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Feed Outlook

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In this report:

Strong Pace of Domestic and Export Use Tighten U.S. Corn Ending Stocks

U.S. corn use is raised 150 million bushels for 2020/21 in the June *World Agricultural Supply and Demand Estimates* (WASDE). As a result, projected beginning stocks for 2021/22 are lowered 150 million bushels, tightening supplies and reducing ending stocks for the upcoming marketing year. Exports and domestic fuel-ethanol-use estimates for 2020/21 are each raised 75 million bushels. Season-average farm prices forecasts remain unchanged for 2020/21 and 2021/22. The season-average price for 2020/21 sorghum is raised $0.10 per bushel, based on higher prices received through April.

U.S. corn export prospects for 2020/21 are boosted further, while Brazil's outlook is downgraded. A reduction in projected corn supplies and exports in Brazil this month is projected to support U.S. exports further, during the latter part of 2020/21. The changes for 2021/22 coarse grain trade are largely limited to barley, with China being the only beneficiary of higher barley exports, which push Chinese record barley imports further.

Approved by USDA's World Agricultural Outlook Board

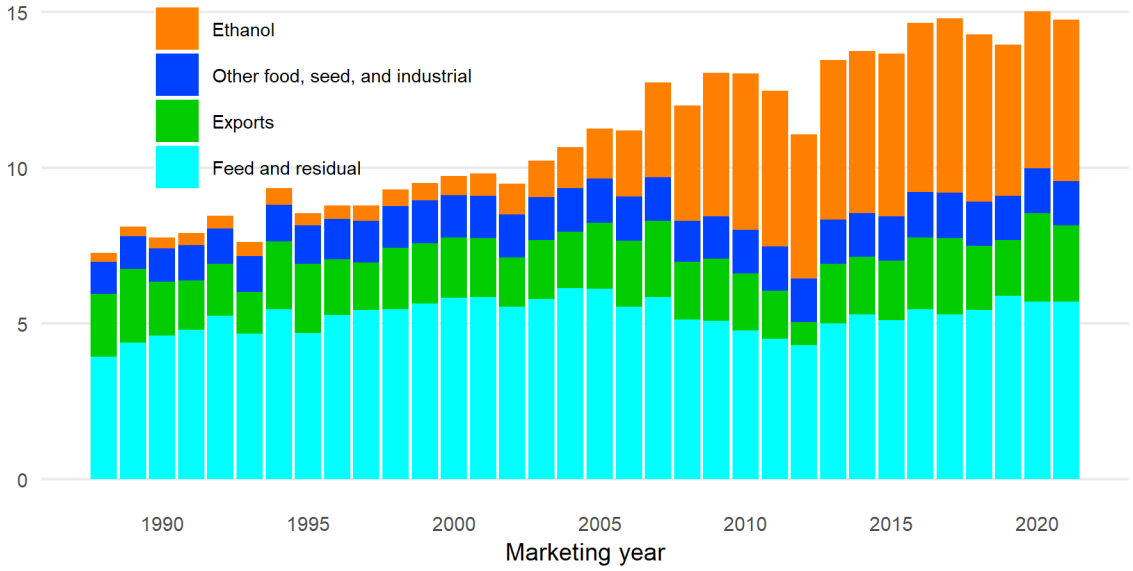
Domestic Outlook

Michael McConnell

Domestic and Export Pace Raises Estimated Use for 2020/21, Lowering Projected Stocks for 2021/22

Corn use in the United States is raised in the June *World Agricultural Supply and Demand Estimates* (WASDE), as domestic use and exports show a strong pace through the end of May and into early June. As a result, ending stocks forecasts for both 2020/21 and 2021/22 are reduced.

Figure 1
U.S. corn utilization
Billion bushels



Note: 2020 is projected.
Source: USDA, Economic Research Service.

Corn exports are estimated to total 2,850 million bushels for 2020/21. This is a 75-million-bushel increase from the previous month, based on the recent pace of official exports reported by the U.S. Census Bureau through April 2021 and grain inspections reports from the USDA's Agricultural Marketing Service (AMS) through early June. According to the Census Bureau, corn exports from September to April have totaled 1,814 million bushels—an 80-percent increase from the same period last year. Much of the increased pace is attributed to higher shipments to China. For 2021/22, corn exports are projected to be 2,450 billion bushels—still large by historical standards, but lower on an annual basis, due to improved supply projections for other

large global corn exporters. Additional information on exports can be found in the International Outlook section of this report.

Corn Use for Fuel Ethanol Raised on Higher Gasoline Use

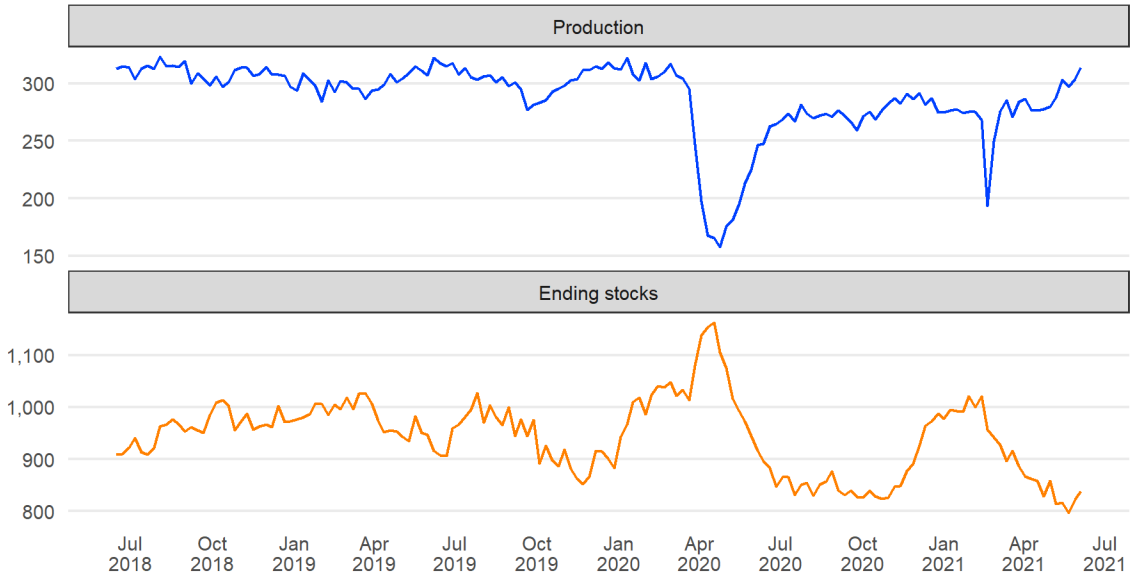
Domestic corn use in 2020/21 is also raised, primarily due to recent trends in the gasoline market. Food, seed, and industrial use is estimated to total 5,700 million bushels—including 5,050 million bushels used for fuel ethanol—representing a 75-million-bushel increase from the May report.

