Ag Decision Maker

A Business Newsletter for Agriculture

Vol. 24, No. 9 www.extension.iastate.edu/agdm July 2020

Farm lease types have different risks and rewards

By William Edwards, retired extension economist, wedwards@iastate.edu

The proportion of Iowa farmland operated by the landowner has stabilized at about 37%, according to the most recent farmland ownership and tenure survey conducted by Iowa State University (Table 1). What has changed, however, is the popularity of different types of farm leases.

Table 1. Land Tenure Arrangements, % of All Iowa Farmland

	2007	2017
Owner-operated	37%	37%
Custom farmed	2%	2%
Fixed cash rent	37%	35%
Flexible cash rent	5%	9%
Crop-share rent	12%	9%
In government programs	7%	8%

Source: ISU Extension Ag Decision Maker File C2-15, www.extension.iastate.edu/agdm/wholefarm/pdf/c2-15.pdf

From 2007 to 2017, traditional crop-share leases decreased from 12% of total farmland acres to only 9%, while flexible cash rent leases increased from 5% to 9%. The acres rented under a fixed cash rent lease fell by 2%. Flexible cash rent leases allow the tenant and landowner to share in the financial and production risks in crop farming without the need to divide the crop and input expenses.

Rent values by type of lease

How have returns to fixed cash, flexible cash and crop-share leases compared in recent years? Figure 1 shows estimated rents per acre realized by the landowner for the past 10 years for a 50-50 corn-soybean rotation. Of course, actual rents will differ for each farm. The fixed cash rent values are the statewide average cash rents paid in Iowa each year, based on Iowa State University Extension and Outreach's annual survey. The flexible cash rent values are estimated at 30% of the gross revenue per acre from corn and 40% of the gross revenue per acre from soybean (Ag Decision Maker File C2-21, www.extension.iastate.edu/agdm/wholefarm/pdf/c2-21.pdf). Gross revenue is calculated by multiplying the state average corn and soybean yields for each year by the state average cash prices in October, November and December of the same year.

continued on page 2

Handbook updates

For those subscribing to the handbook, the following updates are included.

Livestock Enterprise Budgets for Iowa - 2020 – B1-21 (22 pages)

Please add these files to your handbook and remove the out-of-date material.

continued on page 10

Inside . . .

IOWA STATE UNIVERSITY
Extension and Outreach

Ag Decision Maker is compiled by extension ag economists Ann Johanns, aholste@iastate.edu extension program specialist

Farm lease types have different risks and rewards, continued from page 1

USDA commodity payments and multiple peril crop insurance payments received each year are also included. The value of the crop-share rent is estimated as one-half of the gross revenue for each crop, minus one-half of the costs typically shared by the landowner (seed, fertilizer, pesticides, drying, hauling and storage), based on ISU Extension and Outreach typical cost of crop production budgets (Ag Decision Maker File A1-20, www.extension.iastate.edu/agdm/crops/pdf/a1-20.pdf) and leasing surveys.

From 2010 to 2012, crop prices were rising. Crop-share and flexible rents rose immediately because they were directly tied to current prices. Fixed cash rents lagged behind for about two years, then caught up. In 2013, the crop-share and flexible cash rents both nose-dived in response to the lower corn and soybean prices for the 2013 crop, whereas most cash rents were negotiated before the price decline was apparent. In the most recent years, all three rents have been very close, as prices and yields have both been steady.

Figure 1. Rent for Iowa corn-soybean rotation

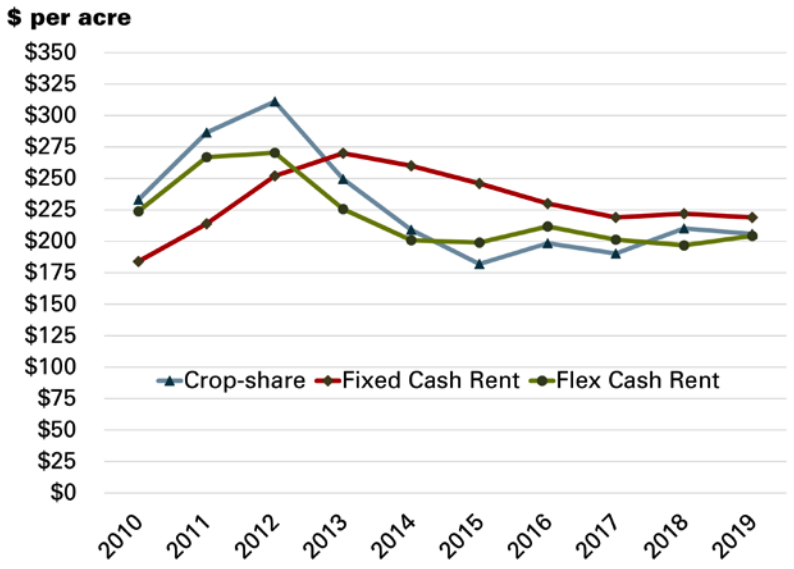
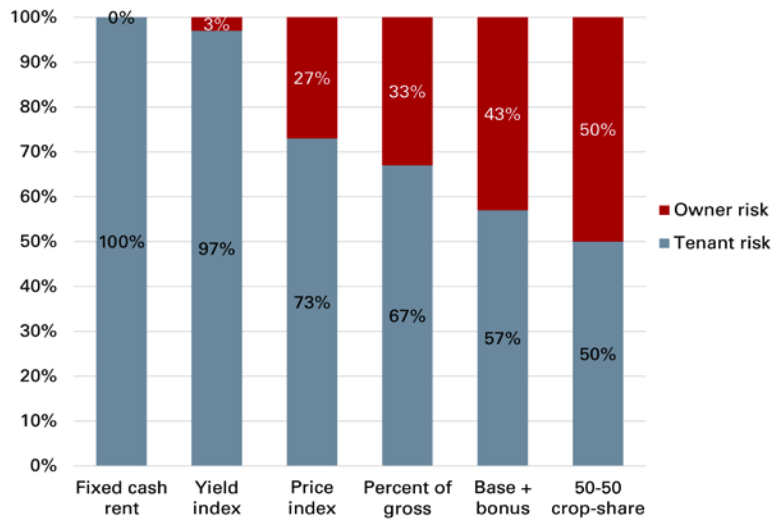


