

Ag Decision Maker

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A BUSINESS NEWSLETTER FOR AGRICULTURE

INSIDE . . .

PAGE 4 A wetter and drier world

PAGE 5 Crop producers need to act on farm bill decisions by March 15

PAGE 6 Crop insurance 2022 in review and call for participants for a crop insurance survey

PAGE 9 Global supplies and export challenges

UPDATES

The following **Information Files** have been updated on extension.iastate.edu/agdm:

A1-21 Historical Costs of Crop Production

A1-87 Budgeting Tool to Evaluate Alternative Approaches to Weed Management

A3-21 Acquiring Farm Machinery Services

A3-34 Joint Machinery Ownership

B2-10 Historical Hog and Lamb Prices

B2-12 Historical Cattle Prices

B2-41 Lean Hog Basis

B2-42 Live Cattle Basis

B2-43 Feeder Cattle Basis

B2-45 Feeder Steer-Heifer Price Spread

The following **Video and Decision Tools** have been updated on extension.iastate.edu/agdm:

A1-10 Chad Hart's Latest Ag Outlook

A1-33 ARC-CO and PLC Calculators

A1-78 Net Returns to Carbon Farming: All States

A3-21 Farm Machinery Financing Analyzer

A3-34 Joint Machinery Ownership

The following **Profitability Tools** have been updated on extension.iastate.edu/agdm/outlook.html:

A1-85 Corn Profitability

A1-86 Soybean Profitability

A2-11 Cash Corn and Soybean Prices

A2-15 Season Average Price Calculator

D1-10 Ethanol Profitability

D1-15 Biodiesel Profitability



Beef cow herd to shrink for years to come

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Have you ever contemplated what The Three Little Pigs, The Three Blind Mice, Goldilocks and the Three Bears, The Three Musketeers, The Three Wise Men and The Three Stooges have in common? The rule of three is a storytelling principle that suggests people better understand concepts, situations, and ideas in groups of three. Three is the smallest number required to make a pattern.

The power of three also works in other arenas. In physics—Newton's three laws of motion. In screenwriting—The three-act structure. In basketball—The NBA has always had Big Threes from Wilt Chamberlain, Jerry West, and Elgin Baylor to Michael Jordan, Scottie Pippen, and Dennis Rodman to LeBron James, Chris Bosh, and Dwyane Wade and so on.

The cattle business also has threes. If you're interested in current and near-term supplies of slaughter cattle and beef production the big three to watch are:

- the number of cattle on feed,
- placements of cattle into feedlots that are intended to eventually go to slaughter, and

- marketings or shipments of cattle out of feedlots to slaughter.

If you're interested in gauging longer-term future supplies of slaughter cattle and beef production the big three are:

- beef cow numbers,
- heifers for beef cow replacement, and
- the calf crop.

Where can you get the data? Each January and July USDA's National Agricultural Statistics Service asks a sample of cattle producers to voluntarily provide inventory numbers. The January survey is the larger of the two surveys. Estimates are made for all states.

Fewer calves mean less beef coming

The calf crop includes beef and dairy calves. NASS estimated the 2022 US calf crop at 34.465 million head, down 2.0% from the 2021 calf crop (Table 1). Some of this "decline" is due to NASS revising the 2021 calf crop up by 80,500 head or 0.2% in the latest report.

Calves born during the first half of 2022 were estimated at 25.3 million head, down 1.6%



Table 1. Cattle inventory by class and calf crop. Source: USDA-NASS.

