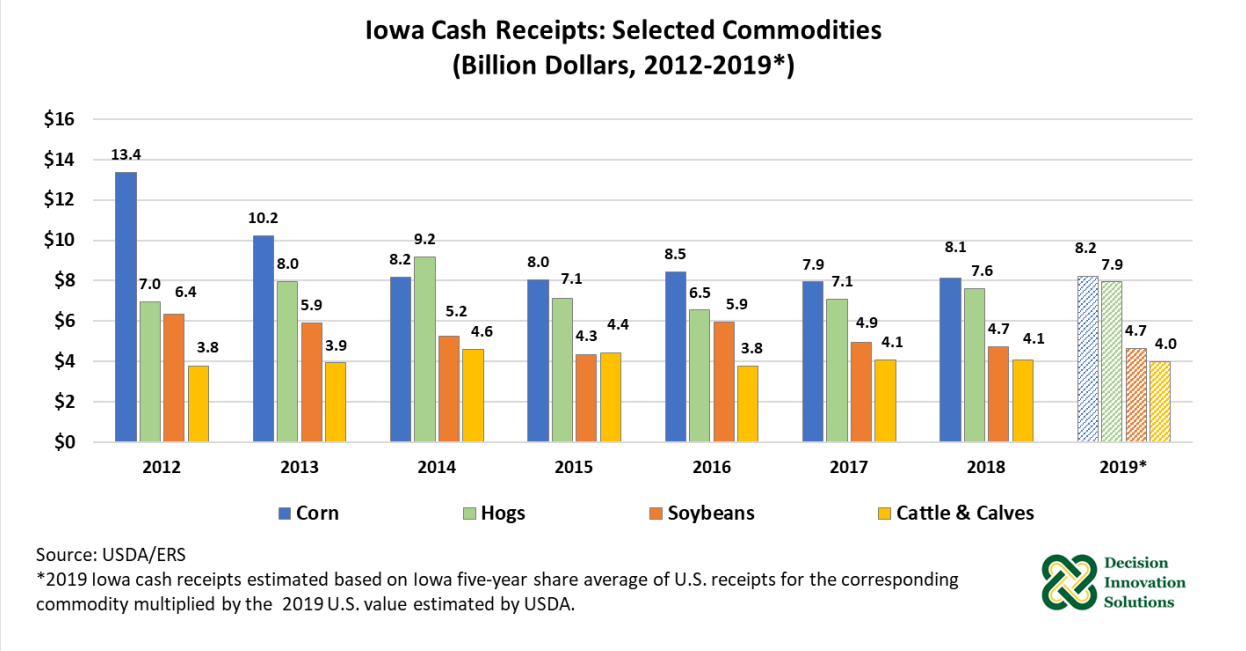


Figure 36, Iowa Cash Receipts: Selected Commodities (Billion Dollars, 2012-2019*)

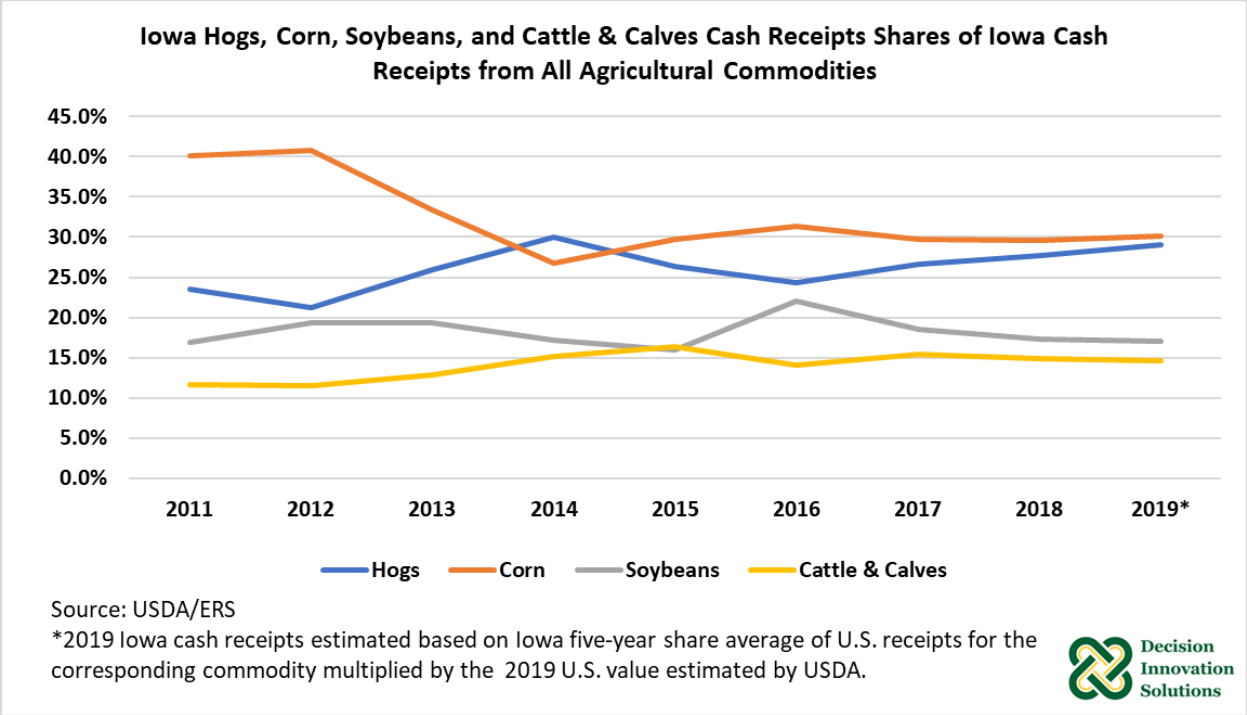


Figure 37, Iowa Hogs, Corn, Soybeans, and Cattle & Calves Cash Receipts Shares of Iowa Cash Receipts from All Agricultural Commodities

Production/Feed Costs and Returns

Changes in feed costs have a considerable impact on the profitability of pig production due to the large proportion of feed costs relative to total production costs. In Iowa, feed costs were about 47% of total production costs related to producing wean-to-finish hogs (270 pound-hog) during 2019. Overall, corn cost was the largest feed expense, representing 44% of total feed cost and 21% of total cost (see Figure 38, Panel B) in 2019.

Despite lower soybean meal and DDGs cost in 2019 compared with the previous year (see Figure 38, Panel A), the average total cost of producing a wean-to-finish hog (finishing a weaned 12-pound hog) in Iowa was up 4% to $143.07/head in 2019 from $138.02/head in 2018. The cost of soybean meal and DDGs represented a smaller proportion (9% and 6%, respectively) of feed cost associated with total production cost. Corn cost, the largest feed expense, increased 9.6% to $30.03/head in 2019 compared with the previous year. Total cost comprises the cost of a 12-pound weaned pig, which in 2019 was up 9% to an average of $43.83/head compared the previous year ($40.32/head).

Figure 39 shows that the large profits realized in 2014 by Iowa hog producers (wean-to-finish) as a result of PEDv were reduced in 2015 and 2016 to the point that by the end of 2016 the annual returns were negative. As Figure 40 indicates, despite lower production costs in 2015

and 2016, particularly due to lower corn and soybean meal prices compared with 2014, hog producers have seen reduced profit margins as a reduction in production costs were offset by falling hog selling prices brought by large supplies. 2017 showed positive returns with stronger hog selling prices, combined with lower feed costs. The last two years have brought negative returns with expanding supplies and lower hog prices, particularly in 2018.

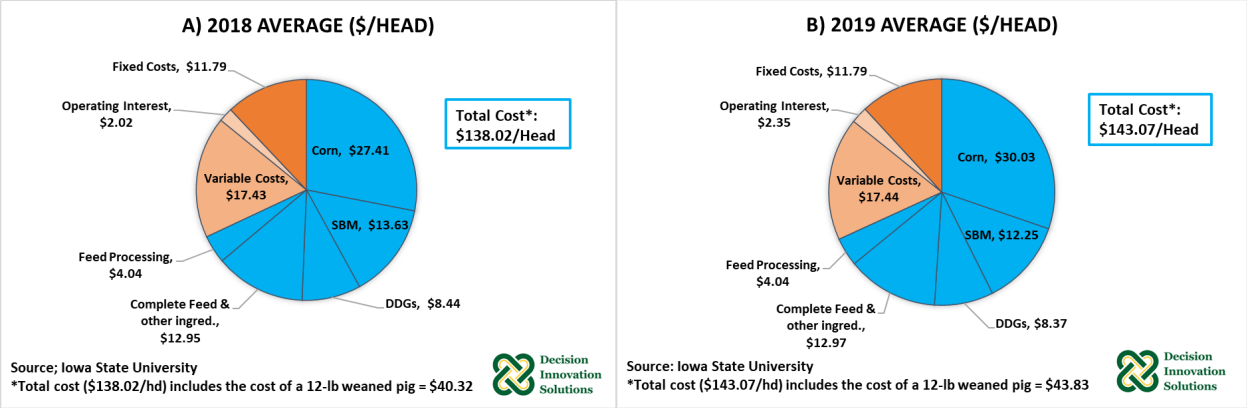


Figure 38, 2018 and 2019 Iowa Average Cost of Hog Production (Wean-to-Finish, $/head)

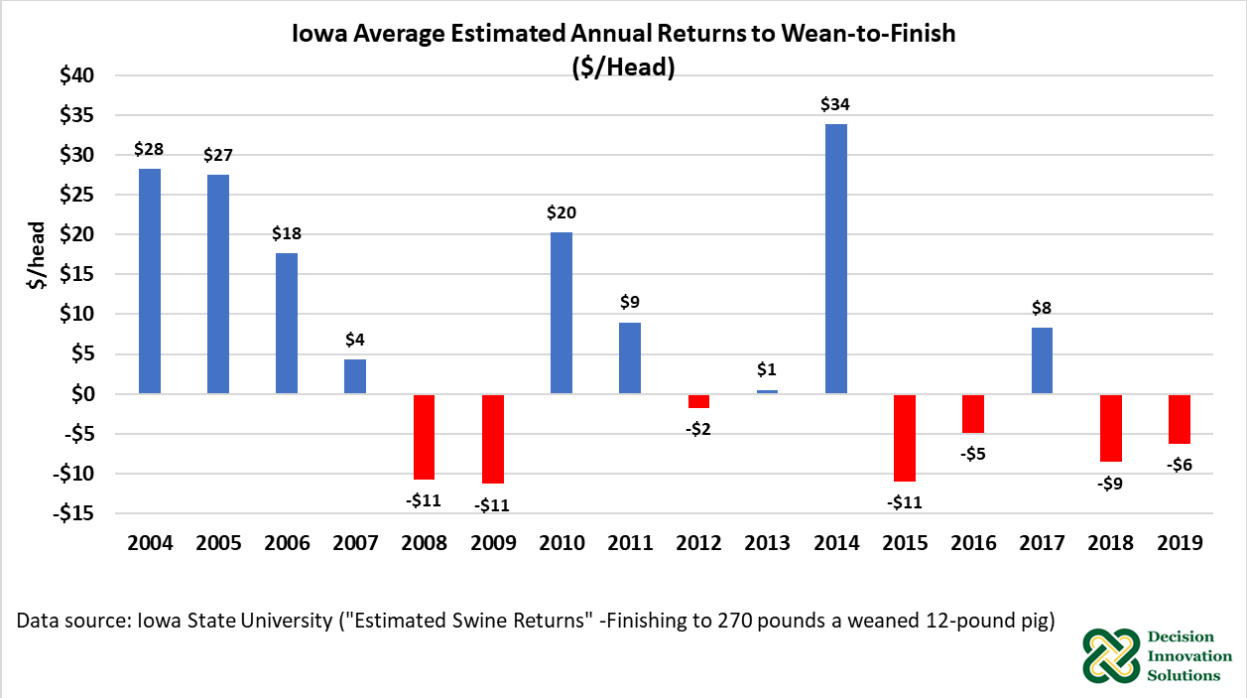


Figure 39, Iowa Average Estimated Annual Returns to Wean-to-Finish ($/Head)