Figure 2. Relative financial risk borne by tenant and owner



Source: "Sharing Financial Risk through Flexible Farm Lease Agreements." Journal of the ASFMRA 76 (2013):154-166. Edwards and Hart.

Sharing financial risk

Another recent ISU study examined the amount of *variation* in net returns to the landowner and tenant under different lease arrangements, based on yield, price and production cost patterns in Iowa over the past several decades. Because cash rents are based on expectations of yields and prices for the coming year, rather than actual results, they change more slowly than flexible or crop-share leases. Many fixed cash rents are not renegotiated each year. This results in a more stable, albeit slightly lower, average rent over time. The landowner knows with certainty at the beginning of the year how much the rent will be. All the variation in net returns caused by unexpected changes in yields, prices and production costs is borne by the tenant, as shown in the first bar in Figure 2.

Flexible leases share risk differently

At the other extreme, under a 50-50 crop-share lease the tenant and landowner share financial risks equally, as shown in the bar on the far right in Figure 2. The other bars show how financial risk is shared under several types of flexible cash leases. The "yield index" bar represents a lease for which the rent paid each year depends on the actual yield attained, only. The "price index" bar represents a lease for which the rent varies with year-to-year market prices, only.

continued on page 3

Farm lease types have different risks and rewards, continued from page 2

The yield index lease transfers very little risk to the owner because in Iowa, at least, yields have been more stable than prices in recent years.

Some flexible leases set the rent each year as a fixed percent of the gross crop income each year. As shown by the "Percent of gross" bar, this reduces the tenant's net income variability even more because the rent automatically adjusts up or down with both prices and yields. The "base plus bonus" bar represents a flexible lease in which rent is equal to a fixed base rent plus a percent of the tenant's return over production costs. By incorporating costs into the rent equation, the tenant's net return varies even less, and the sharing of risk approaches that of a 50-50 crop-share lease.

It is important to note that as landowners take on additional financial risk, their returns will increase in years of higher than expected profits as well as decrease when overall returns decline. Both owners and tenants should select a lease type that reflects their individual abilities and desires to bear risk and reap rewards, versus their needs for more stable income.

More resources on farmland rental arrangements, can be found on the Ag Decision Maker Leasing page, www.extension.iastate.edu/agdm/wdleasing.html.

Agricultural professionals expect lower farmland values over the next 18 months

By Wendong Zhang, extension economist, 515-294-2536, wdzhang@iastate.edu; Mike Duffy, retired extension economist

Due to the significant uncertainty and social distancing requirements posed by the COVID-19 pandemic, the 93rd Soil Management Land Valuation (SMLV) conference, which had been postponed to August, is now cancelled.

However, one conference tradition was not broken– since 1964, conference attendees have provided estimates on land value trends and crop prices. This year, we notified attendees of the cancellation and asked them to provide their estimates in an online survey. We received short- and long-term estimates for land and crop prices from 170 agricultural professionals, which is similar to the number of responses from previous conferences. This article provides a summary of the expert projections.

Of this year's respondents, 45% are agricultural lenders, 20% are farm managers, and more than 10% each are realtors or brokers and rural appraisers. They are generally experienced agricultural professionals who have, on average, worked for 26 years and provided service for nine Iowa counties. The survey asked for land value and cash crop estimates for respondents' local service areas for four short-term horizons – as of May 1, 2020, November 1, 2020, November 1, 2021, and November 1, 2022. In addition, respondents provided land value estimates for November 1, 2025, and November 1, 2040. For each observation, we calculated the yearly percent change from the respondent's May 2020 estimate. We did this transformation because the percentage change estimates are more transferrable than land value estimates with other data sources.