January 1 inventory *	United States			Iowa		
	2022	2023	2023 as % of 2022	2022	2023	2023 as % of 2022
Cattle and calves	92,076.6	89,247.1	96.9	3,860	3,650	94.6
Cows and heifers that calved	39,360.1	38,320.4	97.4	1,130	1,100	97.3
Beef cows	29,983.1	28,917.9	96.4	905	860	95.0
Milk cows	9,377.0	9,402.5	100.3	225	240	106.7
Heifers 500 pounds and over	19,916.0	19,172.5	96.3	870	790	90.8
For beef cow replacement	5,481.5	5,163.7	94.2	160	130	81.3
Expected to calve	3,339.5	3,168.7	94.9			
For milk cow replacement	4,440.6	4,337.2	97.7	120	120	100.0
Expected to calve	2,826.2	2,769.4	98.0			
Other heifers	9,993.9	9,671.6	96.8	590	540	91.5
Steers 500 pounds and over	16,704.7	16,131.6	96.6	1,290	1,240	96.1
Bulls 500 pounds and over	2,109.6	2,029.0	96.2	60	60	100.0
Calves under 500 pounds	13,986.2	13,620.6	97.4	510	460	90.2
Feeder cattle outside feedlots	25,990.2	25,266.5	97.2	1,220.0	1,090.0	89.3
Cattle on feed	14,694.6	14,157.3	96.3	1,170	1,150	98.3
Calf crop **	35,165.9	34,464.5	98.0	1,130	1,070	94.7

* 1,000 head, **2021 and 2022.

Full report: <https://downloads.usda.library.cornell.edu/usda-esmis/files/h702q636h/ms35vn48m/fj237f291/cat0123.pdf>

from the first half of 2021. Calves born during the second half of 2022 were estimated at 9.165 million head, down 3.2% from the second half of 2021. The smaller calf crop implies fewer cattle will come to market in late 2023 and in 2024.

While beef cattle inventories are declining, dairy cattle numbers are stable. That means dairy calves will make up a greater share of calf crops in the coming years. In 2014, dairy calves totaled nearly 26% of the net (adjusted for veal slaughter) calf crop, a recent record. Dairy's share will continue rising and

proportionally more dairy calves will impact cattle markets for at least the next couple of years.

Cattle numbers vulnerable to weather

Cow-calf producers depend more directly on weather than any other livestock sector. Several years of persistent drought in key cattle producing areas of the West and Great Plains have impacted range and pasture conditions and devastated hay production. The Dec. 1, 2022 national hay supply was down a sharp 9.0% from Dec. 1, 2021 and the lowest December 1 hay stock on record

dating back to 1973 (Figure 1). Extreme changes in supplies occurred in the Southern Plains, but reached into Colorado, Nebraska, Missouri, and Iowa.

Cow culling cuts herd

The 28.918 million head US beef cow inventory on Jan. 1, 2023 was down 3.6% from Jan. 1, 2022. That was the largest year over year percentage drop in the beef cow herd since 1985 to 1986. Numbers tumbled as the industry culled 13.3% of the national herd in 2022. This culling rate was the highest ever in the history of the data back to 1986. The US beef cow herd is the smallest since

1962. The 2023 beef cow herd is also already 38,500 head smaller than on Jan. 1, 2014, which was the bottom of the last cattle inventory cycle.

Several top beef cow states continued to liquidate beef herds due to drought, high input costs and high cull cow values. The factor which drove liquidation most varied among operations. Kansas, Oklahoma, Texas, Nebraska and South Dakota accounted for 537,000 head of the total 1,065,200 head decrease in US beef cows (Figure 2).

Fourteen states had more beef cows on Jan. 1, 2023 than on Jan. 1, 2022, but additions only totaled 38,800 head. That's smaller than the 45,000 head beef cow drop in Iowa alone. The largest increases were 6,000 beef cows in Alabama and 5,000 beef cows in Pennsylvania.

Replacements must pass tests

A heifer for beef cow replacement is a heifer that has been selected to be bred and placed in the beef herd. For NASS survey classification purposes those heifers weigh 500 pounds or more on January 1. Beef replacement heifers as of Jan. 1, 2023, at 5.164 million head, were down 5.8% from a year earlier. NASS also asked, "How many of these beef cow replacement heifers are expected to calve during 2023?" Of the 5.164 million beef replacement heifers, 3.169 million head or 61.4% are expected to calve in 2023. That is the highest percentage since 2018.

Figure 1. Percent change December 1, 2022 vs. December 1, 2021 in hay stocks. Source: USDA-NASS.