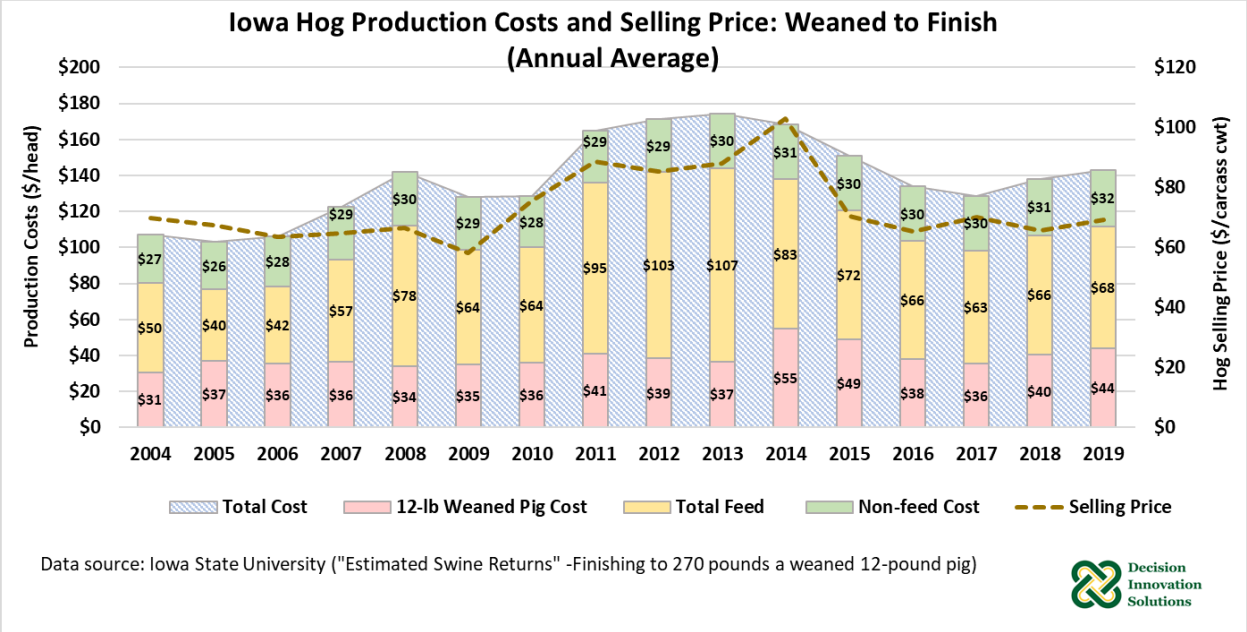


Figure 40, Iowa Hog Production Costs and Selling Price: Wean-to-Finish (Annual Average)

Pork Consumption

U.S. per capita pork consumption ranks third after beef and broiler meat (see Figure 41). Although per capita pork consumption has fallen from 72.9 pounds (carcass weight equivalent - CWE) in 1970, when pork was the second most consumed meat in the U.S., to 65.5 pounds (CWE) in 2018, the figure indicates that the difference between per capita pork consumption and per capita beef consumption has declined. There has been a substantial shift in the types of meat consumed since the 1970s, specifically a decrease in per capita beef, relatively steady per capita pork consumption, and a significant increase in per capita broiler consumption. More recently, per capita pork consumption has increased since 2014.

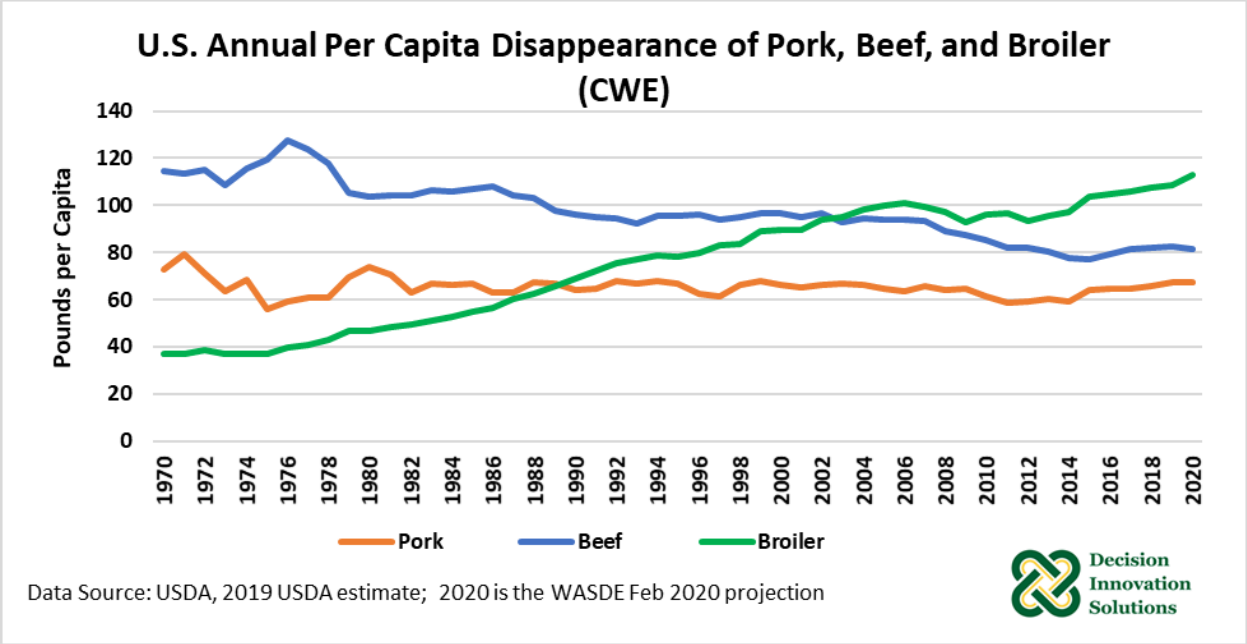


Figure 41, U.S. Annual Per Capita Disappearance of Pork, Beef, and Broiler (CWE)

Figure 42 shows average U.S. per capita consumption of pork, beef, and broiler meat throughout the last five decades (1970-1979 to 2010-2019). Overall, U.S. pork consumption has remained fairly stable compared with beef and broiler meat during that 50-year period. U.S. pork consumption declined 5% from 66.1 pounds CWE per capita, on average in the 1970-1979 decade to 62.6 pounds CWE per capita, on average, in the 2010-2019 decade.

In contrast, U.S. beef consumption fell 30% from the first decade (116.2 pounds CWE per capita, on average) to the last decade (80.9 pounds CWE per capita, on average). At the same time, U.S. broiler consumption grew 157%, on average, from 1970-1979 to 2010-2019. Because of the changes in meat (pork and beef) and broiler consumption patterns during this 50-year period, on average, for each pound of beef consumed in the 1970-1979 decade, 0.57 pound of pork was consumed. In contrast, 0.77 pound of pork was consumed for each pound of beef consumed in the 2010-2019 decade. This reflects a narrowing of the gap between pork and beef consumption during that period.

The consumption pattern between pork and broiler meat substantially reversed during the past 50 years. For each pound of broiler meat consumed in the 1970-1979 decade, 1.68 pounds of pork were consumed, while in the most recent decade, only 0.62 pound of pork was consumed per pound of broiler meat consumed.

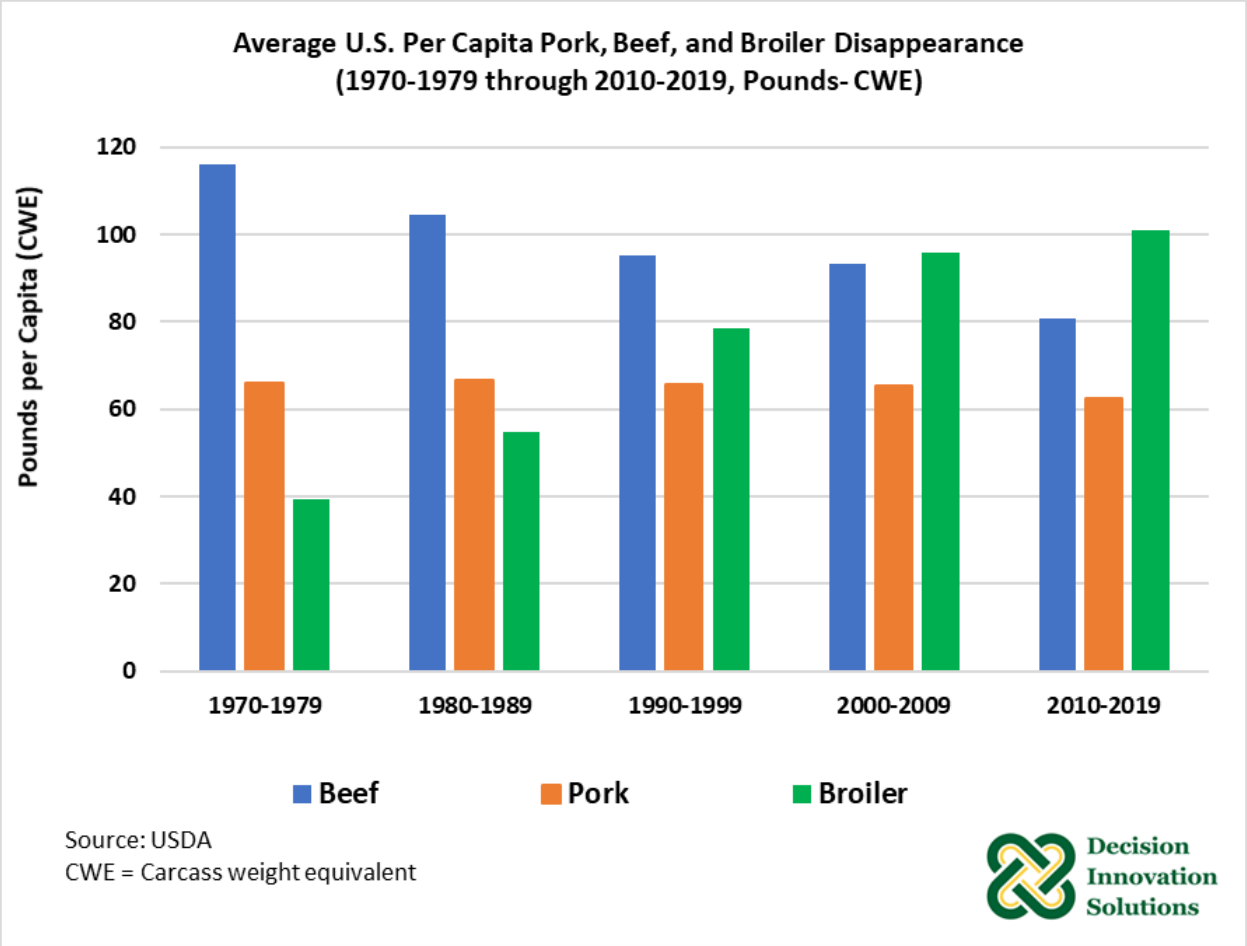


Figure 42, Average U.S. Per Capita Pork, Beef, and Broiler Disappearance (1970-1979 through 2010-2019, Pounds- CWE)

Iowa Feeder Pig Imports

Figure 43 shows Iowa imported 35.796 million head feeder pigs in 2019. Imports were originated from Canada plus 26 U.S. states. Iowa's top five suppliers of feeder pigs were Illinois (16%), Missouri (16%), Oklahoma (13%), Nebraska (11%), and Minnesota (9%). Canada shipped 8% of total feeder pigs imported by Iowa in 2019.

