



Managing farm costs key to profitability in 2021, continued from page 1

for Iowa farms in 2021, and provides guidelines to help farmers calculate their own costs of production.

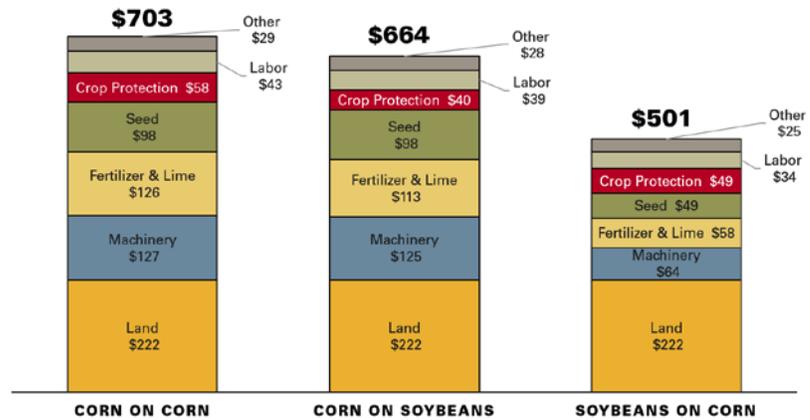
Total costs for corn and soybean production per acre are expected to increase, respectively, by 2.1%–3.4% and 2.6% in 2021. However, higher expected corn yields over a 30-year trend for 2021 suggest that on a per bushel basis, costs would increase by 1.0%–2.6% to remain below their 2019 marks (Figure 1). Fuel and insecticide costs, interest expenses on pre-harvest input financing, and crop insurance premiums are projected lower in 2021.

The estimated cost of production for continuous corn is \$3.88 per bushel for a target yield of 166 bushels per acre, and it goes down to \$3.82 for target yields of 184 and 202 bushels per acre. The estimated costs of production per bushel for corn following soybeans are \$3.34, \$3.31, and \$3.32 for target yields of 181, 201, and 221 bushels per acre, respectively.

Cost of production estimates for herbicide tolerant soybeans amount to \$9.16, \$8.94 and \$8.74 per bushel for target yields of 50, 56, and 62 bushels per acre, respectively. The total cost per bushel of soybeans is projected at \$9.04 for non-herbicide-tolerant beans at 56 bushels per acre, according to the report.

The cost estimates are representative of average costs for farms in Iowa. Very large or small farms may have lower or higher fixed costs per acre. The full report is available online through the [Ag Decision Maker website](http://www.extension.iastate.edu/agdm), [www.extension.iastate.edu/agdm](http://www.extension.iastate.edu/agdm). The publication also includes budgets for alfalfa hay establishment with an oat companion crop and by direct seeding. Annual production costs for established alfalfa or alfalfa-grass hay as well as a budget for maintaining grass pastures are included. Actual costs can be entered in the column for “Your Estimates,” or by using the [electronic spreadsheet Decision Tools](#) on the Ag Decision Maker website, [www.extension.iastate.edu/agdm/crops/html/a1-20.html](http://www.extension.iastate.edu/agdm/crops/html/a1-20.html).

**Figure 2. Costs of crop production in Iowa - 2021, per acre**



### Breakdown of costs for 2021

For corn, land costs account for about one-third of total costs of production (Figure 2). Values of \$187, \$222, and \$256 per acre rent charges for the low, medium, and high quality land were assumed. Variable costs represent just over half of the costs of production, and nitrogen and seed costs account for about 43% of the variable costs. Nitrogen price is projected stable at \$.34 per pound in 2021, but total nitrogen costs are projected to go up by 6%–11% reflecting the higher application rates recommended by the [Iowa State University Corn Nitrogen Rate Calculator](http://cnrc.agron.iastate.edu/nRate.aspx), <http://cnrc.agron.iastate.edu/nRate.aspx>. Corn seed costs are expected to increase by 2% to \$262 per bag.

