



Feed Outlook: March 2022

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Russian Incursion into Ukraine Disrupts Global Grain Markets

Russia's recent military action in Ukraine significantly increased the uncertainty of agricultural supply and demand conditions in the region and globally. The March *World Agricultural Supply and Demand Estimates (WASDE)* report represents an initial assessment of the short-term impacts, as a result of this action.

This month's projections are sharply reduced for Ukrainian grain (mainly wheat and corn) exports. Russian coarse grain exports are unchanged this month. A sharp cut in Ukrainian corn exports is bound to trigger substantial changes in global corn markets. This cut is expected to be partly offset by higher exports by the other major corn suppliers, with the United States projected to have the largest rise in corn exports of 2.0 million tons. However, this increase is not projected to make up for all the lost Black Sea corn exports, and global corn trade is projected lower. This reduction, combined with the fairly low level of global corn stocks in major exporting countries and geopolitical uncertainty, has generated a [grain price spike](#). Substantially higher prices are expected to ration demand for grain and reduce imports in a number of countries.

The outlook for 2021/22 U.S. corn markets in the March *WASDE* report is for higher exports and fuel ethanol use. The projected season-average farm price for 2021/22 is raised \$0.20 per bushel to \$5.65. Projected season-average farm prices for U.S. sorghum, barley, and oats, are also raised from the February report.

Global Trade Outlook

Olga Liefert

Global Grain Markets Are in Flux Because of Geopolitical Disturbance

The USDA released its March *World Agricultural Supply and Demand Estimates (WASDE)* report on March 9, 2022. The most significant development currently affecting global feed grain markets in recent weeks has been Russia's recent military action in Ukraine. The conflict has involved two major grain-producing and exporting countries. The events occurring in Ukraine have disrupted physical, logistical, human, and market assets in the Black Sea region—which is an important supplier of wheat, feed grains, and sunflower products to the world markets.

Russia's recent military action in Ukraine significantly increased the uncertainty of agricultural supply and demand conditions in the region and globally. The March *WASDE* report represents an initial assessment of the short-term impacts as a result of this action. This is also true, but to a lesser extent, of Russia: Though that country is not a battleground, the Russian economy is being jarred by Western economic sanctions. This month—our forecasts of trade, domestic use, and stocks of grain and other agricultural products—are consequently updated, using the best knowledge of the current economic and agricultural conditions in both Ukraine and Russia. Future developments will continue to be incorporated into subsequent projections and reports.

Coarse Grain Exports are Cut for Ukraine, but Unchanged for Russia

An issue of immediate concern is **Ukraine's** ability to export the remaining share of its 2021/22 grain harvest. Under the normal (peaceful) circumstances of last month, Ukraine was projected to export a total of 33.5 million tons of corn by the end of the crop year. Since the beginning of the 2021/22 October-September crop year, Ukraine has already exported more than 17 million tons of corn, leaving about 16 million tons available for export later in the year. This month's projections are sharply reduced, such that Ukrainian exports of corn are projected at 27.5 million tons, a drop of 18 percent. There are at least three reasons why grain exports are projected to drop. The first is that the military action is expected to damage some of the stored grain—for example, there are reports of silos being hit by artillery fire. The second reason is that the Russian advance is harming physical Ukrainian infrastructure and the transportation of stored grain to the export ports on the Black Sea is becoming difficult or impossible. The third and most important reason is that the Black Sea ports have been closed and commercial shipping was all

but suspended almost immediately after the beginning of the invasion. The insurance markets deem the Sea of Azov and the Black Sea (including waters close to Romania and Georgia) to be at high risk with soaring premiums. The ports themselves became the front line, with Russian ground forces and the Russian Navy blockading (and bombarding) them. The vast bulk of Ukraine's grain exports flow out of Black Sea ports.

Lower projected exports mean more corn will remain in Ukraine. Half of this grain is projected not to be exported at any time in the future, as some supplies either are destroyed or become unfit to use. The rest of this corn is projected to be stocked.

Barley exports for Ukraine are projected lower, in line with a reduction in output, down 0.2 million tons to 5.8 million. The reason for such a small cut is that Ukraine has already shipped 95 percent of its projected barley exports since July—the beginning of this crop's local marketing year in Ukraine—leaving only 0.3 million to be shipped later. Exports for the rest of the coarse grain crops—sorghum, oats, and rye—are adjusted slightly down.

Projections for **Russian** corn and barley exports are unchanged this month. Despite tensions and elevated insurance rates for the vessels operating in the Black Sea, Russia (in the short run) can export corn and barley to **Iran** via the Caspian Sea (which is actually a huge lake, not open to the ocean) and to Turkey close by. Small changes in the Russian supply-demand balances for corn and barley reflect final adjustments for the crops' output.

Map A— The geography of port locations—Black, Azov, and Caspian Seas



Source: USDA, Economic Research Service, using data from Tableau.

A development that should support Russian and Ukrainian exports is the depreciation of the countries' currencies. Compared to last year (that is, an average exchange rate for the year), the Russian ruble (by early March) had lost more than a third of its value against the U.S. dollar. For the same period, the Ukrainian currency (hryvnia) lost 9 percent of its value against the dollar. The effect of the depreciation is to increase the price competitiveness of these countries' exports, vis-à-vis the United States and other export competitors.