Ethanol production has rebounded through the spring, with the busy summer driving season approaching. The Department of Energy's Energy Information Administration (EIA) has reported a steady increase in motor gasoline product supplied for several months and has raised its outlook for gasoline consumption during the summer in its most recent *Short Term Energy Outlook (STEO)*, mainly due to vaccination rates being increased and COVID-related restrictions being lifted throughout the country. Weekly ethanol production has steadily trended up, as well—with the exception of brief, isolated weather and supply chain-related disruptions. Additionally, ending stocks of ethanol had been declining until recent weeks, indicating that the increased rate of ethanol production has not kept up with the pace of motor gasoline use over the past few months.

Figure 2

Weekly totals of U.S. ethanol production and ending stocks

Million gallons



Source: U.S. Department of Energy, Energy Information Administration.

The pace of corn crushed for fuel ethanol is expected to be driven by the steadily recovering gasoline consumption for the remainder of 2020/21. Fuel ethanol use for 2021/22 is projected to total 5,200 million bushels, based on a return to longer-term factors affecting transportation fuel demand. These factors include steadily increasing nation-wide vehicle fuel efficiency and declining number of miles driven per capita.

Corn Production Unchanged for 2021/22, Projected to Increase from Previous Year

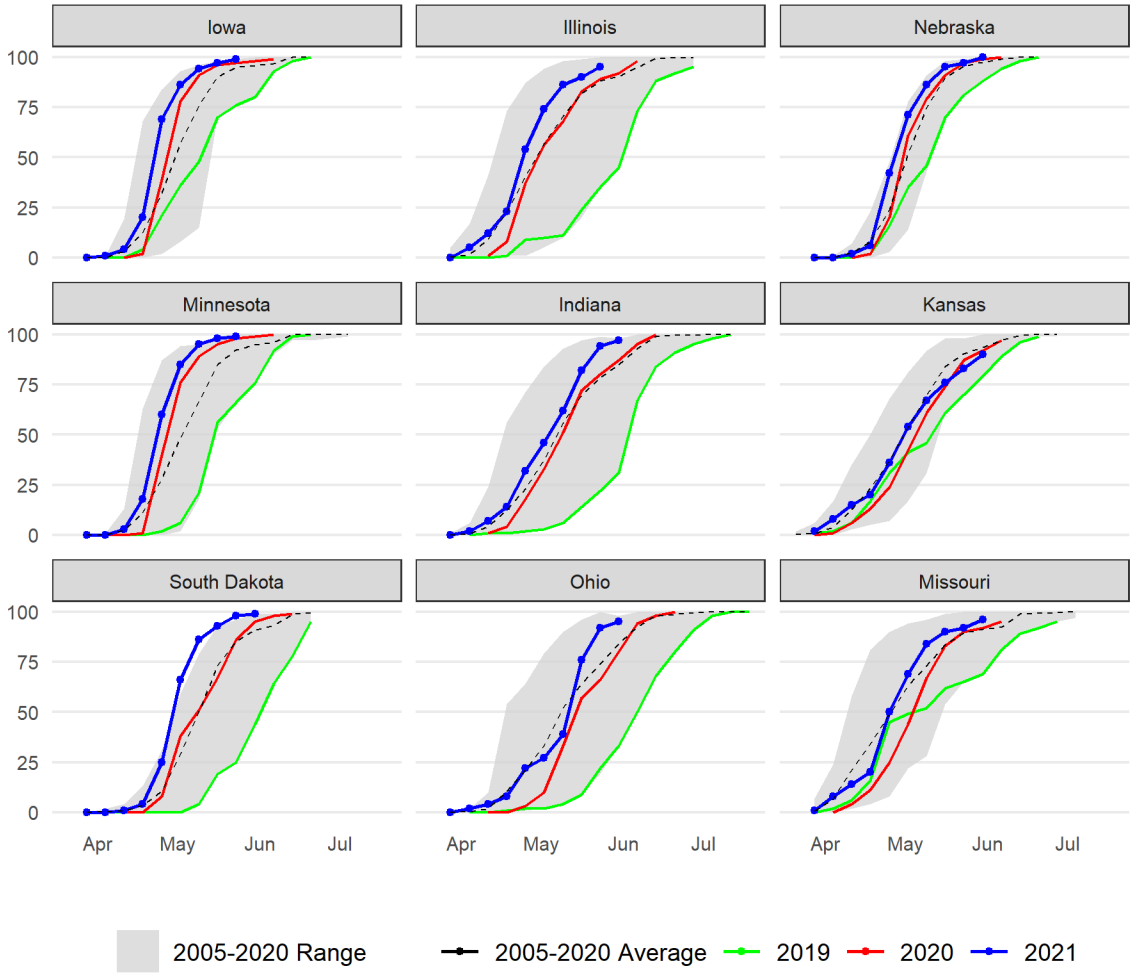
Corn production for 2021/22 is projected to be 14,990 million bushels, based on 91 million acres of planted area (as reported by the March *Prospective Plantings* report) and a planting- and weather-adjusted trend-yield forecast of 179.5 bushels per acre. The yield forecast is predicated on the weather-adjusted trend going back to the 1988/89 crop. The forecast assumes normal precipitation levels for June, as well as normal precipitation and temperate conditions for July. The production projection is unchanged from the May WASDE and reflects a 6-percent increase from the 2020/21 crop. Subsequent projections will take into account updated area forecasts published by NASS's June 30 *Acreage* report; recorded June and July weather information in key-producing States; and eventually, NASS's first survey-based corn yield and production forecast in the August *Crop Production* report.