Land costs account for 44% of total costs of soybean production, and variable costs account for an additional 42%. Seed and fertilizers amount to 44% of variable costs. Phosphorus and potassium were charged, respectively, at \$.39 and \$.30 per pound. Machinery costs are projected to decline by 6% primarily due to lower diesel costs: \$2.02 in 2021 versus \$2.53 in 2020.

### Profitability prospects for 2021

There is substantial uncertainty regarding crop prices in the coming season. The most recent USDA projections for 2021/22, published in October 2020, put the average US farm prices for corn and soybeans at \$3.65 and \$10.00. In this scenario, production of herbicide tolerant and non-herbicide tolerant

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soybean would be profitable for all target yields considered in the report. Net returns per acre to herbicide-tolerant soybean production would range from \$42 to \$78 per acre, depending on target yield and tillage practice.

Corn production would not be profitable in a continuous corn scenario if the price per bushel is \$3.65. Net returns to corn following soybeans would range from \$55 to \$74 per acre under conventional tillage, and average \$82 and \$75, respectively, under strip tillage and no-till.

Current futures prices seem to indicate that corn and soybean prices might average \$4.45 and \$11.40 per bushel in 2021/22, respectively. In this optimistic scenario, corn production would generate profits north of \$95 per acre in a continuous corn rotation, and above \$200 per acre following soybeans. Profits from soybean production would exceed \$110 per acre. However, futures prices are currently reflecting a market reaction to unexpected USDA production and stocks figures, and they could retrench fast once the market reassess the real impact of the new information. In any case, farm operators can always improve their profitability or limit losses by focusing on managing costs and using their break-even estimations to implement a tailored marketing plan.

### **Cost Calculations**

Knowing costs is key, as is understanding the assumptions behind the budgets used in the calculations. When using the Iowa State cost of production estimates for 2021, keep several things in mind. First, fertilizer and lime costs include volume

and early purchase discounts. Second, farmers paying land rents higher than the ones projected in the report might face higher costs of production. Operator/landowners on fully paid land will have much lower accounting costs, since the cash rent used in the report will only be an opportunity cost and not a cash cost (as it is for tenants).

Reference yields for corn and soybean budgets in the annual Iowa State University Extension and Outreach report reflect 30-year trend yields. In the latest projections used for the 2021 report, corn yields are two bushels higher than for 2020, while soybean yields remained unchanged.

Starting in 2021, the amount of nitrogen applied to corn production follows the recommendations from the Iowa State University Corn Nitrogen Rate Calculator. The projected corn-to-nitrogen price ratio used in the calculator amounted to 12.35. Such methodological adjustment resulted in an average 6% increase in the amount of nitrogen applied to corn following corn, and an 11% increase in the amount applied to corn following soybeans.

### **Conclusions**

Producers must have a strong grasp of their own production costs, and the ISU Extension and Outreach report provides a step-by-step guide to help them estimate break-even costs, and serves to benchmark operations and trigger relevant questions on how to better manage enterprise costs.



# Volatility continues to be a main feature of the markets

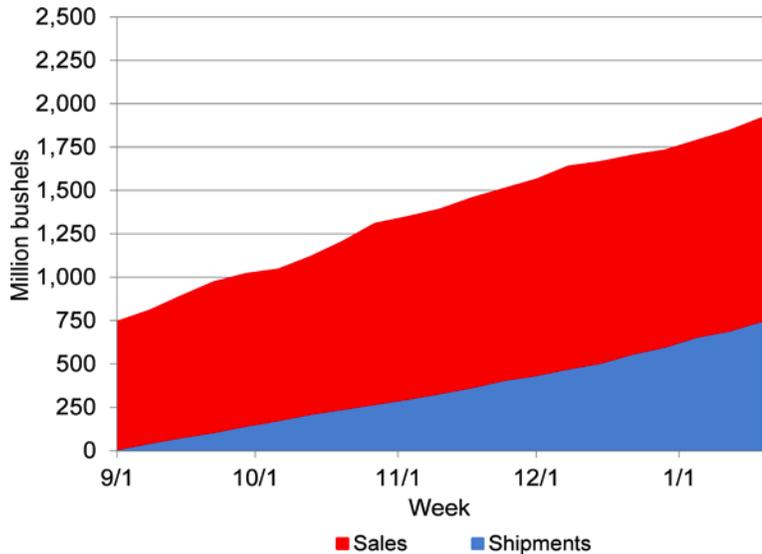
By Chad Hart, extension economist, 515-294-9911, chart@iastate.edu