Global Corn Markets are Adjusting to the Black Sea Export Reduction

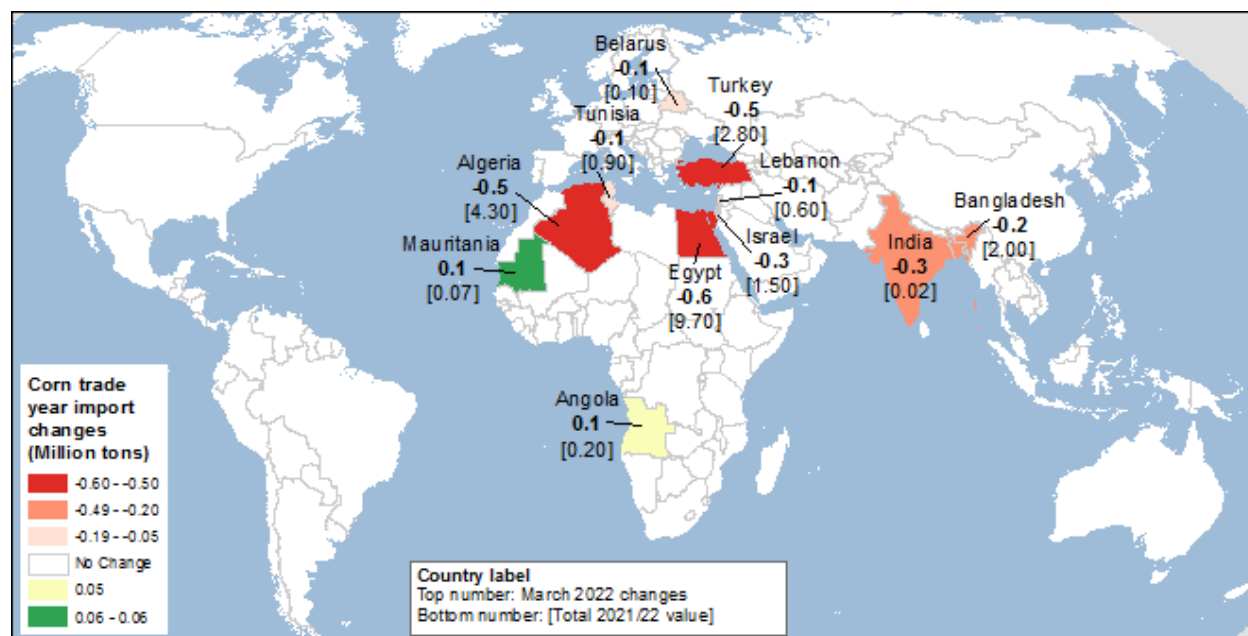
A sharp 6-million-ton cut in **Ukrainian** corn exports is bound to trigger substantial changes in global corn markets. This cut is expected to be partly offset by higher exports of the other major corn suppliers. However, any such increase in rest-of-the-world exports is not projected to make up for all the lost Black Sea exports, such that global corn trade is projected to drop by 2.4 million tons this month. This reduction, combined with the fairly low level of global corn stocks in major exporting countries and geopolitical uncertainty, has generated a grain price spike (see the price discussion and chart 1 below). Substantially higher grain prices are expected to ration demand for grain and reduce imports in a number of countries.

Before the Russian invasion, Ukraine was projected to be the world's third largest corn exporter (October-September trade year basis), following the United States and Argentina (and with Brazil close behind), supplying 17 percent of globally traded corn. The main foreign markets for Ukrainian corn in recent years have been **China**, the **European Union**, **Egypt**, **Iran**, and **Turkey**. However, Ukraine also exports a nontrivial amount of corn to other countries in North Africa, the Middle East, and Asia (see the discussion about key markets in the special article "Ukraine's Geography—Corn Production and Exports" in the February issue of the Feed Grain report).

Although **China** and the **European Union** are the top destinations for Ukrainian corn, their imports are currently not projected to fall. Corn imports are not reduced this month for still another large importer of Ukrainian corn—**Iran**—which can potentially get more corn from its usual suppliers—Brazil and Russia (as mentioned above, Russia can export to Iran via the Caspian Sea, thereby avoiding any trouble in the Black Sea, see map above).

The largest cuts for corn imports are projected for several developing price-sensitive countries that also have imported a big share of their corn from Ukraine—**Egypt**, **Algeria**, and **Turkey**. Smaller reductions are made for **Tunisia** and **Lebanon**. Corn imports are also reduced for **Israel**, which normally imports about half its corn from Ukraine. See map B below for a visual display of corn October-September trade year imports.

Map B – Corn trade year (TY) imports changes for 2021/22, March 2022

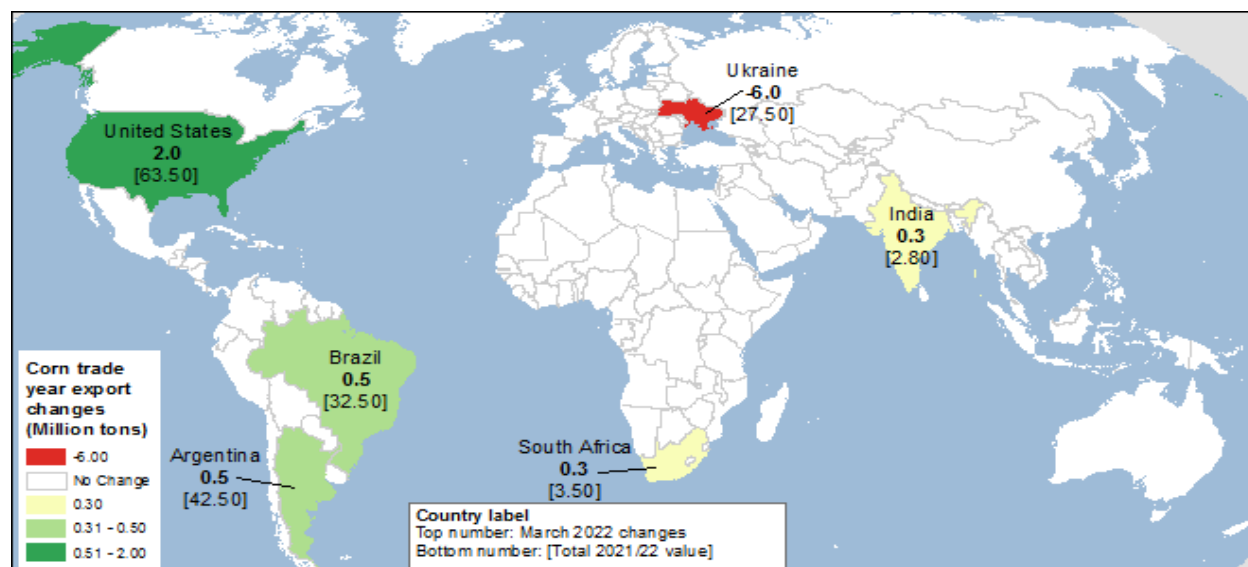


Source: USDA, Foreign Agricultural Service, *Production, Supply, and Distribution* database.