Planting progress has been ahead of average in most of the largest corn-producing States. According to NASS's most recent *Crop Progress* report, 95 percent of the crop has been planted through June 6, compared with 88 percent at the same time last year.

Figure 3

Corn planting progress by State, 2005 to 2021

Percent complete



Source: USDA, National Agricultural Statistics Service.

While the corn projection assumes normal weather conditions through the growing- and harvest-season, as of June 1, the USDA's Drought Monitor rates 24 percent of corn-growing areas to be in drought conditions. That report shows that areas qualifying as extreme or exceptional drought areas (the most severe categories) are primarily outside of the traditional corn-belt. There are some significant corn-producing regions that are rated in severe and moderate drought. Historically, however, national corn yields have been most significantly correlated to weather conditions during the reproductive development stages that typically occur in July. While weather in June is important for development of the corn crop, the effects of precipitation during June are typically small relative to July—except in the cases of extreme drought, such as what was seen during 1988 and 2012. Weather and growing conditions in the coming weeks will likely be a crucial determinant for 2021/22 production.

Reduced Ending Stocks for 2020/21 Tighten Supplies, Stocks for 2021/22

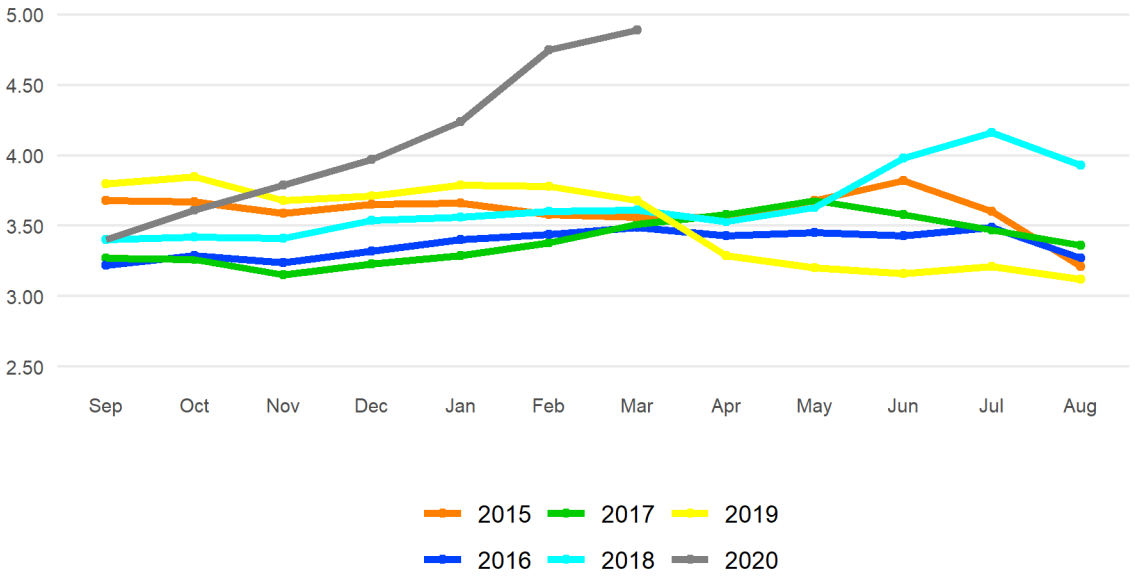
Larger corn use and unchanged supplies result in September 1, 2021 stocks estimated at 1,107 million bushels—150-million-bushels lower than the May estimate. This estimate reduces the carryover into the next marketing year, resulting in 2021/22 ending stocks projected at 1,357 million bushels.

The season-average farm price forecasts are unchanged, with estimates for 2020/21 at $4.35 per bushel and projections for 2021/22 at $5.70. Divergent seasonal patterns in prices for the 2 marketing years are significant factors in the season-average price forecasts. The 2020/21 farm price has steadily risen during the marketing year. This rise is due to 2020/21 corn contracted earlier in the growing season likely receiving lower prices than corn priced during the harvest and post-harvest season. Therefore, monthly prices received by farmers lagged behind cash-market prices. The increase in cash- and futures-market prices began in late summer 2020, as the global corn production outlook was reduced and the outlook for feed demand in China increased.

Figure 4

Price received for corn, monthly

U.S. dollars per bushel



Source: USDA, National Agricultural Statistics Service.

For 2021/22, cash and futures prices have been at elevated levels from the start of the planting and growing season. Corn priced using forward contracts and delivered during the fall and early winter, will likely reflect the current cash- and futures-price levels.

GCAUs Projected Up Slightly for 2021/22, but Less Total Feed and Residual for Grains Expected

Grain-consuming animal units (GCAUs) are estimated at 101.77 million units for 2020/21 and projected to be slightly higher in 2021/22, at 101.78 million units. This estimate is down from the 2019/20 level of 101.92 million units, but still well above historical levels (the 2016/17 to 2018/19 indexes averaged 98.43 million units). For 2021/22, higher indexes in the poultry, hog and dairy sectors, exceed an expected decline in the beef cattle index.

Total feed and residual for energy feeds (corn, barley, sorghum, oats, and wheat) are estimated to total 152.5 million metric tons (MT) for 2020/21, but are projected to fall to 151.3 million MT during 2021/22. Estimates for both years are lower than for 2019/20, which totaled 157.6 million MT. As a result, the feed per animal unit ratio indicates a relatively tighter market for energy feeds for both 2020/21 and 2021/22. This tightness is reflected in the higher price of grain, as well as the higher prices of processed feedstuffs—such as corn gluten meal, corn gluten feed, and dried distillers' grains (DDGs), as reported by AMS. High feed prices typically encourage some livestock producers—particularly beef cattle—to remain on pasture longer. Drought conditions will also be a factor affecting pasture availability, with 30 percent of cattle area in the United States under drought conditions as of June 1, according to the USDA's Drought Monitor.