The upward pricing pattern for corn and soybeans that established itself during the latter half of 2020 subsided as we entered 2021, but the price volatility that supported the price gains remains. The markets have experienced large price swings in both directions since New Year's Day. Both bears and bulls have found reasons to trade so far this year, and both types of traders can find reasons to support their outlook in the market data.

Bulls point to the strong pace of export sales for both crops. Bears are concentrating on the pace of actual shipments and the potential for sales cancellations. Figures 1 and 2 highlight these issues for corn and soybeans. For corn, the pace of international sales this year has been much stronger than in the previous couple of years. With sales approaching 2 billion bushels already, the data is supportive of USDA's projection of 2.55 billion bushels of corn exports. But while corn sales have been robust, corn shipments (actual deliveries of those export sales) have been lagging behind. At the end of January, less than 750 million bushels of corn had been delivered to international markets. Roughly 40% of sales have been converted to shipments. Thus, the corn market does face some risk from trade cancellations. Burrowing into the individual country data, China and Mexico have received approximately half of their corn purchases, running ahead of the overall average. Out of our top markets, it's Japan and Taiwan where outstanding sales are much larger than accumulated exports.

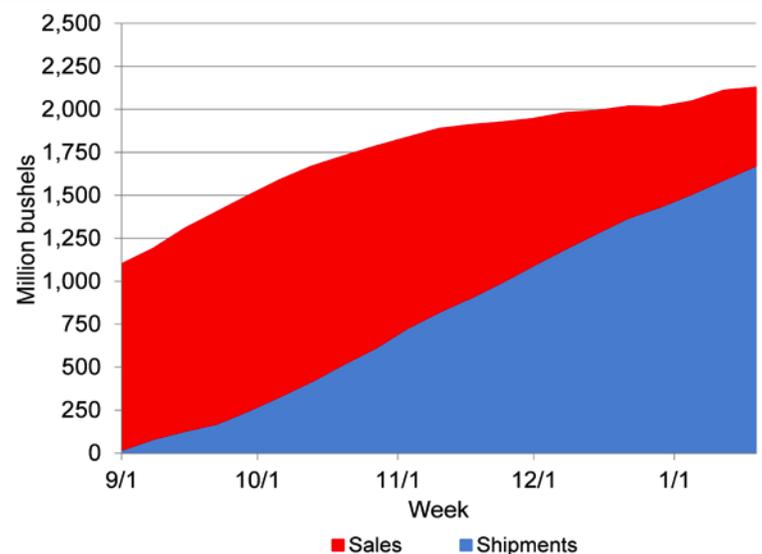
Soybeans face a different issue in the export markets. Shipments have been brisk throughout the fall and winter, while sales have slipped. The early rush for beans has put the market already very close to USDA's export target, but the sales pace has raised some concern in the trade. Overall, roughly

Figure 1. Corn export data



Source: USDA FAS

Figure 2. Soybean export data



Source: USDA FAS

80% of soybean export sales have been shipped. So the threat of cancellations is smaller for soybeans than for corn. For China, the dominant market in the arena, shipments stand at 90%. Countries where shipments are lagging include Japan (65%), Taiwan (58%), and Mexico (56%).

Volatility continues to be a main feature of the markets, continued from page 4

Both the corn and soybean markets will remain extremely sensitive to export news. Corn traders will focus on the pace of actual shipments and the potential for cancellations. Soybean traders are looking for some additional sales before the global markets turn toward the South American crops.