Surging global prices, following a sharp cut in Ukrainian corn exports, generate higher projected coarse grain exports by all the other major corn exporters: The **United States**, **Argentina**, **Brazil**, and **South Africa**. This year, **India** is expected to join this list by exporting more corn, due to higher world prices. Right now, the **United States** is the only large **corn** exporter with sufficient stocks to respond, and its exports are projected 2.0 million tons higher this month, to reach 63.5 million tons (up 75 million bushels to 2,500 million). Argentina and Brazil will largely re-enter export markets in big way later in the year: Argentina in April and Brazil only in July after the beginning of its second crop corn harvest. Corn exports for both countries for 2021/22 are projected 0.5 million higher. South Africa is going to harvest corn in May-June, and despite lower projected output this month, is expected to export 0.3 million tons more. Indian corn output got a large boost this month, and the country is currently projected to export an additional 0.3 million tons.

See a visual display of this month's country changes in corn trade year exports in map C below.

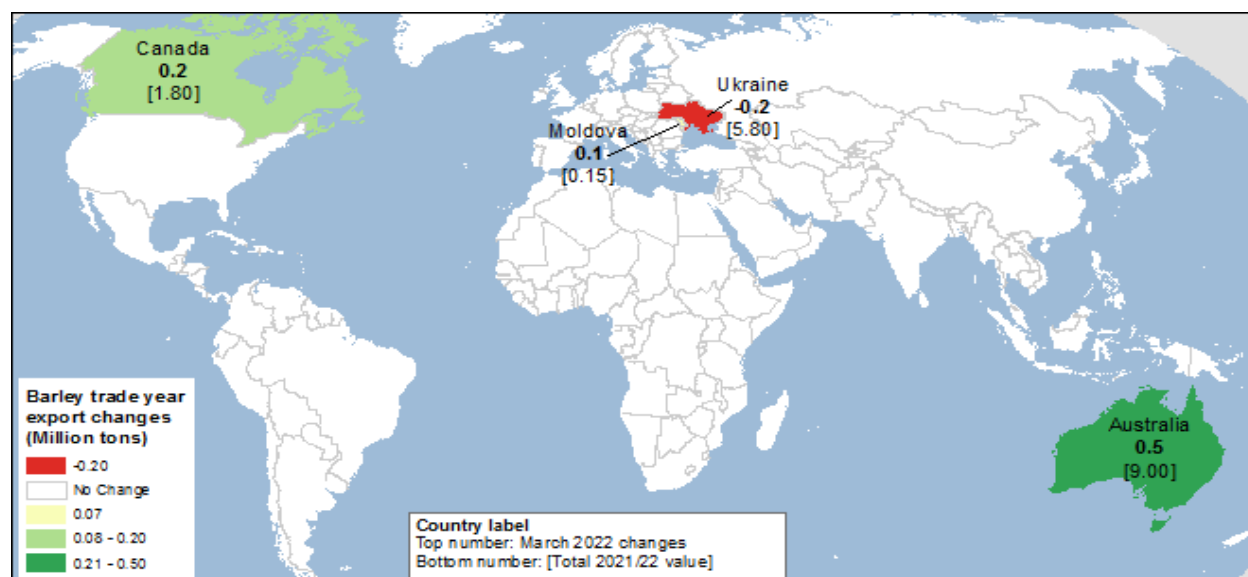
Map C – Corn trade year (TY) exports changes for 2021/22, March 2022



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

Despite a reduction in Ukrainian exports, **barley** trade got a boost this month, with higher projected **Australian** and **Canadian** exports. On the import side, **Saudi Arabia** is expected to import 0.5 million tons more barley, while imports for **Thailand** are reduced by 0.4 million tons based on the data through February. A small increase of 50,000 tons is also projected for **U.S.** barley imports (from Canada).

Map D – Barley trade year (TY) exports changes for 2021/22, March 2022



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

Sorghum trade is also projected higher, up 0.2 million tons, with **China** being the recipient of additional **Australian** sorghum that is going to further enhance its Chinese feed use.

Domestic Outlook

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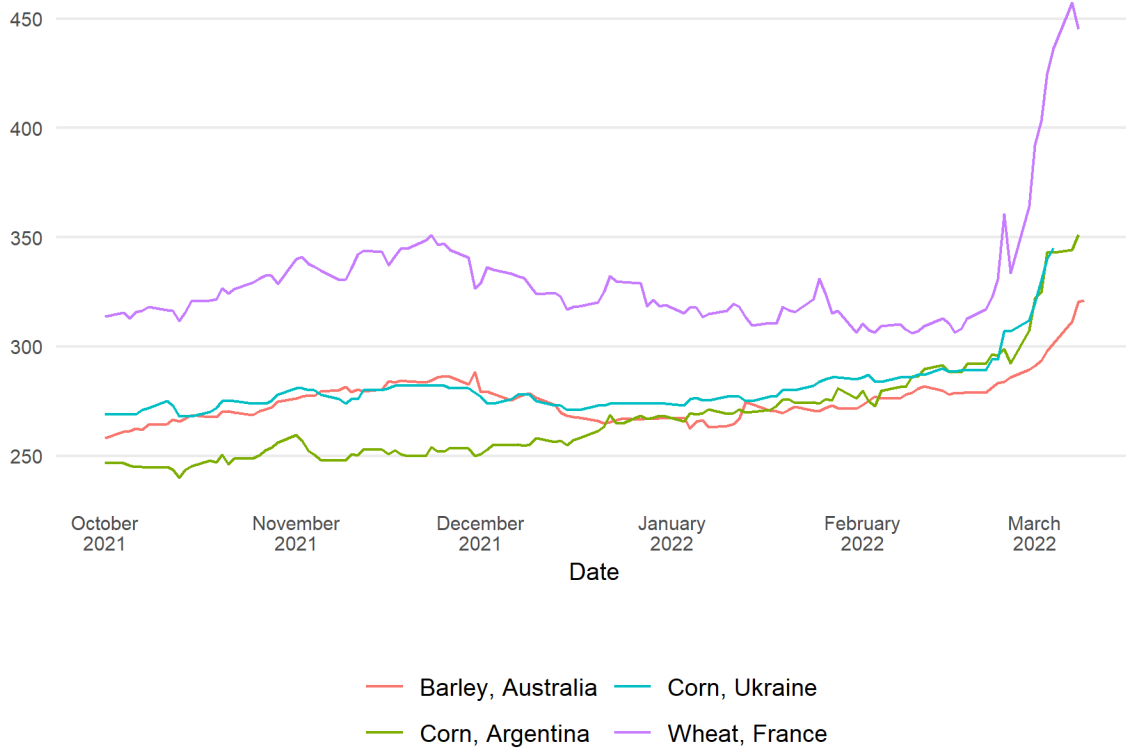
High Global Grain Prices Raise U.S. Domestic Cash Markets