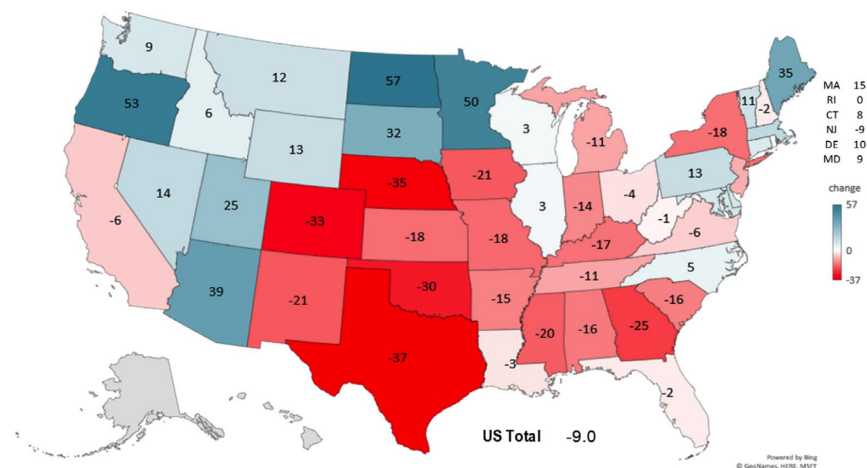
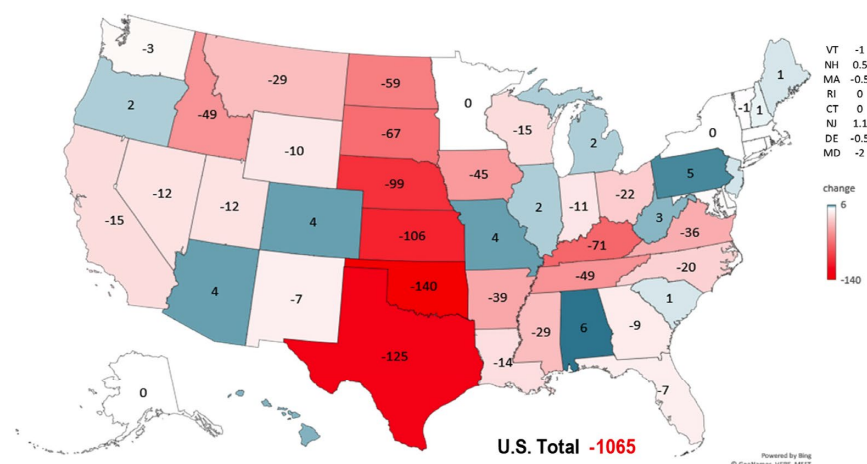


Figure 2. Change January 1, 2023 vs. January 1, 2022 in beef cows, 1,000 head. Source: USDA-NASS.



Replacement heifers are genetic building blocks for the cow herd. Producers hope that a replacement heifer will become a fertile cow that produces a calf, annually, for a long time. Producers make many management steps and decisions in the process of selecting and growing replacement heifers. Each heifer must pass several "production tests" to remain on track and, hopefully, become a member of the cow herd. Selection at weaning, development from weaning to first breeding, evaluation after first breeding and calving season and establishment of successful rebreeding are the "production tests" each heifer must pass. Heifers not meeting production targets are typically culled at any point in the process.

Understand biological time lag

In 2022, 73.4% of all calves in the United States were born from January 1 through June 30. A heifer calf born in spring 2022 would have been weaned in the fall. If she was selected to be a cow herd replacement, she will be bred in summer 2023. She will calve for the

first time in spring 2024, and she will wean her first calf in fall 2024. If her calf is intended for the slaughter market, it must still be finished and harvested before it adds to beef production. This won't occur until the summer or fall of 2025.

Some suggest meaningful progress in rebuilding the nation's beef cow herd may not materialize until 2025. During the early stages of beef herd expansion, marketings will actually decline as producers hold more heifers for breeding. Even more time will pass before a larger breeding herd can send more calves to market.