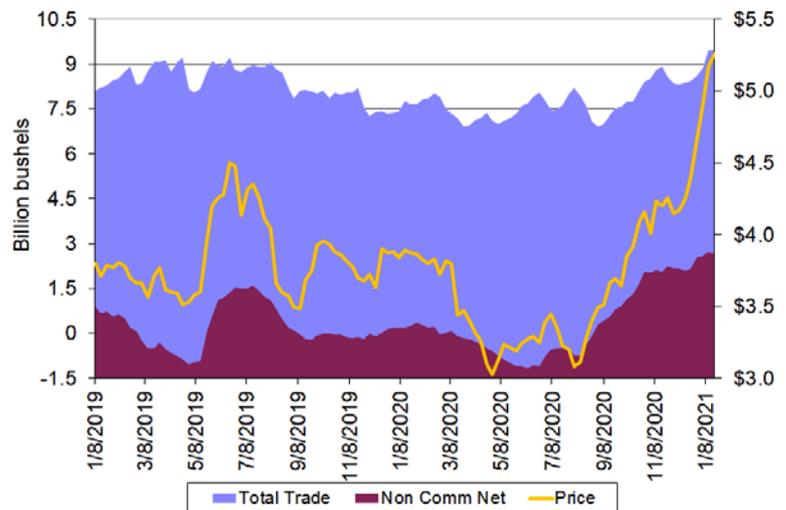
Another feature that has supported prices over the last few months and has definitely added to the volatility in the crop markets has been the strength of speculative trade in the crop markets. As we discussed last month, outside investors have moved significantly into agriculture over the past several months, flipping from being short in both corn and soybeans to establishing long positions (the longest we have seen in the past couple of years) for both crops.

Figures 3 and 4 provide updates on speculative positions. For corn, speculative interest has plateaued over the last month. That support has helped hold corn prices in the \$5 range.

Meanwhile, for soybeans, speculators have been shrinking their net long position over January. The pullback in speculative interest coincides with a pullback in soybean futures prices. Overall, speculators remain bullish on soybeans, holding a billion bushel net long position, but they have shaved that position down noticeably over the past few weeks.

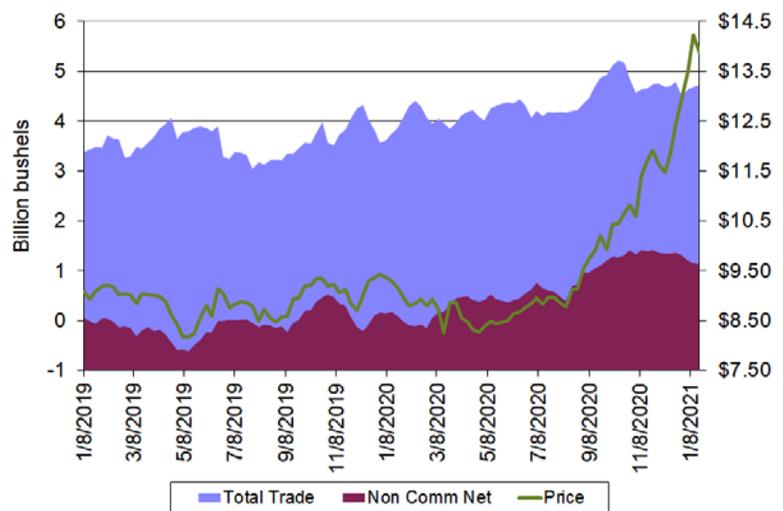
Farmers have enjoyed an incredible run in crop prices since the derecho. Figure 5 shows the evolution of the 2020/21 season-average price since the beginning of last year. The roughly \$1.50 per bushel swing in corn and \$4 per bushel bump in soybean prices have improved the financial outlooks for many. While January has been turbulent, crop prices remain at very strong levels. Corn has been able to weather the mid-month jitters and finished the month with the highest price projection for the marketing year. Soybeans were not as fortunate, coming down from a peak earlier in the month.