U.S. corn and feed grain markets are highly integrated into global agricultural commodity markets. Since the Russian military invasion of Ukraine, grains and oilseed prices across the globe have increased substantially, in both physical and financial derivatives markets (such as futures contracts). Additionally, markets have been very volatile—moving sharply from day-to-day and even hour-to-hour—as the geopolitical uncertainties compounded relatively tight global grain supplies. Data reported by the International Grains Council show that corn exported from Ukraine increased in price by 12 percent from February 1 to March 1. The price increases are not isolated to Black Sea exports though—as increases over the same period have occurred in corn from Argentina (15 percent), wheat from France (26 percent), and barley from Australia (7 percent)—as indicative of the broad geographic and cross-commodity market impact.

Figure 1

Global grain export prices, daily

U.S. dollars per metric ton



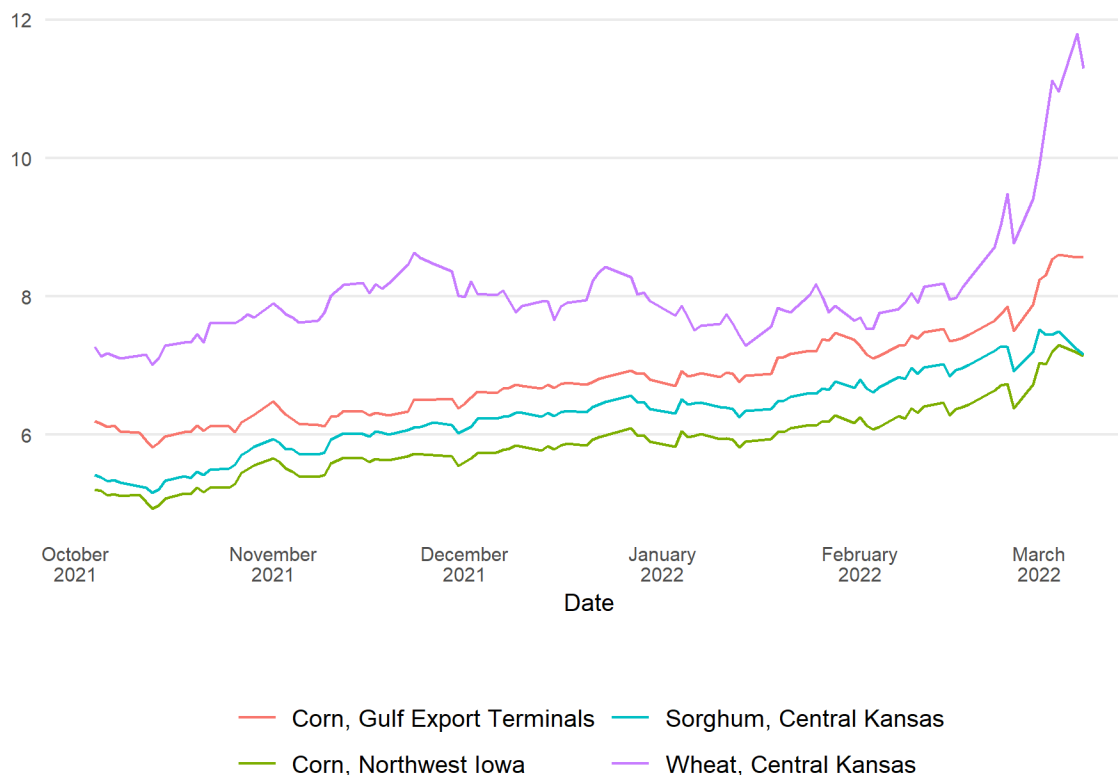
Source: International Grains Council.

Domestic cash markets for feed grains in the United States have also increased substantially since the Russian military actions in Ukraine began. Daily bids for corn at U.S. Gulf Export terminals have increased to more than \$8.00 per bushel in March. Cash prices for corn and other feed grain markets have followed suit in many interior markets, as well. These new global market factors are now expected to be an important factor in the market outlook for 2021/22, as markets respond to changing developments occurring in Ukraine.

Figure 2

U.S. cash grain prices, daily

U.S. dollars per bushel



Source: USDA, Agricultural Marketing Service.

Local cash markets have not moved in lock-step throughout the country. This is reflected in basis levels (the difference between local cash market prices and futures contract prices) reported by the USDA's Agricultural Marketing Service (AMS). Local market fundamentals (such as proximity to sources of demand like crushing mills and livestock operations) and the volatility in the futures markets have resulted in distinct price responses across different regions of the country. Basis at the Gulf export terminals—which are physically and economically closest to global market developments—have strengthened, while many markets within the Corn Belt have seen basis weaken sharply, as local market fundamentals become a more significant factor in price discovery. While prices have increased since Russia's military invaded Ukraine, the responsiveness of prices to those events has varied within the United States.