Table 1 presents the results from the 2020 survey. Overall, agricultural professionals expect a modest decline in farmland values in their local service areas over the next 18 months. In particular, they forecast an average 2.3% decline in land values from May 1 to November 1, 2020. They further expect land values to drop by 1.2% from May 1, 2020, to November 1, 2021, which shows an expected stabilization or modest increase in land values from November 1, 2020, to November 1, 2021. Furthermore, the respondents project the land market to continue to stay stable and gradually increase from 2021 to 2022.

continued on page 4

Agricultural professionals expect lower farmland values over the next 18 months, continued from page 3

Table 1. 2020 Soil Management Land Valuation (SMLV) estimated land and crop price forecasts

Description	Observations	Mean	Standard Deviation	Min	Max
Percent change in land value from May '20 to Nov '20	163	-2.3%	4.0%	-18.5%	10.0%
Percent change in land value from May '20 to Nov '21	160	-1.2%	6.6%	-25.0%	20.0%
Percent change in land value from May '20 to Nov '22	158	0.7%	9.0%	-37.5%	40.0%
Percent change in land value from May '20 to Nov '25	158	10.4%	13.5%	-25.0%	80.0%
Percent change in land value from May '20 to Nov '40	158	44.1%	39.9%	-25.0%	260.0%
Estimated cash corn price May 1, 2020	159	$ 2.97	$0.17	$2.45	$ 3.60
Estimated cash corn price Nov 1, 2020	159	$ 3.05	$0.27	$2.35	$ 3.75
Estimated cash corn price Nov 1, 2021	150	$ 3.35	$0.33	$2.00	$ 4.25
Estimated cash corn price Nov 1, 2022	149	$ 3.57	$0.41	$2.00	$ 5.00
Estimated cash soybean price May 1, 2020	158	$ 8.04	$0.44	$4.00	$ 9.35
Estimated cash soybean price Nov 1, 2020	158	$ 8.21	$0.54	$5.00	$10.00
Estimated cash soybean price Nov 1, 2021	149	$ 8.64	$0.79	$3.00	$12.00
Estimated cash soybean price Nov 1, 2022	148	$ 9.05	$1.04	$3.25	$15.00

Figure 1. The distribution of estimated price changes from May 2020 to November 2020 and November 2021

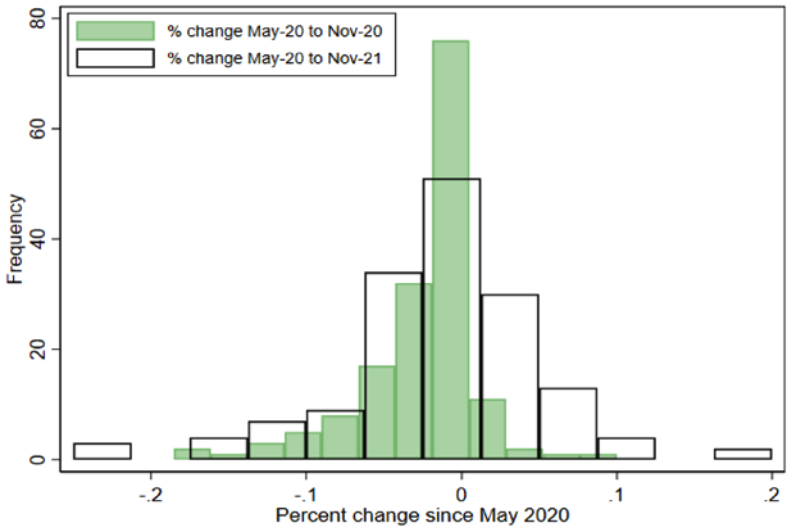


Figure 1 reveals more heterogeneity in the short-term land price forecasts by showing the distribution for the two most recent land price forecasts over the next 18 months across surveyed agricultural professionals. Notably, almost half of respondents expect no change in their local land values over the next six months. Another 15% and 12% of respondents expected a decline of less than 3% or a 3%–5% drop, respectively. In contrast, only 10% of surveyed respondents expect a higher land value six months later. Compared to the forecast from last year's conference, most agricultural professionals expected a stable land market throughout 2020. Most respondents cited lower commodity prices as the key reason for their forecast of modest decline, followed by agricultural trade uncertainty, especially with China, and the uncertainty surrounding the COVID-19 pandemic, including the lack of a viable vaccine.