**Figure 3. Corn futures trade and prices**



Sources: CFTC and CME Group

**Figure 4. Soybean futures trade and prices**



Sources: CFTC and CME Group

As we move forward into February and March, traders will begin to shift their focus to the prospects for the 2021 crops. Weather conditions, such as the lingering drought in the Great Plains, will add to the volatility mix in the markets. Traders in both the corn and soybean markets are preparing for roughly 90 million acres planted to each crop. An increase in overall planted area is expected, but with the potential for diminished soil moisture, questions will center on the potential for additional crop production. As farmers look to gear up to meet the greater crop usage we have seen over the past several months, traders will

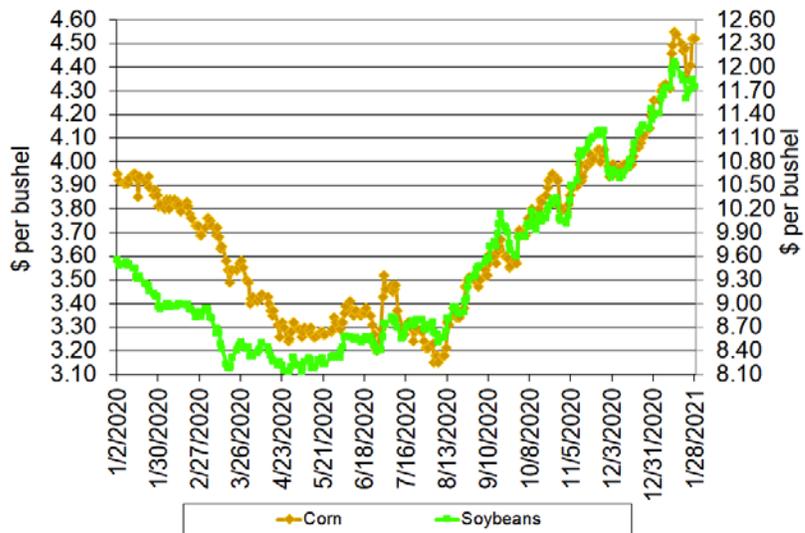
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Volatility continues to be a main feature of the markets, continued from page 5

be watching for and will be wary of the potential for that usage to slip, especially from the international perspective.

For more market outlook through the month, the latest outlook presentation is always available on the [Ag Decision Maker Outlook page](http://www.extension.iastate.edu/agdm/outlook.html), [www.extension.iastate.edu/agdm/outlook.html](http://www.extension.iastate.edu/agdm/outlook.html).

**Figure 5. 2020/21 projected season-average prices (derived from futures)**



## No clear signals on beef cattle herd expansion

By Lee Schulz, extension livestock economist, 515-294-3356, [lschulz@iastate.edu](mailto:lschulz@iastate.edu)

Cattle currently have some of the most stable inventories of the entire US livestock sector. That's one conclusion from survey data USDA National Agricultural Statistics Service gathered from cattle owners for the annual Cattle inventory report.

The 93.595 million head of all cattle and calves in the U.S. on January 1, 2021 was down just 0.2% from January 1, 2020 (Table 1). The beef cow inventory was 31.158 million head, down 0.6%. Milk cows, at 9.44 million head, were up 1.0%. The 35.136 million head 2020 calf crop was down 1.3% from 2019 and smaller than expected. The smaller 2020 calf crop should tighten cattle and beef supplies in 2021's second half and into 2022.

The most curious national number was the 5.812 million head of beef replacement heifers. It was up fractionally from January 1, 2020. Before the report, analysts expected the inventory of heifers held for beef cow replacement to decline between 0.8% and 3.0%, with an average of down 1.9%. Government payments likely played a significant role in negating negative returns in 2020, which could have impacted some production decisions.

Cow-calf producers face considerable drought and feed cost pressure, which could significantly dampen returns. Still, with higher calf prices expected, 2021 cow-calf returns should be positive.

### Watch cow slaughter for clues

Heifer replacement numbers do not immediately change the trajectory of the beef cow herd, but they eventually do. Beef cow slaughter will be a metric to watch, especially following calving this spring. If producers send more beef cows to market while only having slightly more heifers to put back in the herd, this could lead to a smaller beef cow inventory as early as July of 2021, but more likely by January of 2022. The reverse could be true as well.