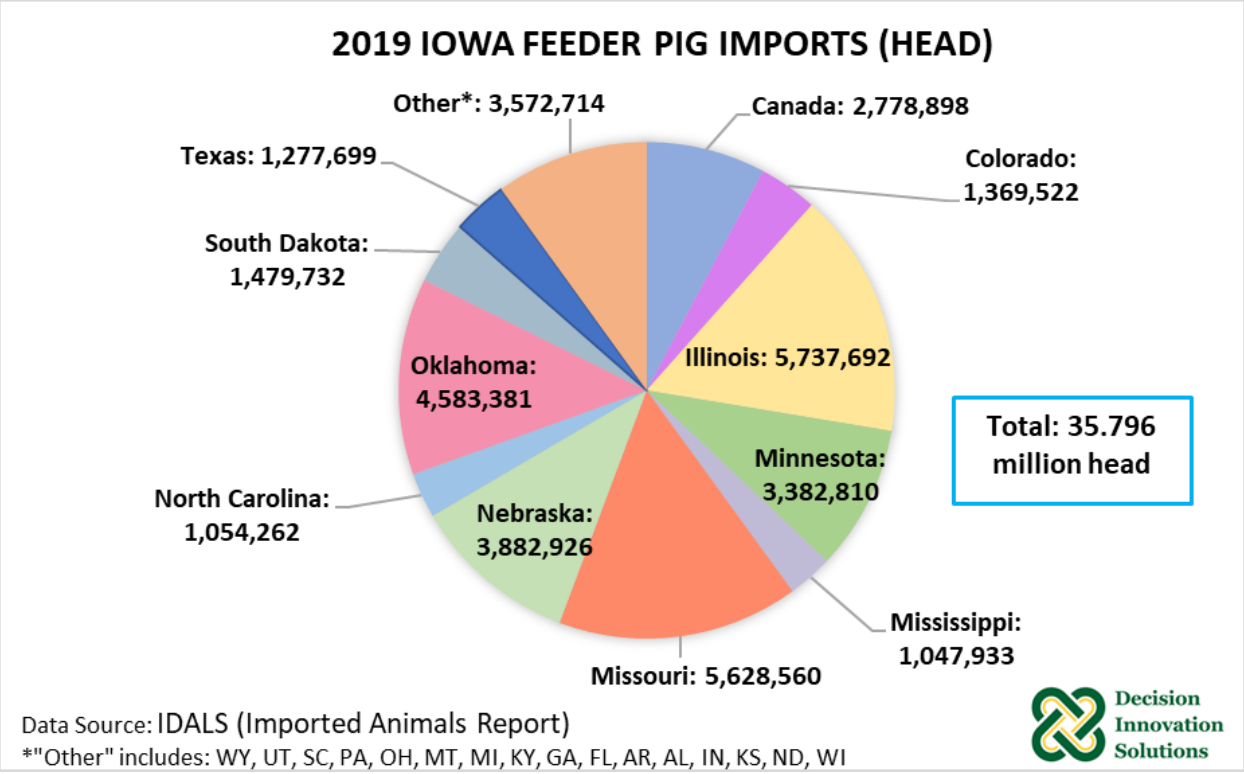


Figure 43, 2019 Iowa Feeder Pig Imports (Head)

U.S. Pork Exports

U.S pork muscle cut exports are a part of total U.S. pork exports with a share of about 80% of total U.S. pork exports. The remainder of U.S. pork exports are in the form of variety meats. U.S. pork muscle cuts exported during 2019 reached a record volume of 2.176 million metric tons (MT), increasing 10% and 14% from 2018 and 2017, respectively (see Figure 44). The 2019 export value ($5.947 billion) was up 11% year-over-year (see Figure 45).

Pork exports in 2019 started to exceed the corresponding monthly volume of the previous two years in June and registered the highest volume in December, up 36% compared with December 2018 (see Figure 46). U.S. pork exports soared in 2019 with substantial volumes shipped to China, whose swine herd has been significantly cut by African swine ever (ASF), resulting in lower Chinese pork production while increasing domestic pork prices. Note that exports to China grew despite high retaliatory tariffs on U.S. pork.

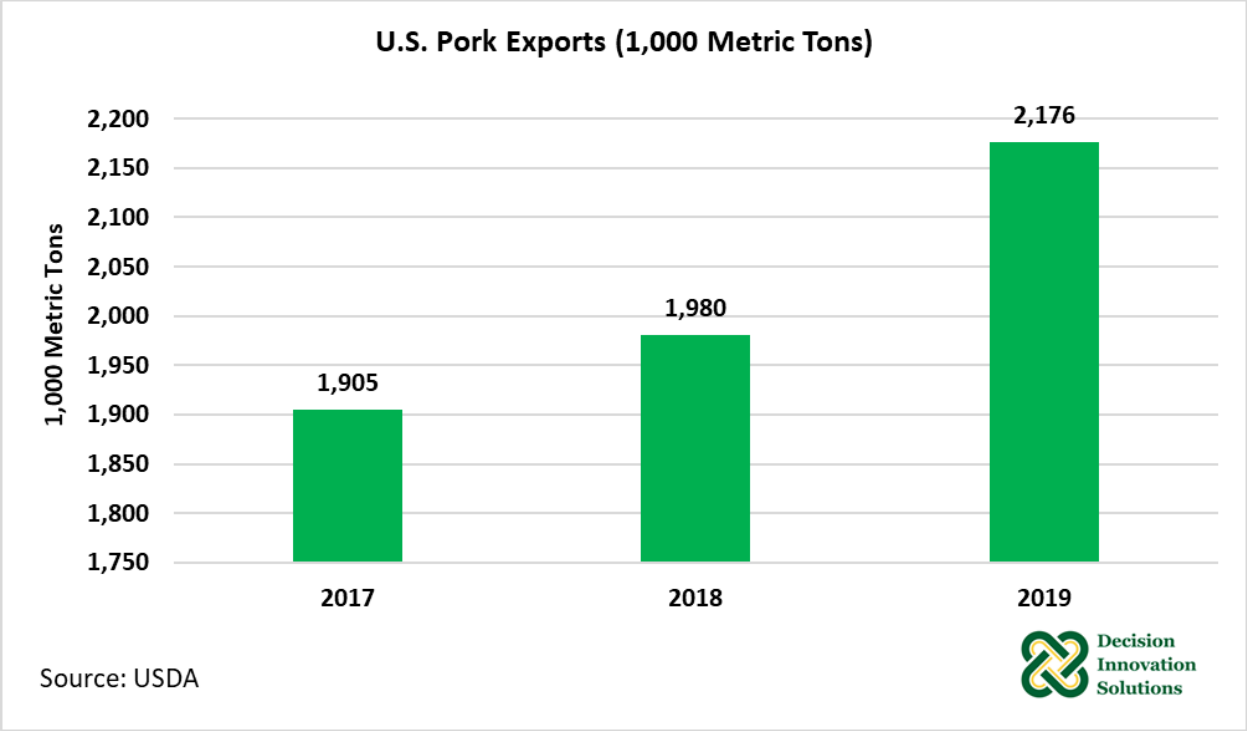


Figure 44, U.S. Pork Exports (1,000 Metric Tons)

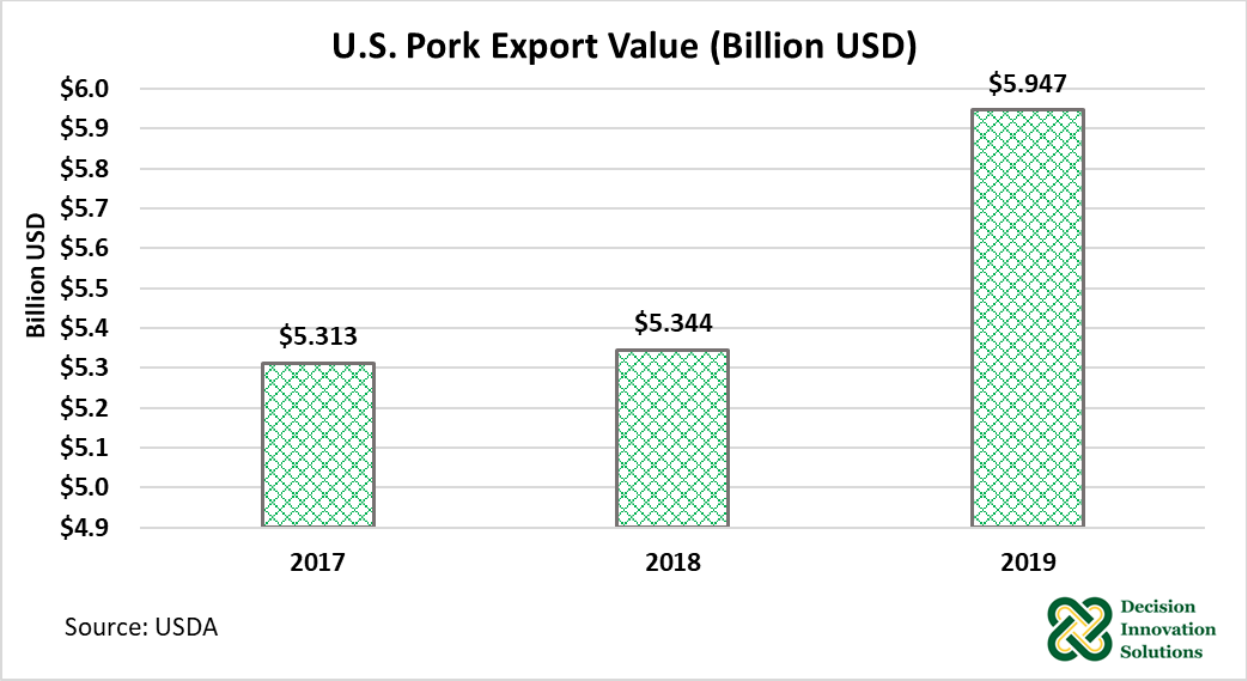


Figure 45, U.S. Pork Export Value (Billion USD)

Recent data shows that during the first five months of 2020, U.S. pork exports reached 1.134 million MT, up 36% year-over-year (see Figure 46), with China as the largest driver of U.S. pork exports during 2020[3].

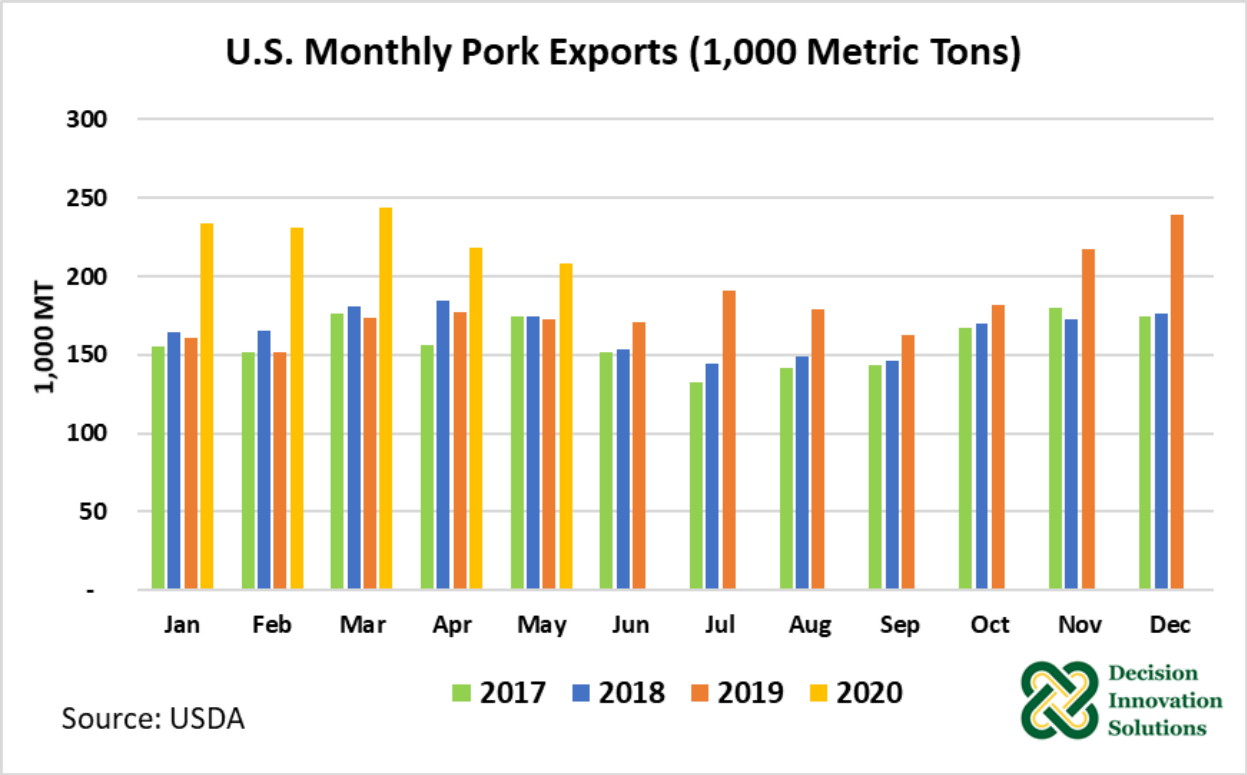


Figure 46, U.S. Monthly Pork Exports (1,000 Metric Tons)

U.S. Pork Exports to Main Destinations

Overall, Mexico has been the top volume market for U.S. pork followed by Japan. On average in 2017 and 2018, Mexico and Japan accounted for 34% and 20% of U.S. total pork exported volume, respectively. South Korea and Canada each had about 10% share of the U.S. total exports during those two years. On the other hand, China's share was 6%, on average, making China the 5th largest market for U.S. pork during 2017 and 2018.