The projected declines are consistent with other surveys. For example, the Purdue Ag Economy Barometer, https://ag.purdue.edu/commercialag/ageconomybarometer/covid-19-continues-to-impact-farmer-sentiment-majority-indicate-economic-assistance-bill-necessary/, a monthly telephone survey of farmer sentiment based on 400 US agricultural producers, reports that in May 2020, the Current Conditions index regarding agricultural economy was 46% lower than three months earlier. Furthermore, the share of farmers expecting lower farmland prices a year later rose from 13% in January 2020 to about 33% in April and May 2020, while the percent of farmers expecting higher farmland prices 12 months ahead dropped from 16% to less than 10% during the same period.

continued on page 5

Agricultural professionals expect lower farmland values over the next 18 months, continued from page 4

Figure 1 also shows that respondents are slightly more optimistic about the land market outlook 18 months from now compared to the immediate future. The share of agricultural professionals who expect a higher land value 18 months from now increased to almost 40%, while the most frequent answer is still "no change" when comparing land values now to in 18 months. The respondents cited lower interest rates, good crop yields, and strong demand amid tight land supply as main factors driving up land values. A **comparison**, www2.econ.iastate.edu/faculty/zhang/smlv/2017/Zhang_SMLV_Introduction_2017.pdf, (Slides 14-15) of the SMLV 6-month and 18-month land price forecasts with land value estimates reported later by the Iowa State University land value survey shows that overall the forecasts are accurate, and the discrepancy slightly increases when the forecast horizon is more distant.

Put simply, land value equals income divided by interest rate. Recent drastic cuts by the Federal Reserve to combat COVID-19 economic uncertainties have resulted in a near-zero federal funds rate and a reduction of average farmland loan rates from 5% to 4.5% or lower. **Our recent research** (www2.econ.iastate.edu/faculty/zhang/publications/working-papers/Basha_Zhang_Hart_2020_Interest_Rate_Land_Value.pdf) supports the respondents' observations on the supporting role of lowered interest rates in land values, and shows that the large cut in the interest rate in 2020 will fully offset the 2015–2018 interest rate hikes made by the Federal Reserve. The peak impact from the 2020 cut will reveal itself in 2021, adding roughly 4% to land values, which will overwhelm the remaining impact from the 2015–2018 hikes. More importantly, the 2020 rate cut will dominate the interest rate impact for the foreseeable future and the net effects of interest rate changes on farmland values will become positive, beginning in 2021.

The surveyed respondents have a rosier outlook for long-run land values—in particular, they expect, on average, a 10% increase in land values from May 2020 to November 2025, and a 45% increase in land values from May 2020 to November 2040. This echoes the fact that farmland is typically a long-term investment, with half of land in Iowa held by the same owner for over 20 years, as shown in the 2017 Iowa Farmland Ownership and Tenure Survey.

Table 1 also presents the respondents' average statewide forecasts of cash corn and soybean prices for May 2020, November 2020, November 2021, and November 2022. On average, the respondents expect the November 2020 cash corn and soybean prices at $3.05/bushel and $8.21/bushel, respectively. Furthermore, they expect the cash prices to increase slightly to $3.57/bushel and $9.05/bushel for corn and soybean, respectively, two years from now. It is worth noting that the respondents expect a much higher jump for cash soybean prices from November 2020 to November 2022. This may implicitly reflect how respondents anticipate improvements in soybean trade with China.

Note that the cash prices forecasted reflect a basis consideration (cash minus the nearby futures contract price), which, during the month of November in Iowa, could mean cash prices $.20–$.50/bushel for corn and $.50–$1.00/bushel for soybean below the futures prices at harvest. These futures contracts tend to be December for corn and November for soybean, respectively. In addition, the respondents are more pessimistic due to COVID-19 uncertainties, and these short-term commodity price forecasts for November 2020 are about $.60/bushel and $.40/bushel lower for corn and soybean, respectively, when compared to their predictions in May 2019.

Finally, respondents provided cash rent estimates for the corresponding time-period, for which we calculate the gross capitalization rates for the land market as respondents' gross cash rent estimates divided by land value estimates. We also group all individual counties into one of the four quadrants across Iowa and calculate the regional-average short-, medium-, and long-term land value estimates. Table 2 presents these regional-specific land value percent changes and gross capitalization rates. The general trends in land market outlooks across regions are similar, with professionals in southern Iowa, especially in Southeast Iowa, being slightly optimistic.

continued on page 6

Agricultural professionals expect lower farmland values over the next 18 months, continued from page 5

Table 2. 2020 SMLV estimated land price forecasts and gross capitalization rate for land value across Iowa regions

	Northwest	Northeast	Southwest	Southeast	STATE
Percent change in land value from May '20 to Nov '20	-2.7%	-2.5%	-2.3%	-1.6%	-2.3%
Percent change in land value from May '20 to Nov '21	-2.1%	-1.4%	-0.6%	0.0%	-1.2%
Percent change in land value from May '20 to Nov '22	-0.7%	0.6%	1.7%	2.6%	0.7%
Percent change in land value from May '20 to Nov '25	10.2%	9.2%	13.1%	10.3%	10.4%
Percent change in land value from May '20 to Nov '40	41.8%	47.5%	43.0%	46.5%	44.1%
	Northwest	**Northeast**	**Southwest**	**Southeast**	**STATE**
Gross capitalization rate May 1, 2020	2.8%	3.2%	3.5%	3.3%	3.2%
Gross capitalization rate Nov 1, 2020	2.8%	3.2%	3.5%	3.3%	3.1%
Gross capitalization rate Nov 1, 2021	2.8%	3.2%	3.5%	3.3%	3.1%
Gross capitalization rate Nov 1, 2022	2.8%	3.2%	3.4%	3.3%	3.1%
Gross capitalization rate Nov 1, 2025	2.8%	3.2%	3.4%	3.3%	3.1%
Gross capitalization rate Nov 1, 2040	2.8%	3.1%	3.3%	3.1%	3.1%

Table 2 also shows that the respondents expect the gross capitalization rates to be stable at around 3.1%–3.2% from now to 2040. In other words, respondents expect cash rent to rise or decrease at the same pace as land values. It is worth noting that the projected capitalization rates for Northwest Iowa, in part, reflect the higher land prices and more competitive nature in the land market.