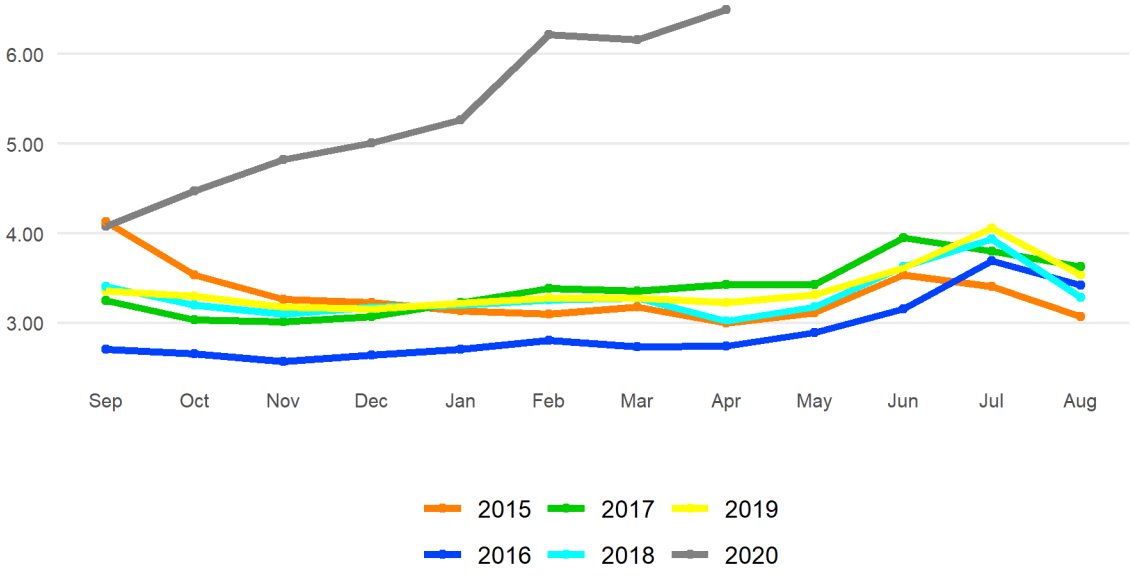
Sorghum Prices Raised for 2020/21 as Strong Export Pace Continues

Sorghum markets continue to be driven by strong export demand, particularly shipments destined for China's livestock feed markets. This demand is expected to continue into 2021/22. No changes are made to the sorghum balance sheet for either the 2020/21 estimates or 2021/22 projections from the previous month's forecasts. The season-average farm price estimates for 2020/21 are raised $0.10 to $5.15 per bushel, while the projection for 2021/22 remains unchanged from the previous month at $6.10. Like corn, the season-average farm price for 2021/22 is expected to be impacted by producers that contract at the relatively high current cash-market levels. This price contrasts with 2020/21, which witnessed prices significantly lower during the early growing season, as compared to the post-harvest market.

Figure 5

Price received for sorghum, monthly

U.S. dollars per bushel



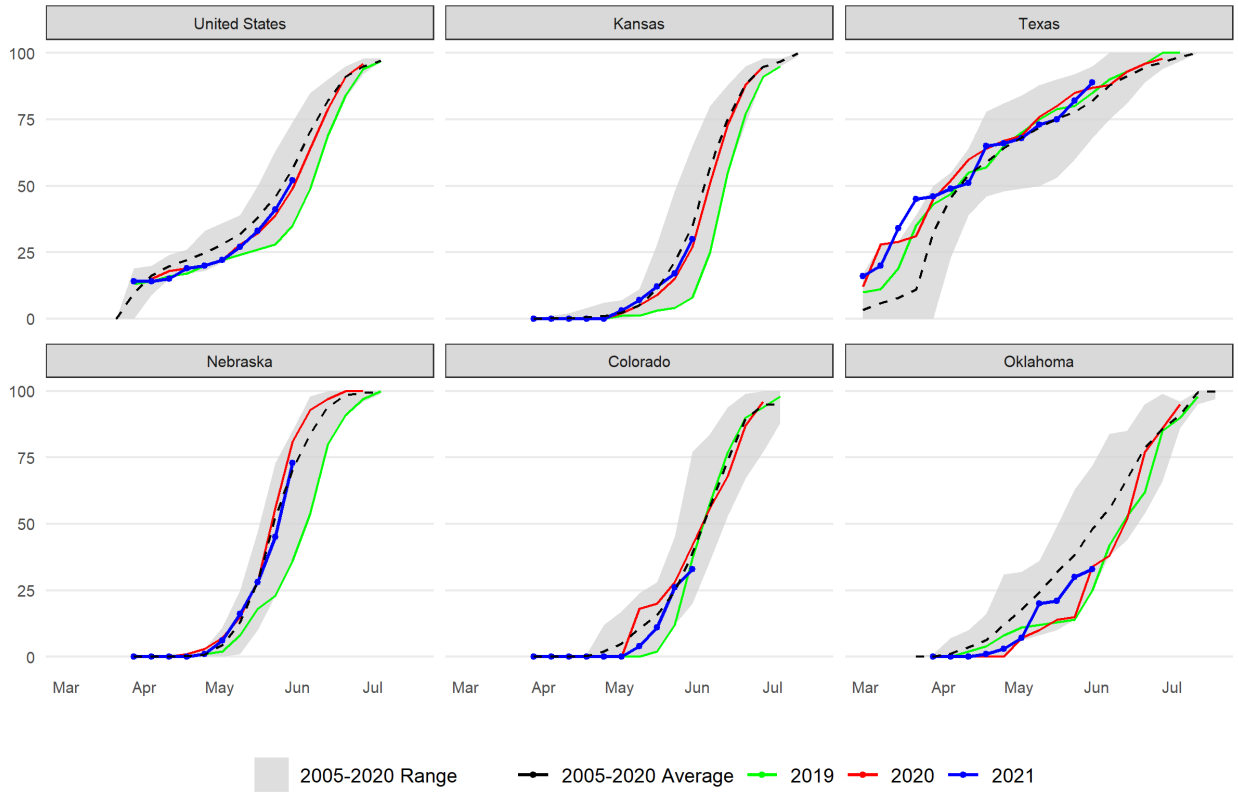
Source: USDA, National Agricultural Statistics Service.