In 2019, Mexico continued as the main market for U.S. pork shipments, while China, surpassed Japan in volume terms (see Figure 47). U.S. pork exports to China increased 258% year-over-year, while shipments to Canada were up 5%. On a monthly basis, U.S. pork exports to China consistently exceeded previous year's volumes beginning in March 2019 (14,288 MT). In

[3] China's duty rate on frozen pork muscle cuts was lowered twice within the first two months of 2020; yet it remains at 63%. Before retaliatory tariffs were imposed in April 2018, the tariff on frozen pork muscle cuts was 12%.

December 2019, the U.S. exported to China the largest volume of the year at 82,659 MT, which was about nine times higher than the volume exported a year earlier (9,335 MT) (see Figure 48). Although declining 10% compared to the previous month, January 2020 U.S. pork exports (74,350 MT) to China were up about 10 times the volume exported in January 2019. The disruption on China's pork industry brought by ASF in that country has opened considerable opportunities for U.S. pork exports. From January to May 2020, U.S. pork (muscle pork cuts) exports to China were over five times higher than last year's volume (up 463%) (see Figure 48) and accounted for 34% of total U.S. pork exports (muscle cuts).

In contrast, compared with the previous year, 2019 total U.S. pork shipments to Mexico, Japan, South Korea, and Hong Kong were down 10.7%, 6.0%, 13.5%, and 13.4%, correspondingly. Exports to Mexico were restrained in 2019 as Mexico retaliatory tariffs on U.S. pork persisted during the first five months of the year.

It should be noted that U.S. pork exports to some of these markets improved during the last part of 2019. For instance, starting in August 2019, U.S. monthly pork exports to Hong Kong exceeded previous year volumes and scored the largest volume of the year in November (2,675 MT), which was up 85% from November 2018.

Also, December exports to Mexico jumped 10% to 55,667 MT year-over-year. Exports consistently increased since November 2019. This trend continued during the first three months of 2020. From January to March exports exceeded previous year's volumes (see Figure 49). In January and March exports were each up 12% year-over-year, while February's exports were up 20%.

Current data indicates U.S. muscle pork cut exports to Mexico from January to May 2020 reached 230,704 MT, up 2% year-over-year; however, as Figure 49 shows, pork exports to Mexico lost momentum during April and May. As indicated by the U.S. Meat Export Federation (USMEF), Mexico's pork production increased while prices declined during this spring, which encouraged price-driven competition.

U.S. pork shipments to Japan were down 31% in May 2020 compared with the previous month (38,758 MT), but January through May exports were up 8% relative to the same period in 2019. The U.S.-Japan agreement that took effect at the beginning of the year is boosting U.S. pork exports to that important value market.

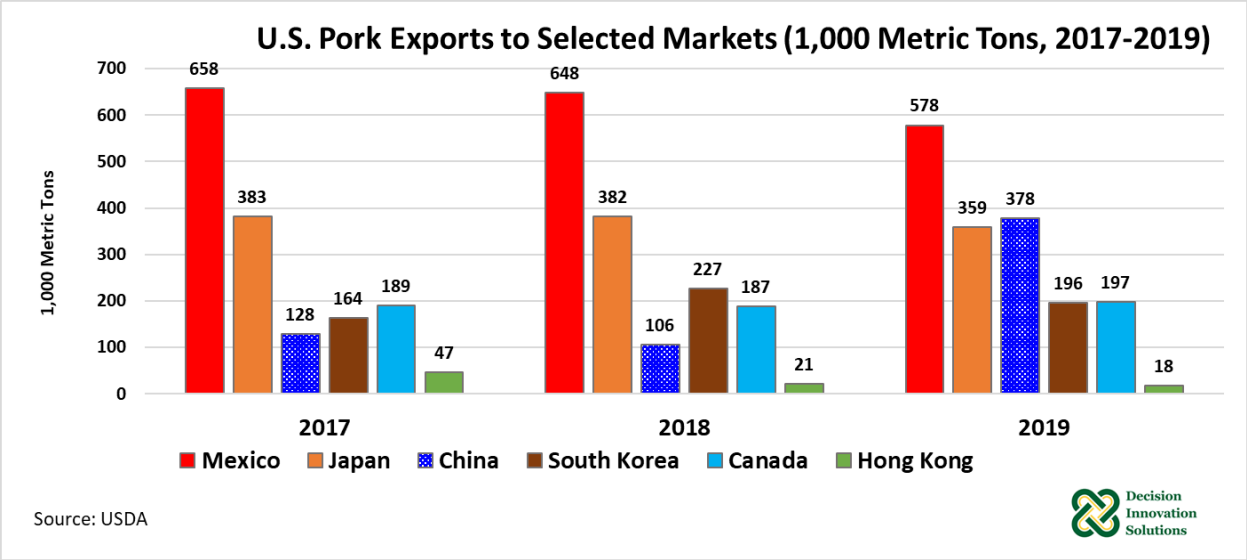


Figure 47, U.S. Pork Exports to Selected Markets (1,000 Metric Tons)

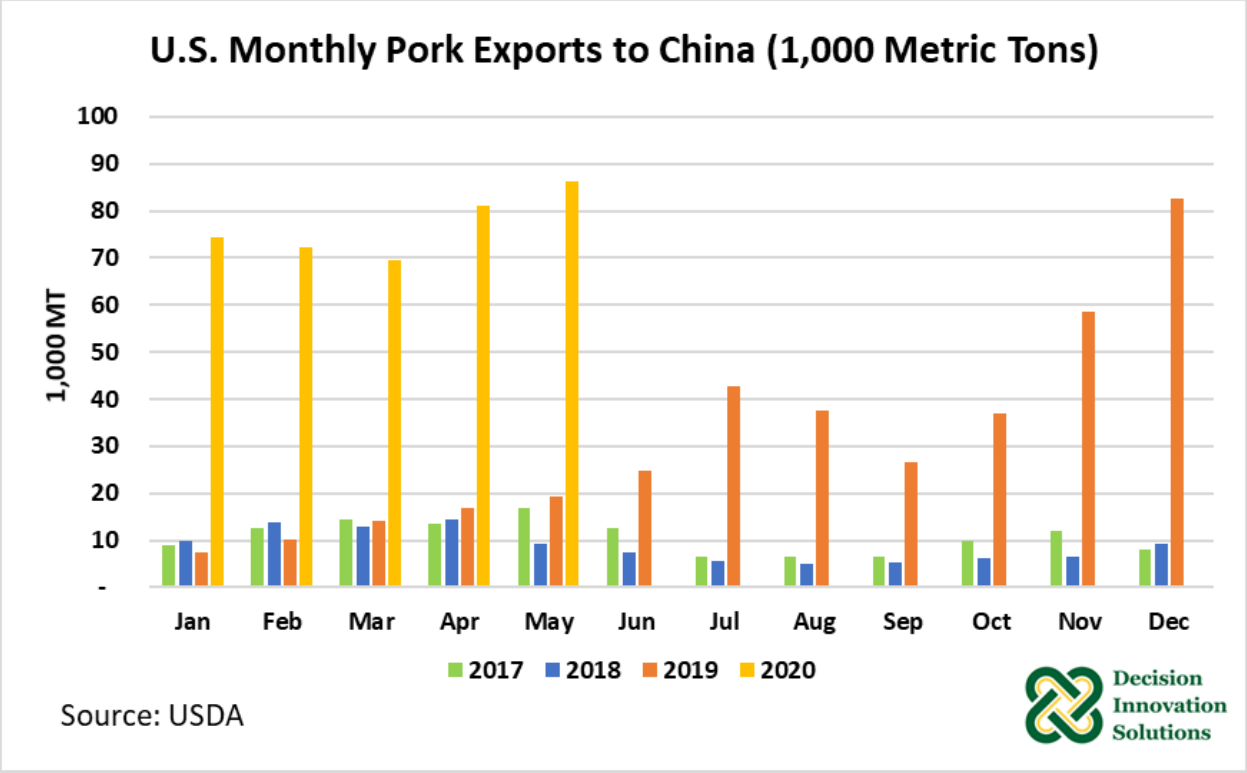


Figure 48, U.S. Monthly Pork Exports to China (1,000 Metric Tons)

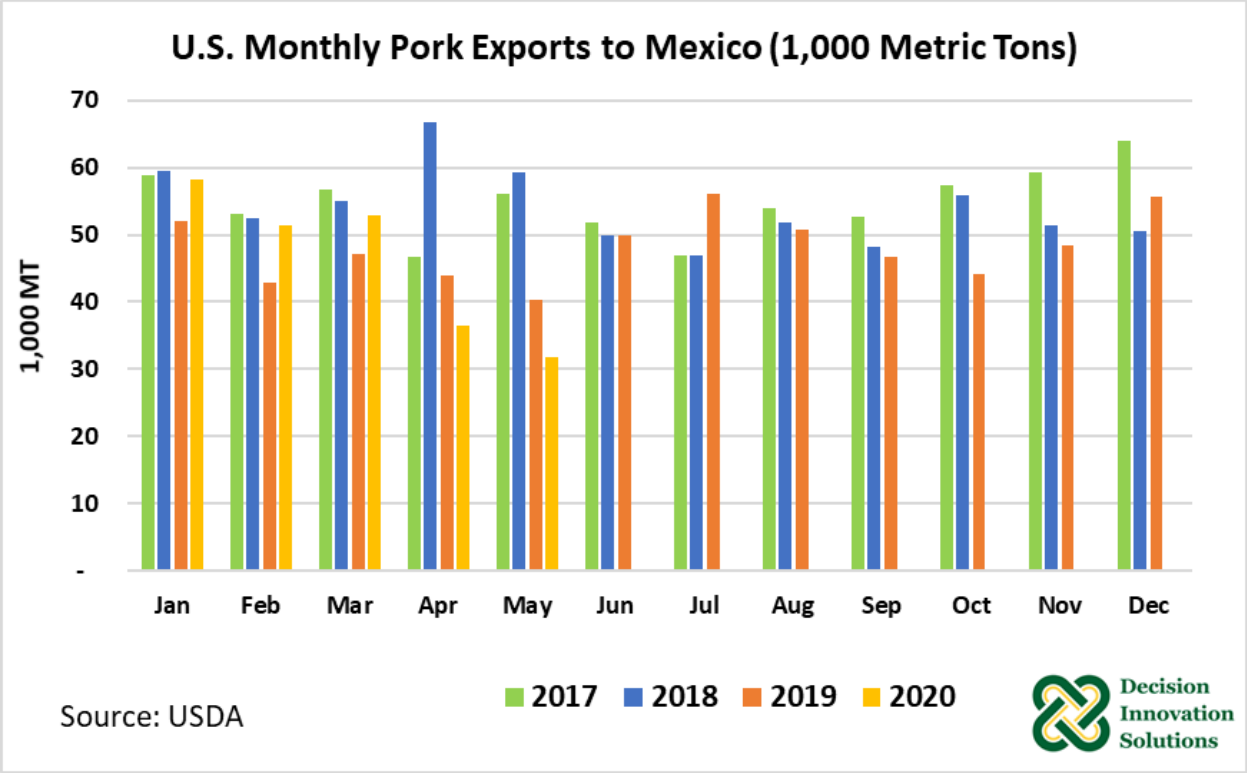


Figure 49, U.S. Monthly Pork Exports to Mexico (1,000 Metric Tons)

As Figure 50 shows, Japan is the leading value market for U.S. pork. Although Japan imports both fresh-chilled pork and frozen pork products, the U.S. is the main supplier of fresh pork products including higher-priced cuts such as loins. In 2017 and 2018, one third of the total value of U.S. pork exports was generated by the value of shipments to Japan. With the substantial increase in exports to China in 2019, and the 5.9% decline in exports to Japan, Japan's share of U.S. total value of pork exports declined to 25.2% in 2019.