Another rule of three is using three successive words to express a central idea. Examples include: Life, liberty, and the pursuit of happiness. The Good, the Bad, and the Ugly. Blood, sweat, and tears. One could argue these describe cattle production at times. The hope for this year is another Hendiatrix – Moisture, moisture, moisture.



A wetter and drier world

By Don Hofstrand, retired agricultural business specialist

Reviewed by Eugene Takle, retired professor emeritus, Iowa State University

This article is part of our series focused on the causes and consequences of a warming planet.

The warming of the planet influences the amount and distribution of precipitation. Although there are exceptions, in general, wet areas are expected to become wetter and dry areas drier.

Wet areas will become wetter because warmer air can hold more water vapor. Also, warmer air, along with warmer oceans, causes more evaporation of water from oceans into the atmosphere. When the moist air cools, it condenses into tiny droplets that become clouds. As the droplets get bigger and heavier, they fall as rain. Because there is more moisture in the atmosphere, there is more rainfall.

This process is magnified because some of the water that fell as rain is recycled. The water

that fell to earth as rain returns to the atmosphere through evaporation where it once again falls to the earth as rain.

But to make an area wetter, this process needs to start with a source of water like an ocean and the proper wind currents to move the moist air over land.

Conversely, in a desert, we are either not close to an ocean or the wind blows moist air in the wrong direction. In this case, warmer temperatures cause more evaporation of the already limited soil moisture in the desert, making the desert even drier.

These changes will impact agriculture. In places where farming is already marginal due to a lack of rainfall, these areas



Photo credit: i-love-advanture/stock.adobe.com

will get drier, making farming even less feasible. Areas with sufficient rainfall will get more rainfall, potentially causing water-logged soils, delayed planting, soil erosion, flooding, and other problems. Whether wetter or drier, these changes in precipitation will impact agricultural production.

See the [Ag Decision Maker website](https://www.extension.iastate.edu/agdm/energy.html#climate), [extension.iastate.edu/agdm/energy.html#climate](https://www.extension.iastate.edu/agdm/energy.html#climate), for more from this series.



Crop producers need to act on farm bill decisions by March 15

By Alejandro Plastina, extension economist, 515-294-6160 | plastina@iastate.edu
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Resources available to help producers make the best choices for their farm

Crop producers must make some important and timely decisions if they want to participate in the Farm Bill programs for 2023. The deadline to make an election and enroll with the USDA Farm Service Agency is March 15.

For program year 2023, producers have three options: Agriculture Risk Coverage-County (ARC-CO), Price Loss Coverage (PLC) or Agriculture Risk Coverage-Individual Coverage (ARC-IC). Even if producers have enrolled in the past and want to keep the same program, they still need to enroll this year, by March 15. Enrollment is an annual decision.

To be eligible for payment, producers must complete the enrollment contract for each of their farms. Every situation is unique, so we need to make the best decisions for individual farm operations and take the opportunity to make changes if necessary.

For this month's Ag Decision Maker, Johanns created [two YouTube videos](#), www.extension.iastate.edu/agdm/info/farmbill.html, that explain the options and what producers need to consider in making the best option for their farm. In the first video, Kevin McClure, chief agriculture program specialist with the United States Department of Agriculture's Farm Service Agency, explains the programs and enrollment process.

In the second video, Alejandro Plastina, associate professor in economics and extension economist at Iowa State, discusses the tools producers can use to determine which program is best for their own situation. The tools include payment estimators for each program, and historical payment data by Iowa county.

We are updating these tools as new price projections and yield data are made available. While these programs have been available for several years, there will be producers

making this decision for the first time. Updated tools are available, along with archived materials covering the programs more in-depth. Our [farm management specialists](#), www.extension.iastate.edu/ag/farm-management are also available for specific questions, before producers commit to a program.





Crop insurance 2022 in review and call for participants for a crop insurance survey

By Hongli Feng, Endowed Professor for Excellence in Agricultural Economics, Iowa State University Department of Economics, hfeng@iastate.edu

The Federal Crop Insurance Program plays an important role in how Midwestern farmers manage yield and price risk. As the deadline for purchasing crop insurance for the 2023 crop year is approaching, it might be helpful to take a closer look at the program from both big-picture and individual-level perspectives.