Sorghum production in 2021/22 is projected at 427 million bushels, based on 6.9 million planted forecast in the NASS March *Prospective Plantings* report and a 68.9 bushel per acre yield—based on the 20-year median yield. The current projection represents a 14-percent increase from 2020/21 levels. Through June 6, 41 percent of the national sorghum crop was planted, according to NASS. This planting compares with 39 percent the previous year and 46 percent on average since 2005. At the State-level, sorghum planting progress through early June has been in line with historical trends.

Figure 6

Sorghum planting progress by State, 2005 to 2021

Percent complete



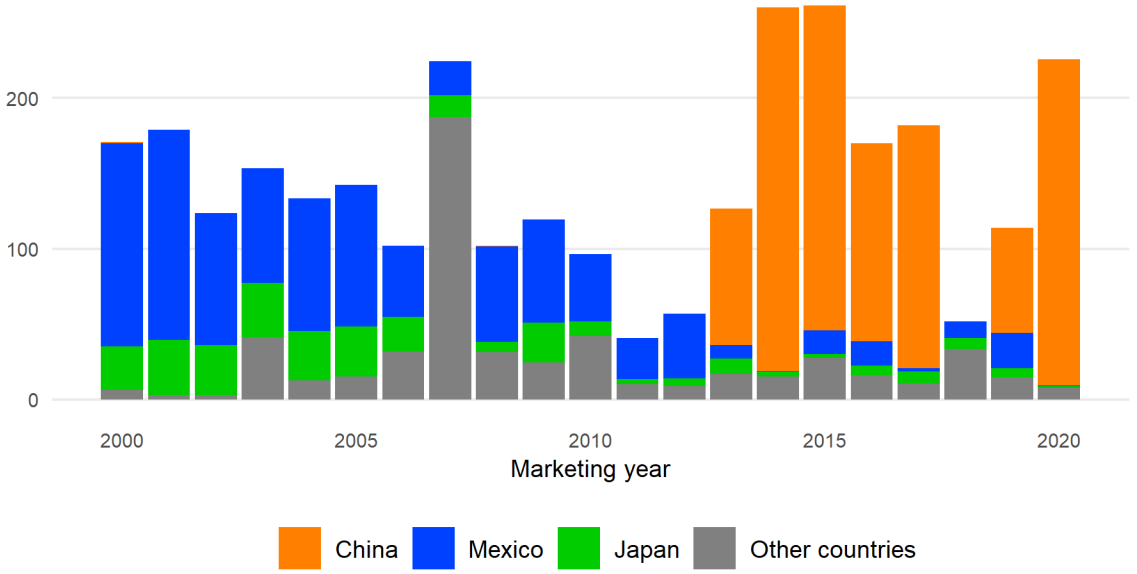
Source: USDA, National Agricultural Statistics Service.

Through April, 2020/21 U.S. sorghum exports have totaled 226 million bushels, nearly double the same period the prior year. China has been, by far, the largest market for exported sorghum. Weekly export inspections data show a reduction in the pace of sorghum exports in May and early June. This reduction is most likely due to constraints in available supplies, however. Ending sorghum stocks are estimated to be nearly 40 percent lower in 2020/21 than the previous year. At 18 million bushels, 2020/21 ending stock estimates would be the lowest since 2012/13. Despite the indicated reduction in pace in export shipments, strong cash prices remain at Gulf export ports. With tight supplies and strong prices, there may be an incentive for early harvested sorghum—especially crop grown near the Texas Gulf coast—to be shipped overseas during August (the final month of 2020/21). Sorghum exports in 2021/22 are projected at 350 million bushels—a 15-percent increase from the current 2020/21 estimate.

Figure 7

U.S. sorghum exports, September through April, marketing years 2000 to 2020

Million bushels



Source: U.S. Department of Commerce, Bureau of the Census.

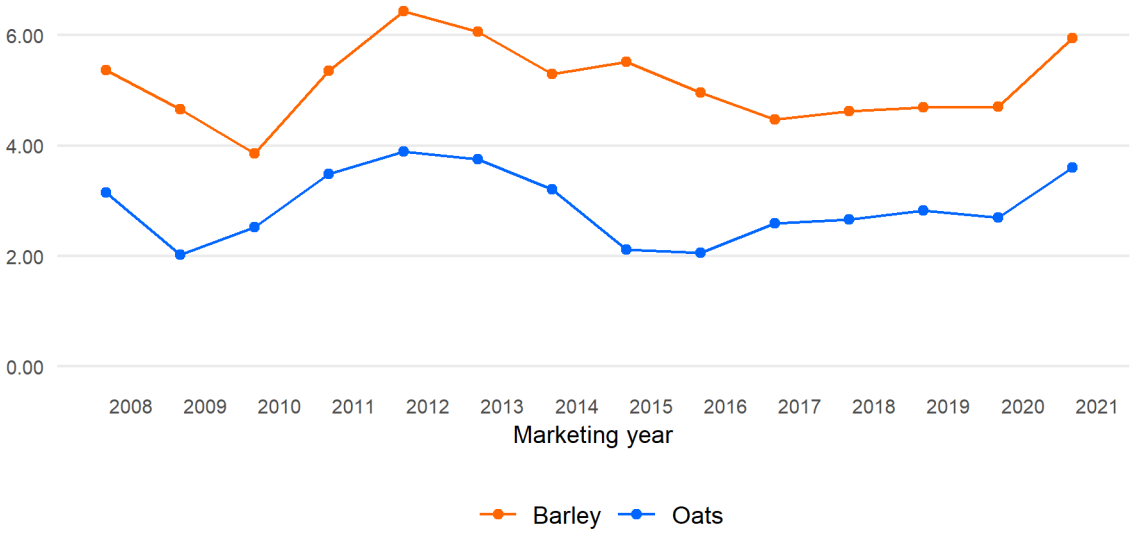
Small Changes in 2020/21 Trade Outlook Result in Lower Projected 2021/22 Ending Stocks for Barley and Oats

Minor changes are made to the U.S. barley and oats balance tables—both with regards to trade. U.S. barley exports for 2020/21 are raised 1 million bushels from the previous month's estimate, to 13 million—based on the pace of exports through April, as reported by the Census. Likewise, oat imports are reduced 1 million tons from the May WASDE, totaling 89 million. In both cases, the change in trade is carried though into lower projected beginning and ending stocks for 2021/22. Projected 2021/22 season-average farm prices for each commodity remain unchanged at $5.95 per bushel for barley and $3.60 per bushel for oats. If realized, the current projections would be the best national price since 2013/14 for both markets.

