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Feed Outlook: February 2023

In this report:

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<u>Domestic Outlook</u> International Outlook

U.S. Feed Grain Use Projections Are Revised in February, Prices Hold Strong for 2022/23

This month, there are no changes to the 2022/23 domestic supply of corn, sorghum, or oats—while barley imports are up slightly from January. U.S. corn consumed for food, seed, and industrial use (FSI) is forecast down 25 million bushels (to 6,690 million bushels) in the February *World Agricultural Supply and Demand Estimates* (*WASDE*) report, on lower corn ethanol demand in the first 5 months of the marketing year (beginning September 1). Conversely, sorghum FSI increased 10 million bushels from last month, on a strong pace of consumption for fuel alcohol production. Sorghum exports are revised down again in February (to 90 million bushels) on limited supplies and continued weakness in commercial export activity.

The 2022/23 projected season-average farm price for corn is \$6.70 per bushel (the highest since 2012/13) and \$6.90 per bushel for sorghum (the highest since at least 1950/51). The projected season-average farm prices for all barley (of \$7.30 per bushel) and for oats (of \$4.85 per bushel) are the highest value for each commodity since at least 1975/76, if realized.

A cut in projected corn production in Argentina drives global coarse grain production lower and sharply lowers the country's corn exports. On the other hand, for trade year 2022/23 (October 2022 through September 2023), Brazilian corn exports are projected 2.5 million tons higher this month to reach 51 million (catching up with the U.S. corn export projection, with the 2 countries' share in global corn trade forecast at 28 percent). Strong demand from the European Union boosts corn trade. For Ukraine, the major corn exporter to the European Union, exports are projected higher. U.S. sorghum exports are projected lower this month.

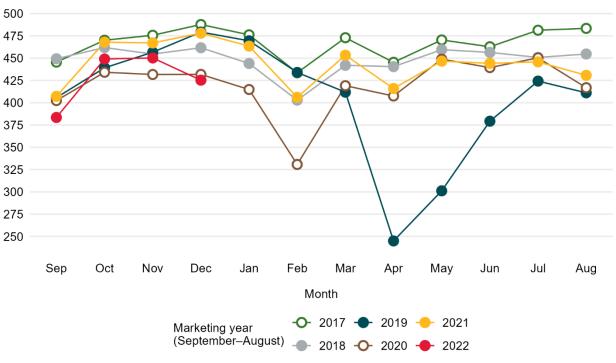
Domestic Outlook

Claire Hutchins Angelica Williams

Domestic Corn Use Is Expected To Fall in 2022/23

While total corn supplies remain unchanged from last month, total domestic use in 2022/23 is forecast at 11,965 million bushels—down from January—on a 25-million-bushel cut to FSI, led by weaker ethanol demand. According to the USDA, National Agricultural Statistics Service (NASS), total U.S. corn consumed for fuel alcohol production in the first 4 months of 2022/23 (September through December)—of 1,708 million bushels—was down 9 percent from the same period in 2021/22. Lower gasoline demand and periods of tight ethanol processing margins have pressured ethanol production thus far in the marketing year. The February *WASDE* report projects corn used in the production of ethanol (and ethanol by-products) in 2022/23 at 5,250 million bushels, down 1 percent from last year but slightly ahead of the previous 5-year average.

Figure 1
U.S. corn consumed for fuel alcohol production, by month and marketing year, 2017–2022
Million bushels



Source: USDA Economic Research Service using data from USDA, National Agricultural Statistics Service.

The 2022/23 corn export figure is unchanged this month, while the ending stocks forecast increased by 25 million bushels (to 1,267 million bushels). Ethanol exports continue to lag last year's pace, with U.S. Bureau of the Census data showing total marketing year exports down 32 percent through December 2022. The forecasted corn season-average farm price for 2022/23—of \$6.70 per bushel—is unchanged from last month but still the highest projected since 2012/13.