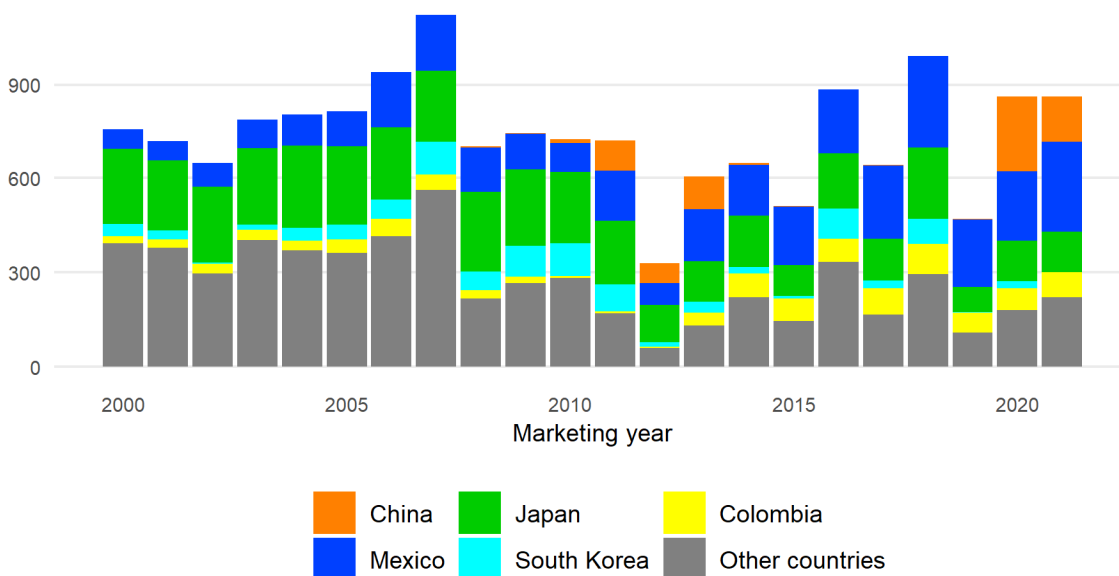
Corn Use Projections are Raised in 2021/22 on Higher Demand for U.S. Supplies

As mentioned in the Global Trade Outlook section of this report, U.S. corn exports are projected higher than in the February *WASDE* report. For the domestic market year balance sheet, the increase is 75 million bushels higher, totaling 2,500 million bushels for 2021/22 (ending in August 2022). Through January, the U.S. Department of Commerce’s Census Bureau reports 863 million bushels of corn were shipped to foreign markets, compared with 861 million bushels during the same period in 2020/21. The peak of the U.S. export season typically occurs March and June, however. Export Sales (reported by the USDA’s Foreign Agricultural Service) report that remaining outstanding sales to be shipped to foreign markets are lower than they were at this point of the year in 2020/21.

Figure 3

U.S. corn exports, September through January marketing years 2000 to 2021

Million bushels



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

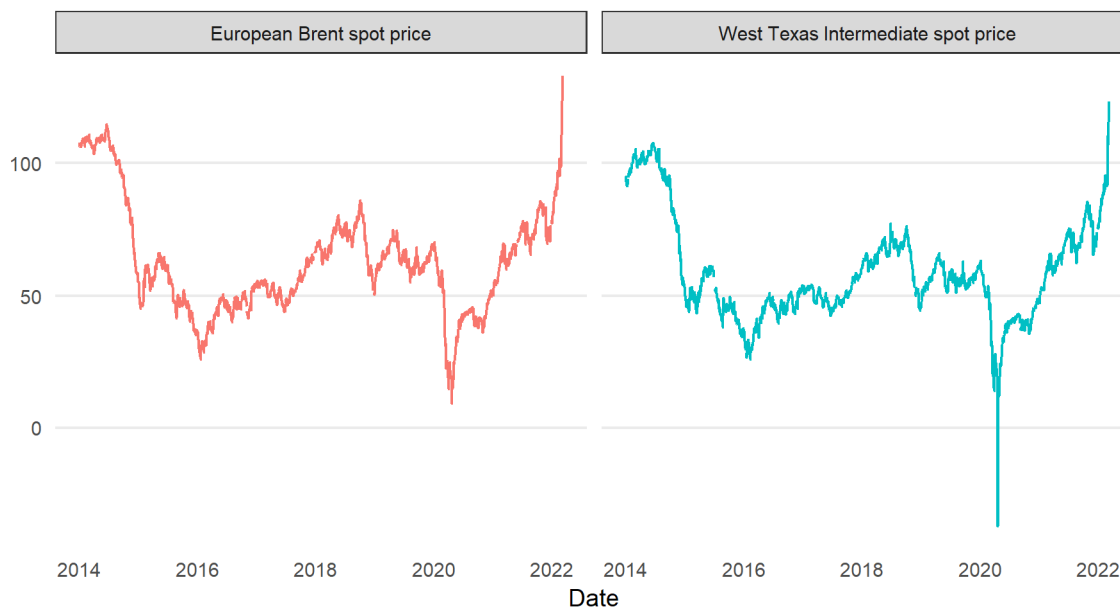
Corn used for fuel ethanol is also raised in the March *WASDE* report to 3,350 million bushels—up 25 million bushels from the February *WASDE* report’s projection. Ethanol production increased significantly since the beginning of 2021/22, aided primarily by the availability of supplies from the 2021 crop and steadily recovering gasoline demand within the United States. The combination of lower corn prices and increasing fuel prices resulted in strong operating margins for dry mill ethanol plants beginning in the fall. Gasoline and ethanol stocks increased

substantially beginning in January, however—coinciding with higher rates of COVID-19 infection during the rise of the Omicron variant. While such a jump in inventories could result in weaker margins, global oil prices have increased considerably since February 24, 2022. As a result, the underlying demand for fuel and energy should help maintain attractive operating margins beyond any relatively short-term disruption in gasoline demand, due to the most recent wave of COVID-19 cases in the United States.

Figure 4

Spot prices for crude oil, daily

U.S. dollars per barrel



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

Food, seed, and industrial use for 2020/21 is estimated at 6,470 million bushels, including ethanol fuel use at 5,032 million bushels. Both of the estimates are 4-million-bushels higher than the February *WASDE* report, due to updated 2021 annual data provided in the National Agricultural Statistics Service’s (NASS) *Grain Crushings and Co-Products Production Annual Summary* released on March 1, 2022. As a result, estimated feed and residual use is lowered 4-million-bushels to 5,598 million bushels, as September 1, 2021 ending stocks remain unchanged.