The extent producers are willing to hold heifers for breeding herd replacements versus sending them to feedlots will also dictate expansionary activity. Heifers sell at prices below steers for similar weights. But, the January price spread was the narrowest it had been in four years. February has started the same way. The tight steer-heifer price differential and current price levels could encourage cow-calf

No clear signals on beef cattle herd expansion, continued from page 6

producers to sell heifers to feedlots, rather than retaining them as breeding herd replacements. Diverting heifers from cow herds to feedlots reduces the impact of declining supplies of feeder cattle outside feedlots.

### Iowa counters national trends

The total inventory of cattle and calves in Iowa was 3.65 million head, down 5.2% from January 1, 2020. The beef cow inventory totaled 890,000 head, down 1.7% and the smallest since 2014. Beef replacement heifers in Iowa totaled 155,000 head, up 6.9% year over year. The 2020 Iowa calf crop was 1.03 million head, 4.6% lower than in 2019.

The Iowa feeder supply is calculated at 1.03 million head, down 8.0%. This is the number of weaned feeder cattle being backgrounded plus nursing calves. It's a summation of the inventories of steers (over

500 lbs.), other non-breeding heifers (over 500 lbs.) and calves (under 500 lbs.) and then subtracting the inventory of cattle on feed. This is the smallest January 1 feeder cattle supply in Iowa since 2005. Cattle on feed in all Iowa feedlots totaled 1.17 million head, down 9.3%, also the smallest since 2005.

Cattle on feed in Iowa feedlots with a capacity of 1,000 or more head totaled 610,000 head on January 1, 2021. This was down 9.0% from January 1, 2020. Iowa feedlots with a capacity of less than 1,000 head had 560,000 head on feed, down 9.7%. Tight supplies of feeder cattle in and outside of feedlots may or may not continue. Feedlots have fixed costs. Managers may strive to keep pens full in order to spread fixed costs over more cattle. Doing so may lead to greater placements of lighter weight cattle than the current feed cost situation would dictate.

January 1 inventory <sup>1/</sup>	United States			Iowa		
	2020	2021	2021 as % of 2020	2020	2021	2021 as % of 2020
Cattle and calves	93,793.3	93,594.5	99.8	3,850	3,650	94.8
Cows and heifers that calved	40,681.3	40,598.0	99.8	1,120	1,110	99.1
Beef cows	31,338.7	31,157.6	99.4	905	890	98.3
Milk cows	9,342.6	9,440.4	101.0	215	220	102.3
Heifers 500 pounds and over	20,024.4	20,000.1	99.9	860	800	93.0
For beef cow replacement	5,808.9	5,812.1	100.1	145	155	106.9
For milk cow replacement	4,684.0	4,604.5	98.3	115	125	108.7
Other heifers	9,531.5	9,583.5	100.5	600	520	86.7
Steers 500 pounds and over	16,541.2	16,597.8	100.3	1,300	1,210	93.1
Bulls 500 pounds and over	2,237.4	2,210.5	98.8	60	60	100.0
Calves under 500 pounds	14,309.0	14,188.1	99.2	510	470	92.2
Feeder cattle outside feedlots	25,724.0	25,662.0	99.8	1,120.0	1,030.0	92.0
Cattle on feed	14,657.7	14,707.4	100.3	1,290	1,170	90.7
Calf crop <sup>2/</sup>	35,591.6	35,135.5	98.7	1,080	1,030	95.4

<sup>1/</sup> 1,000 head

<sup>2/</sup> 2019 and 2020

Data Source: USDA National Agricultural Statistics Service

Full report: <https://downloads.usda.library.cornell.edu/usda-esmis/files/h702q636h/n009www19g/9880wj45t/cat10121.pdf>

No clear signals on beef cattle herd expansion, continued from page 7

## Family Farms Dominate Iowa Beef Industry

Family farms comprise 97% of all Iowa farms with cattle and calves and account for 93% of the cattle inventory according to the 2017 Census of Agriculture Farm Typology report, which was released on January 22, 2021 by USDA National Agricultural Statistics Service. The report provides a wealth of information about the ownership, size and operational characteristics of farms as well as their impact on the economy and communities. It also provides some useful benchmark statistics for producers.

