

2023 Crop Market Outlook

Western Wisconsin Ag Lenders Conference Program

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1/5/2023



World Agricultural Economic
and Environmental Services

Major Drivers

2022/23 Old Crop Market Year Issues

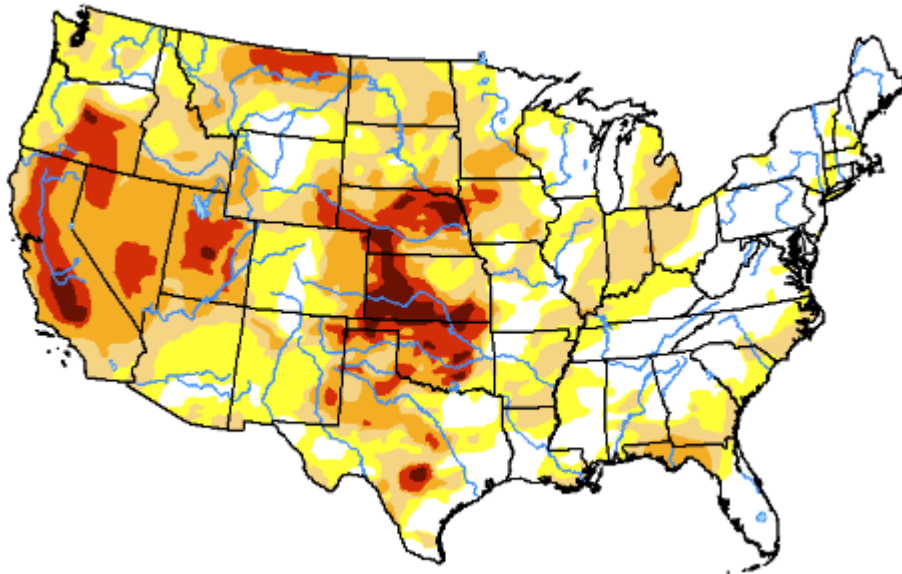
- ❑ US corn exports
- ❑ South American crop size (La Niña 3rd year in a row, but doesn't appear to be as severe)
- ❑ Biofuels – EPA proposed rule, RD proposed rule

2023 Growing Season Issues

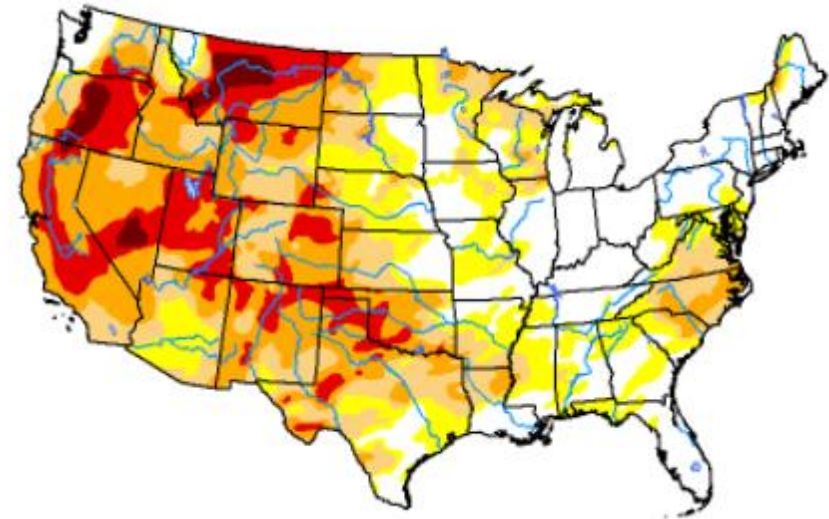
- ❑ Russia/Ukraine war
- ❑ Fertilizer and fuel prices
- ❑ 2023 US crop acreage
- ❑ Continued high US farm income in 2022

US Drought Monitor

December 27, 2022



December 28, 2021

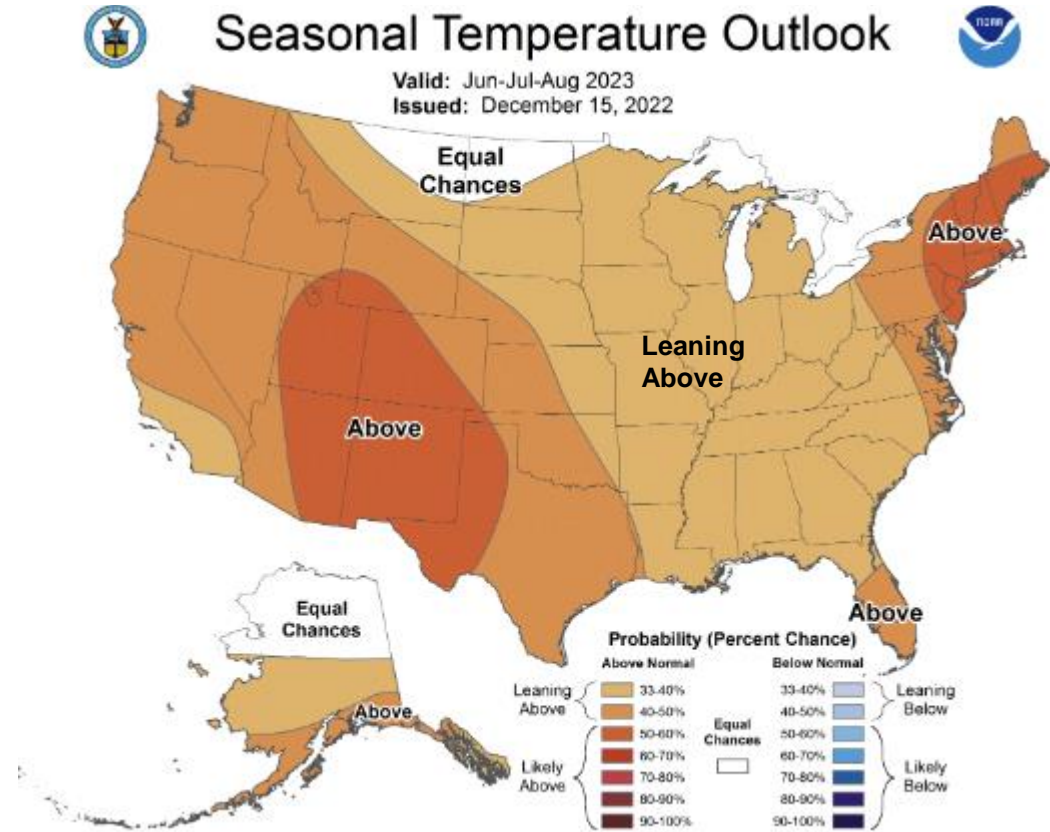
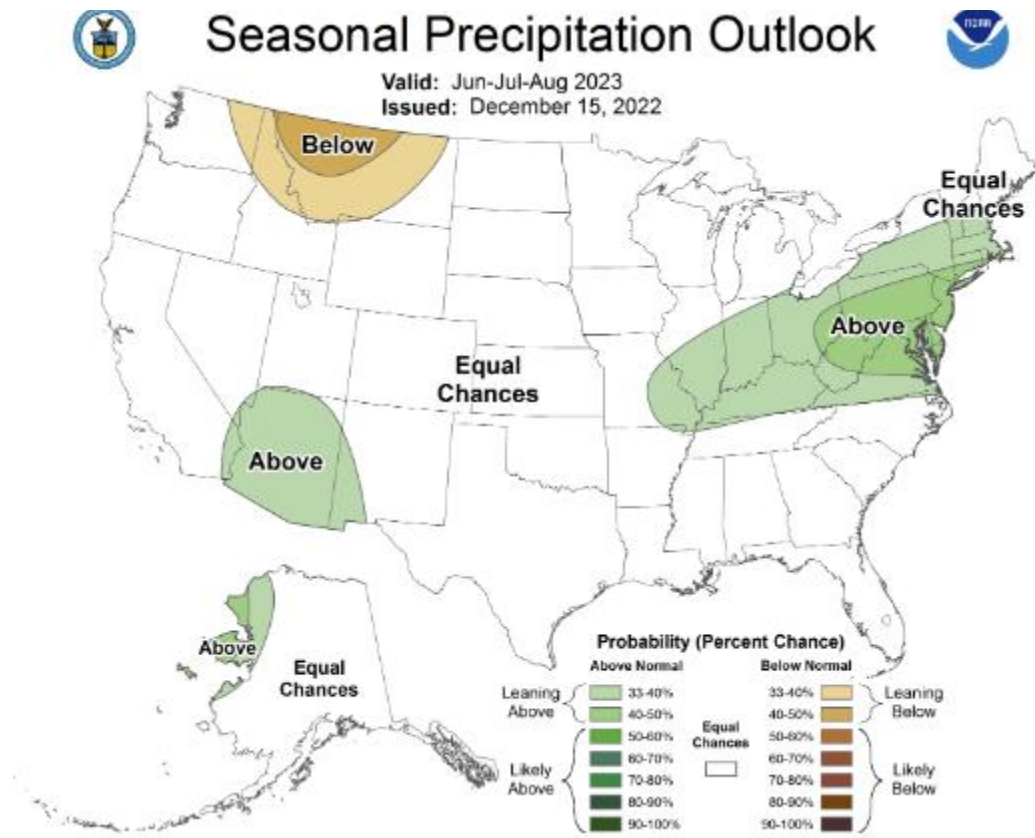


Drought Classification

- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)

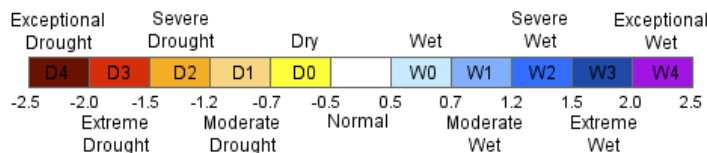
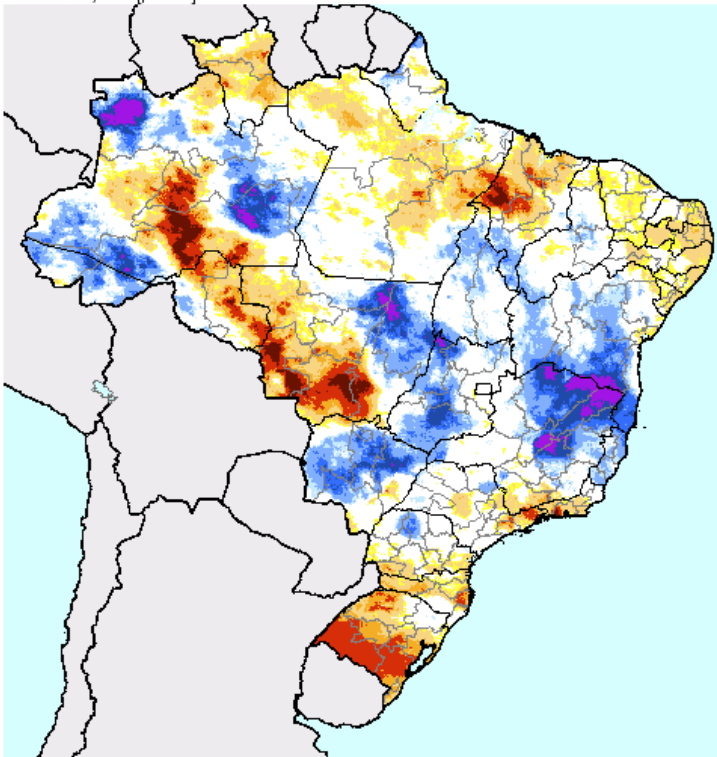
- D3 (Extreme Drought)
- D4 (Exceptional Drought)
- No Data

Precipitation & Temperature Outlook During the Growing Season (Jun-Aug)