The COVID-19 situation is highly fluid and uncertain, which makes land and crop price forecasts like ours particularly challenging. However, despite the projected modest declines, most respondents expect to see a relatively steady land market in the foreseeable future. This is in contrast with much more steep drops in commodity prices and farm income, especially for livestock producers, amid intensifying concerns related to COVID-19.

We look forward to the next SMLV conference to be held in Ames on Wednesday, May 12, 2021.

Some positive news for a change

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

The June Acreage and Grain Stocks reports often create a lot of market buzz, usually in the downward direction. But this year's reports provided a positive lift for a change. While corn disappearance did decline dramatically this spring, corn stocks on June 1 were roughly the same as they were in 2019. Soybean stocks were 22% lower this year. And while acreage was up for both corn and soybean this year, compared to last year, the increases were not big as the markets anticipated. So short-term supplies are at or below last year's levels and long-term supply projections are now smaller than first feared. Combine that with some positive signs on the demand side with ethanol plants continuing to bring back production and some movement on soybean export sales, and both the corn and soybean markets gain 10 to 20 cents.

In looking at the reports, let's start with what was the most bearish piece of news in the reports, the drop in corn disappearance. The markets already knew disappearance had fallen; the question was how much. The stocks report gave us the answer, at roughly 700 million bushels over the last three months. The closures within the ethanol industry explain the lion's share of the reduction.

continued on page 7

Some positive news for a change, continued from page 6

However, since the 2019 crop was smaller than the 2018 crop, overall national corn stocks on June 1 were able to hold at roughly the same level (5.2 billion bushels) across the years. So disappearance dropped, but stocks didn't grow dramatically. And the rebound in ethanol production creates opportunities for corn disappearance to ratchet back up and corn ending stocks to finish close to the previous year's level, around 2.22 billion bushels.

The state stocks data showed where the drop in ethanol production had the largest impacts. While the ethanol industry felt the squeeze all across the country, the larger pullbacks occurred in the western Corn Belt. Table 1 outlines the implied reductions in corn usage from the stocks data. To compute this, I compared the state corn stocks on March 1 and June 1 for 2019 and 2020 and calculated the relative bushel change in stocks over the two years. Minnesota experienced the largest reduction, with roughly 150 million more bushels staying in storage during the spring this year. Iowa producers are holding 140 million more bushels. Illinois and South Dakota have roughly 100 million bushels each.

Table 1. Implied reductions in corn usage

	Million Bushels
US	682.1
Minnesota	152.7
Iowa	141.1
Illinois	100.4
South Dakota	97.9
Indiana	67.1
Ohio	50.1
Michigan	44.5
Nebraska	38.0
Colorado	17.9
Wisconsin	12.5

Soybean stocks, on the other hand, were down significantly, 22% lower than this time last year. While soybean disappearance was also lower, the impact was smaller, only an 8% hit versus the 20% hit corn took. And given the smaller crop in 2019, soybean stocks continue to shrink in comparison to the last couple of years. The pace of soybean drawdown is strong enough to bring 2019/20 ending stocks well below the 2018/19 level.

The stocks report addressed some concerns about current supplies. The acreage report addressed some concerns about upcoming supplies. And here, the crops switched positions, with the corn market dealing with the lower numbers and soybean essentially holding steady. Since the March Prospective Plantings report, the corn market had been weighed down by the prospect of 97 million acres being planted this spring. Well, the June Acreage report revealed that intentions are one thing and actions are another. While for the most part, weather conditions suited a rapid and robust planting window, farmers chose to pull back on corn planting this year. Table 2 shows the shifts in corn area from the March intentions to the June plantings. I list the top 10 states with declines from March intentions and all of the states that displayed increases. Nationwide, farmers indicate that 92 million acres of corn will be planted (with roughly 2 million acres still to be planted at the end of the survey period). That's 5 million acres less than the March intentions. The largest reductions were in the Great Plains, with North Dakota, South Dakota, and Nebraska all cutting back by at least 600,000 acres. But they weren't the only ones. Farmers in 32 states planted less corn than the March intentions outlined. Iowa producers pulled back by 100,000 acres. Now, corn area is still higher than it was in 2019, it's just much lower than what the March survey said was coming. We did see some corn expansion, in five states, with Wisconsin being the largest gainer. The 5 million reduction in acreage translates to a 830 million bushel reduction in expected production, given trendline yields. So, while the 2020 crop is still projected to be a record crop, the US is no longer flirting with a 16 billion bushel corn crop.