The publication defines a “family farm” as “any farm where the majority of the business is owned by the producer and individuals related to the producer, including relatives who do not live in the producer’s household.” Further, USDA defines a farm as “any place from which \$1,000 or more of agricultural products were produced and sold, or normally would have been sold, during a given year.”

Family farms are classified based on gross cash farm income (GCFI) which includes the farm producer’s sales of crops and livestock, fees for delivering commodities under production contracts, government payments and farm-related income. Non-family farms are “any farm where the producer and persons related to the producer do not own a majority of the business.” No size categories are offered for these operations.

Table 2 shows select data for Iowa cattle farms and inventories in 2017. More detailed data are contained in the report. Iowa has 14,090 family farms raising beef cows that have a GCFI less than \$350,000. USDA considers these low-sales and moderate sales farms. Most of these farms are small, with 10,976 of them having fewer than 50 beef cows in inventory. This means that 3,114 or 22% of the small family farms had more than 50 beef cows in inventory and a GCFI less than \$350,000. On the other hand, 254 of 930 Iowa beef cow farms that have less than 50 beef cows have a GCFI of one-million dollars or more. These are large-scale family farms, where beef is not the major enterprise.

Midsize family beef cow farms, or farms with a GCFI between \$350,000 and \$999,999, account for 19% of all Iowa beef cow farms and 32% of the beef cow inventory. Most of these farms are still relatively small with fewer than 100 beef cows. Non-family Iowa farms tend to be larger averaging 92 beef cows per farm compared to a total average (family farms + non-family farms) of 49 beef cows per farm.

GCFI is very crude measure of profitability because it ignores many items that go on the profit and loss statement. This may help explain some of the variability across cattle farm type and size. Year to year variation also is likely to occur. The bottom line is: producing beef, using resources efficiently and providing a quality of life takes farms of all sizes.

**Table 2. Farm Typology of Iowa Cattle Farms by Gross Cash Farm Income, 2017**

		Total	Small family farms		Midsize family farms GCFI \$350,000 to \$999,999	Large family farms		Non-family farms
			GCFI less than \$150,000	GCFI \$150,000 to \$349,999		GCFI \$1,000,000 to \$4,999,999	GCFI \$5,000,000 and more	
Cattle and calves	farms	25,367	13,520	3,857	5,088	1,875	172	855
	head	3,950,920	533,864	463,176	1,030,857	1,089,530	560,522	272,971
Beef cows	farms	19,171	11,105	2,985	3,569	901	29	582
	head	938,818	276,371	182,801	296,122	120,672	9,256	53,596
Farms with-								
	1 to 9 head	4,306	3,796	221	196	35	-	58
	10 to 49 head	8,624	5,664	1,295	1,221	213	6	225
	50 to 99 head	3,682	1,340	886	1,079	214	5	158
	100 to 199 head	1,905	286	504	772	251	5	87
	200 to 499 head	592	19	79	285	157	9	43
	500 or more head	62	-	-	16	31	4	11

Data source: USDA NASS, 2017 Census of Agriculture Farm Typology report

Updates, continued from page 1

Live Cattle Basis – B2-42 (1 page)

Feeder Cattle Basis – B2-43 (1 page)

Please add these files to your handbook and remove the out-of-date material.

**Internet Updates**

The following [Information Files and Decision Tools](#) have been updated on [www.extension.iastate.edu/agdm](http://www.extension.iastate.edu/agdm):

2018 Farm Bill Payment Estimator by County for ARC-CO and PLC – A1-33 (Decision Tool)

Feeder Steer-Heifer Price Spread – B2-45 (1 page)

**Current Profitability**

The following [profitability tools](#) have been updated on [www.extension.iastate.edu/agdm/info/outlook.html](http://www.extension.iastate.edu/agdm/info/outlook.html):

Corn Profitability – A1-85

Soybean Profitability – A1-86

Iowa Cash Corn and Soybean Prices – A2-11

Season Average Price Calculator – A2-15

Ethanol Profitability – D1-10

Biodiesel Profitability – D1-15

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