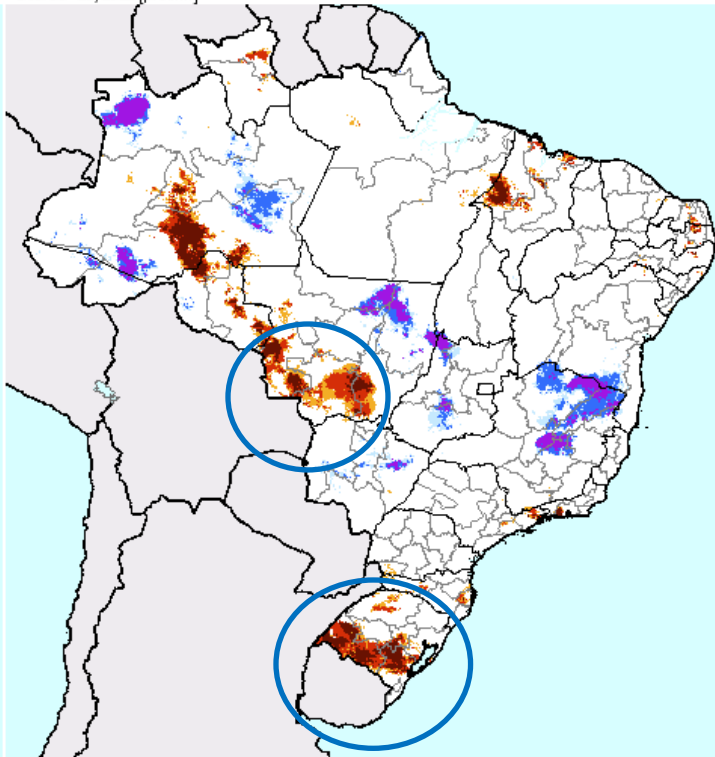


Western Mato Grosso and Southern Brazil have been running on the dry side over Dec 2022 (La Niña 3rd year in a row)

SPI Drought Severity (CHIRPS)
Dec. 11 - 20, 2022 [prelim.]

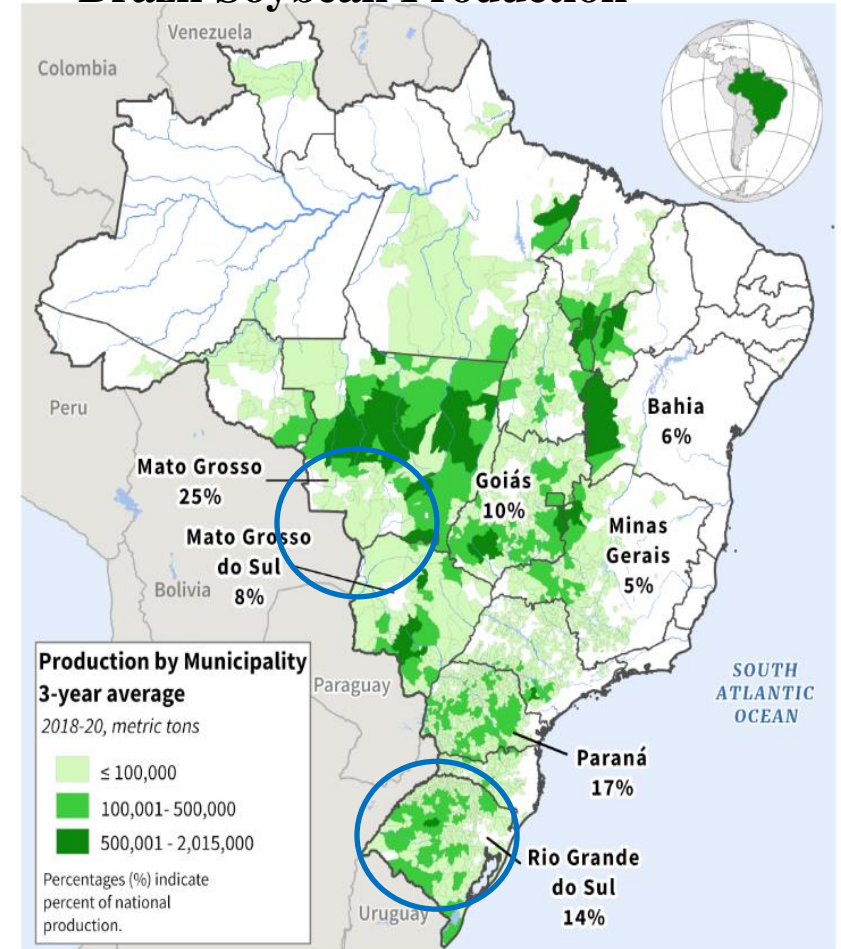


Precipitation Rank (CHIRPS)
Dec. 11 - 20, 2022 [prelim.]



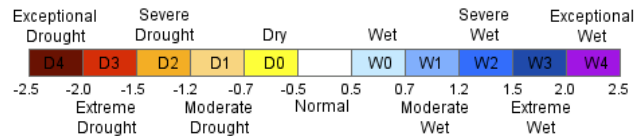
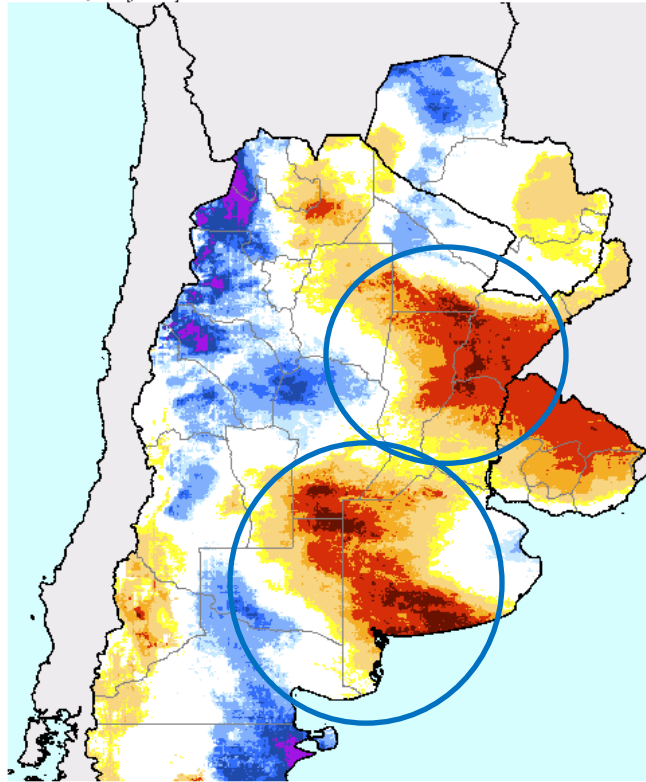
Source: CHIRPS data from UC Santa Barbara
<https://www.chc.ucsb.edu/data/chirps>

Brazil Soybean Production



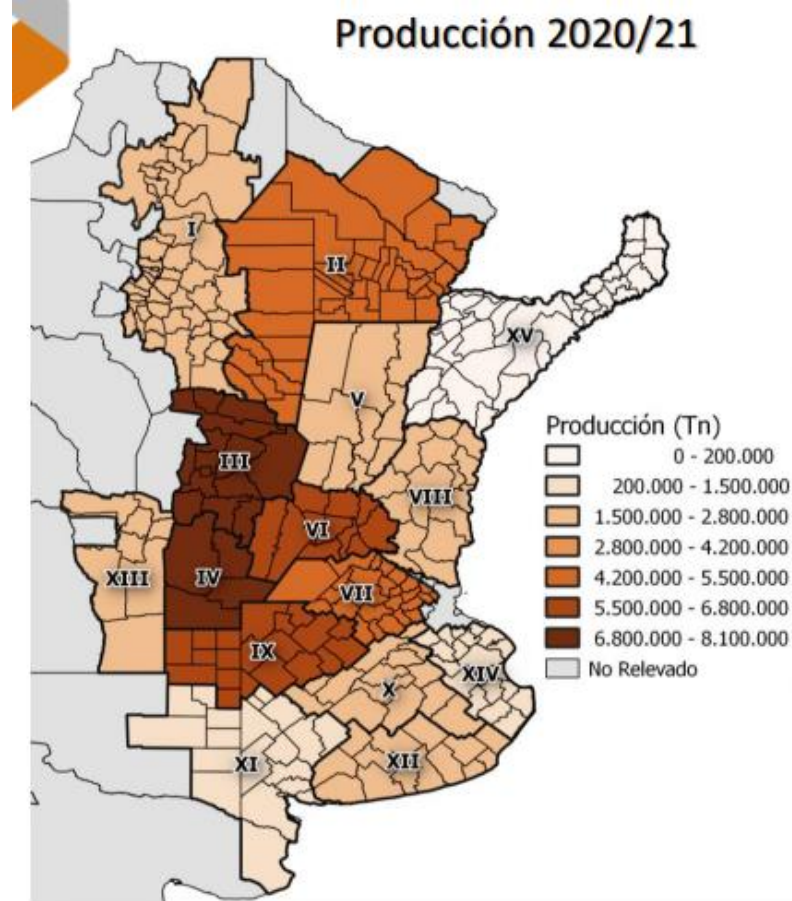
La Niña appears to be affecting Argentina more than Brazil – dry conditions in corn growing regions may shift area to soybeans

SPI Drought Severity (CHIRPS)
Dec. 11 - 20, 2022 [prelim.]



Source: CHIRPS data from UC Santa Barbara
<https://www.chc.ucsb.edu/data/chirps>

2020/21 Argentina Corn Production



Source: Bolsa de Cereales 9/1/2021

Some impact on corn production from dry conditions, but not expected to be large.

64% of Argentina corn areas report water conditions between normal and adequate as of 12/28/2022.

There could be some modest reduction in Argentina's corn production in the January WASDE.

Uruguay is almost completely plagued by drought.

Corn Outlook



Proposed RFS Volume Obligations

Calendar Year		2019	2020	2021	2022	2023	2024	2025	2030	2035
November 2022 Baseline										
Overall RFS	Million Gallons	20,083	17,130	18,840	20,880	21,067	21,142	21,467	23,092	24,717
Conventional Gap (Implied Ethanol)	Million Gallons	15,122	12,500	13,790	15,250	15,250	15,000	15,000	15,000	15,000
Advanced	Million Gallons	4,961	4,630	5,050	5,630	5,817	6,142	6,467	8,092	9,717
Biodiesel	Million Gallons	1,983	2,430	2,430	2,760	2,910	3,060	3,210	3,960	4,710
Cellulosic	Million Gallons	421	510	560	630	630	630	630	630	630
Advanced Gap	Million Gallons	1,466	354	724	722	822	922	1,022	1,522	2,022
EPA Proposed Reset Rule (Dec 2022)										
Overall RFS	Million Gallons	20,083	17,130	18,840	20,880	21,070	21,870	22,680		
Conventional Gap (Implied Ethanol)	Million Gallons	15,122	12,500	13,790	15,250	15,250	15,250	15,250		
Advanced	Million Gallons	4,961	4,630	5,050	5,630	5,820	6,620	7,430		
Biodiesel	Million Gallons	1,983	2,430	2,430	2,760	2,820	2,890	2,950		
Cellulosic	Million Gallons	421	510	560	630	720	1,420	2,130		
Biogas to CNG/LNG		421	510	560	630	720	820	930		
Biogas to Electricity		0	0	0	0	0	600	1,200		
Advanced Gap	Million Gallons	1,466	354	724	722	870	865	875		

Baseline: Biomass-based diesel VO growing by 150 mgal per year
 EPA: Biomass-based diesel VO growing by 60-70 mgal per year