Sorghum Exports Slip Again in February on Lackluster Commercial Activity, but Ethanol Demand Continues To Climb

Projected sorghum supplies for 2022/23 (of 235 million bushels) are unchanged from last month but represent the lowest volume available since 1951/52, on drought-stricken yields and low harvested area. The USDA, Foreign Agricultural Service (FAS) reported total sorghum export commitments (accumulated exports plus outstanding sales) at 784,000 metric tons as of February 2, 2023 (week 23 of the marketing year)—85 percent below the previous 5-year average and the second-lowest volume over the same period since 2011/12.

Figure 2
Pace of total U.S. sorghum export commitments to all destinations, by week and marketing year, 2017–2022

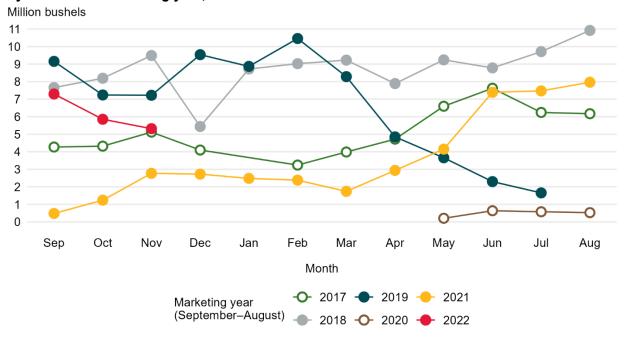


Source: USDA, Economic Research Service using data from USDA, Foreign Agricultural Service.

Extremely short exportable supplies, combined with virtually no commercial activity to China (the top market for U.S. sorghum) over the first 5 months of marketing year 2022/23, led to a 10-percent reduction (of 10 million bushels) in the total 2022/23 sorghum export forecast in February (see the International section for more information). If realized, the new export projection for the current marketing year—of 90 million bushels—would be the second-lowest volume since 2012/13.

Fewer exports thus far in the marketing year mean more sorghum is available for domestic use in 2022/23. In February, the sorghum FSI forecast increased by 10 million bushels (to 50 million bushels), on continued strength in the crush pace reported by the U.S. Department of Energy, Energy Information Administration (EIA). In the first quarter of the marketing year, EIA reported that U.S. operators consumed a total of 18.5 million bushels of sorghum for fuel alcohol production—more than 4 times greater than the first quarter of 2021/22 and 4 percent more than the first quarter average (of reported data) between 2017/18 and 2021/22.

Figure 3
U.S. sorghum consumed for fuel alcohol production, by month and marketing year, 2017–2022

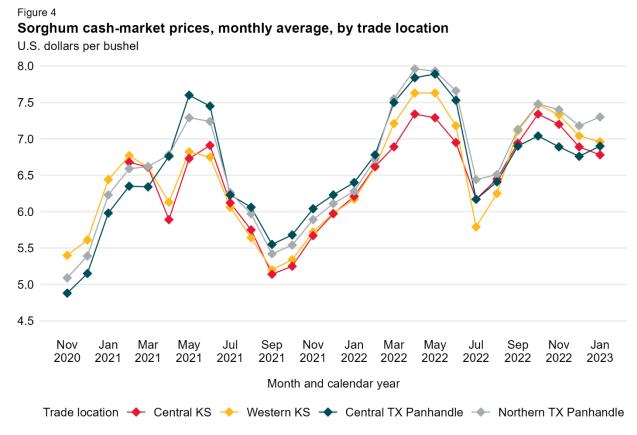


Note: Data were withheld between September 2020 and April 2021 to avoid disclosing information for individual operators. Data were not reported in January 2018.

Source: USDA, Économic Research Service using data from USDA, National Agricultural Statistics Service and the U.S. Department of Energy, Energy Information Administration.

Strong Domestic Cash Markets Translate Into the Highest Projected Season-Average Farm Price for Sorghum in Decades

The forecasted U.S. season-average farm price for sorghum is raised \$0.05 this month to \$6.90 per bushel in 2022/23, the highest price in more than 70 years—surpassing the previous high of \$6.33 per bushel in 2012/13. Limited supplies and strong domestic demand for feed grains have boosted sorghum cash prices over the first 4 months of the marketing year. According to the USDA, Agricultural Marketing Service (AMS), spot prices (cash price for nearby delivery) received across key trade locations in Kansas and Texas (the top sorghum-producing States) were significantly higher between September 2022 and January 2023 compared to the same period in 2021/22. Between January 2022 and January 2023, the sorghum price increased by 9 percent in central Kansas (to \$6.78 per bushel), by 13 percent in western Kansas (to \$6.96 per bushel), by 8 percent in the central Texas Panhandle (to \$6.90 per bushel), and by 16 percent in the northern Texas Panhandle (to \$7.30 per bushel).