Projected 2021/22 Corn Ending Stocks Lower, Prices Raised

Corn ending stocks for 2021/22 are projected at 1,440 million bushels. A 100-million-bushel reduction from the February *WASDE* report, due to raised use projections and no changes to projected supplies. The season-average farm price for corn in 2021/22 is projected at \$5.65 per

bushel—up \$0.20 from the February *WASDE* report. The national average priced received by producers for January 2022 was \$5.47 per bushel, according to the NASS’s latest *Agricultural Prices* report, released on February 28, 2022. Historically, most corn is marketed between September and January. Based on historical marketing patterns and the potential for substantially higher cash price levels for producers, the outlook is for relatively higher farm-gate prices and values for corn, compared with the February *WASDE* report projections.

Sorghum Projected Supply and Use for 2021/22 Unchanged

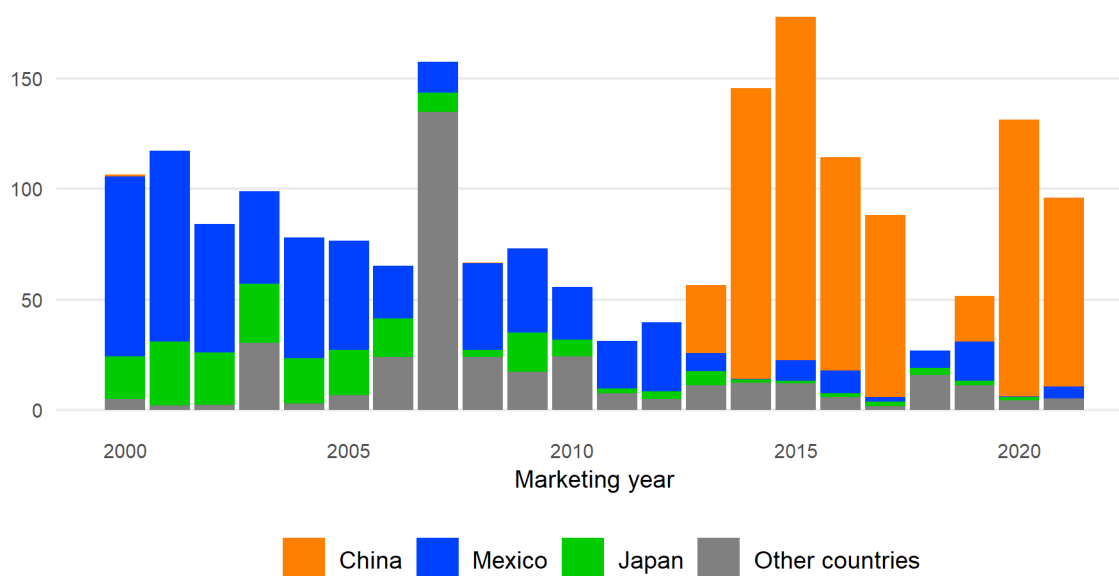
The March *WASDE* report projects unchanged sorghum supply and use for 2021/22, with sorghum production at 448 million bushels. Total use is projected at 435 million bushels, with sorghum exports unchanged at 310 million bushels.

Through the first 5 months of 2021/22, sorghum exports have totaled 96 million bushels, compared to 164 million in 2020/21. U.S. exports in 2021/22 have been mainly destined for China, followed by Mexico. While still on track to meet projections, year-to-date exports are not at the same level as the previous year, due to differences in seasonal shipping patterns as a result of higher production and exports from foreign competitors, primarily from Argentina and Australia.

Figure 5

U.S. sorghum exports, September through January marketing years 2000 to 2021

Million bushels



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

Estimated 2020/21 sorghum use for food, seed, and industrial use is reduced 3 million bushels to 6.8 million. The update is based on available data in NASS's *Grain Crushings and Co-Products Production Annual Summary*, published on March 1, 2022.

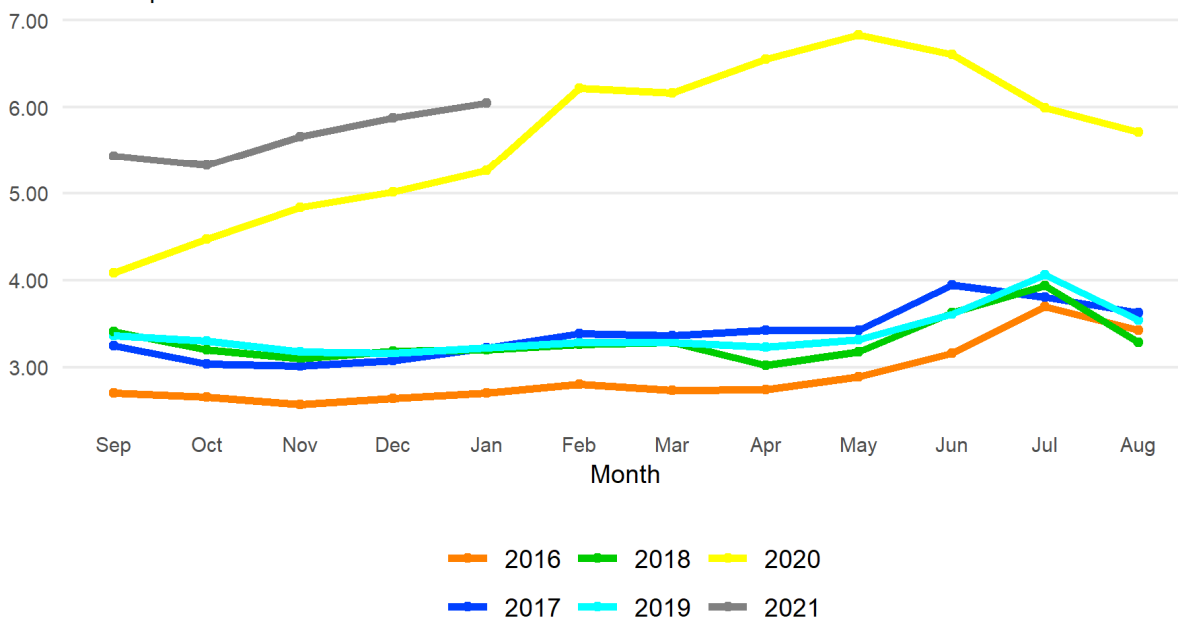
Estimated feed and residual use is raised 3 million, to 92 million bushels. Feed and residual use for 2021/22 remains unchanged at a projected 115 million bushels.