Corn insurance policy choice in 2022

Based on RMA’s Summary of Business data for 2022, Table 1 reports the number of corn crop insurance policies sold by type in the 2022 crop year. Corn growers in the 12 Midwest states (IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, WI) predominately chose Revenue Protection (RP) policies to insure their corn. These policies accounted for over 92% of the corn policies sold in 2022. This share was even higher at 95% for Iowa alone. The RP

with Harvest Price Exclusion (RP-HPE) policies and Yield Protection (YP) policies had respective market shares of only 0.58% and 5.84% in the Midwest and 0.85% and 3.16% in Iowa. Other corn policies, which are based on either county average corn revenue (Area Revenue Protection, ARP), county average corn yield (Area Yield Protection, AYI), or county average net corn revenue (Margin Protection, MP; MP-Harvest Price Option, MP-HPO), made up less than 2% of total corn policies sold in 2022 in either the Midwest or Iowa.

Corn insurance policy endorsement choice in 2022

Table 2 reports the number of corn policy endorsements sold in 2022. Overall, Midwestern corn growers showed little interest in the endorsement products. Among all corn growers in the 12 Midwest states, the endorsement

product sold most was the Supplementary Coverage Option – Revenue Protection (SCO-RP). But the number of SCO-RP endorsements sold as a percent of the number of RP policies sold was only 4.3%. For Iowans, this percentage was only 2.7%. Iowans show a slightly stronger interest in another endorsement product, the Enhanced Coverage Option – Revenue Protection (ECO-RP), but the number of ECO-RP endorsements sold as a percent of the number of RP policies sold was just 3.1%. The new endorsement product, Post-Application Coverage Endorsement (PACE), first introduced in 2022 for corn growers that split nitrogen application before and after planting, was purchased by less than 0.02% of the underlying RP corn policyholders.

Table 1. Number of corn policies sold in 2022

Policy name	RP	RP-HPE	YP	ARP	AYP	MP	MP-HPO	Total
Panel A: For the 12 Midwest states								
Number of policies sold	404,197	2,528	25,476	1,455	488	52	2,288	436,484
Percent of all sold policies	92.60%	0.58%	5.84%	0.33%	0.11%	0.01%	0.52%	100%
Panel B: For Iowa only								
Number of policies sold	70,243	625	2,330	76	24	0	358	73,656
Percent of all sold policies	95.37%	0.85%	3.16%	0.10%	0.03%	0.00%	0.49%	100%

Data source: Calculated from data in Summary of Business, Risk Management Agency, February 13, 2023.

Table 2. Number of corn policy endorsements sold in 2022

Endorsement name	SCO-RP	SCO-RPHPE	SCO-YP	ECO-RP	ECO-RPHPE	ECO-YP	PAGE-RP
Panel A: For the 12 Midwest states							
Number of endorsements sold	17,206	69	156	11,066	42	149	62
Percent of the underlying policies sold	4.26%	2.73%	0.61%	2.74%	1.66%	0.58%	0.02%
Panel B: For Iowa only							
Number of endorsements sold	1,886	3	11	2,203	5	40	10
Percent of the underlying policies sold	2.68%	0.48%	0.47%	3.14%	0.80%	1.72%	0.01%

Data source: Calculated from data in Summary of Business, Risk Management Agency, February 13, 2023.

Table 3. Acres covered by each insurance unit type of the RP corn policies in 2022

Unit type	Enterprise Unit (EU)	Basic Unit (BU)	Optimal Unit (OU)	Whole Farm Unit (WU)	Total
Panel A: For the 12 Midwest states					
Acres	44,038,544	7,833,019	13,784,692	12,268	65,668,523
Share in total RP covered acres	67%	12%	21%	0%	100%
Panel B: For Iowa only					
Acres	7,119,598	1,771,990	2,849,327	85	11,741,000
Share in total RP covered acres	61%	15%	24%	0%	100%

Data source: Calculated from data in Summary of Business, Risk Management Agency, February 13, 2023.