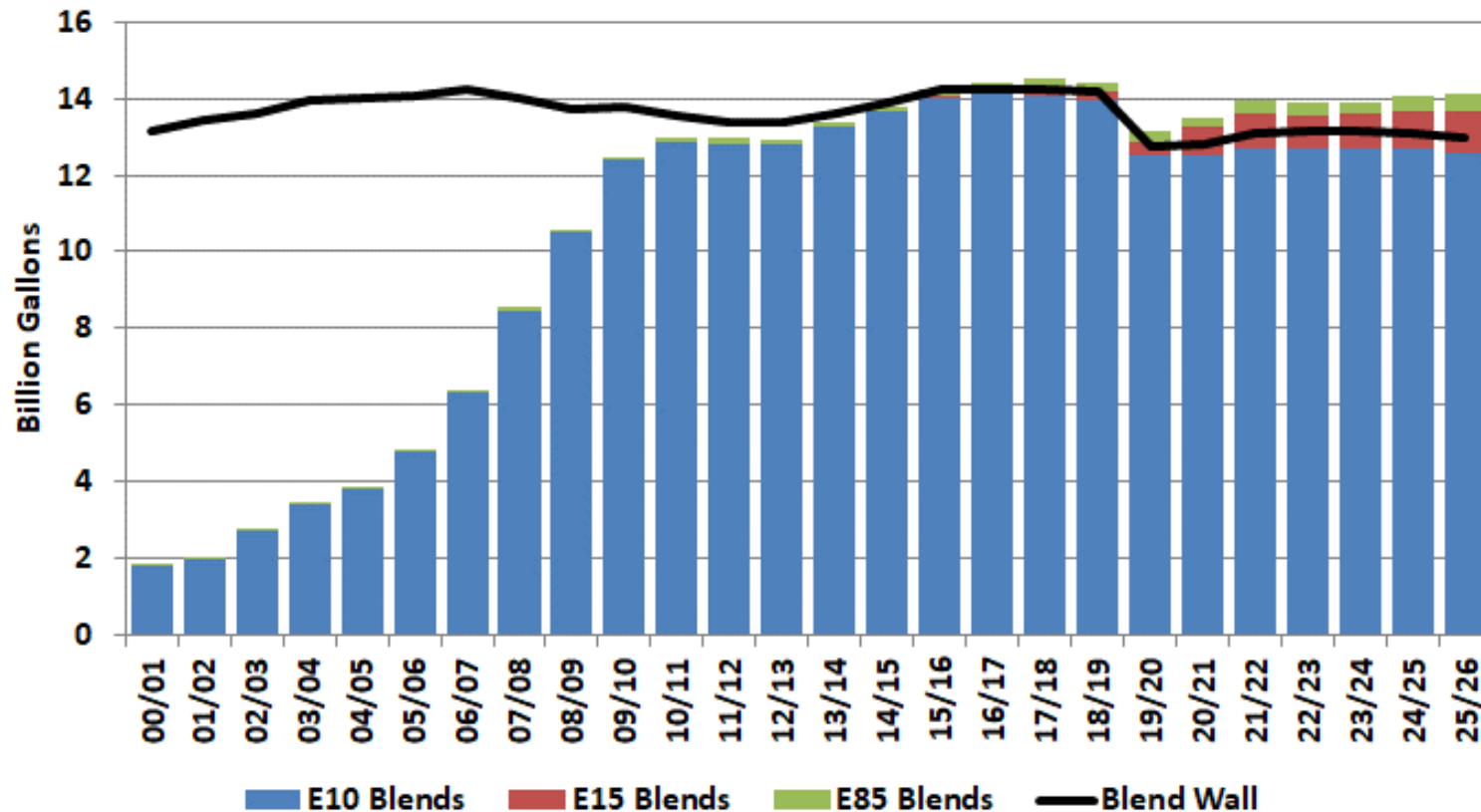
Baseline: Advanced gap VO growing 100 mgal per year
 EPA: Advanced Gap 150 mgal higher in 2023 and then relatively flat

Baseline: Flat cellulosic VO
 EPA: growing NG based portion of cellulosic VO by 90-100 mgal per year and adding a biogas to electricity VO which grows 600 mgal per year in 2024 and 2025

* Volume obligations are technically implemented as % blend requirements by the obligated parties. Volume obligations are also adjusted for estimated waivers. EPA errors associated with estimating demand cause the actual volume obligations to be higher or lower based on this error. Yellow highlighted cells are actual volume obligations. Green highlighted cells are WAEES projections. Blue highlighted cells are EPA proposed volume obligations

US Ethanol Domestic Consumption

WAEES Nov 2022 Baseline Projections (Marketing Year)



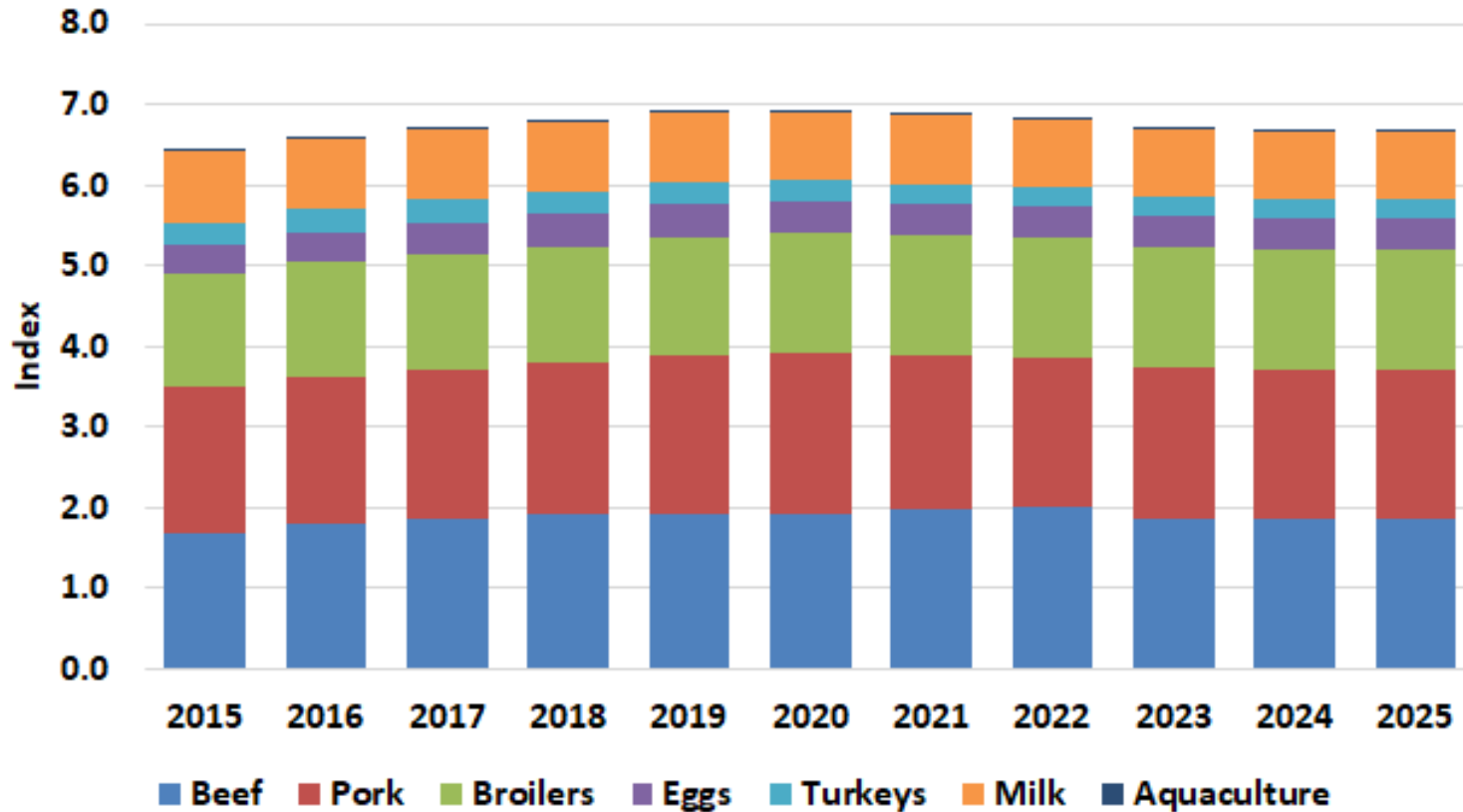
E15 consumption has been limited by consumer access and perception.

Approval for year round E15 continues to be discussed and has bipartisan support. It is included in the proposed Consumer and Fuel Retailer Choice Act of 2022.

However, it is unclear if the infrastructure will be developed to provide consumer access in the major demand areas on the east and west coasts especially with the shifting emphasis to electric vehicles.

Grain Consuming Animal Units by Livestock Species

WAEES Nov 2022 Baseline Projections

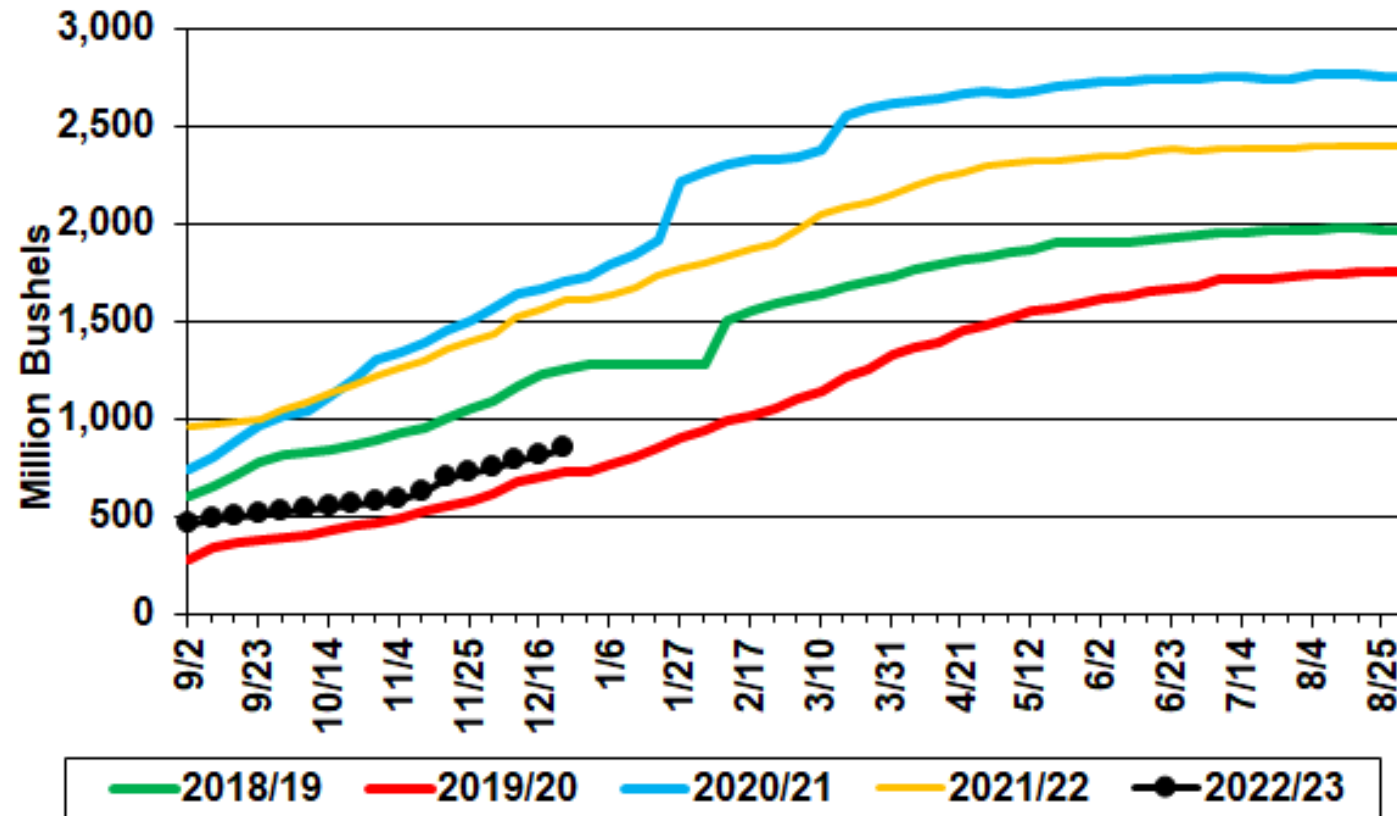


Overall feed demand for grains is expected to continue to weaken primarily with weaker demand from cattle and hogs.