The value of exports to China was four times higher in 2019 compared with the preceding year. Although the value of U.S. pork exports to Mexico fell 3% in 2019, Mexico continued as the second-largest value market for U.S. pork exports (see Figure 50).

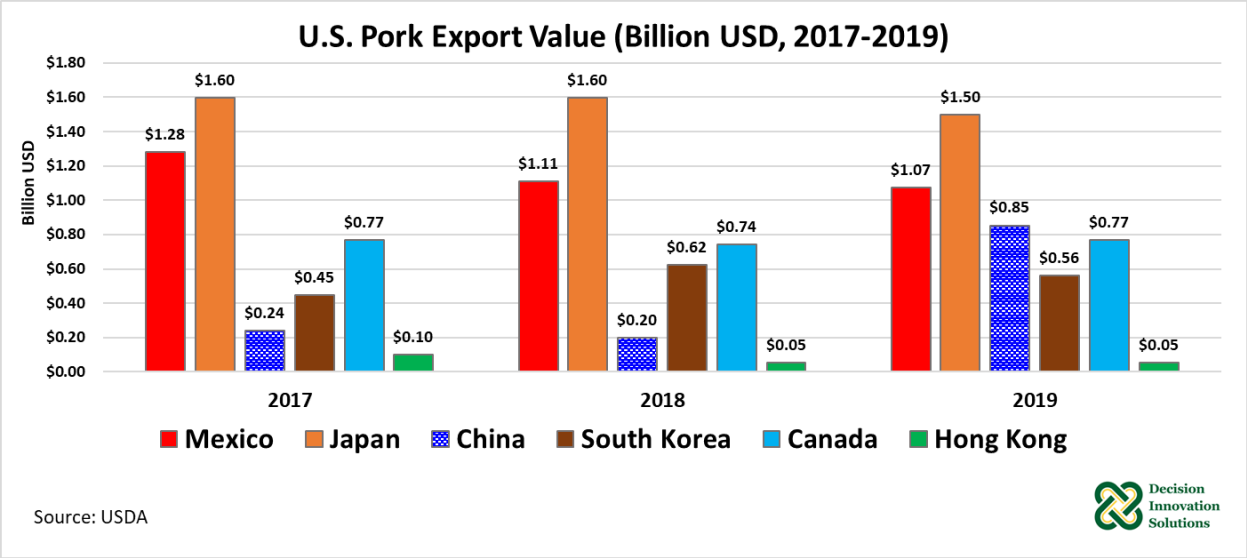


Figure 50, U.S. Pork Export Value (Billion USD)

The approval of the U.S.-Mexico-Canada Agreement (USMCA) at the beginning of the year (2020) is expected to boost U.S. pork exports to these two important markets (Canada and Mexico), while the U.S.-China "Phase One" trade agreement signed on January 15, 2020, expands the permissible product range for U.S. pork and pork products, including bungs and intestines and processed products.

With important developments in U.S. pork trade agreements such as these, 2020 pork exports are projected to increase this year. In addition, the ASF adverse impact on China hog/pork production is expected to contribute to the expansion in U.S. pork exports in 2020. USDA's latest forecast (July 2020) indicates 2020 U.S. pork exports would grow 19% to 7.523 billion pounds (carcass weight equivalent) compared with last year (6.321 billion pounds, carcass weight equivalent). Projections indicate U.S. pork exports would account for 26% of production, up from 23% during 2019.

Iowa Pork Exports

Key data to estimate Iowa pork muscle cut exports was:

1) the 2017 USDA Census Iowa county hog inventory share to total Iowa hog inventory that year.

2) Iowa's percent of market hog inventory (32.846%) to total U.S. market hog inventory in December 2018, and

3) Iowa's percent of market hog inventory (33.037%) to total U.S. market hog inventory in June 2019.

4) 2019 U.S. pork muscle cut exports: January to June 2019 (1.006 million MT) and July to December 2019 (1.170 million MT)

We applied the following procedure:

Iowa Market Hog Inventory Data by County: December 1, 2018 and June 1, 2019

December 1, 2018 USDA Survey market hog inventory data for Iowa was not available at the county level. To estimate Iowa's Dec 1, 2018 market hog inventory data by county, we applied the 2017 USDA Census Iowa county hog inventory share to total Iowa hog inventory that year (see Table 4) to Iowa's December 1, 2018 market hog inventory (22.580 million head). We used the December 1, 2018 market hog inventory data because historically in Iowa, on average, 95% of December 1 inventory is composed of market hog inventory, which are the hogs that enter processing plants within the next six months (January to June).

June 1, 2019 USDA Survey market hog inventory data for Iowa was not available at the county level. To estimate Iowa June 1, 2019 market hog inventory data by county, we applied the 2017 USDA Census Iowa county hog inventory share to total Iowa hog inventory that year to Iowa's June 1, 2019 market hog inventory (22.900 million head). (see Table 4). We used the June 1, 2019 market hog inventory data since historically in Iowa, on average, 95% of June 1 inventory is composed of market hog inventory, which are the hogs that enter processing plants within the next six months (July to December).

Iowa 2019 Pork Muscle Cut Exports: January to June and July to December

To estimate January through December 2019 Iowa pork muscle cut exports (referred from here on as Iowa pork exports), we assumed that the percent of Iowa's pork exports from January to June 2019 to U.S. pork exports during that period (1,006,479 MT), was the same as Iowa's percent of market hog inventory (32.846%) to total U.S. market hog inventory in December 2018. Based on this percentage, Iowa exported 330,590 MT (1,006,479 MT * 32.846%) of pork muscle cuts from January to June 2019. In addition, we assumed that the percent of Iowa's pork exports from July to December 2019 to U.S. pork exports during that period (1,170,005 MT), was the same as Iowa's percent of market hog inventory (33.037%) to total U.S. market hog inventory in June 2019. Based on this percentage, Iowa exported 386,538 MT (1,170,005 MT * 33.037%) of pork from July to December 2019. Iowa pork exports from January to December 2019 was assessed at 717,128 MT.

2019 Iowa County Pork Muscle Cut Exports

To estimate Iowa pork muscle cut exports from January to June 2019 at the county level, we applied the 2017 USDA Census Iowa county hog inventory share to total Iowa hog inventory that year to the estimated Iowa January to June 2019 exports (350,590 MT). To estimate Iowa pork muscle cut exports from July to December 2019 at the county level, we applied the 2017 USDA Census Iowa county hog inventory share to total Iowa hog inventory that year to the

estimated Iowa July to December 2019 exports (386,538 MT). Iowa pork exports for the entire 2019 year at the county level are the sum of January-June plus July to December 2019 county level data (see Table 4).

Among the selected 35 Iowa counties, five counties exported 24.6% of total Iowa pork muscle cut exports in 2019, with Washington and Sioux counties exporting 42,025 MT (5.9%) and 39,725 MT (5.5%), respectively. The selected 35 Iowa counties exported about one-fifth (19.6%, 425,889 MT) of all U.S. pork muscle cut exports from January to December 2019.

Table 4, Focus Counties: Inventory, Exports, and County Share of Total Exports (January to December 2019)

Selected County	December 1, 2018 Iowa Market Hog Inventory (Head)	June 1, 2019 Iowa Market Hog Inventory (Head)	January to June 2019 Pork Muscle Cut Exports by Selected County (MT)	July to December 2019 Pork Muscle Cut Exports by Selected County (MT)	January to December Pork Muscle Cut Exports by Selected County (MT)	County Share of Iowa Total Pork Muscle Cut Exports (January to December 2019, %)	County Share of U.S. Total Pork Muscle Cut Exports (January to December 2019, %)
Washington	1,323,226	1,341,979	19,373	22,652	42,025	5.9%	1.9%
Sioux	1,250,794	1,268,520	18,313	21,412	39,725	5.5%	1.8%
Lyon	1,065,734	1,080,837	15,603	18,244	33,847	4.7%	1.6%
Hamilton	1,004,646	1,018,884	14,709	17,198	31,907	4.4%	1.5%
Plymouth	918,218	931,231	13,443	15,719	29,162	4.1%	1.3%
Carroll	744,518	755,070	10,900	12,745	23,645	3.3%	1.1%
Hardin	624,780	633,634	9,147	10,695	19,843	2.8%	0.9%
Kossuth	592,170	600,562	8,670	10,137	18,807	2.6%	0.9%
O'Brien	501,013	508,113	7,335	8,577	15,912	2.2%	0.7%
Wright	480,325	487,132	7,032	8,222	15,255	2.1%	0.7%
Pocahontas	396,179	401,793	5,800	6,782	12,582	1.8%	0.6%
Buchanan	365,546	370,726	5,352	6,258	11,610	1.6%	0.5%
Buena Vista	346,050	350,954	5,066	5,924	10,990	1.5%	0.5%
Howard	316,966	321,458	4,641	5,426	10,067	1.4%	0.5%
Calhoun	314,110	318,561	4,599	5,377	9,976	1.4%	0.5%
Butler	283,253	287,267	4,147	4,849	8,996	1.3%	0.4%
Clayton	278,561	282,509	4,078	4,769	8,847	1.2%	0.4%
Audubon	264,594	268,344	3,874	4,529	8,403	1.2%	0.4%
Scott	254,143	257,744	3,721	4,351	8,071	1.1%	0.4%
Chickasaw	242,210	245,643	3,546	4,146	7,692	1.1%	0.4%
Floyd	235,545	238,883	3,449	4,032	7,481	1.0%	0.3%
Fayette	230,559	233,826	3,376	3,947	7,322	1.0%	0.3%
Mitchell	191,949	194,670	2,810	3,286	6,096	0.9%	0.3%
Marshall	176,469	178,970	2,584	3,021	5,605	0.8%	0.3%
Webster	172,444	174,888	2,525	2,952	5,477	0.8%	0.3%
Dubuque	139,989	141,973	2,050	2,396	4,446	0.6%	0.2%
Iowa	126,970	128,770	1,859	2,174	4,033	0.6%	0.2%
Winneshiek	124,646	126,412	1,825	2,134	3,959	0.6%	0.2%
Jones	107,951	109,481	1,580	1,848	3,428	0.5%	0.2%
Allamakee	82,883	84,058	1,213	1,419	2,632	0.4%	0.1%
Jefferson	82,165	83,330	1,203	1,407	2,610	0.4%	0.1%
Woodbury	68,808	69,783	1,007	1,178	2,185	0.3%	0.1%
Lucas	44,204	44,831	647	757	1,404	0.2%	0.1%
Wapello	36,859	37,382	540	631	1,171	0.2%	0.1%
Page	21,358	21,660	313	366	678	0.1%	0.0%
Other	9,170,165	9,300,123	134,259	156,980	291,239	40.6%	13.4%
STATE TOTAL	22,580,000	22,900,000	330,590	386,538	717,128	100.0%	32.9%
U.S. TOTAL	68,744,600	69,315,600	1,006,479	1,170,005	2,176,484		

Source: Inventory data: USDA CENSUS and Survey data

Export Data: USDA-FAS

Decision Innovation Solutions

Economic Contribution of Hog Production and Related Industries

State Level Results

After identifying the three IMPLAN sectors to be studied, a state model was created and modified according to the IMPLAN-recommended methodology. The 2018 data model was utilized (the most current) and, where appropriate, adjusted to 2020 dollars. Further details on methodology can be found in Appendix A. Results are presented for the following three (adjusted) industries:

- Hog Production
- Hog Slaughtering
- Hog Processing

State Jobs

'Jobs' represents an estimate of the number of positions (jobs) currently filled in an area and/or industry. The estimates provided here originate with the IMPLAN input-output model database. 'Jobs' includes positions whether they are full or part time, so care must be used in making comparisons. As shown in Figure 51, Iowa's hog production, slaughtering, processing and related economic activities contribute significantly to Iowa's total jobs with about 147,105 jobs. Of this amount, 46% comes from hog production, 45% from hog slaughtering, and about 9% from hog processing.