Source: USDA, Economic Research Service calculations using data from USDA, Agricultural Marketing Service.

Barley and Oat Prices Are Forecast To Hold Strong in 2022/23

The barley supply forecast for the current marketing year increased by 1 million bushels this month (to 232 million bushels), on a slight upward revision to imports. The oat supply forecast is unchanged from January. Barley and oat demand forecasts are unchanged in the February *WASDE* report. For all barley, the 2022/23 projected season-average farm price (of \$7.30 per bushel) represents the highest price in almost 50 years—based on tight supplies, strong domestic demand, and higher overall prices in the global grains complex. Though unchanged from last month, the \$7.30 per bushel forecast is underpinned by continued strength in the monthly prices received for both malting and feed barley through December 2022 (reported by NASS).

U.S. dollars per bushel

7.5

7.0

6.5

6.0

5.5

5.0

4.5

4.0

3.5

3.0

2.5

2.0

1.5

1995

2000

Marketing year (June-May)

Commodity - Barley - Oats

2005

2010

2020

2015

Figure 5
Price received for all barley and oats, by marketing year, 1975–2022

Note: Prices in 2022 are forecasts, prices in preceding years are estimates. Source: USDA, Economic Research Service using data from USDA, World Agricultural Outlook Board.

1990

1.0

1975

1980

1985

The forecasted season-average oat price for 2022/23 is reduced by \$0.15 to \$4.85 per bushel in February (on easing monthly prices received) but still represents the highest value since at least 1975/76, if realized.

U.S. dollars per bushel All barley Oats 8.0 8.0 7.5 7.5 7.0 7.0 6.5 6.5 6.0 6.0 5.5 5.5 5.0 5.0 4.5 4.5 4.0 4.0 3.5 3.5 3.0 3.0 2.5 2.5 2.0 2.0 Jun Aug Oct Dec Feb Apr Jun Oct Dec Feb Apr Aug Month 2017 -**1** 2019 Marketing year (June-May) ◆ 2020 -2022

Figure 6
Price received for all barley and oats, by month and marketing year, 2017–2022

Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service.

Lower Cattle Inventories Drive Grain Consuming Animal Units Lower for 2022/23

On January 31, 2023, NASS released its annual Cattle report, which provides inventory numbers for cattle in the United States (as of January 1). All cattle and calves in the United States totaled 89.3 million head—a 3-percent decline from 2022 cattle inventories of 92.1 million head and the lowest number since 2015. All-cattle-on-feed inventories for all feedlots for January 1, 2023 were down 4 percent to 14.2 million head, while cattle on feed in feedlots (with 1,000 head or more) are down 3 percent from a year ago. Following extensive herd liquidation due to drought conditions in major cattle regions, NASS reported that the number of beef cows (down 4 percent), total calves (down 3 percent), and replacement beef heifers (down 6 percent) are all lower in 2023. The 2022 calf crop, which has important implications for the future of the feeder pipeline, was down 2 percent from the previous year to 34.5 million head.

Cattle inventories in the dairy sector were up slightly to 9.4 million for milk cows and down 2 percent to 4.3 million head for heifers intended to replace milk cows.

Million head Total cattle and calves Cattle on feed 14.5 96 14.0 93 13.5 90 13.0 Beef cows Replacement beef heifers 33 6.0 32 31 5.5 30 29 Replacement dairy heifers Dairy cows 4.8 9.4 4.6 9.3 4.4 9.2 9.1 4.2 9.0 4.0 2003 2003 2007 2007 2011 2019 2023 2011 2015 2019 2023 2015 Calendar year

Figure 7
U.S. cattle inventories as of January 1, by cattle type

Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service.