Drought has caused producers in the southwestern US to cull cattle herds extensively and it will take time for cattle inventories to recover.

Accumulated Corn Exports and Outstanding Sales to All Countries

(Sep 1, 2022 to Dec 22, 2022)



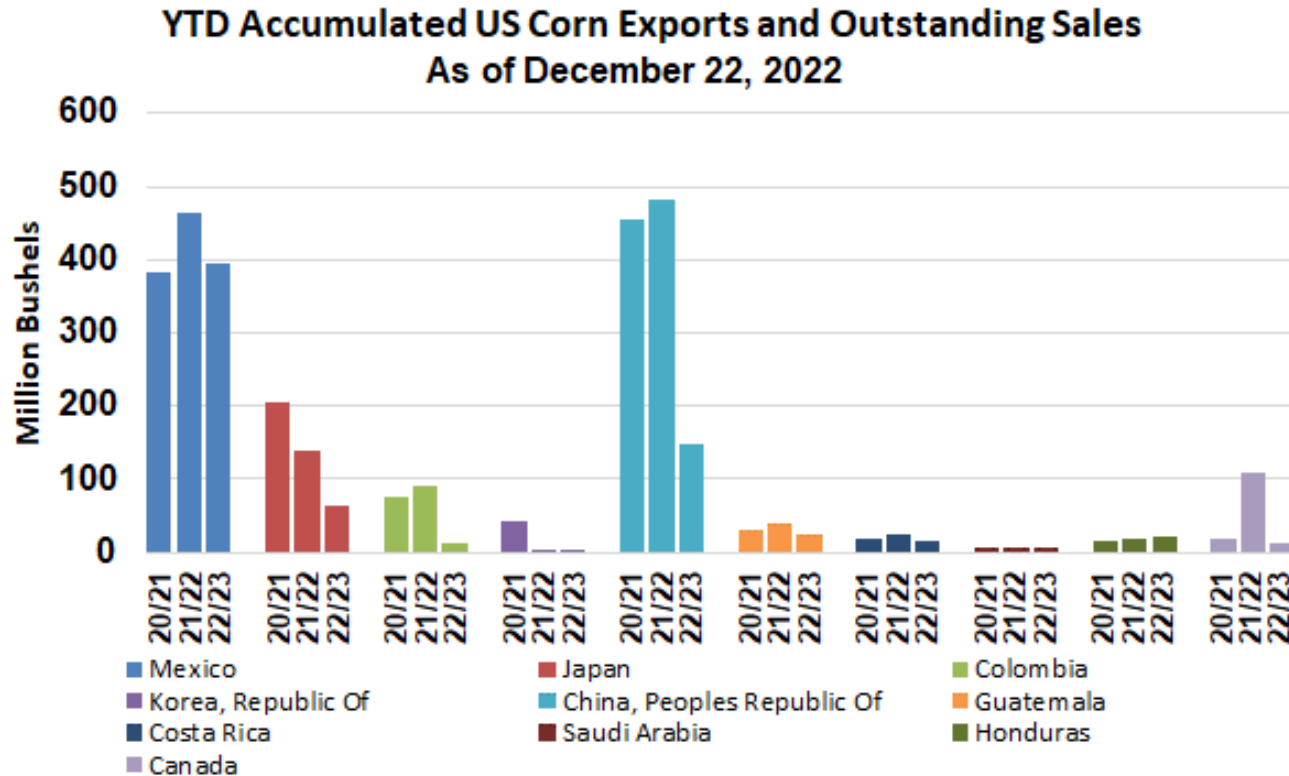
Corn exports and outstanding sales running considerably below 2021/22 and 2020/21 pace.

USDA has begun to reduce US corn exports projections in WASDE.

Source: USDA-FAS, US Export Sales

Accumulated Corn Exports and Outstanding Sales

(Sep 1, 2022 to Dec 22, 2022)



Weaker Chinese imports are primarily responsible for the weaker exports

Weaker exports to Mexico and Japan are also contributing.

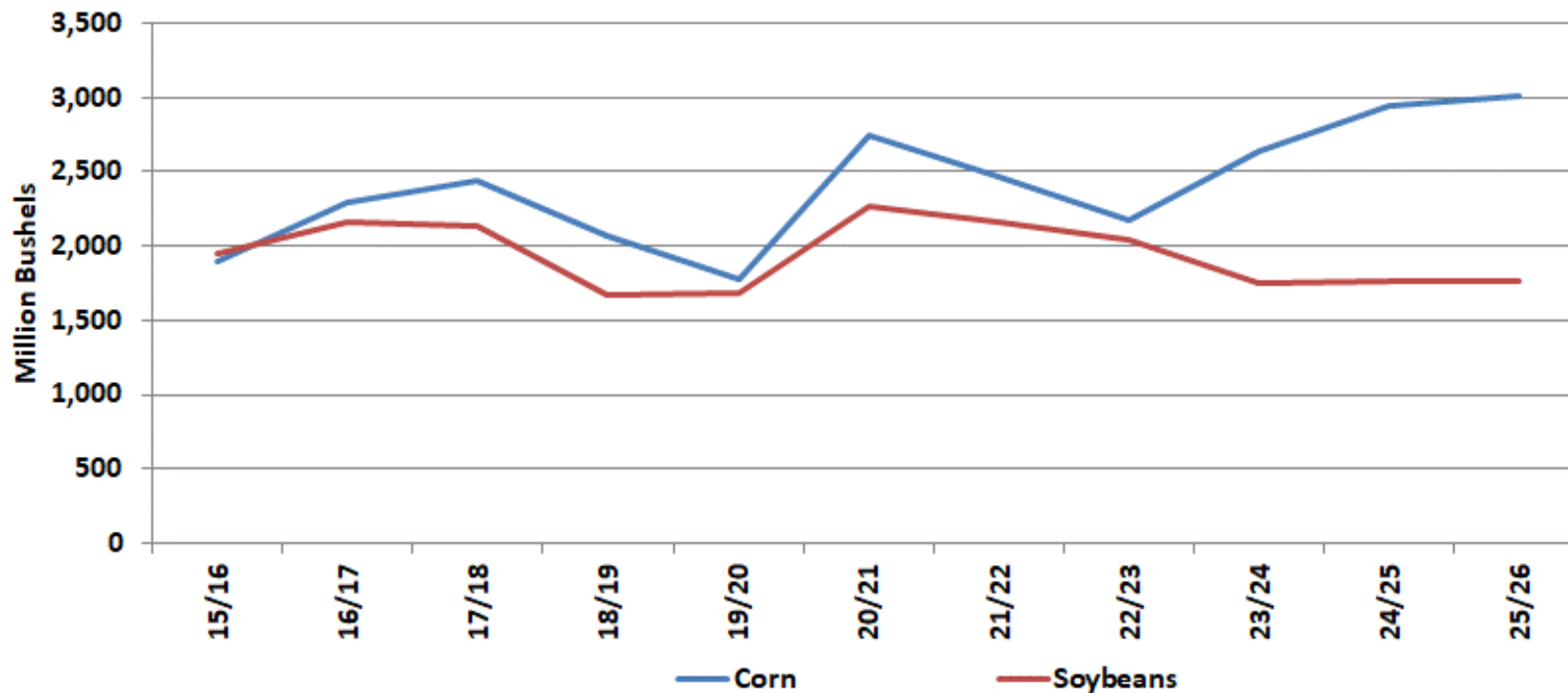
Longer run issue of GMO's still unresolved with Mexico, our #1 corn customer.

The slow export pace may foreshadow lower corn prices.

Source: USDA-FAS, US Export Sales, accessed 1/3/2023

US Corn and Soybean Exports

WAEES Nov 2022 Baseline Projections



US corn exports are expected to decline in 2022/23 based on weaker demand from China and recovering production and exports in Brazil.

Soybean exports decline with higher domestic crush driven by the higher biomass-based diesel production assumption included in the baseline.

Brazil 2022/23 Crop Area, Yield, and Production

(December 2022 Estimates)

	Official Brazil Source - CONAB						USDA - PSD Database					
	Area		Yield		Production		Area		Yield		Production	
	Mil Acres		Bu/Acre		Mil Bu		Mil Acres		Bu/Acre		Mil Bu	
	2021/22	2022/23	2021/22	2022/23	2021/22	2022/23	2021/22	2022/23	2021/22	2022/23	2021/22	2022/23
<i>english units</i>												
Corn Total	53.3	55.2	83.5	89.7	4,453	4,954	53.9	56.1	84.8	88.4	4,567	4,960
First Crop	11.2	10.9	87.6	98.1	985	1,072						
Second Crop	40.4	42.6	83.6	88.9	3,381	3,790						
Third Crop	1.6	1.6	52.8	56.2	86	92						
Soybeans	102.5	107.3	48.2	56.3	4,943	6,042	102.5	106.0	45.5	52.7	4,666	5,585
	Area		Yield		Production		Area		Yield		Production	
	1000 HA		MT/HA		1000 MT		1000 HA		MT/HA		1000 MT	
	2021/22	2022/23	2021/22	2022/23	2021/22	2022/23	2021/22	2022/23	2021/22	2022/23	2021/22	2022/23
<i>metric units</i>												
Corn Total	21,581	22,338	5.24	5.63	113,111	125,828	21,800	22,700	5.32	5.55	116,000	126,000
First Crop	4,551	4,422	5.50	6.16	25,027	27,226						
Second Crop	16,369	17,254	5.25	5.58	85,892	96,271						
Third Crop	661	661	3.32	3.53	2,192	2,330						
Soybeans	41,492	43,408	3.03	3.54	125,550	153,478	41,500	42,900	3.06	3.54	127,000	152,000

Note the expected recovery in corn yields as well as the expansion in corn area contributing to the 500 million bushel expansion in Brazilian production.

Soybean yields are expected to recover significantly from 2021/22 levels driving soybean production up 1.1 billion bushels.