continued on page 8

Some positive news for a change, continued from page 7

Table 2. Change in corn planting, March intentions versus June actions (Source: USDA-NASS)

Declines	(1,000 acres)	Increases	(1,000 acres)
US	-4,984		
North Dakota	-800	Wisconsin	100
Nebraska	-700	Kentucky	50
South Dakota	-600	Oklahoma	20
Illinois	-400	Utah	15
Indiana	-400	Delaware	5
Minnesota	-300		
Texas	-300		
Kansas	-200		
Michigan	-200		
New York	-180		

Normally, reductions in corn area also translate into increases in soybean area. However, that was not the case this year. Of the 5 million acres moving away from corn, only 315,000 acres found its way to soybean. And again, the Dakotas play a pivotal role here. There was a general pullback across the Dakotas, with soybean plantings being 800,000 acres less than the March intentions. So the Dakotas planted much less corn and soybeans than the producers there hoped to do in March. Weather factors, both this year and last year, sculpted those decisions. Between the weather delays with last year's crops (including some harvest of it this year) and the highly variable precipitation patterns this year (where you don't have to travel too far to go from drought conditions to excess moisture), farmers in the Dakotas had a rougher spring than most. Meanwhile, we did see some of that normal shifting from corn to soybeans in areas further south and east. Kansas and Indiana were the two states with the largest gains in soybean area over their March intentions. And in Iowa, the 100,000 acres of corn were lost, soybeans gained. Overall, the additional soybean acres only add 16 million bushels to the projected supply.

Table 3. Change in soybean planting, March intentions versus June actions (Source: USDA-NASS)

Declines	(1,000 acres)	Increases	(1,000 acres)
		US	315
North Dakota	-600	Kansas	300
Missouri	-200	Indiana	300
South Dakota	-200	Mississippi	150
Illinois	-100	North Carolina	120
Nebraska	-100	Louisiana	120
Maryland	-50	Wisconsin	100
Virginia	-30	Tennessee	100
Pennsylvania	-20	Michigan	100
		Iowa	100
		South Carolina	50
		Kentucky	50
		Arkansas	50
		Alabama	50

Putting the reports together, the corn market now has a good picture of the extent of the damage done to usage by COVID-19, but has also seen that farmers have potentially more than compensated for that with lighted plantings. Meanwhile, soybean usage suffered less damage, and also didn't absorb the acreage first intended for corn. All in all, traders finally got some bullish news, and thus far, they haven't wasted it. We'll get USDA's new price outlook in a week and a half, but the futures markets are pushing for better season-average prices than USDA's current projections. As we enter July, USDA stands at $3.20 per bushel for corn and $8.20 per bushel for soybeans on the 2020 crops. The futures markets point to season-average prices in the $3.40 per bushel range for corn and $8.60 per bushel range for soybean.

What's included and excluded in USDA hog numbers?

By Lee Schulz, extension livestock economist, 515-294-3356, lschulz@iastate.edu

COVID-19 has impacted every link in the pork supply chain. Stay at home orders early in the pandemic triggered changes in pork flow. Restaurant and food service demand for pork plunged. Grocery store sales surged. In April and May, a second main shock crippled capacity to harvest hogs for pork.

Producers adjusted hog diets, upped stocking densities, sorted or topped-off pens and found additional facility space. Despite these short-term reactions to the unprecedented situation, some pig removals still occurred.

Disruptions and producers' responses created potential for some odd-looking numbers and relationships in USDA's June Hogs and Pigs Report (Table 1). To help market participants understand which hogs USDA tallies and what the numbers represent, USDA provides definitions for items in the report and some questions and answers pertaining to hogs and pigs estimates.

Table 1. USDA Quarterly Hogs and Pigs Report Summary

	United States				Iowa		
	2019	2020	2020 as % of '19		2019	2020	2020 as % of '19
June 1 inventory *							
All hogs and pigs	75,725	79,634	105.2		23,900	25,200	105.4
Kept for breeding	6,410	6,326	98.7		1,000	960	96.0
Market	69,316	73,308	105.8		22,900	24,240	105.9
Under 50 pounds	22,210	22,160	99.8		5,920	5,790	97.8
50-119 pounds	19,693	20,370	103.4		7,520	7,670	102.0
120-179 pounds	14,396	16,090	111.8		5,430	5,900	108.7
180 pounds and over	13,017	14,687	112.8		4,030	4,880	121.1
Sows farrowing **							
Dec – Feb [1]	3,099	3,158	101.9		530	520	98.1
Mar – May	3,133	3,172	101.2		530	510	96.2
Jun – Aug [2]	3,275	3,123	95.4		575	550	95.7
Sep – Nov [3]	3,265	3,090	94.6		570	540	94.7
Mar – May pigs per litter	11.00	11.01	100.1		11.45	11.40	99.6
Mar – May pig crop *	34,454	34,933	101.4		6,069	5,814	95.8