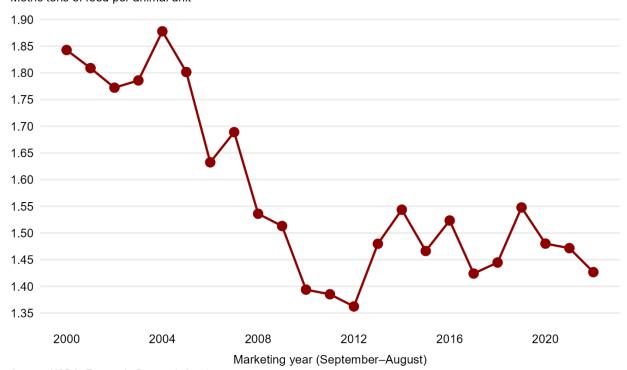
NASS also released its annual Sheep and Goats report on January 31, 2023—which provides January 1 inventories of sheep, lambs, and goats in the United States. All sheep and lambs in the United States totaled 5.02 million head, down 1 percent from 2022. All goats and kids were also lower for 2023, totaling 2.51 million head, a 2 percent decline from 2022. For additional information on cattle and livestock markets—see the Livestock, Dairy, and Poultry Outlook report series—with the February 2023 report scheduled for release on February 14.

Grain consuming animal units (GCAU) are projected to be down from 100.0 million units in 2021/22 to 99.3 million units in 2022/23. Cattle on feed is a significant component of the Grain Consuming Animal Units (GCAU), accounting for 21.7 million units in February 2023, down from the 22 million units in the January Feed Outlook report. For dairy, GCAUs fell from 10.64 million animal units in the January report to the current 10.61 million units.

Figure 8

U.S. feed availability per grain consuming animal unit

Metric tons of feed per animal unit



Source: USDA, Economic Research Service.

Total feed and residual use for energy feeds (corn, sorghum, barley, oats, and wheat) in the United States for 2022/23 (September through August) is projected to be at 141.6 million metric tons. Corn and sorghum feed use are down while barley, oats, and wheat are higher; however, the decline in corn and sorghum feed use more than offsets higher availability in the other crops. On a per-animal unit basis, feed availability is down for the 3rd consecutive year (figure 8), with the decline in total feed availability outpacing the decline in animal units for 2022/23.

International Outlook

Angelica Williams Olga Liefert

Global Coarse Grain Production Is Trimmed

World coarse grain production in 2022/23 is projected at 1,442.8 million tons, down 3.6 million this month, mostly due to reduced prospects in *Argentina*. Global corn production is forecast down 4.6 million tons, sorghum is reduced 0.3 million tons—whereas barley, oats, and rye prospects are increased. See table A1 below.

Region or	Production	Change from	YoY	Comments
country		previous month ¹ Million tons	Change ²	
oarse grain prod	uction (total)			
World	1.442.8	-3.6	-59.6	
Foreign	1,084.3	-3.6	-20.3	Partly offsetting changes are made for a number of countries and commodities. See table A2.
United States	358.5	No change	-39.2	See section on U.S. domestic output.
orld production	of coarse grai	ns by type of grai	n	
			CO	RN
World	1,151.4	-4.6	-64.6	
Foreign	802.6	-4.6	-30.5	Reductions in Argentina and Uruguay more than offset higher production in Phillipines, Vietnam, and Uzbekistan. See Table A2.
United States	348.8	No change	-34.1	See section on U.S. domestic output.
			BAR	LEY
World	150.5	+1.0	+4.6	
Foreign	146.7	+1.0	+3.4	Higher output in Australia, Russia and Uruguay. See table A2.
United States	3.8	No change	+1.2	See section on U.S. domestic output.
-			SORG	НИМ
World	58.5	-0.3	-3.6	
Foreign	53.8	-0.3	+3.0	Lower output is projected for Argentina. See table A2.
United States	4.8	No change	-6.6	See section on U.S. domestic output.
			OA	TS
World	25.0	+0.2	+2.3	
Foreign	24.2	+0.2	+2.0	Higher production is projected for Russia. See table A2.
United States	0.8	No change	+0.3	See section on U.S. domestic output.
			R۱	/E
World	12.2	+0.1	-0.3	
Foreign	11.8	+0.1	-0.4	Higher production is projected for Russia. See table A2.
United States	0.3	No change	Fractional	See section on U.S. domestic output.
Change from previous	month. ² YoY: yea	r-over-year changes. 3	Totals may r	not add due to rounding.