Figure 8

U.S. season-average farm price for barley and oats, marketing year

U.S. dollars per bushel



Note: 2020=estimate, 2021=projected.
Source: USDA, National Agricultural Statistics Service.

International Outlook

Olga Liefert

Coarse Grain **2021/22** Production Up Slightly; Brazilian Corn Output for **2020/21** Reduced

World coarse grain production is projected to reach 1,496.6 million tons in **2021/22**, a small increase of 0.7 million from last month's forecast. A higher projected barley crop in the ***European Union (EU)*** is partly offset by reductions in ***Turkey*** and ***India***. For the crop year of **2020/21**, the reduction in coarse grain production is larger—down 3.8 million tons, mainly due to the cut in ***Brazil's*** second-corn crop. For the **2019/20** crop year, the revisions of official data for ***Australia*** and ***Pakistan*** boosted coarse grain output by 1.7 million tons.

For more information and a visual display of this month's changes in coarse grain production, see tables A1 and A2 below.

Table A1 – World and U.S. coarse grain production at a glance (2021/22), June 2021

	Region or country	Production	Change from previous month	YoY change[1]	Comments
		Million tons			
Coarse grain production (total)					
↑	**World**	**1,496.6**	**+0.7**	**+62.8**	
↑	**Foreign**	**1,100.4**	**+0.7**	**+41.2**	Changes are made for a number of countries and commodities. See table A2.
	United States	**396.2**	**No change**	**+21.6**	See section on U.S. domestic output.
World production of coarse grains by type of grain					
CORN					
	World	**1,189.9**	**No change**	**+64.8**	
	Foreign	**809.1**	**No change**	**+44.3**	No changes in corn production are projected this month.
	United States	**380.8**	**No change**	**+20.5**	See section on U.S. domestic output.
BARLEY					
↓	**World**	**157.2**	**–0.1**	**–2.6**	
↓	**Foreign**	**153.7**	**–0.1**	**–2.5**	Higher projected production for the EU[2] and Ukraine is more than offset by reductions for Turkey, Syria, and India. See table A2.
	United States	**3.5**	**No change**	**–0.1**	See section on U.S. domestic output.
MILLET					
↑	**World/Foreign**	**31.2**	**+0.8**	**Small change**	Higher projected output for India.

[1]YoY: year-over-year changes. [2] EU: European Union, doesn't include United Kingdom.

Fractional changes are made for oats in Uruguay and rye in Argentina.

For changes and notes by country, see table A2.

Source: USDA, Foreign Agricultural Service, *Production, Supply, and Distribution online database*.

Table A2 – Coarse grain foreign production changes by country at a glance, June 2021						
	Type of crop	Crop year	Production	Change in forecast[1]	YoY[2] change	Comments
			Million tons			
2021/22 Crop year						
EUROPEAN UNION (EU) [3]						
↑	**Barley**	*Jul–Jun*	**56.0**	**+0.7**	**+0.7**	Good moisture and cool weather throughout the region were beneficial to barley production (as well as wheat). Higher yields are projected for France, Germany, Romania, and Hungary—while localized dryness slightly reduced yields in Spain.
UKRAINE						
↑	**Barley**	*Jul–Jun*	**9.1**	**+0.1**	**+1.2**	Favorable conditions in the primary winter barley area of the country benefit the crop.
TURKEY						
↓	**Barley**	*Jul–Jun*	**6.2**	**–0.8**	**–1.9**	Barley harvest is almost complete. Unrelenting dryness and heat in all major barley producing regions of the country reduced crop's yield.
INDIA						
↓	**Barley**	*Apr-Mar*	**1.9**	**–0.1**	**+0.1**	A revision based on the Government third advanced estimate.
↑	**Millet**	*Nov-Oct*	**12.8**	**+0.8**	**+0.3**	A revision based on the Government third advanced estimate.
2020/21 Crop year						
BRAZIL						
↓	**Corn**	*Mar-Feb*	**98.5**	**-3.5**	**-3.5**	Second-crop (safrinha) corn yields are reduced this month. Extensive dryness is hurting yield prospects in Mato Grosso Do Sul, Parana, parts of Mato Grosso, Goias, and other smaller producing States. Corn area is projected higher. See report text.
MEXICO						
↓	**Sorghum**	*Oct-Sep*	**4.0**	**–0.3**	**–0.3**	A reduction of sorghum area and output is based on updated official data from the Mexican Ministry of Agriculture SADER (Secretaría de Agricultura y Desarrollo Rural).
INDIA						
↑	**Corn**	*Nov-Oct*	**30.3**	**+0.1**	**+1.5**	A revision based on the Government estimate.
↑	**Sorghum**	*Nov-Oct*	**4.8**	**+0.1**	Small change	A revision based on the Government estimate.
2019/20 Crop year						
AUSTRALIA						
↑	**Barley**	*Nov-Oct*	**10.1**	**+1.1**	**+1.3**	A revision (higher area and yields) by the Australian Bureau of Statistics.
↑	**Oats**	*Nov-Oct*	**1.1**	**+0.3**	Small change	A revision (higher area) by the Australian Bureau of Statistics.
PAKISTAN						
↑	**Corn**	*Jul–Jun*	**7.2**	**+0.3**	**+0.4**	A revision (higher area and yields) made by the Pakistan Statistical office.