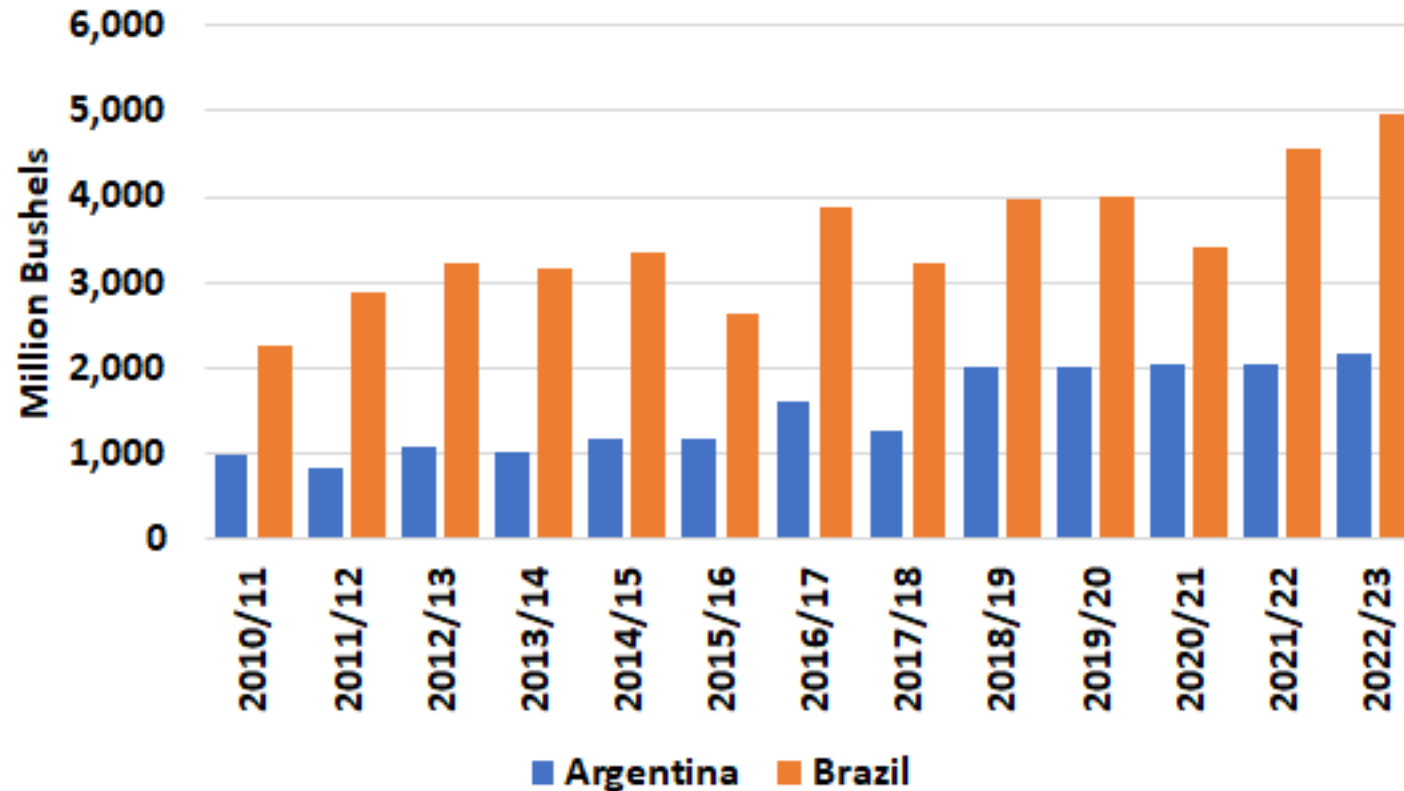
Sources: USDA-FAS, PSD Database, 12/2022 and Brazil's Boletim de Monitoramento dos Cultivos de Verão - Dezembro 2022.

Weblinks: <https://apps.fas.usda.gov/psdonline/app/index.html#/app/advQuery>

<https://www.conab.gov.br/info-agro/safras>

Record corn production expected in Argentina and Brazil

WAEES Nov 2022 Baseline Projections



South America has benefited from the global conflicts in the sense of increased demand for their products:

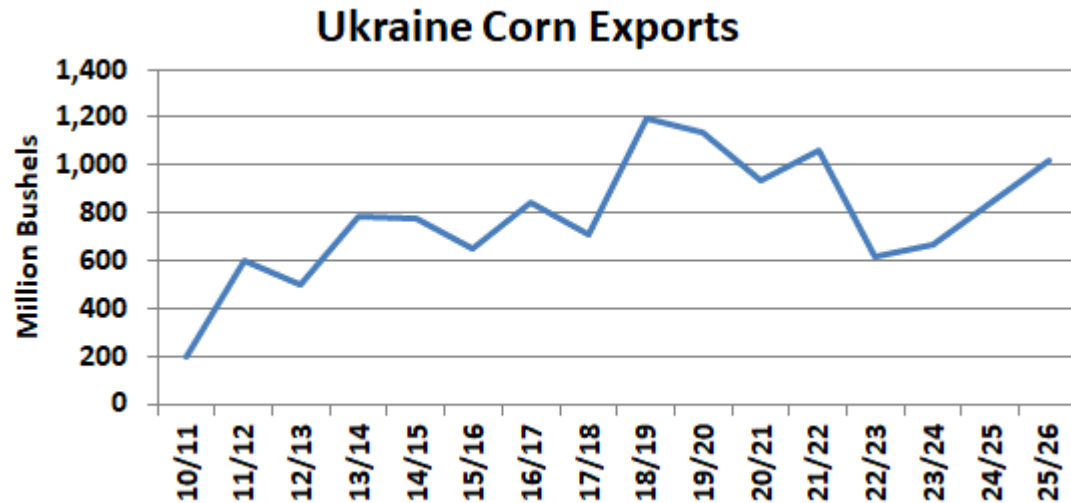
- US-China trade war
- Russia-Ukraine war

The longer term implications suggest more competition for US exports which agriculture is projected to become increasingly reliant on.

Demand for crops as feedstocks for biofuels is not likely to have the same growth experienced over the past decade given the shift in emphasis to electric vehicles.

Uncertainty created from the Russia/Ukraine war will contribute to commodity price variability

WAEES Nov 2022 Baseline Projections

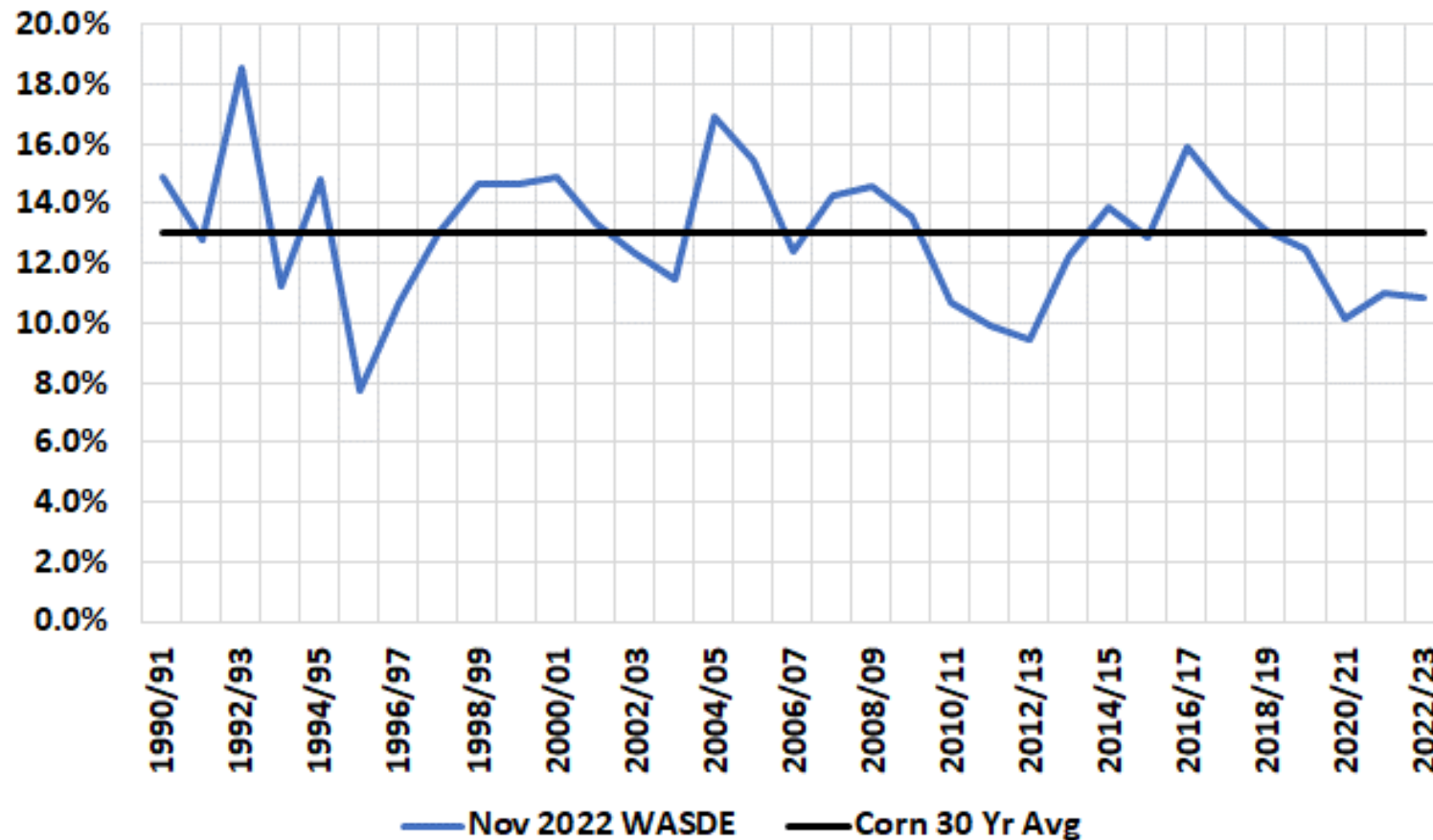


The war impacts on Ukrainian crop production has tightened crop supplies keeping upward pressure on crop prices, particularly grains, but also oilseeds.

How soon the war ends and how fast Ukraine can recover will significantly affect global crop supplies.

Corn Ending Stocks-to-Use Ratio

World less China



In general, the stocks-to-ratio is tight when it falls below the long range average which is the case for corn.

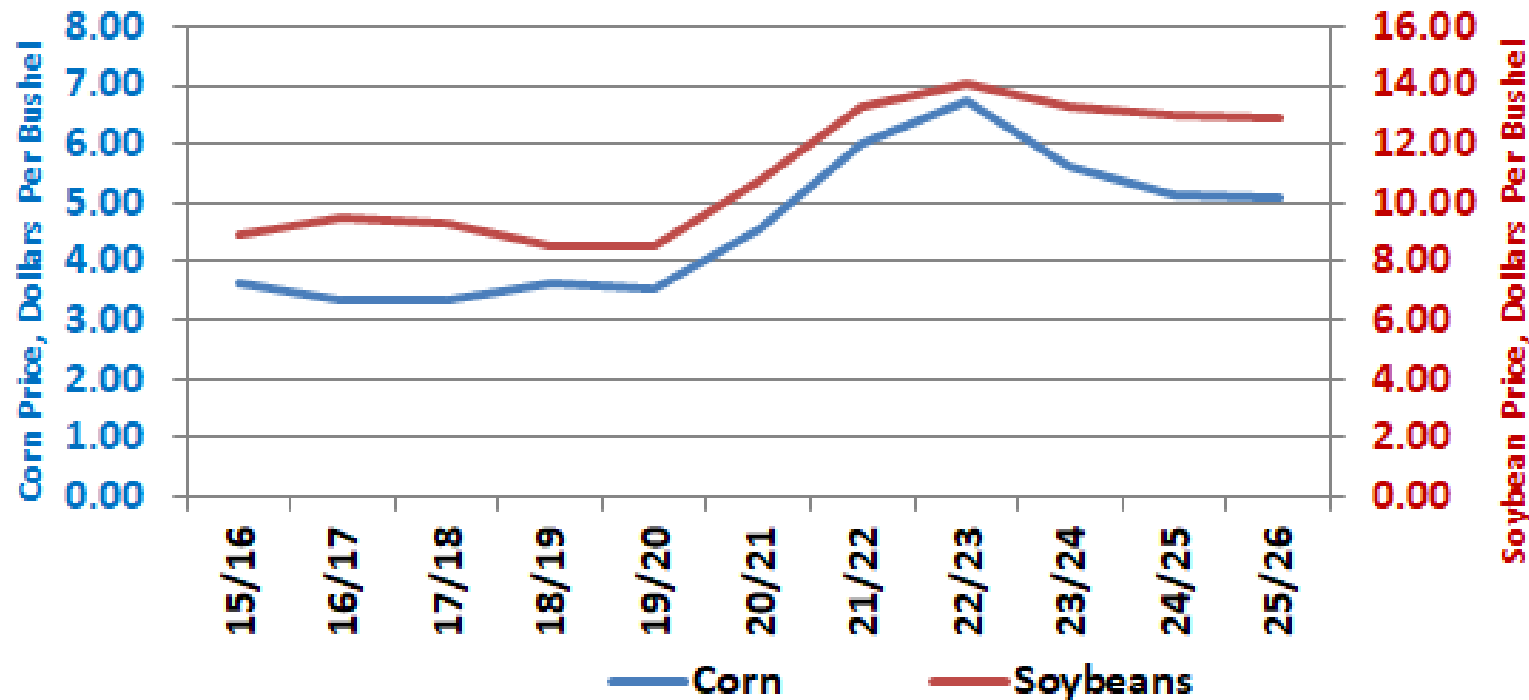
Much will depend on demand from China, and the debate about whether China has been stockpiling or actually needs that much grain may be settled in the coming year.