For at-a-glance information of the revisions in coarse grain production by country and type of grain, see table A2 below.

Barley May-Apr 0.9 +0.2 Fractional Corn area and yield are revised higher this month.		Type of crop	Crop year	Production	Change in forecast ¹	YoY ² change	Comments				
ARGENTINA Corn Mar-Feb 47.0 -5.0 -2.5 Corn area and yields are revised down this month (see report text). Sorghum Mar-Feb 3.5 -0.3 +0.1 Heat and drought reduce sorghum yield prospects (see report text). AUSTRALIA Barley Nov-Oct 13.7 +0.3 -0.6 Main barley areas received above-average precipitation, improving barley yield prospects. PHILLIPINES Corn Jul-Jun 8.1 +0.2 -0.2 Beneficial rains are expected to improve corn yield prospects. VIETNAM Corn May-Apr 4.4 +0.2 Fractional Corn area is revised higher, based on a release of prelliminary official data. RUSSIA Barley Jul-Jun 21.5 +0.5 +4.0 Based on higher area in the updated Russian Statistical Agency ROSSTAT report, published in mid-January. Oats Jul-Jun 4.0 +0.2 +0.3 Based on higher area in the updated Russian Statistical Agency ROSSTAT report, published in mid-January. Rye Jul-Jun 2.0 +0.1 +0.3 Based on higher area in the updated Russian Statistical Agency ROSSTAT report, published in mid-January. UZBEKISTAN Corn Jul-Jun 0.6 +0.1 Fractional Corn area is revised higher this month, following a release of official data. URUGUAY Corn Apr-Mar 0.8 -0.1 -0.1 Due to poor growing conditions, corn area and yields are revised down this month (see report text). Barley May-Apr 0.9 +0.2 Fractional Corn area and yield are revised higher this month.				Λ	Million tons	_					
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Corn Jul-Jun 0.6		Rye	Jul-Jun	2.0	+0.1	+0.3					
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YoY: year-over-year changes.	¹ Change from previous month. Smaller changes are made for several countries.										
	Yc	oY: year-over-yea	r changes.								

In *Argentina*, heat and dryness hurt crops during the critical stages of crop development in the major growing areas. While crucial rains in the latter half of January allowed filling corn and sorghum to recoup some loses, rainfall for the month was below normal in most of the key growing areas, and temperatures averaged above normal. The adverse weather affected the early-planted corn—the crop planted before December. Early corn carries higher risk than corn planted a month or 2 later because the critical stages of its reproductive period occur in the hottest and driest months. The farmers in Argentina reduce risk by shifting/expanding into late-corn area. Consequently, the share of area under early corn has been declining and is estimated to reach a record low of around 30 percent this year (see figure 9). As more of early-planted corn is damaged by poor pollination this year and is expected to be harvested for silage instead for grain, the projected corn harvested area is reduced 0.2 million hectares to 6.7 million this month. The projected yield in Argentina is reduced 7 percent to 7.0 tons per hectare—

reflecting the damage to early-planted crop done by the hot, dry conditions in December—as well as additional yield loses in early January. Sorghum is more drought tolerant than corn, but that crop also experienced serious stress while in its critical stage of development. Argentine sorghum yields are forecast down almost 8 percent this month to 4.0 tons per hectare.

Million hectares

2022/23 late-planted corn, forecast

Figure 9
Argentina corn planting, area planted by the first week of December

Source: Economic Research Service, using data from Bolsa de Cereales, Buenos Aires Grain Exchange, Argentina.

In neighboring *Uruguay*, corn suffered from heat and drought that strongly affected early corn. Area and yields prospects for 2022/23 are reduced this month, cutting production by 8.5 percent. Barley in Uruguay enjoyed favorable weather and is already harvested. The official data indicate higher-than-expected area and yield, with a 33 percent increase in output.