The season-average farm price received by farmers for sorghum in 2021/22 is projected at \$5.80 per bushel, up \$0.35 from the February report. Monthly farm prices have sustained increases since the beginning of the current marketing year, with a national average of \$6.05 per bushel in January 2022.

Figure 6

Price received for sorghum, monthly

U.S. dollars per bushel



Source: USDA, National Agricultural Statistics Service.

Barley Balance Sheet Unchanged, Prices Raised for 2021/22

There are no changes to the 2021/22 U.S. barley supply and use projections in the March *WASDE* report, compared with the February report. U.S. barley production remains unchanged for 2021/22, estimated at 118 million bushels—a substantially lower amount than last year. Total barley supplies of 198 million bushels are the lowest in at least 40 years, due to drought

conditions in key-growing regions in the Northern Plains during the summer of 2021. Barley use is unchanged from the February *WASDE* report at 130 million bushels for 2021/22.

The season-average farm price of barley is projected to be \$5.25 per bushel in 2021/22—up from the February *WASDE* report's projection of \$5.15 and the highest since 2015/16. Tight barley supplies and strong demand for feed grains, compounded by recent global geopolitical tensions, have been supportive for barley cash prices since the beginning of the new marketing year in June 2021.

Oat Prices Also Raised for 2021/22

U.S. oat supply and use projections in 2021/22 are unchanged in the March *WASDE* report. U.S. oat ending stocks are projected at 127 million bushels, down from the 2020/21 estimate of 150 million bushels. The projected season-average price for 2021/22 is raised \$0.20 per bushel to \$4.20.

Grain Consuming Animal Units Projected Lower for 2021/22

Grain consuming animal units (GCAUs) are projected at 100.5 million units in 2021/22, down from the 2020/21 estimate of 101.2 million units. This decrease would be lowest level recorded for implied demand for energy feed demand from livestock since 2018/19—which recorded 100.7 million units. Prior to 2018/19, the highest GCAU level was 98.8 million units. Beginning in 2018/19, a considerable increase in units derived from the hog and cattle-on-feed sectors resulted in a jump in GCAUs that has sustained, despite the year-over-year declines.

Total feed grain and wheat feed and residual supplies are projected at 149.5 million metric tons—down slightly from 2020/21 estimates of 149.6 million. Higher annual supplies of corn, sorghum, and barley—measured on a September through August basis—are offset by less wheat and oats.

International Production Outlook

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World Coarse Grain Production Projected Higher

Global 2021/22 coarse grain production is projected higher this month, up 1.5 million tons to a total of 1,498.9 million tons. Improved prospects for corn production in **India** and **Russia**—as well as for barley and sorghum in **Australia**—more than offset lower corn output for **Argentina**, **South Africa**, and small reductions in corn and barley for the **European Union** and **Ukraine**. Coarse grain production in the **United States** is unchanged this month. See table A1 below.

Table A1 - World and U.S. coarse grain production at a glance (2021/22), March 2022					
	Region or country	Production	Change from previous month ¹	YoY Change ²	Comments
Million tons					
Coarse grain production (total)					
↑	World	1,498.9	+1.5	+64.9	
↑	Foreign	1,100.2	+1.5	+39.1	Changes are made for a number of countries and commodities. See table A2.
	United States	398.7	No change	+25.8	See section on U.S. domestic output.
World production of coarse grains by type of grain					
CORN					
↑	World	1,206.1	+0.8	+82.9	
↑	Foreign	822.2	+0.8	+57.4	Higher corn production prospects for India and Russia are partly offset by reductions for Argentina, South Africa and several other countries. See Table A2.
	United States	383.9	No change	25.5	See section on U.S. domestic output.
BARLEY					
↑	World	146.1	+0.4	-13.9	
↑	Foreign	143.6	+0.4	-12.7	Higher production prospects in Australia are partly offset by a reduction for Ukraine. See table A2.
	United States	2.6	No change	-1.2	See section on U.S. domestic output.
SORGHUM					
↑	World	65.6	+0.3	+3.6	
↑	Foreign	54.2	+0.3	+1.7	Higher output projected for Australia. See table A2.
	United States	11.4	No change	+1.9	See section on U.S. domestic output.
OATS					
↑	World	22.7	Fractional	-2.8	
↑	Foreign	22.1	Fractional	-2.4	A small increase in Ukraine is partly offset by the changes for Russia.
	United States	0.6	No change	-0.4	See section on U.S. domestic output.
¹ Change from previous month. ² YoY: year-over-year changes. ³ Totals may not add due to rounding.					
For changes and notes by country, see table A2.					
Source: USDA, Foreign Agricultural Service, <i>Production, Supply and Distribution</i> database.					

The largest production change this month is an increase in the corn crop projection for **India** of 2.5 million tons, to a total 32.5 million tons. According to the 2nd advanced estimate released by the Indian Ministry of Agriculture, record-high yields and a rise in harvested area pushed corn production prospects up to record-high.

Australian barley saw a 0.7 million-ton increase in production to reach 13.7 million tons, due to higher projected area and record yields, in line with the most recent report by the Bureau of Agricultural and Resource Economics and Sciences (ABARES) of the Australian Government. Sorghum output prospects are favorable, with an increase of 0.3 million tons to a total 2.3 million tons, which signals near-record yields not seen since 2007.

South Africa's coarse grain production is revised lower this month, in line with the first official production estimate—with small changes in corn, barley and sorghum output. The country had 2 consecutive “*La Niña*” years—a weather pattern that causes dry weather in some areas and heavy rainfall in others. In South Africa, this weather anomaly typically takes a toll on corn yields. Projected corn output in South Africa is reduced by 0.7 million tons this month to 16.3 million tons, while barley and sorghum were lowered fractionally.