Tight stocks suggest that there will be large market reactions to even small changes in supply or demand.

Production problems can cause large upward movements in price, while overproduction can quickly drop prices.

US Farm Prices Projected to Fall

WAEES Nov 2022 Baseline Projections



In the WAEES forecast, corn prices fall more than soybean prices. This is contingent in part upon the growth in the biomass-based diesel volume obligations.

Based on EPA's preliminary rule, those volume obligations are not likely to grow that quickly, which is likely to result in weaker soybean prices.

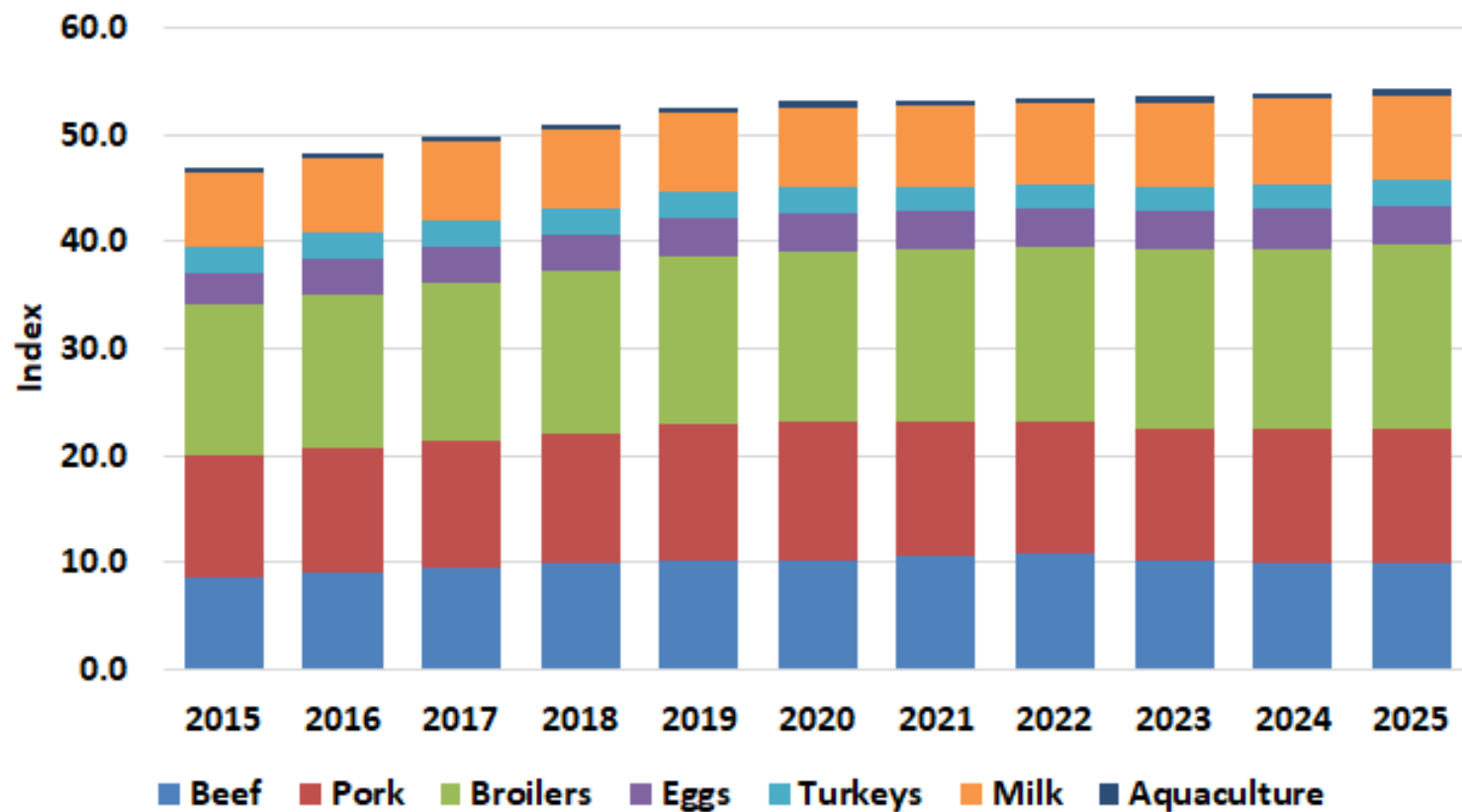
In addition, Ukraine is assumed to recover relatively quickly with the war ending in early 2024 and production recovering to pre-war levels by 2027. As the war lingers and damage becomes more prevalent, it is unlikely that production can recover so quickly. This may sustain grain prices in the next few years.

Soybean Outlook



High Protein Animal Units by Livestock Species

WAEES Nov 2022 Baseline Projections

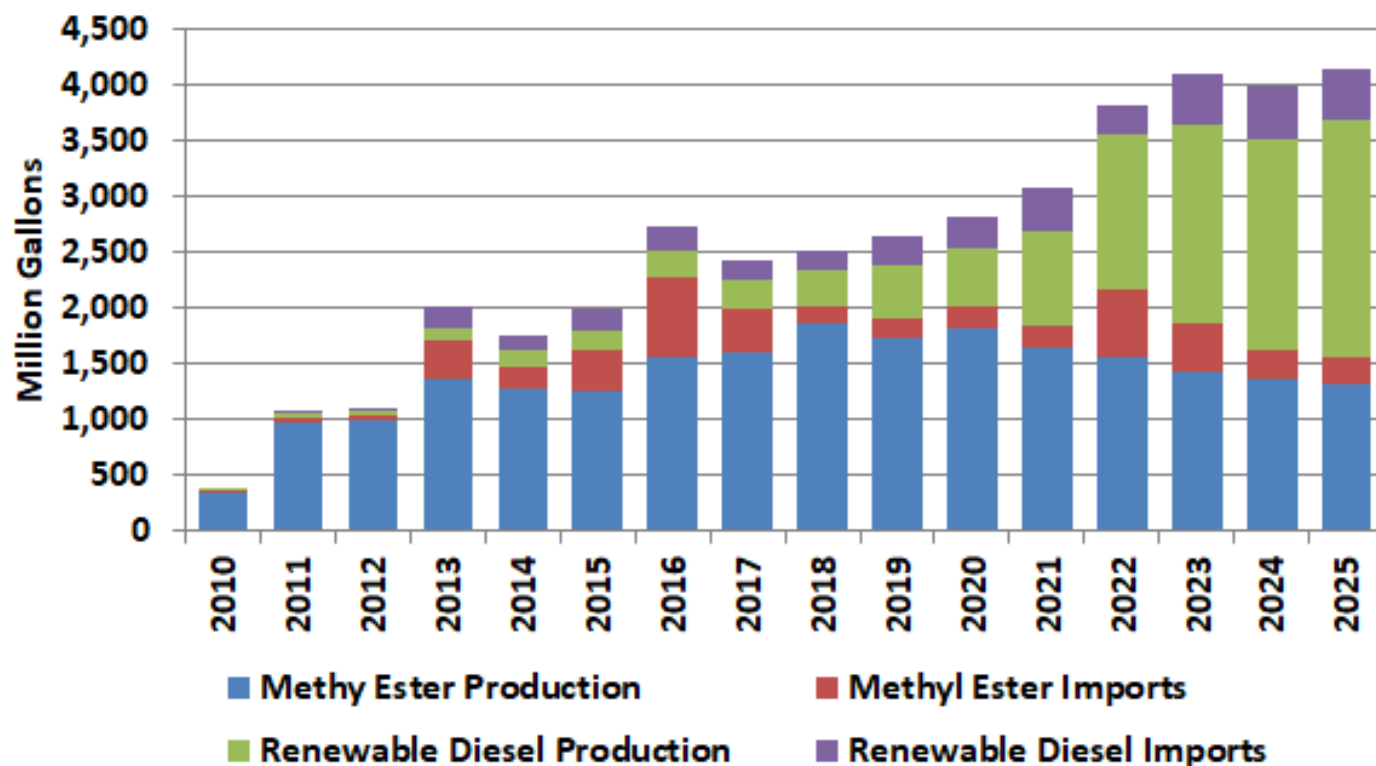


Continued growth in soybean meal demand expected in the US driven by the poultry sector.

US Biomass-Based Diesel Production & Imports

WAEES Nov 2022 Baseline Projections

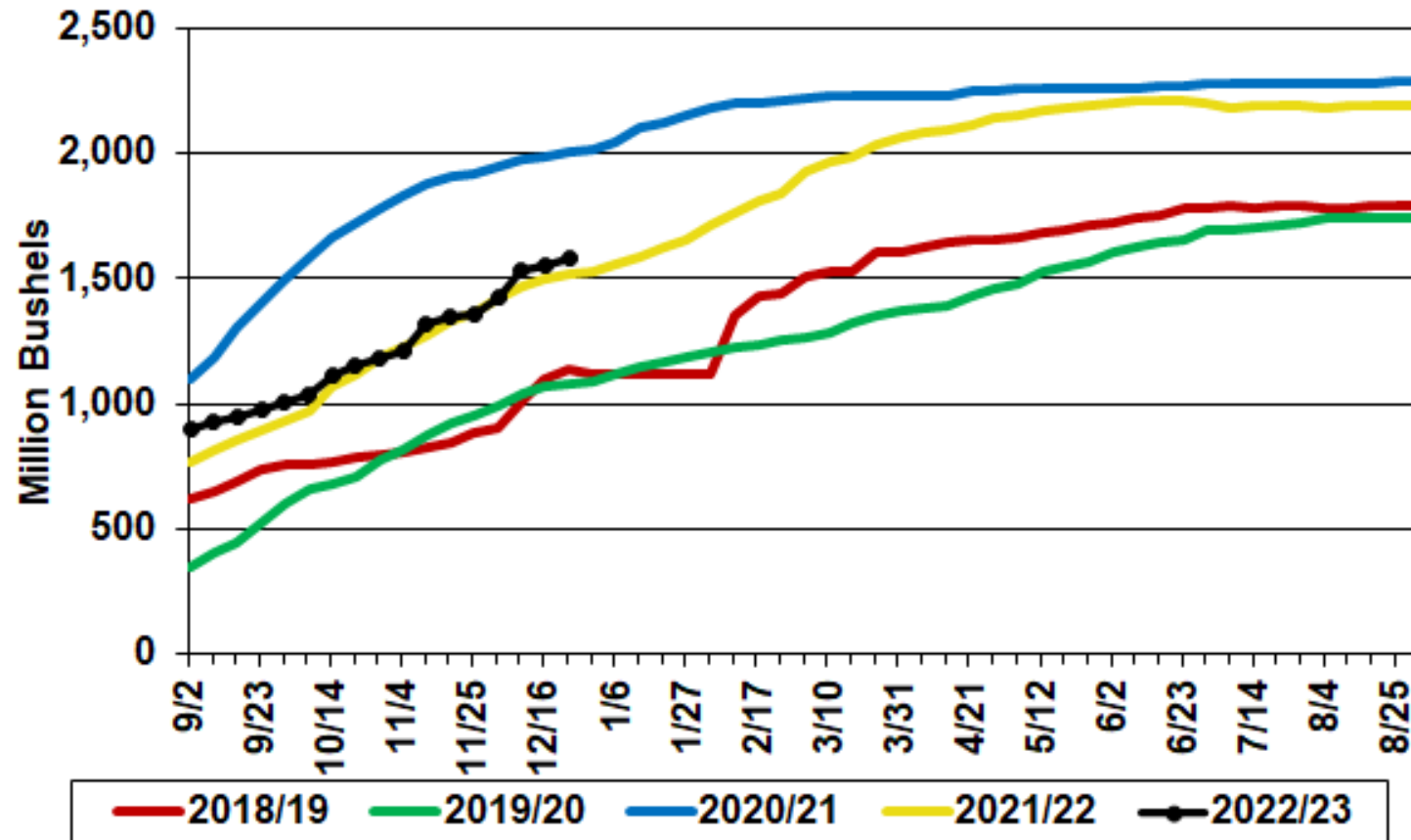
US Biomass-Based Diesel Production and Imports