Strong Demand From the European Union Boosts Corn Trade

World corn trade in 2022/23 (October-September) is projected to reach 182.4 million tons, up 1.3 million this month. Largely, the increase is driven by strong demand from the *European Union*. EU corn imports are forecast 2.0 million tons higher this month to reach 23.5 million, on par with the 2018/19 record. With the lowest corn output in 15 years, the demand for imported corn (as well as wheat and barley) continues to be strong. The high pace of EU corn imports (according to the EU customs surveillance data) supports the increase. So far in 2022/23 (since the beginning of October), the European Union has imported almost 11 million tons of corn, with roughly the same amounts coming from *Ukraine* and *Brazil*, leaving very little space for other usual suppliers—Canada and Serbia—whose shares in the EU corn imports dropped this year.

In trade year 2022/23 (October 2022 through September 2023), Brazilian corn exports are projected 2.5 million tons higher this month to reach 51 million, catching up with the U.S. corn export projection. For the 2022/23 local marketing year, Brazilian corn exports are now forecast to exceed those of the United States. This is quite a change from the historical norm when the U.S. share of world corn trade reached more than 80 percent in 1979/80 and often exceeded two-thirds. Expansion of corn area in Brazil (second-crop corn) and Ukraine, as well as the elimination of corn export taxes in Argentina in 2016, boosted these countries' corn production and exports while steadily reducing the U.S. corn share in global trade. However, with the exception of 2012/13 (due to a severe drought in the United States and almost all of the Northern Hemisphere) when U.S. corn exports fell to 18.3 million tons and its share in the world corn trade was a mere 18.1 percent (for the October-September trade year), the United States was still the largest global corn exporter until this year. In 2022/23, the U.S. and Brazilian shares in global corn trade are both forecast at 28 percent. See figure 10.

Percent

80

70

60

40

30

20

10

0

Real policy policy

Figure 10
United States and Brazil: corn export shares, October-September trade year

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

In the first 4 months of the trade year (October-January), *Brazil* has exported the record amount of 25.5 million tons of corn, with record-high shipments in December and January (the tail end of its local marketing year). Brazil's corn exports to China are rising swiftly in the wake of the latter's decision to start buying Brazilian corn. In January 2023, Brazil exported 6.5 million tons of corn (of which China was the largest destination at just over 1 million tons)—while maintaining its high exports share to *Japan*, *Vietnam*, *South Korea*, and *Iran*. Brazil's corn exports are expected to slow significantly in the coming months, as growing soybean exports

are expected to limit the transportation and port capacity available to move corn exports. Over the next 8 months of the trade year (February-September 2023), corn exports need to average about 3.3 million tons per month to reach the 51 million annual forecast. Planting of second-crop corn in Brazil is underway, with expectations for expansion in area relative to a year ago. Assuming average weather, the country is projected to produce a large second-crop corn harvest by July that will be partly exported in July-September, the last quarter of the 2022/23 trade year.

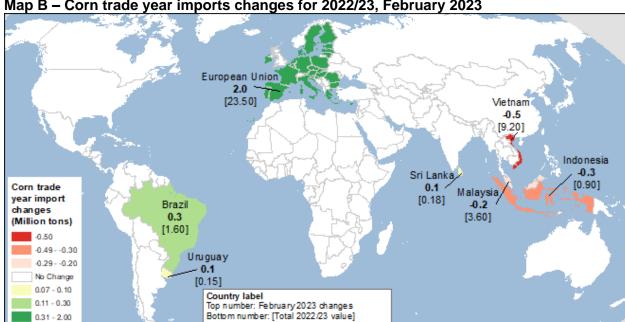
Ukrainian corn exports in January surpassed previous expectations and are projected 2 million tons higher at 22.5 million this month. As discussed in previous reports, Ukrainian corn exports this year became decoupled from the crop size because of the large accumulated stocks—a direct consequence of the Russian military invasion and the initial blockade of its Black Sea ports. Although the current "grain corridor"—a safe passage for Ukrainian grain-loaded ships leaving the country via several Black Sea ports—experiences frequent delays in ship inspections, Ukraine continues to move corn mostly to the **European Union** and **China**, drawing from its corn stocks.