Full report: https://downloads.usda.library.cornell.edu/usda-esmis/files/rj430453j/qn59qr33h/5q47s871k/hgpg0620.pdf

** 1,000 head;*
***1,000 litters;*
[1] December preceding year;
[2] Second intention for 2020.
[3] First intention for 2020.

continued on page 10

What's included and excluded in USDA hog numbers?, continued from page 9

Euthanized unweaned pigs aren't included

Unweaned pigs that die are not included in the pig crop. The pig crop is a function of sows farrowed and the number of pigs per litter. The denomination of pigs per litter is "pigs saved," which for all intents and purposes are "pigs weaned." The March-May average pigs saved per litter was 11.01, compared to 11.00 last year. While the litter rate was record high for the quarter, the 0.1% rise was well below what would have been predicted based on recent productivity.

Using data since 2014, a simple linear trend model predicted 11.16 pigs per litter (Table 2). This would have been a 1.5% annual rise, which would have been modest compared to the 3.2% average annual rise of the previous four quarters.

Analysts can make inferences about pig removals based on the difference in predicted pigs saved per litter and the reported pigs saved per litter, assuming all else constant. For the March-May quarter this equates to 0.15 pigs. This may seem small, but when applied to 3.172 million sows, equates to 466,520 pigs or a 1.3% lower pig crop. This can be couched as additional pre-wean mortality. Monthly, the largest difference in predicted pigs saved per litter and the reported number was in May, which aligned with the apex in slaughter reduction and the resulting backlog that persists today.

Plunging pig prices and space constraints incentivized producers to keep only the most viable pigs in every litter, which likely contributed to the lower than expected pigs saved per litter and resultant lower pig crop. Also, USDA includes sows whose unweaned pigs are euthanized in sows farrowed but with zero pigs saved for that litter. Disease is typically the major driver in curbing litter rates. Nationally, 2020 has so far proven to be a milder year for incidences of PRRS and PEDV.

Euthanized weaned pigs aren't included

Pigs that are weaned and die are not included in the pig crop. The pig crop is defined as the number of pigs which were born alive during the reference period (monthly, quarterly or semi-annually) and are either still owned by the operation, or have been sold or slaughtered by the reference date (December 1, March 1, June 1 or September 1) of the publication. Pigs which die for any reason other than being slaughtered for human consumption are not included in the pig crop estimate.

The March-May pig crop, at 34.933 million head, was 479,000 head or up 1.4% from 2019. This continues a trend of 24 consecutive year-over-year hikes in quarterly pig crop estimates. However, this is the third smallest rise of those 24 quarters.

These viable pigs are still subject to post-weaning mortality. USDA treats pig death loss during the grow-finish process as the residual required to balance hog slaughter numbers and the reported pig crop six months or two quarters prior. This simple comparison between observed slaughter and the reported pig crop is only a rough estimate of actual pig death loss because the pig crop is used not only for slaughter, but also for breeding, and adjustments are needed for herd expansion or liquidation in particular years, imports of feeder pigs and a couple of thousand exports of live hogs.

Regardless of these dynamics, USDA does not adjust pig crop figures to eliminate the imbalance, or residual, caused by death loss. In the latest report, USDA reviewed all inventory and pig crop estimates for June 2019 through March 2020 using up-to-date pig crop, official slaughter, import and export data and death loss data for 2019.

Table 2. Sows Farrowing, Pigs per Litter, and Pig Crop – United States: 2020

Period	Sows farrowed	Pigs saved per litter		Pig crop		Predicted - Actual
		Predicted	Actual	Predicted	Actual	
March	1,070,000	11.09	10.96	11,866,300	11,733,000	133,300
April	1,056,000	11.18	11.03	11,806,080	11,653,000	153,080
May	1,045,000	11.25	11.05	11,756,250	11,548,000	208,250
March-May	3,172,000	11.16	11.01	35,399,520	34,933,000	466,520

Data Source: USDA-NASS. Lee Schulz calculations. Values may not add to due to rounding.

continued on page 11

What's included and excluded in USDA hog numbers?, continued from page 10

From the March to June report, USDA revised upward the estimate of the Dec. 1, 2019 all hogs and pigs inventory by 390,000 head, or 0.5%. The breeding herd was unchanged, while the market hog inventory, specifically the 50-119 pound category, captured all of the upward revision. Pigs of this weight would have reached market weight roughly mid-February through March. This paralleled the large year-over-year surge in slaughter during that period.

USDA revised up September-November 2019 sows farrowed by 18,000 litters (0.6%) and boosted the September-November pig crop by 198,000 pigs (0.5%) which aligned the pig crop with April-June 2020 slaughter. The pigs saved per litter estimate remained the same. The mere fact that the pig crop was revised upward for a period corresponding to likely higher death loss resulting from reduced slaughter capacity affirms that pigs that are weaned and die are not included in the pig crop.