- The level of production is driven by volume obligation set by EPA. These projections assumed growth in the biodiesel volume obligation and the advanced gap, but no growth in cellulosic volume obligations.
- Currently, state policies, such as the California LCFS, tend to influence the feedstocks used for the state, but not the overall volumes consumed nationally.
- Renewable diesel has had higher profit margins than methyl ester biodiesel which is putting financial pressure on methyl ester plants because RD plants can afford to pay more for feedstocks.

Accumulated Soybean Exports and Outstanding Sales to All Countries

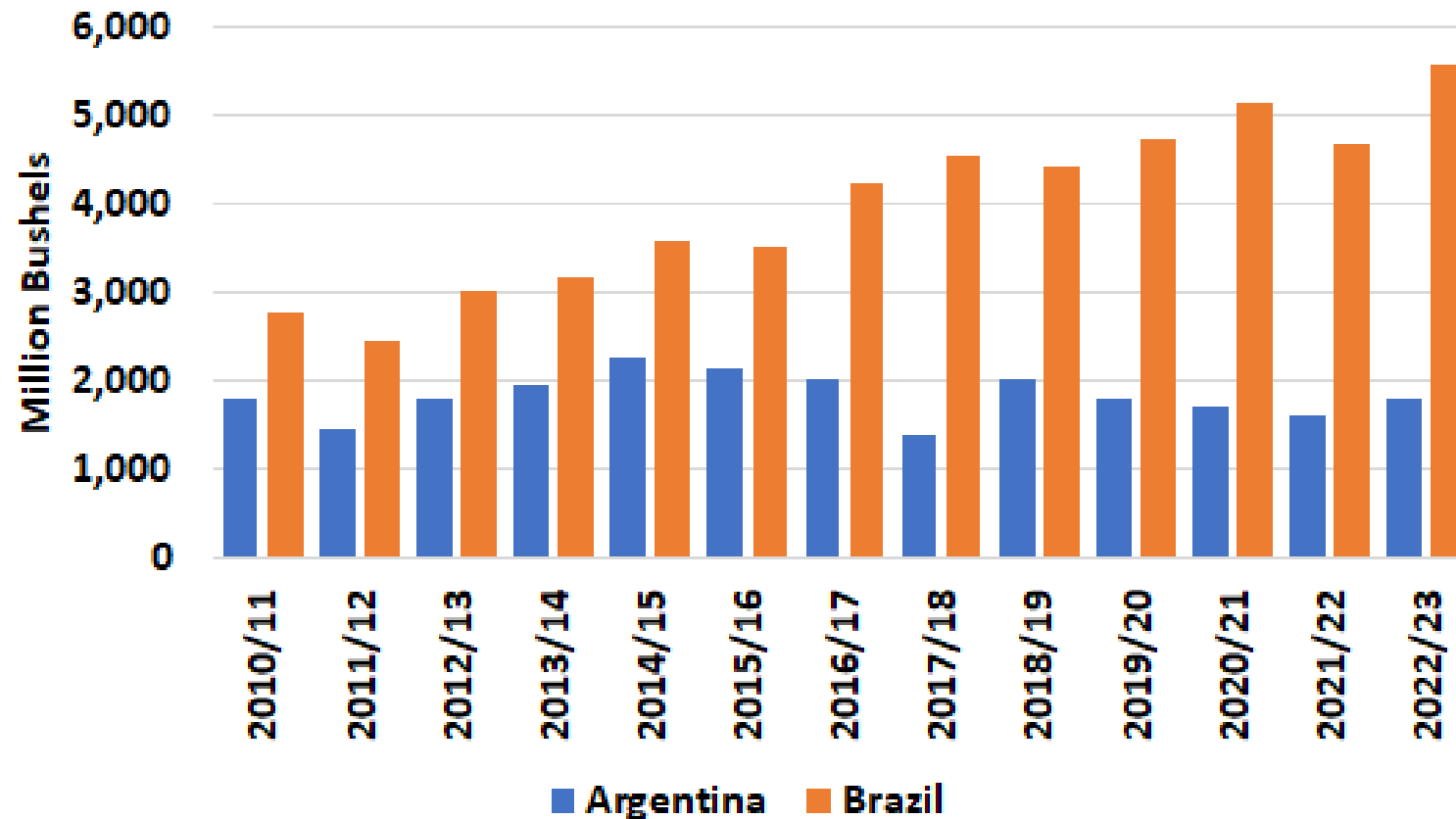
(Sep 1, 2022 to Dec 22, 2022)



Source: USDA-FAS, US Export Sales, Accessed 1-3-2023

Record soybean production expected in Brazil

WAEES Nov 2022 Baseline Projections



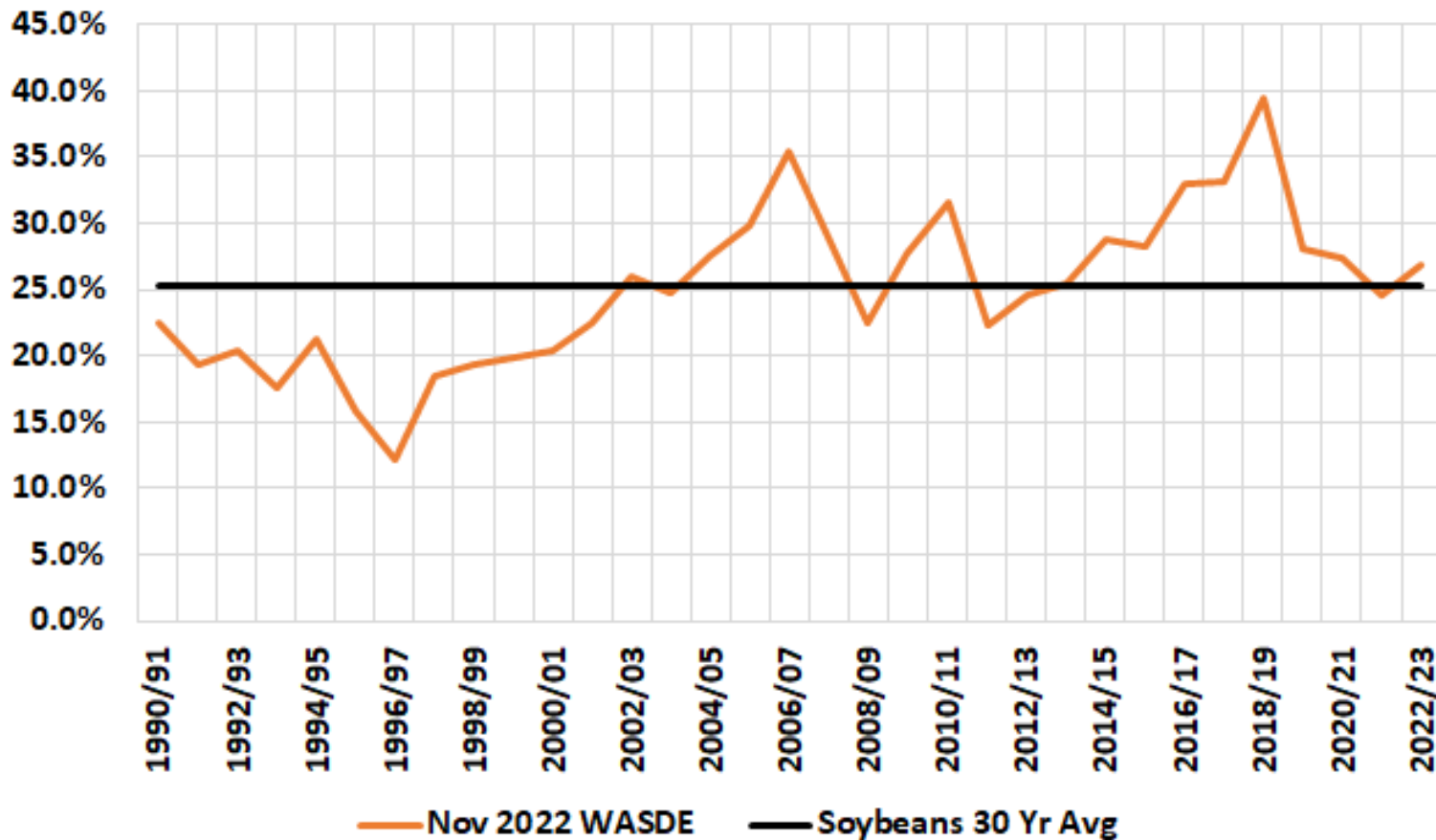
Despite dry conditions, USDA has not made major revisions to the soybean crop size in South America.

USDA's estimates of Brazil's crop size have grown from 5.47 billion bushels to 5.58 billion bushels since August.

In contrast, estimates of Argentina soybean crop size have declined from 1.87 billion bushels to 1.81 billion bushels since August. Shifting area from corn to soybeans may result in higher production that USDA is projecting.