Argentina's corn export projections for 2022/23 are sharply constrained by reduced production prospects. For the October-September trade year, Argentine corn exports are cut 4 million tons this month to 33 million. Corn exports projections are reduced for both 2021/22 and 2022/23 local marketing years: down 1.5 million tons for the current 2021/22 local marketing year (March 2022-February 2023), reflecting the lackluster pace of exports since October 2022, and down 3 million tons for the 2022/23 local marketing year that starts in March 2023 (see map A).



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

Brazil's corn imports are increased 0.3 million tons to 1.6 million, based on higher shipments from *Paraguay* to the southern part of Brazil that suffered from the drought. However, with a cut of Argentine corn export projections, the major Argentine destination countries—Vietnam, Indonesia, and Malaysia—saw their imports projections reduced (see map B).



Map B - Corn trade year imports changes for 2022/23, February 2023

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

World barley trade for 2022/23 (October-September) is projected up 0.4 million tons this month to 29.9 million. *Australian* barley export prospects got a boost from higher projected barley output. Imports are increased for Turkey—but reduced for Philippines, Thailand, and **Vietnam**—based on the recent countries' trade data.

Global sorghum trade is lowered 0.6 million tons to 6.8 million due to reduced export prospects for Argentina (caused by lower production) and for the United States because of slow export sales, down 0.3 million tons for both countries. U.S. sorghum exports for 2022/23 (October-September trade year) are projected down 0.3 million tons to 2.3 million (down 10 million bushels to 90 million for the September-August local marketing year). Sluggish U.S. exports and very low outstanding sales support a reduction in the U.S. sorghum export forecast, down almost 70 percent year over year. Import prospects are reduced for *China* to reach 5.1 million tons, less than half of 2021/22 Chinese sorghum imports.

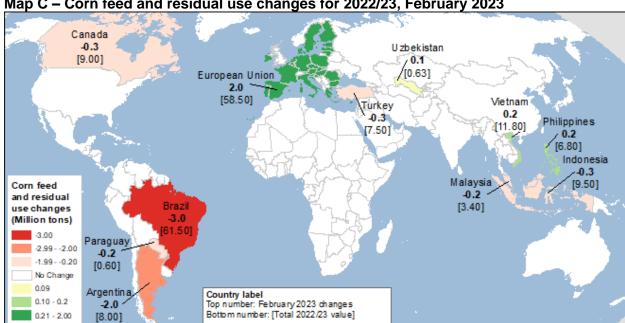
Coarse Grain Use and Stocks Are Reduced

Global coarse grain feed and residual use in 2022/23 is projected down 3.2 million tons (or 0.35 percent) this month. Global corn feed use is forecast down 3.8 million tons. Sorghum feed use is down 0.3 million tons, but barley is up 0.9 million tons this month.

The largest changes are for *Brazil*, where corn feed and residual use is cut 3 million tons, as higher exports are driving up corn prices in the domestic market. Feed use is reduced for Argentina, down 2 million tons because of tighter domestic supplies of corn. Conversely, with increased imports, corn feed use in the *European Union* is projected higher, up 2 million tons.

Multiple additional but partly offsetting changes for domestic coarse grain consumption are made this month across several countries and commodities.

For a visual display of this month's changes in corn feed and residual use, see map C.



Map C - Corn feed and residual use changes for 2022/23, February 2023

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

The reduction in global coarse grain production is steeper than the decrease in use, thereby lowering projected global ending stocks. Coarse grain ending stocks for 2022/23 are forecast slightly lower, down 0.8 million tons this month, with corn accounting for the decline. Individual countries' changes in stocks reflect production and trade revisions. The only substantial change in ending stocks this month is a 2-million-ton reduction for *Ukraine*, as the country is drawing on its stocks accumulated during the half-year blockade of its major Black Sea ports to export more grain. Stocks in the *United States* are projected 0.7 million tons higher, reflecting lower corn food, seed, and industrial use—see the discussion in domestic section above.

For a visual display of this month's changes in corn feed and residual use, see map D.



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

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