Euthanized swine are estimated annually

USDA publishes death loss estimates in the *Meat Animals Production, Disposition, and Income Annual Summary*. Death loss refers to pigs that die after weaning and cannot be counted in any inventory category. Analysts can use USDA data to calculate annual death loss percentage in several ways. One is simply dividing deaths by the total annual pig crop which was just over 138 million pigs in 2019. By this measure, death loss was 8.7%. That is down from 9.0% in 2018, even with over 5.4 million more pigs.

The unusually wide range of pre-report estimates for the market hog inventories, especially the heaviest and lightest weight categories, indicates considerable disagreement among analysts as to the actual magnitude of death losses due to COVID-19 disruptions, including euthanized swine. Analysts pegged the 180 pound and over category at between 102.2% and 126.8% of a year ago (Table 3). This equates to a difference of 3.2 million head. A difference of 3.6 million pigs was suggested for the under 50 pound category. USDA's numbers were higher than the average of trade expectations for the lightest pigs and lower for the heaviest pigs.

We have no estimate on the number of weaned pigs removed prior to slaughter because that number is not required to be reported anywhere. If anything, that number is modest relative to earlier anticipations due to the tremendous efforts of producers and those throughout the supply chain. A long road remains though.

The pipeline approach to pork production attempts to forecast hog slaughter at a specific future point based on observations at various points in the production cycle. Pigs enter the pipeline at weaning. The assumption is that what goes in the pipeline must eventually come out, barring "leakage" due to death loss, breeding herd additions and exports. If 2020 death loss is higher, impacts on the pipeline and slaughter could be higher than normal.

For more information on what USDA includes and excludes in hog numbers go to: www.nass.usda.gov/Education_and_Outreach/Understanding_Statistics/Hogs-and-Pigs-Inclusions.pdf.

Table 3. Market Hog Inventory Estimates – United States: June 1, 2020

	2019	2020	2020 as % of 2019	Pre-Report Range	Pre-Report Estimate	Actual - Estimate
Total market inventory *	69,316	73,308	105.8	102.4 - 105.7	104.2	1.6
Under 50 pounds	22,210	22,160	99.8	87.8 - 104.2	97.8	2.0
50-119 pounds	19,693	20,370	103.4	98.0 - 106.6	102.6	0.8
120-179 pounds	14,396	16,090	111.8	104.0 - 106.3	105.2	6.6
180 pounds and over	13,017	14,687	112.8	102.2 - 126.8	116.6	-3.8

** 1,000 head.*
Data Source: USDA-NASS and Urner Barry complied pre-report estimates.

continued on page 12

What's included and excluded in USDA hog numbers?, continued from page 11

Commercial slaughter and price forecasts

Table 4 contains the Iowa State University price forecasts for the next four quarters. Prices are for the Iowa-Minnesota producer sold weighted average carcass base price for all purchase types. Basis forecasts along with lean hog futures prices are used to make cash price projections. The table also contains the projected year-over-year changes in commercial hog slaughter.

Table 4. Commercial Hog Slaughter Projections and Price Forecasts, 2020-2021

	Year-over-Year Change In Commercial Hog Slaughter	ISU Model Price Forecast, Negotiated IA/So MN	CME Futures (6/25/20) Adjusted for IA-MN Producer Sold Weighted Average Carcass Base Price for All Purchase Types Historical Basis
	(percent)	($/cwt)	($/cwt)
Jul-Sep 2020	4.60	49-53	50.66
Oct-Dec 2020	0.26	51-55	52.91
Jan-Mar 2021	-4.31	60-64	62.01
Apr-Jun 2021	4.75	67-71	69.03

COVID-19 Resources

For up-to-date resources regarding COVID-19, the CARES Act, Coronavirus Food Assistance Program (CFAP), and more, visit the AgDM Blog, https://blogs.extension.iastate.edu/agdm/covid19/, or the printable list of resources, https://blogs.extension.iastate.edu/agdm/files/2020/05/Link-list.pdf.

IOWA STATE UNIVERSITY
Extension and Outreach

Iowa Concern Hotline
800-447-1985

Finances • Legal Concerns • Stress
Disaster Recovery • Resources • Referral

24/7 phone support • confidential • free

Updates, continued from page 1

Internet Updates

The following Information Files and Decision Tools have been updated on www.extension.iastate.edu/agdm.

Livestock Enterprise Budgets – B1-21 (12 Decision Tools)

Lean Hog Futures Forecast Errors, 2000-2019 – B2-67 (3 pages)

Managing Farm Family Finances – C3-51 (5 pages)

Current Profitability

The following tools have been updated on 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

This institution is an equal opportunity provider. For the full non-discrimination statement or accommodation inquiries, go to www.extension.iastate.edu/diversity/ext.

Permission to copy
Permission is given to reprint ISU Extension and Outreach materials contained in this publication via copy machine or other copy technology, so long as the source (Ag Decision Maker Iowa State University Extension and Outreach) is clearly identifiable and the appropriate author is properly credited.