Insurance unit type choice of RP corn policies sold in 2022

Table 3 reports the acres covered by each insurance unit type of the RP corn policies in 2022. We only report the RP policies as RP made up over 90% of crop insurance policies sold in 2022. Among Midwestern corn growers, the Enterprise Unit (EU) was the most popular insurance unit in 2022. It covered about 67% of all the RP policyholders' corn acres. Optimal Unit (OU) covered about 21% and Basic Unit (BU) covered 12%. Corn

growers showed little interest in the Whole Farm Unit (WU) type as it covered only 12,268 acres. For Iowa, EU covered 61% of the RP policyholders' corn acres, OU covered 24%, and BU covered the remaining 15%.

Call for participants for a crop insurance survey, compensation offered

Results based on the program participation data show some important patterns in corn growers' crop insurance choices. For example, corn growers have a strong preference for insuring against

both the yield risks and price risks than yield risks alone (RP vs. YP), and generally prefer to insure all corn acres under one insurance policy than under multiple policies (EU vs. other insurance unit types). However, these results also reveal significant heterogeneities among corn growers' insurance choices, especially in the coverage level choices. Questions arise about what factors drive each individual farmer's insurance choice and whether farmers making different choices are all making

the best use of the Federal Crop Insurance Program.

Crop insurance can be a very personal choice depending on each farmer's specific farm operation. A non-exhaustive and overlapping list of possible factors includes:

- Perceptions about soil condition, weather, and price risks.
- Risk tolerance levels with those potential risks.
- Premium and subsidy levels for each potential coverage level.
- The likelihood of receiving an indemnity payment for the chosen coverage level.
- Past experience with crop insurance policies.
- Agent recommendations and friend suggestions.

A farmer's crop insurance decision is usually a combination of the above factors. The underlying decision-making processes are not, however, reflected in the program participation data. To understand how farmers make crop insurance decisions and related impacts on farm operation, researchers (led by Dr. Hongli Feng) at Iowa State University, Kansas State University, Michigan State University, and the University of Illinois Urbana-Champaign are conducting a short survey.

The survey takes about **30** minutes to complete and contains questions about crop insurance usage, crop insurance decisions in given scenarios, and basics of the farm operation.

If you complete the survey then the research team will send you an Amazon gift card. Gift card values range from **\$50** to **\$99** with an average value of **\$71**.

To participate in the survey, please scan the QR code below or go to <https://bit.ly/crop-ins-survey>. This survey will enhance the two-way knowledge flow between farmers and researchers as the data will be utilized in research to generate insights that could better serve farmers. Your input will be invaluable to the research on farmers' crop insurance decision making and to identify any potential measures that can help farmers make the best use of the Federal Crop Insurance Program.





Global supplies and export challenges

By Chad Hart, extension crop market economist,
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While the US corn and soybean crops were smaller this past year, that was not true for some of our major competitors across international agriculture. Despite drought challenges in South America and the war in the Black Sea region, global crop production was mixed. Corn production fell, wheat production held steady with last year, and soybean production set another record. The combination of tighter US supplies, strong US prices, and expansion by some of our export competitors has put a dent in the export outlook for the 2022 and 2023 crops.

Currently, a lot of the market chatter is focused on the weather conditions in South America and the impact on South American production. Tables 1 and 2 show the latest global estimates from USDA and the major adjustments were in South American crops. For corn, the general picture is for reduced global production, with drought conditions in Argentina sharply reducing corn potential. The latest update shaved 200 million bushels off of Argentina's corn supply. However, increased corn acreage in Brazil is leading to a sizable jump in Brazilian corn production. Brazil's corn crop is projected to be 350 million bushels larger this year.

Table 1. World corn production. Source: USDA-WAQB.