Argentine corn production is projected 1.0 million tons lower, to a total of 53 million tons this month. Continued hot temperatures and limited soil moisture reserves have had a significant impact on corn crop, which is currently at the flowering/tasseling stage of growth. Estimated average corn yields are reduced and are projected the lowest in 4 years. Rains have brought some relief to northeastern areas and could partly alleviate poor growing conditions. Corn area is projected higher this month, partly offsetting yield reduction.

Brazil's corn production for the marketing year 2021/22 is unchanged this month. Brazil's first crop corn—which is about a quarter of the year's total corn output—was planted in September/October. However, hot and dry weather conditions during the critical pollination/filling stages significantly reduced yield prospects. At this time, about a quarter of the first crop corn has been harvested, with some areas harvested for silage. The planting of Brazil's second crop corn (*safrinha*) progresses at a record pace and is virtually over, particularly in areas such as Mato-Grosso where planting was way ahead of the previous year. In the rest of the country, second crop corn has been planted ahead of the pace of the last 5 years and considerably ahead of last year.

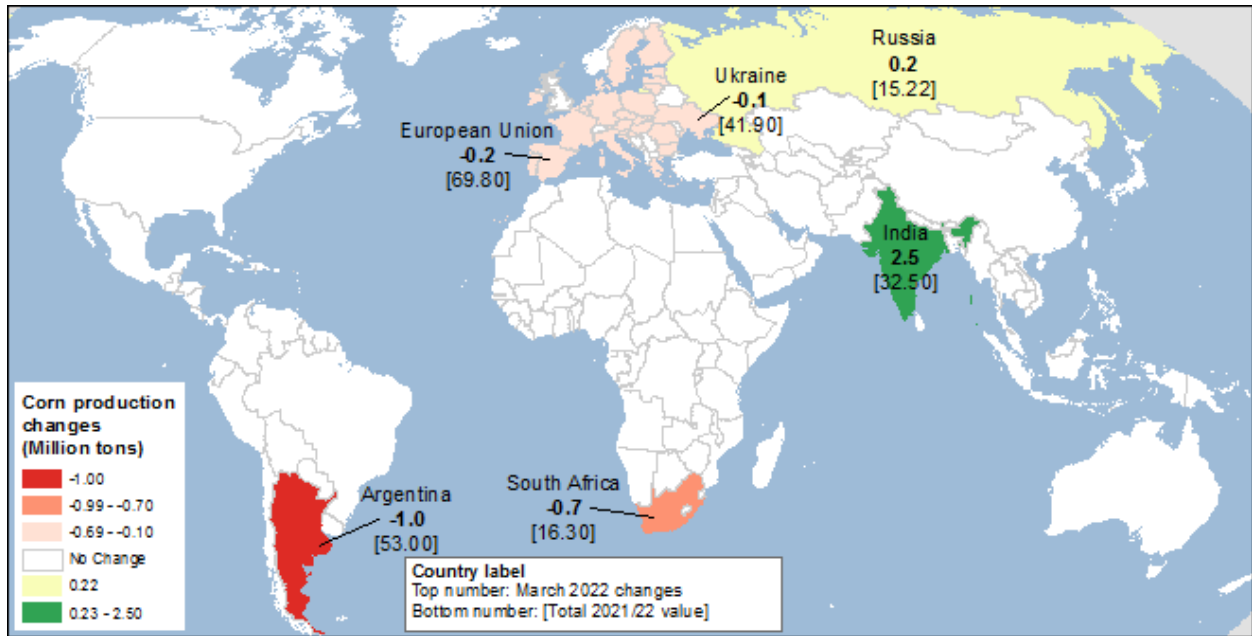
See table A2 below for the detailed list and specific causes of the 2021/22 revisions made this month in coarse grain production, by country and type of grain.

Table A2 - Coarse grain foreign production for 2021/22 at a glance, March 2022

Type of crop	Crop year	Production	Change in forecast ¹	YoY ² change	Comments	
<i>Million tons</i>						
Coarse grain production by country and by type of grain						
INDIA						
↑	Corn	Nov-Oct	32.5	+2.5	+0.9	A change aligned with the second advanced estimate of the Indian Ministry of Agriculture. With higher projected corn area and record-high yield, the projection for corn output is up 8 percent this month.
RUSSIA						
↑	Corn	Oct-Sep	15.2	0.2	+1.4	Based on the final data reported by the Federal Service for State Statistics (Rosstat).
ARGENTINA						
↓	Corn	Mar-Feb	53.0	-1.0	+1.5	Persisting dry conditions reduce yields prospects, while higher projected area partly offsets a reduction in corn output (see report text).
SOUTH AFRICA						
↓	Corn	May-Apr	16.3	-0.7	-0.7	With the first production estimate released, corn yields are revised down on par with the previous year; also a "La Niña" phenomenon year.
EUROPEAN UNION						
↓	Corn	Oct-Sep	69.8	-0.2	+2.7	Revised lower area and reduced production in France and Hungary are partly offset by an increase in Poland .
UKRAINE						
↓	Corn	Oct-Sep	41.9	-0.1	+11.6	Based on numbers released by the Ukrainian State Statistical Committee.
↓	Barley	Jul-Jun	9.9	-0.3	+2.0	Based on numbers released by the Ukrainian State Statistical Committee.
AUSTRALIA						
↑	Barley	Nov-Oct	13.7	+0.7	+0.6	Projections for 2021/22 are revised higher based on reported increased barley area and record-high yields.
↑	Sorghum	Mar-Feb	2.3	+0.3	+0.8	Projections for 2021/22 are revised higher, based on increased sorghum area and second-high yields.
¹ Change from previous month. Smaller changes are made for several countries, see map E for changes in corn .						
² YoY: year-over-year changes.						
Source: USDA, Foreign Agricultural Service, <i>Production, Supply and Distribution</i> database.						

See a visual display of this month's country changes in corn production in map E below.

Map E – Corn production changes for 2021/22, March 2022



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

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