[1] Change from previous month. Smaller changes for coarse grain output are made for several countries.

[2] YoY: year-over-year changes. [3] EU: European Union, doesn't include United Kingdom.

Source: USDA, Foreign Agricultural Service, *Production, Supply, and Distribution online database*.

With Dryness Persisting in Brazil, the 2020/21 Corn Output is Reduced, Despite Higher Area

The largest change among the production and trade projections this month is a reduction of corn production in ***Brazil*** for the 2020/21 crop year. The harvest of the first-crop corn that was planted in the fall of 2020 is complete, while the harvest of the second and third-crop corn for 2020/21 will start in June and continue through August 2021. Precipitation in both April and May of 2021 was much below normal in the ***South-West*** region of Brazil, in the states of Mato Grosso do Sul and Parana. The seasonal precipitation in this subtropical region is normally much higher than observed this year. Parana got just a small share of the "normal" amount this May, while Mato Grosso do Sul stayed mostly dry. These two southern states produce about a third of second-crop corn in the country. Located in the ***Center-West***, the state of Mato-Grosso—the largest second-crop (safrinha) corn producer, with more than a 40 percent share in safrinha output—is expected to be seasonably dry in May. Isolated rains in the southeast of Mato Grosso, that arrived in the last week of May, were an opportune development.

Although late season rains in southern Brazil and parts of Mato Grosso were beneficial, they arrived too late to substantially improve the crop that is mostly beyond the reproductive period, depending on the time of planting. However, this year, planting of the second-crop corn was delayed and additional moisture received in May could benefit the later-planted crop. This month, average corn yield is reduced 4.2 percent to reach 4.96 tons per hectare. The new projected yield is slightly higher than that in the previous drought year of 2017/18.

Forecast harvested corn area in Brazil is raised 0.2 million hectares to 19.9 million this month, as additional corn area was newly accounted for in all states that grow second and third-crop corn, with the exception of the state of Goias. The increase in corn area is not surprising, given the record-high corn prices the farmers observed at the time of planting. With higher area and lower yields, corn production is reduced 3.5 million tons this month to 98.5 million.

U.S. Corn Export Prospects for **2020/21** Boosted Further, while Brazil Outlook Downgraded

Global **coarse grain** trade for the October-September international trade projection year of **2021/22** is up 0.7 million tons to 245.3 million this month. The changes in projections include higher barley exports from the ***European Union*** and ***Ukraine***, following the adjustments of barley production forecasts—with additional exports going mainly to ***China***—and an increase in

barley exports from Uruguay to ***China*** for both the current 2020/21 and 2021/22 projection years. China's barley imports are projected higher for both 2020/21 and 2021/22. For 2021/22, projections for Chinese barley imports are up 0.6 million tons to reach 10.6 million, as the country is expected to continue to import massive amounts of grains.

For the current **2020/21** October-September international trade year that runs through the end of September 2021, coarse grain trade is projected 1.7 million tons higher to reach 231.1 million. Corn exports are up 1.3 million tons (higher exports from the ***United States*** and ***Canada*****,** partly offset by a reduction for ***Brazil***). Barley exports are raised 0.3 million tons (higher exports from ***Canada*** and ***Uruguay*** to ***Chin***a—and a fractional exports increase from the ***United States,*** *mainly to* ***Canada***); there is also a slight increase for sorghum exports by ***Mexico***. Global oats trade is unchanged from last month, although imports to the ***United States*** are projected slightly lower and are almost offset by an increase for ***South Africa***.

For the **2020/21** October-September trade year, ***U.S.*** corn exports are boosted by another 3.0 million tons to 73.0 million tons this month (up 75 million bushels [1.9 million tons] to 2,850 million bushels [72.4 million tons] for the September-August local marketing year). The exports increase is attributable to both stronger-than-anticipated recent shipments, as U.S. corn export prospects continue to benefit from massive ***Chinese*** demand for grains, and a further reduction in the expected size of ***Brazil's*** crop. After 2 record corn crops in a row, Brazil's 2020/21 corn production is expected to decline by 3.5 million tons, as heat and dryness cut Brazil's second-crop corn prospects (see production section). The reduced crop will limit Brazil's exports from July—when Brazil starts exporting new crop—through the end of the trade year, with a projected 2.0-million-ton export decline providing additional support to U.S. exports.

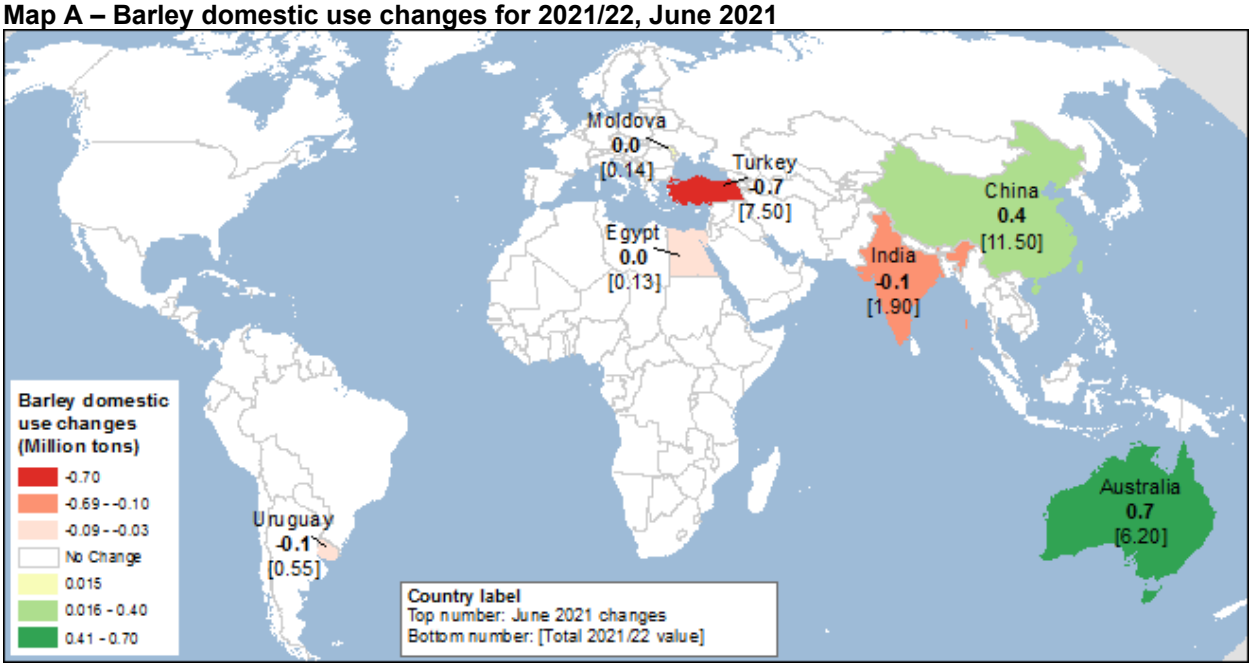
U.S. corn export inspections for May came at 8.2 million, while the U.S. Census Bureau reported that exports for October 2020 to April 2021 reached 42.2 million tons, a record by far. At the same time, large outstanding corn sales—that are on par with the back-loaded year of 2017/18 (a year of another Brazilian crop failure)—support an assumption of high, although declining, monthly corn exports through the end of this trade year.