Country or Region	2021-2022 estimate	2022-2023 forecast	Change from January 12	Change from 2021-2022
<i>Million tons</i>				
World	1,216.0	1,151.4	-4.6	-64.6
United States	382.9	348.8	--	-34.1
Foreign	833.1	802.6	-4.6	-30.5
Argentina	49.5	47.0	-5.0	-2.5
Brazil	116.0	125.0	--	9.0
Mexico	26.8	27.6	--	0.8
Canada	14.6	14.5	--	-0.1
European Union	71.0	54.2	--	-16.8
Serbia	6.0	5.4	--	-0.6
FSU-12	63.7	46.4	0.1	-17.3
Ukraine	42.1	27.0	--	-15.1
Russia	15.2	14.0	--	-1.2
South Africa	16.1	16.7	--	0.6
China	272.6	277.2	--	4.6
India	33.6	32.0	--	-1.6

Table 2. World soybean production. Source: USDA-WAQB.

Country or Region	2021-2022 estimate	2022-2023 forecast	Change from January 12	Change from 2021-2022
<i>Million tons</i>				
World	358.0	383.0	-5.0	25.0
United States	121.5	116.4	--	-5.2
Foreign	236.5	266.6	-5.0	30.2
Argentina	43.9	41.0	-4.5	-2.9
Brazil	129.5	153.0	--	23.5
Paraguay	4.2	10.0	--	5.8
Canada	6.2	6.5	--	0.3
India	11.9	12.0	--	0.1
China	16.4	20.3	--	3.9

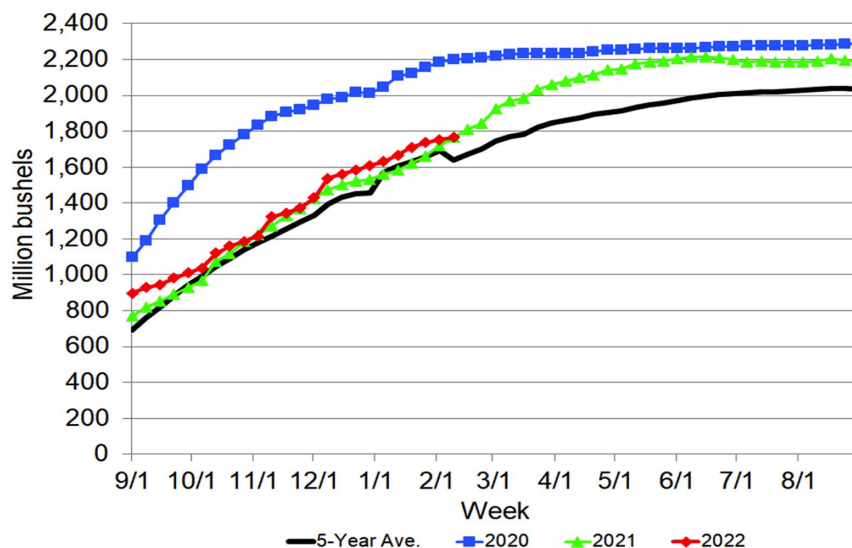
The global soybean situation is different. Global production is higher, despite the fall in US production. The drought in Argentina forced USDA to downgrade soybean production potential by 160 million bushels. But as with corn, the Argentine decline is being more than

made up for by the increase from Brazil. In fact, the growth from Brazil is enough to cover both the Argentinian and US declines. Brazil is projected to harvest over 5.5 billion bushels of soybeans. Add on the growth in soybean production in Paraguay and South America has plenty of soybeans for the global market.

The export markets have been strong supporting pillars for corn and soybean prices. Figures 1 and 2 show the export sales pace currently and compare it across the past few years. In both graphs, the blue line (square) shows the sales pattern for the 2020 crop, when both corn and soybeans set records for the number of bushels exported. The green line (triangle) shows the pattern for the 2021 crop, when fewer bushels moved out of the country, but prices rose more than enough to offset the bushel decline, leading records in terms of export value. The red line (diamond) shows the sales for the 2022 crop thus far and the black line (solid) displays the five-year average pattern for export sales.