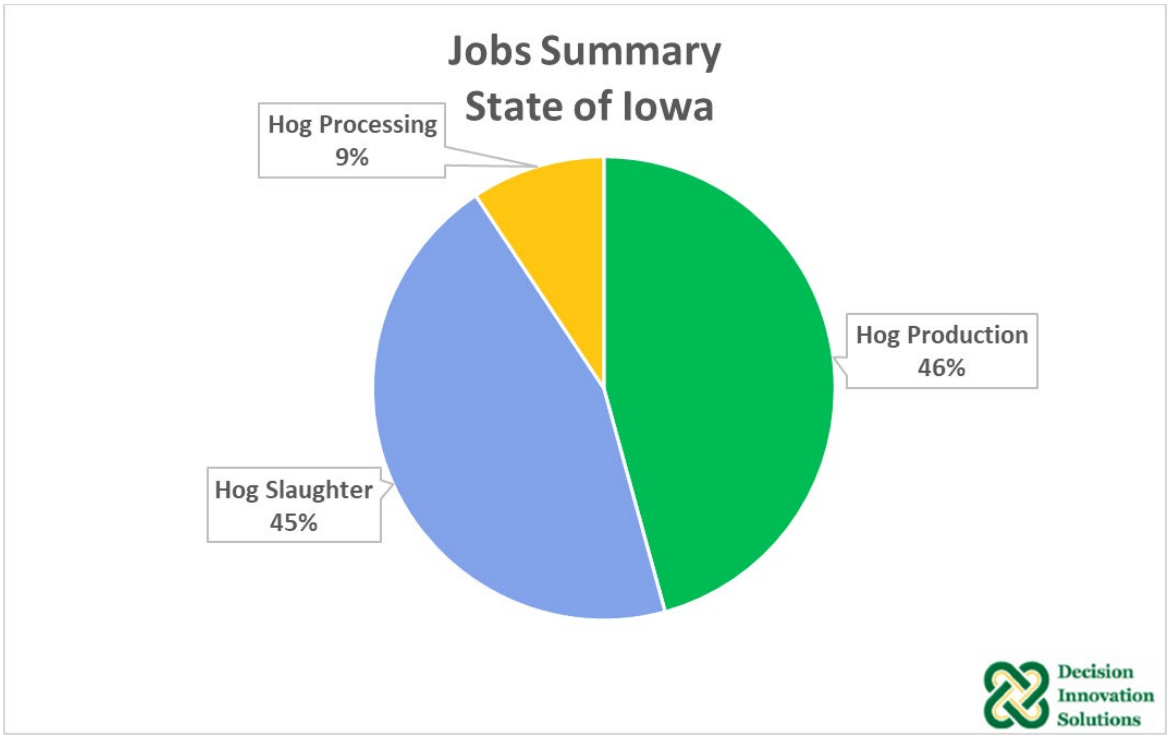


Figure 51, State of Iowa Pork Industry Jobs Summary

State Value-Added

'Total value-added' refers to that portion of the value of total sales (output) beyond the cost of inputs used in the production process from other industries. Hog production, slaughtering, processing and related economic activities make a sizeable contribution to the economy in Iowa with about $11.9 billion in value-added. As shown in Figure 52, about 46% of this amount comes from hog production, 9% from hog slaughtering, and about 45% from hog processing.

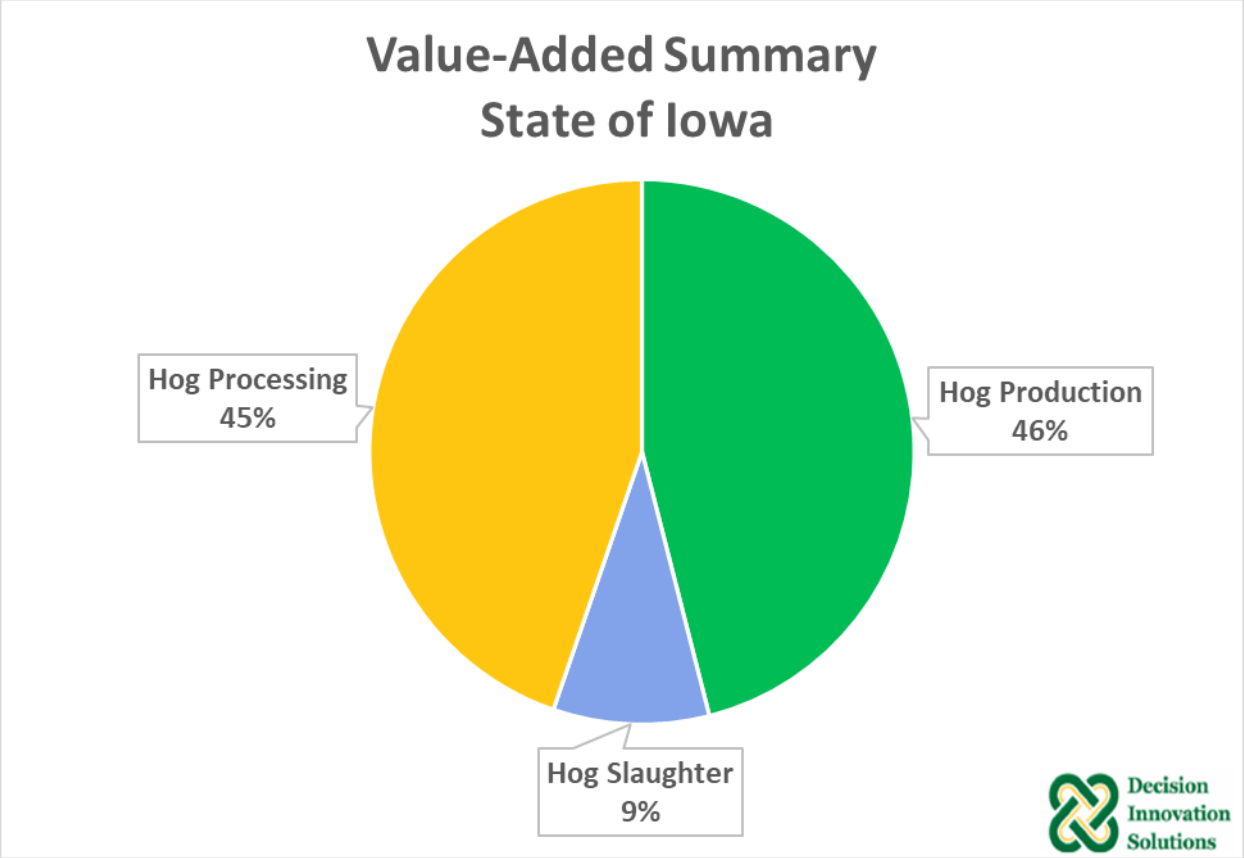


Figure 52, State of Iowa Pork Industry Value-Added Summary

State Sales (Output)

'Total sales' refers to the total value of all the sales (also known as output) of a study area and/or industry. This is a total number that does not make deductions for the cost or origination of inputs that were used in the production process. Figure 53 illustrates the contribution of hog production, slaughtering, processing, and other related economic activities to Iowa's economy. As shown, Iowa's hog industry contributes about $40.8 billion in total sales. Of this amount, about 34% comes from hog production, 55% from hog slaughtering, and about 11% from hog processing.

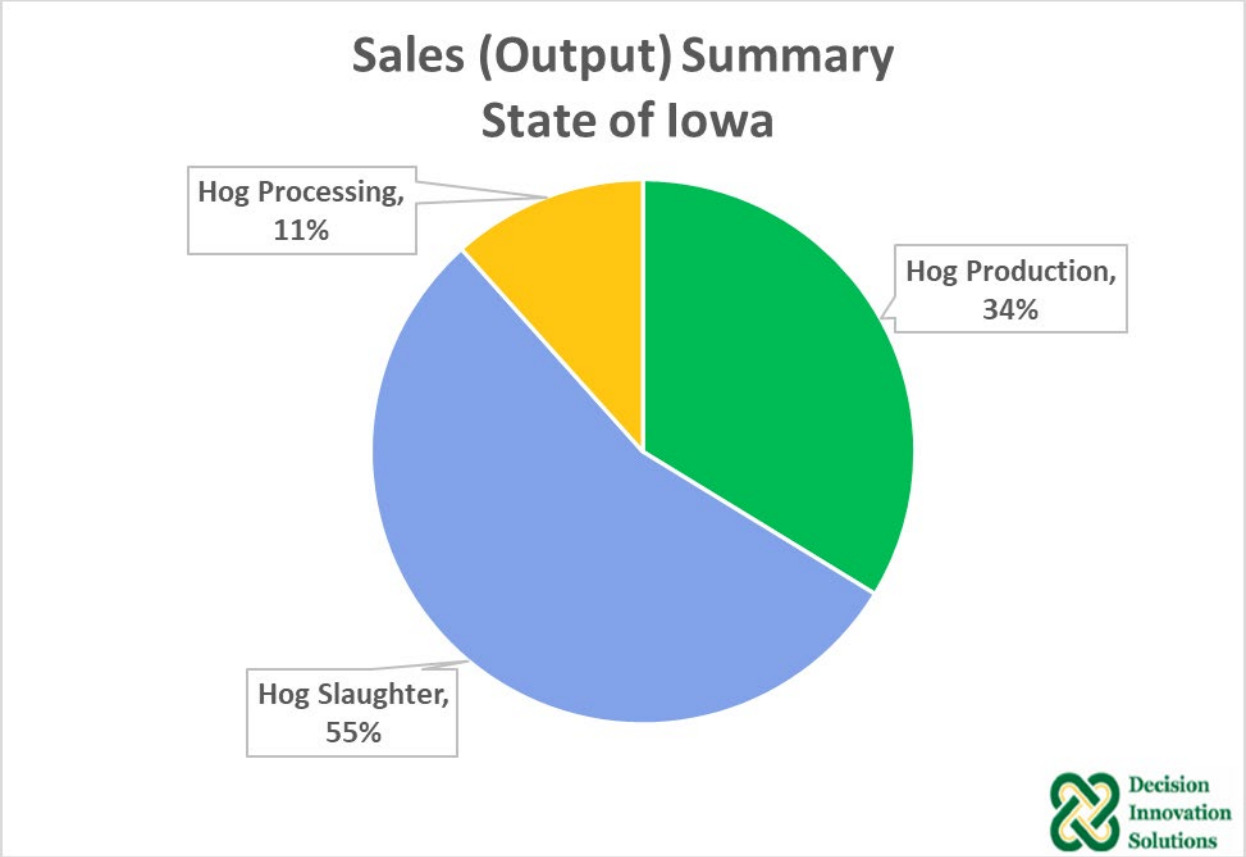


Figure 53, State of Iowa Pork Industry Sales (Output) Summary

State Labor Income

'Labor income' is the sum of employee compensation (work for hire) and proprietor income (self-employed) and is a sub-component of value-added. Hog production, slaughtering, processing and related economic activities make a significant contribution to the economy in Iowa with $6.8 billion in labor income. As shown in Figure 54, 40% of this amount comes from hog production, 49% from hog slaughtering and 11% from hog processing.