Coarse Grain Consumption and Stocks Change Fractionally

The forecast for world coarse grain use for 2021/22 is projected slightly higher this month, up 0.9 million tons to 1,490.2 million, with several partly offsetting changes of under 1 million tons across crops and countries. Higher barley consumption in ***Australia*** is a result of an upward official production revision for previous years, and an increase in barley use in ***China***, supported

by higher projected imports. With higher projected output, millet consumption is increased 0.6 million tons in ***India***. Partly offsetting are reductions for barley use in ***Turkey***, down 0.7 million tons, and ***India***, down 0.1 million tons (lower projected output). Several smaller changes are made for a number of countries. For a visual display of the changes in barley feed use, see map A.

Map A – Barley domestic use changes for 2021/22, June 2021

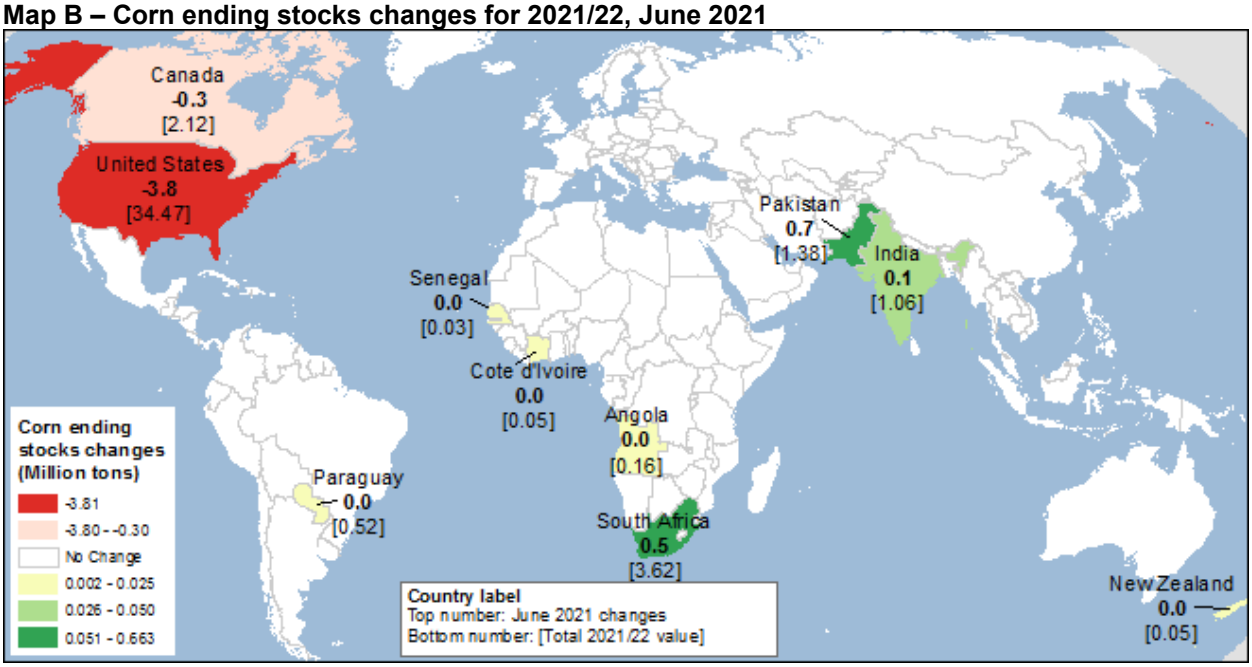


Source: USDA, Foreign Agricultural Service, *Production, Supply and Distribution online database*.

World coarse grain ending stocks projected for 2021/22 are down 2.7 million tons to 318.2 million, led by lower U.S. corn stocks, while foreign stocks are projected 1.2 million tons higher.

World corn ending stocks for 2021/22 are projected down 2.9 million tons this month to 289.4 million, with a fairly tight stocks-to-use ratio, although slightly higher than a year ago. Most of the decline in corn stocks is for the United States, with a much smaller drop for Canada (higher corn exports). Partly offsetting are stocks increases in Pakistan (upward production revision for previous years) and South Africa (downward revision of feed use for 2019/20, based on official stocks statistics), with fractional increases in India and Angola. For the United States, ending stocks for corn are reduced by 3.8 million tons (a rise in 2020/21 exports produced a drop in 2021/22 beginning stocks; in addition, corn use for ethanol is projected higher for 2021/22), and slightly decreased for oats (see the section on domestic grains). For a visual display of the changes in corn ending stocks, see map B.

Map B – Corn ending stocks changes for 2021/22, June 2021



Source: USDA, Foreign Agricultural Service, *Production, Supply and Distribution online database*.

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