For soybeans, the strength in export sales has originated from a variety of sources. For the 2020 marketing year, it was driven by the surge in sales to China following the Phase 1 trade agreement. Those sales in the fall and early winter of 2020 set the stage for the record international shipments. For the 2021 marketing year, export sales for the first half of the marketing year were hovering around

Figure 1. Soybean export sales. Source: USDA-FAS.



the five-year average until the Russian-Ukrainian war broke out. Concerns about global vegetable oil supplies (as Ukraine is a vital producer of sunflower oil) spurred on some late season soybean purchases during March and April of 2022. Mexico, the European Union, and Egypt substantially increased their soybean purchases from the US during that time. Thus far, for the 2022 crop, the export sales pace has been similar to the 2021 crop, hovering just above average. The concern is that USDA's current outlook shows that those similarities will end, as export sales are expected to fall below last year's pace and the five-year average over the remaining months of the marketing year. The gains from Mexico, the European Union, and Egypt have been lost this year thus far. And while Chinese purchases have increased, it is not enough to maintain the record export pace of the past couple of years.

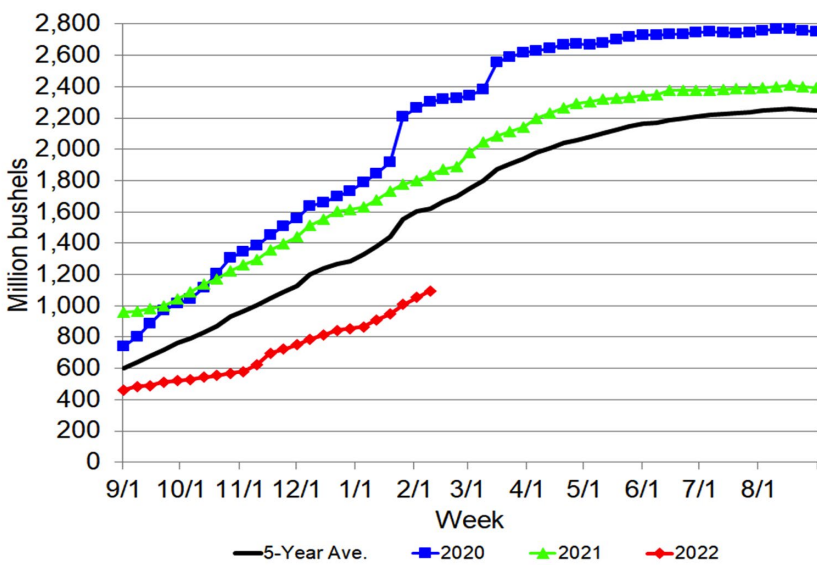
For corn, the storyline for the 2020 export sales was the same as for soybeans, Chinese purchases surged exported bushels to record levels. The 2021 marketing year saw that strong export pace remain fairly consistent throughout the year. Our North American trade partners, Canada and Mexico, provided a great deal of support during the last crop year. Both countries increased their corn purchases significantly, as drought impacts affected their feed grain production. But US corn export sales fell off at the start of the 2022 marketing year and haven't recovered. The drop in sales put us not only behind the pace of the past few years, but also well behind the five-year average. And USDA's current outlook suggests that corn sales will continue to lag, with 1.925 billion bushels exported, which is roughly 300 million bushels below the five-year average.

The reduction in corn sales has been broad based as countries in Latin America, eastern Asia, and Africa has limited purchases, but the largest reduction has been from China. Thus far, China has purchased 300 million fewer bushels of US corn.

For 2022-23 season-average prices, USDA held firm with corn at \$6.70 per bushel, but raised soybeans to \$14.30 per bushel, a 10 cent increase. The weakening of export potential hasn't put a damper on old crop pricing. But new crop pricing is showing some strain from the possibility of more moisture for the US and South America for the next set of crops and the concern that export markets may not rebound as robustly as crop supplies. Currently, futures point to the 2023-24 season-average prices being in the \$5.80 range for corn and the \$13.40 range for soybeans. Both crops are facing 90 cent reductions in price. But these reductions in price will get larger if exports continue to fall short.

View the latest [Crop Market Outlook video](https://go.iastate.edu/QV9STY), <https://go.iastate.edu/QV9STY>, for further insight on market outlook.

Figure 2. Corn export sales. Source: USDA-FAS.



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

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