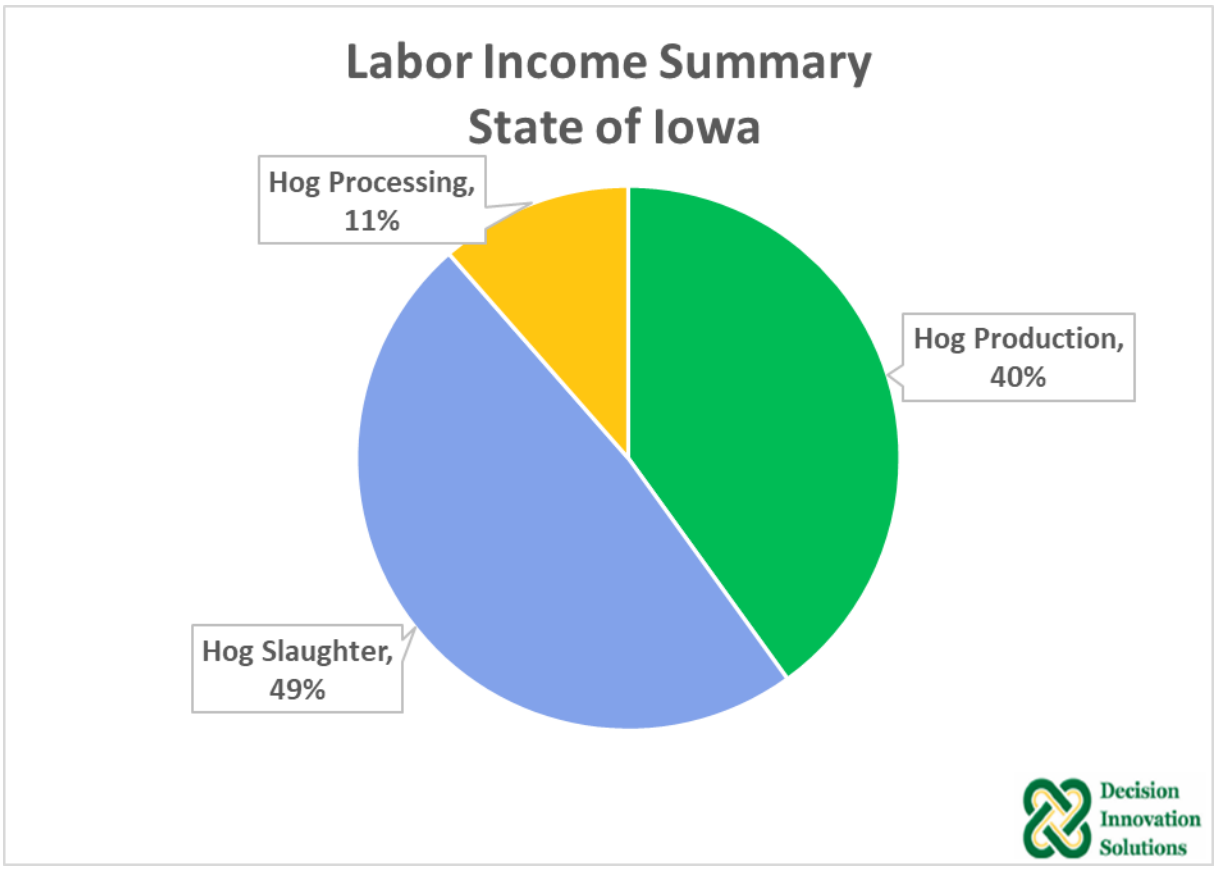


Figure 54, State of Iowa Pork Industry Labor Income Summary

Tax Summary

Iowa's hog production, slaughtering, processing, and related economic activities are also a significant source of tax revenue, contributing $2.2 billion in taxes at jurisdictions. About $893 million (41%) of that amount goes to the state and local levels and about $1.3 billion (59%) is paid at the federal level. Estimates of taxes paid are shown in Figure 55.

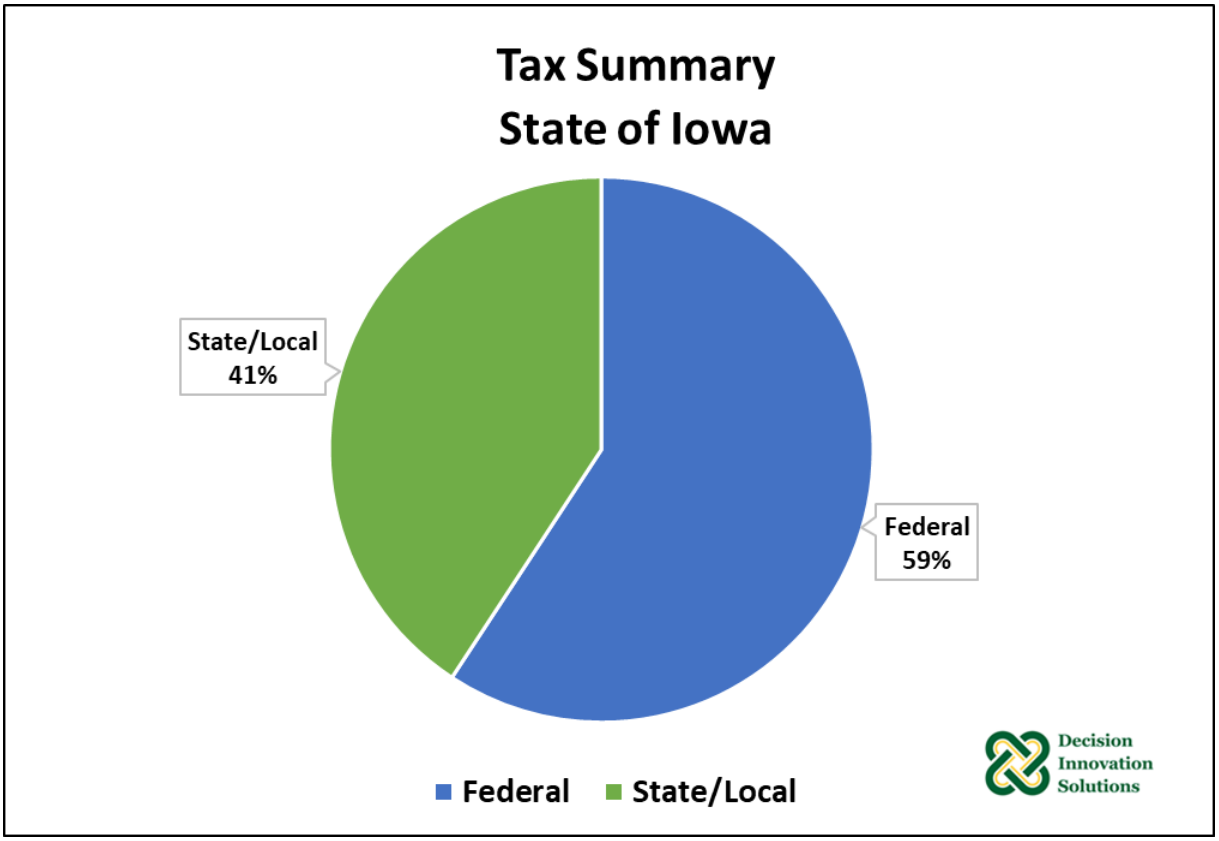


Figure 55, State of Iowa Pork Industry Tax Summary

Economic Impact Study – 2,400-Head Wean-to-Finish Hog Farm

The 2018 IMPLAN data package was also used for this portion of the analysis and, where appropriate, adjusted to 2020 dollars. The entry of a new 2,400-head wean-to-finish hog farm causes a measurable increase in economic activity within the state of Iowa, both in terms of construction and annual operations. When a hog farm enters a local economy, it causes a series of new economic activities (impacts) to take place. For this summary, we break the impacts into one-time construction impacts and ongoing annual operations impacts. The magnitude of these new economic activities is largely related to the presence of industries which supply the needed inputs for a new hog farm. A wean-to-finish facility in Iowa sources roughly 35.5% of all operation's inputs locally.

The construction of a new hog farm requires several purchases such as steel, concrete, and equipment; once construction is completed, hog farms purchase feed, veterinary and other professional services, and many other inputs to produce hogs for sale. The direct purchase of supplies and equipment are known as direct effects. The suppliers and vendors used by the hog farm then must purchase inputs to supply the hog farm; these are known as indirect effects. Those who work in the construction of the farm, for the hog farm once it has been completed, and for the farm's suppliers and vendors then use their additional income to make household purchases; these are known as household, or induced effects. Taken together, the sum of direct, indirect and induced effects is known as total effects and accounts for the total multiplier effect present from the construction and operations of a new hog farm. Value-added numbers are a better way to represent the economic impact of a certain event because it is a summation of all value-added to inputs. Sometimes the total sales (output) number is used because it's bigger but it inherently includes some double counting since it sums inputs for each round of value-added as it moves through the chain.

A new 2,400-head hog wean-to-finish farm's total impact of construction and operations for the first year in Iowa would generate $1.1 million in total value-added or 12 total jobs. In terms of labor income nearly $637 thousand and $2.5 million in total sales would be added to Iowa.

Table 5, Total Effect of Constructing and Operating a 2,400 Head Wean-to-Finish Barn for First Year[4]

Combined Effect of Construction and Operations for First Year				
Impact Type	Employment	Labor Income	Value-Added	Sales
Direct Effect	7	$347,430	$591,083	$1,473,695
Indirect Effect	3	$178,506	$312,437	$711,754
Induced Effect	3	$110,606	$201,693	$362,444
Total Effect	12	$636,541	$1,105,213	$2,547,892

[4] Totals may not add up to the totals presented in the report due to rounding

Constructing a 2,400-head deep pit barn in Iowa will create economic impacts through every phase of construction. A construction cost of $316/head was used to determine the cost to construct the facility. Looking at Table 6, this would create a total value-added impact of $579,058 or 6 total jobs with labor income of nearly $377,000. In addition, $1.2 million in total sales are added to the Iowa economy.

Table 6, Total Effect of Constructing a 2,400-Head Wean-to-Finish Barn

Construction				
Impact Type	Employment	Labor Income	Value-Added	Sales
Direct Effect	4	$232,666	$325,646	$757,228
Indirect Effect	1	$78,992	$134,342	$269,034
Induced Effect	2	$65,264	$119,070	$213,930
Total Effect	6	$376,921	$579,058	$1,240,193

As shown in Table 7, the economic sector impacted the most through total value-added by constructing a wean-to-finish farm in Iowa is "construction of new commercial structures, including farm structures" with a total value-added effect of nearly $172,000. The second largest impacted economic sector is "ready-mix concrete manufacturing" with a total value-added effect of nearly $104,000.

Table 7, Top 10 Sectors Impacted by Value-Added of Constructing a 2,400-Head Wean-to-Finish Barn for First Year

	Construction Top 10 Sectors Impacted – Value-Added				
Sector #	Sector	Direct	Indirect	Induced	Total
55	Construction of new commercial structures, including farm structures	$171,957	$0	$0	$171,957
204	Ready-mix concrete manufacturing	$101,210	$2,338	$30	$103,578
260	Farm machinery and equipment manufacturing	$37,219	$105	$1	$37,325
240	Ornamental and architectural metal work manufacturing	$15,260	$114	$2	$15,376
203	Cement manufacturing	$0	$12,601	$6	$12,607
417	Truck transportation	$0	$8,823	$994	$9,817
441	Monetary authorities and depository credit intermediation	$0	$4,260	$4,181	$8,441
396	Wholesale - Other durable goods merchant wholesalers	$0	$7,801	$440	$8,241
29	Sand and gravel mining	$0	$8,189	$5	$8,194
490	Hospitals	$0	$0	$6,153	$6,153

Construction of a 2,400-head wean-to-finish site will create tax impacts at both the state and local level and the federal level. As shown in Table 8, nearly $37,000 are added to state and local taxes and nearly $72,000 are added to federal taxes.

Table 8, Tax Impacts of Constructing a 2,400-Head Wean-to-Finish Barn

Tax Impacts of Construction	
Total	$108,243
State and Local	$36,699
Federal	$71,544

Operating the wean-to-finish farm would contribute economic impacts to Iowa's economy through the production of market pigs. A 2,400-head site was expected to have two turns of pigs marketed per year with a mortality of 4.67%. This would result in just over 4,500 head of pigs marketed. Market pigs were assumed to have a sales price of $68/cwt on a carcass basis with the average carcass weight of marketed pigs being 213 pounds. As shown in Table 9, this would support $526,000 in total value-added and nearly $260,000 in labor income to Iowa's economy. This would also support 6 total jobs, and in terms of total sales $1.3 million would be contributed to Iowa.

Table 9, Total Effect of Operating a 2,400-Head Wean-to-Finish Barn for First Year

Operations for First Year				
Impact Type	**Employment**	**Labor Income**	**Value-Added**	**Sales**
Direct Effect	3	$114,764	$265,437	$716,467
Indirect Effect	2	$99,514	$178,095	$442,719
Induced Effect	1	$45,342	$82,623	$148,513
Total Effect	6	$259,620	$526,155	$1,307,699

As shown in Table 10, by operating a wean-to-finish farm in Iowa, the economic sector impacted the most through total value-added was "animal production, except cattle and poultry and eggs" with a total value-added effect of $268,000. The second-largest impacted economic sector was "wholesale – other nondurable goods merchant wholesalers" with a total value-added effect of nearly $37,000.

Table 10, Top 10 Sectors Impacted by Value-Added of Operating a 2,400-Head Wean-to-Finish Barn for First Year[5]

	Operations Top 10 Sectors Impacted – Value-Added				
Sector #	Sector	Direct	Indirect	Induced	Total
14	Animal production, except cattle and poultry and eggs	$240,423	$27,739	$59	$268,221
400	Wholesale - Other nondurable goods merchant wholesalers	$0	$35,697	$1,076	$36,773
167	Nitrogenous fertilizer manufacturing	$25,014	$561	$2	$25,578
417	Truck transportation	$0	$12,314	$689	$13,003
64	Other animal food manufacturing	$0	$11,846	$17	$11,863
447	Other real estate	$0	$7,975	$1,668	$9,643
444	Insurance carriers, except direct life	$0	$4,188	$2,756	$6,944
19	Support activities for agriculture and forestry	$0	$6,750	$12	$6,762
441	Monetary authorities and depository credit intermediation	$0	$3,119	$2,915	$6,034
490	Hospitals	$0	$0	$4,296	$4,296

Operations for the first year of a 2,400-head wean-to-finish farm will create tax impacts at both the state and local level and the federal level. As shown in Table 11, $32,000 are added to state and local taxes and $49,000 are added to federal taxes.

Table 11, Tax Impacts of Operating a 2,400-Head Wean-to-Finish Barn for First Year

Tax Impacts of Operations	
Total	$81,433
State and Local	$32,095
Federal	$49,338

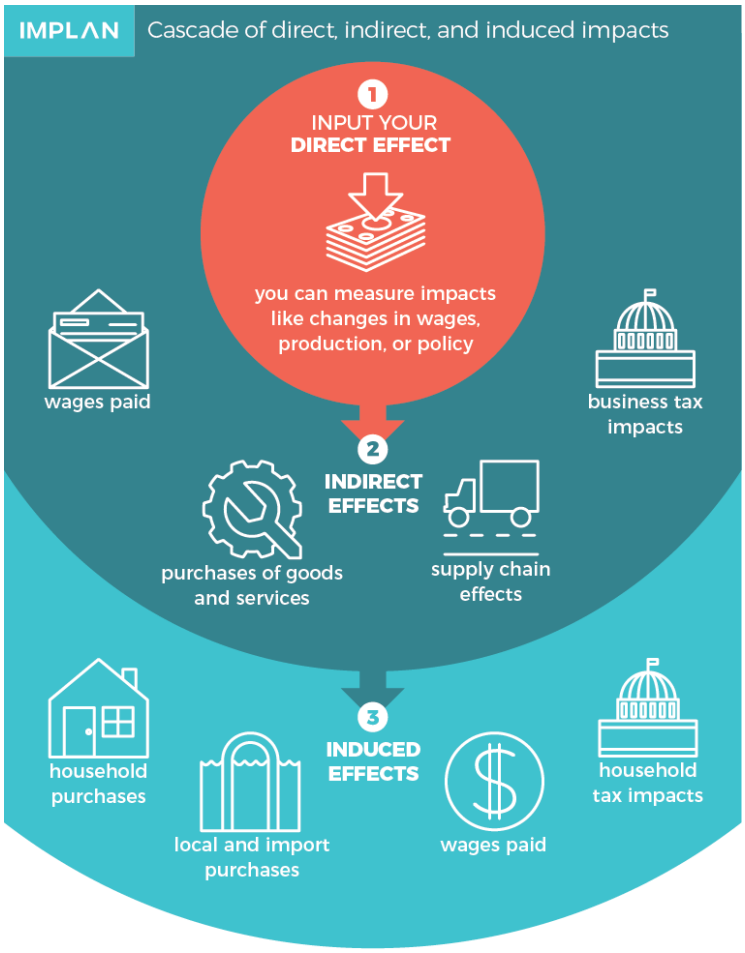
[5] For additional details on IMPLAN sectors please see IMPLAN's website

Appendix A - Methodology

The 2020 Iowa Pork Industry Economic Contribution Study was completed with a combination of the 2018 Iowa IMPLAN[6] dataset, data from the USDA 2017 Census of Agriculture and other USDA/NASS sources. The IMPLAN modeling system and Microsoft Excel were used for calculating and tabulating the results of this analysis. Results, shown as 2019 values throughout this report, are presented using these common economic modeling terms:

- **Value-Added**
  - Sales (output) minus the cost of inputs
- **Sales (Output)**
  - The broadest measure of economic activity – sometimes referred to as "output"
- **Employment (Jobs)**
  - A measure of job positions without regard to whether they are full-time equivalents
- **Household Income**
  - Income from all sources that accrues to individuals as payment for personal employment (earnings or labor income), payment for ownership interests or capital provision (dividends, interest and rents), or as transfer payments (payments to individuals for which nothing is offered in return)

[6] IMPLAN is a platform that combines a set of extensive databases, economic factors, multipliers, and demographic statistics with a highly refined modeling system that is fully customizable.



Economic Impact Study vs. Economic Contribution Study

The term "Economic Impact Study" implies a change has taken place within a local economy. The change in a local economy typically comes from one of the following sources:

- Entrance/departure of a new business or industry
- Expansion/contraction of an existing business or industry

While estimating a change (economic impact study) such as the entrance or departure of industry activity is a worthwhile endeavor in many instances, this is not how the contribution of the agri-food sector in this analysis was estimated.

This analysis is an effort to evaluate the structure of existing industries within an existing economy. As a result, shocking the economy to create or eliminate parts of the industry is not appropriate. For that reason, this study is called an "economic contribution analysis;" in other words, we are interested in understanding what Iowa agriculture currently contributes to the overall economy. This is a key difference from what is traditionally termed an "economic impact study." With a contribution analysis, the sum of individual industry estimates will never differ from the total of what actually exists in a given study area.

Defining Hog Production and Related Industries

When completing an economic contribution study, there are generally questions as to how far up and down the value chain should be included for a particular industry. Outlined below is the process used in this study for defining hog production and related industries.

The 2018 IMPLAN data package was used for this portion of the analysis. Within the IMPLAN modeling system are 536 industries which are aggregations of all North American Industry Classification System (NAICS) codes. Within the 536 industries are many that deal with crops, livestock and processing of these commodities. We have chosen to include the following industries in this contribution analysis.

- **Sector 14, Animal Production, Except Cattle and Poultry and Eggs (Hog Production)**

  We recognize that more than hogs are included in this IMPLAN sector. To separate hogs from the rest of what is included here, we used sales figures by livestock species from the 2017 Census of Agriculture to calculate the share of value attributed to hogs.

- **Sector 89, Animal, Except Poultry, Slaughtering (Hog Slaughtering)**

  This IMPLAN sector includes all red meat slaughter. We utilized slaughter and processing location data from the Iowa Economic Development Authority and other sources to estimate the total portion devoted to hog slaughter.

- **Sector 90, Meat Processed from Carcasses (Hog Processing)**

  This IMPLAN sector includes all red meat processing. We utilized slaughter and processing location data from the Iowa Economic Development Authority and other sources to estimate the total portion devoted to hog processing.

The inclusion of these industries follows our overarching reasons for other studies of this nature, which is that the production of the commodity plus its first round of added-value activity are normally included.

2020 IOWA PORK ECONOMIC CONTRIBUTION STUDY

STATE OF IOWA

24.8
(MILLION)
NUMBER OF HOGS

Based on the USDA 2017 Census of Agriculture and adjusted for the statewide rate of change for Iowa shown in the Dec. 1, 2019 NASS Hogs & Pigs Report.*

5,418
NUMBER OF HOG FARMS

Based on the USDA 2017 Census of Agriculture and adjusted for the statewide rate of change for Iowa shown in the Dec. 1, 2019 NASS Hogs & Pigs Report.*

147,105
JOBS

A measure of the full and part-time jobs in the state created directly by the pork industry including those in hog production, slaughter, processing, and related activities.*

$11.9
(BILLION)
VALUE-ADDED ACTIVITY

The difference between sales from pork production, slaughter, processing, and related activities, and the cost of the inputs. Inputs include Household Income, Taxes, and other economic activity.*

$40.8
(BILLION)
PORK PRODUCTION & PROCESSING SALES

Represents current annual revenue projections for the pork industry based on the USDA 2017 Census of Agriculture. It is adjusted for 2019 by calculating the rate of change determined by the IMPLAN calculator for projected revenues of Iowa's hog production, slaughter, and processing activity, as well as other related activities.*

$6.8
(BILLION)
HOUSEHOLD INCOME

The total payroll related to hog production, slaughter, processing, and other related activities. This includes employee wages, salaries, and benefits, in addition to payments received by self-employed owners.*

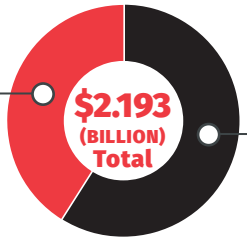
3,021,320
(ACRES)
CORN CONSUMPTION
(22% of Iowa corn acres)

2,234,234
(ACRES)
SOYBEAN CONSUMPTION
(23% of Iowa soybean acres)

These are the number of crop acres in the county needed to feed the pigs raised here. Consumption estimates are based on average yields (bu./acre) from the NASS 2019 report on county acreage, production, and yields. From wean to market weight, a pig, on average, will consume 12 bu. of corn and 2.5 bu. of soybeans. Two groups of pigs are raised each year.

IOWA PORK INDUSTRY TAX SUMMARY

$893
(MILLION)
STATE/LOCAL TAXES



$1.3
(BILLION)
FEDERAL TAXES

This chart shows the distribution of tax dollars generated by the pork industry and related activities.*

iowapork.org

IOWA PORK PRODUCERS ASSOCIATION
Successful farmers. Enriched lives.

*This study was conducted by Decision Innovation Solutions (decision-innovation.com) in 2020. It was completed with a combination of the 2018 Iowa IMPLAN dataset, data from the USDA 2017 Census of Agriculture, and other National Agricultural Statistics Service (NASS) sources.

OVERVIEW of METHODOLOGY:

The purpose of this economic contribution analysis is to evaluate the impact of Iowa's pork industry on the local economy. This study is based on the 2018 IMPLAN modeling system, USDA 2017 Census of Agriculture, and USDA/NASS datasets. In this study, we focus on activities within the pork industry. These activities, also referred to as Industries in IMPLAN, are aggregations of all relevant North American Industry Classification System (NAICS) codes. This study evaluated the following economic activities:

- Animal production, Except Cattle and Poultry (IMPLAN Sector 14)
- Animal, Except Poultry, Slaughtering (IMPLAN Sector 89)
- Meat Processed from Carcasses (IMPLAN Sector 90)a

By default, the above sectors include animals other than hogs in the initial results. Therefore, the hog share was estimated for each industry at the state and county level (35 counties). Below is a brief description of how this allocation was applied.

5. IMPLAN Sector 14: Using 2017 Census of Agriculture sales figures by species, we calculated the production value attributed to hogs.
6. IMPLAN Sector 89: we extracted the hog share of animal slaughter by utilizing processing and slaughter data from sources such as the Iowa Economic Development Authority to identify locations of animal slaughter facilities in Iowa. We estimated the total portion of animal slaughter facilities for hogs using the information regarding location and types of animal slaughter facilities in Iowa.
7. IMPLAN Sector 90: We also allocated a hog share of Sector 90, which includes all red meat processing by utilizing slaughter and processing location data and type of processor from Iowa Economic Development Authority and other sources at the county level. Pork processing on the state level was calculated by determining the pork share of 99 counties as a function of the state total.
8. Once all allocations for hog share of each of the previously mentioned industries were calculated, they were applied to the economic activities within the industries. Economic activity for Iowa's pork industry is measured by: Employment (jobs), Labor Income (Household Income), Value-Added, and Output (sales), Federal Tax, and State & Local Tax.

Our calculations from the 2019 IMPLAN results estimates the economic footprint of Iowa's hog production, slaughter, and processing. Economic activity from Iowa's hog/pork industry supports many industries. The local jobs created, labor income, sales, and value-added from the hog production, slaughter, and processing are the *direct* effects of Iowa's pork industry. When businesses within these sectors purchase goods and services from local industries this becomes the *indirect effect* of Iowa's pork industry, and supports a range of industries from crop farming, warehousing and storage, grocery and product wholesale, truck transportation and more. The effect on the economy which occurs from household spending of the labor income earned from these industries becomes the *induced effect*. This analysis reflects the importance of Iowa's hog/pork industry to the overall economy.