Soybean Ending Stocks-to-Use Ratio

World less China

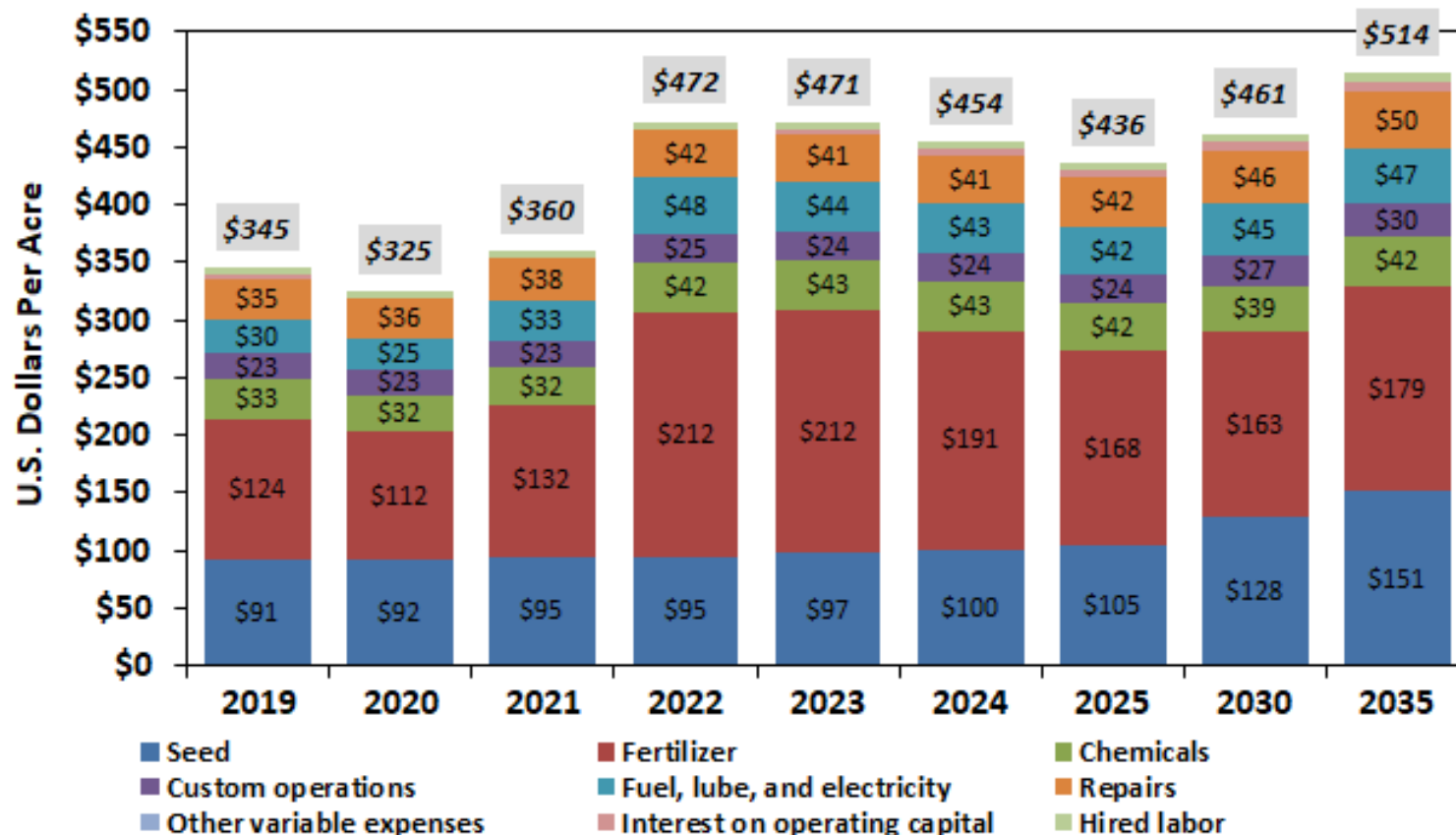


The soybean stocks-to-use ratio appears to be increasing above the 30 year average of 25% which might suggest easing prices.

However, this is assuming normal soybean yields in the South American soybean crop.

U.S. Corn Cost of Production

WAEES Nov 2022 Baseline Projections

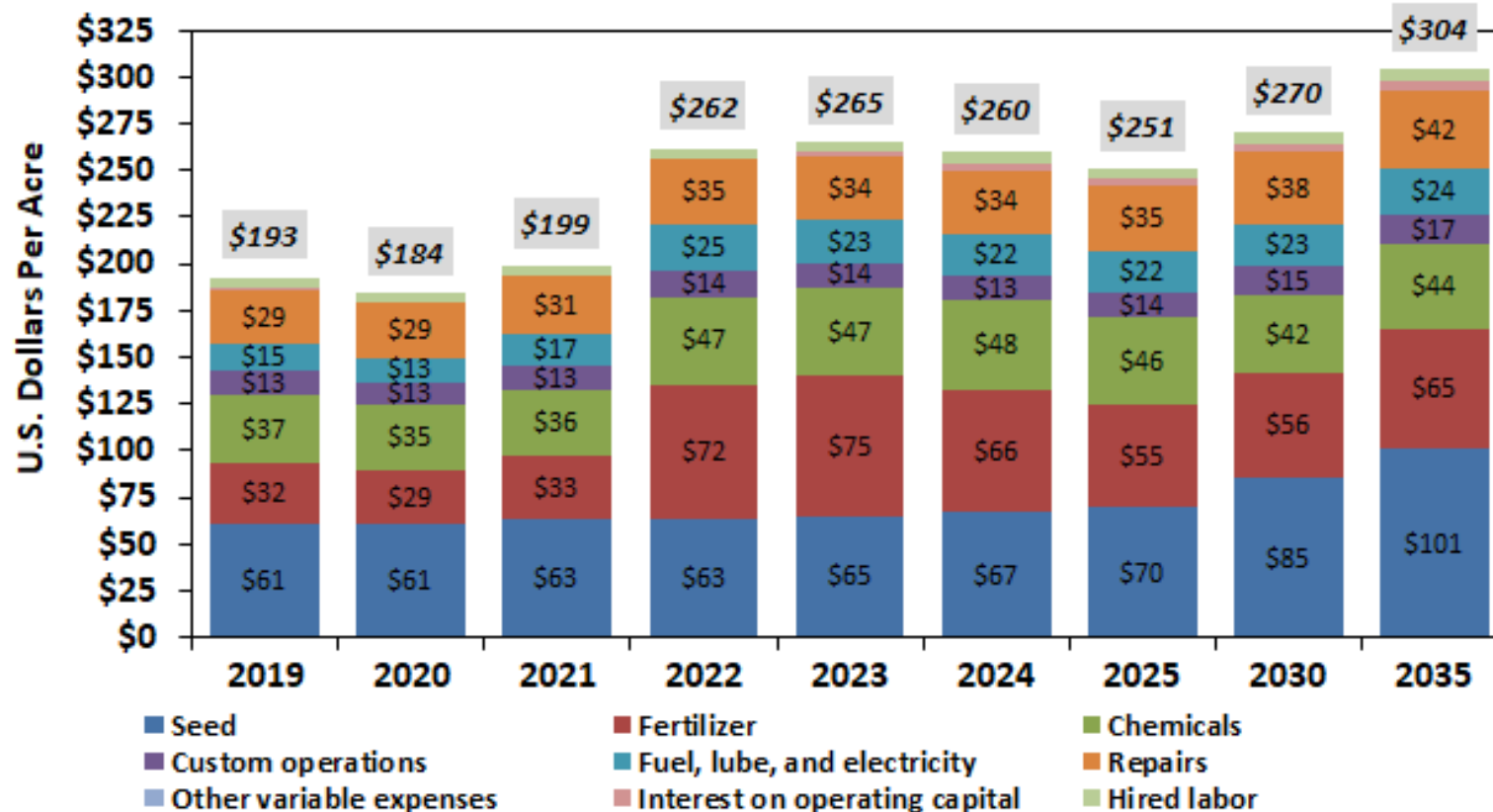


Fertilizer prices expected to remain elevated in 2023 before beginning to ease in 2024, but much will depend on production and supply chain recovery.

Chemical costs are also elevated due to supply chain issues from COVID, labor shortages, and higher shipping costs.

U.S. Soybean Cost of Production

WAEES Nov 2022 Baseline Projections



Fertilizer prices have less impact on soybean costs of production.

However, the corn-to-soybean price ratio still heavily favors corn.

This could change if changes in the South American crop size emerge.

WAEES, FAPRI, and USDA 2023 Crop Area Projections

2023 US Crop Planted Area Projections

	WAEES*	FAPRI**	USDA***
<i>Mil Acres</i>			
Corn	93.0	93.5	92.0
Soybeans	84.8	86.2	87.0
Wheat	46.5	47.5	47.5
Cotton^	11.2	11.4	9.5
Rice	2.6	2.4	2.5

*Projections made in November 2022.

** FAPRI estimates made in November 2022.

*** USDA estimates from November 2022 Baseline.

^ Estimates of upland cotton only for FAPRI & USDA.

WAEES has similar estimates to FAPRI and USDA for US corn area.

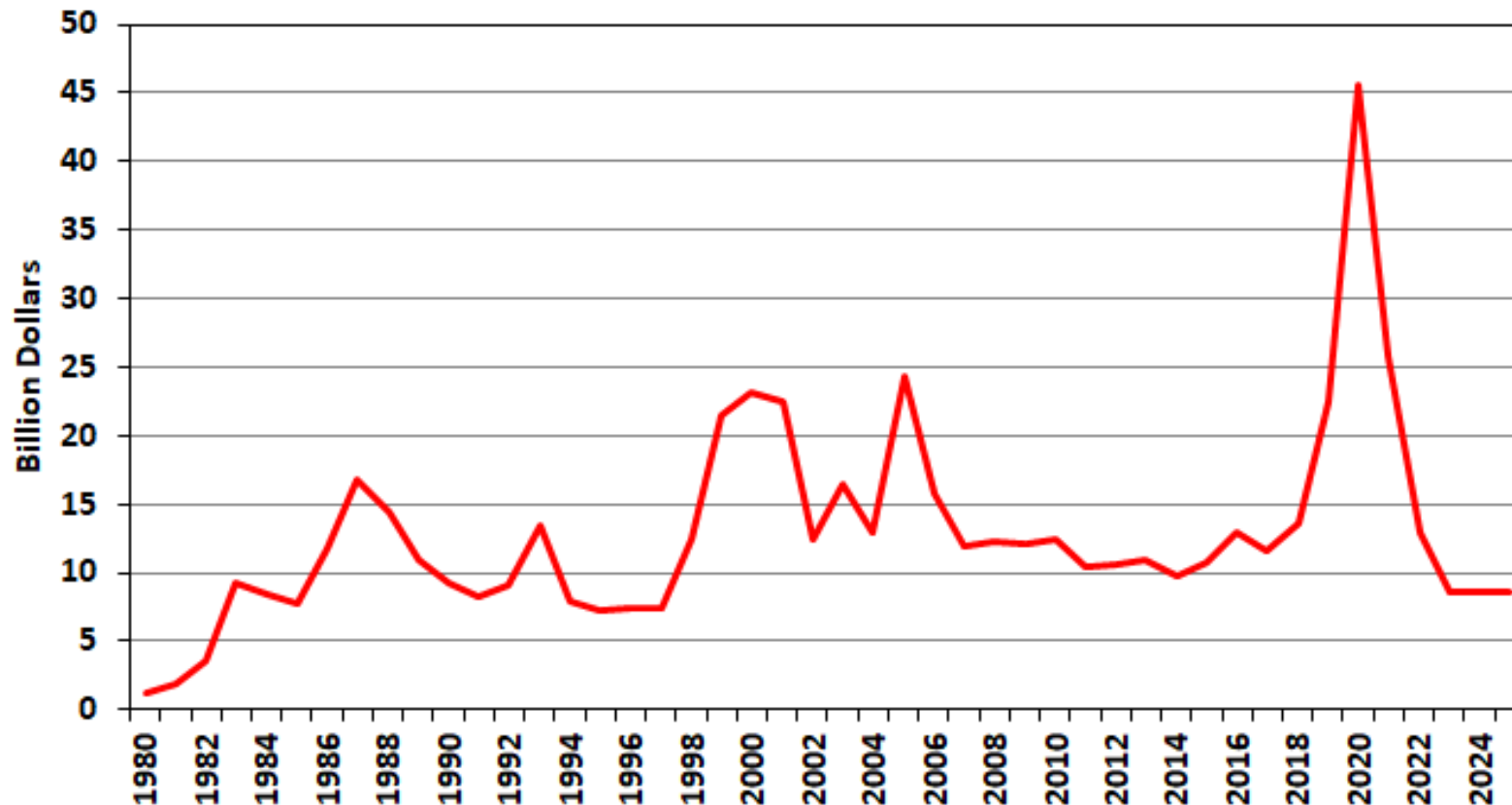
WAEES estimates for soybeans are somewhat lower than FAPRI and USDA.

FAPRI projections include an increase of 2.6 million acres in 2023 area devoted to the largest 11 crops, while WAEES total crop area is flat from 2022.

USDA's cotton area estimate appears low, but cotton prices have been falling.

U.S. Federal Direct Government Payments to Farmers

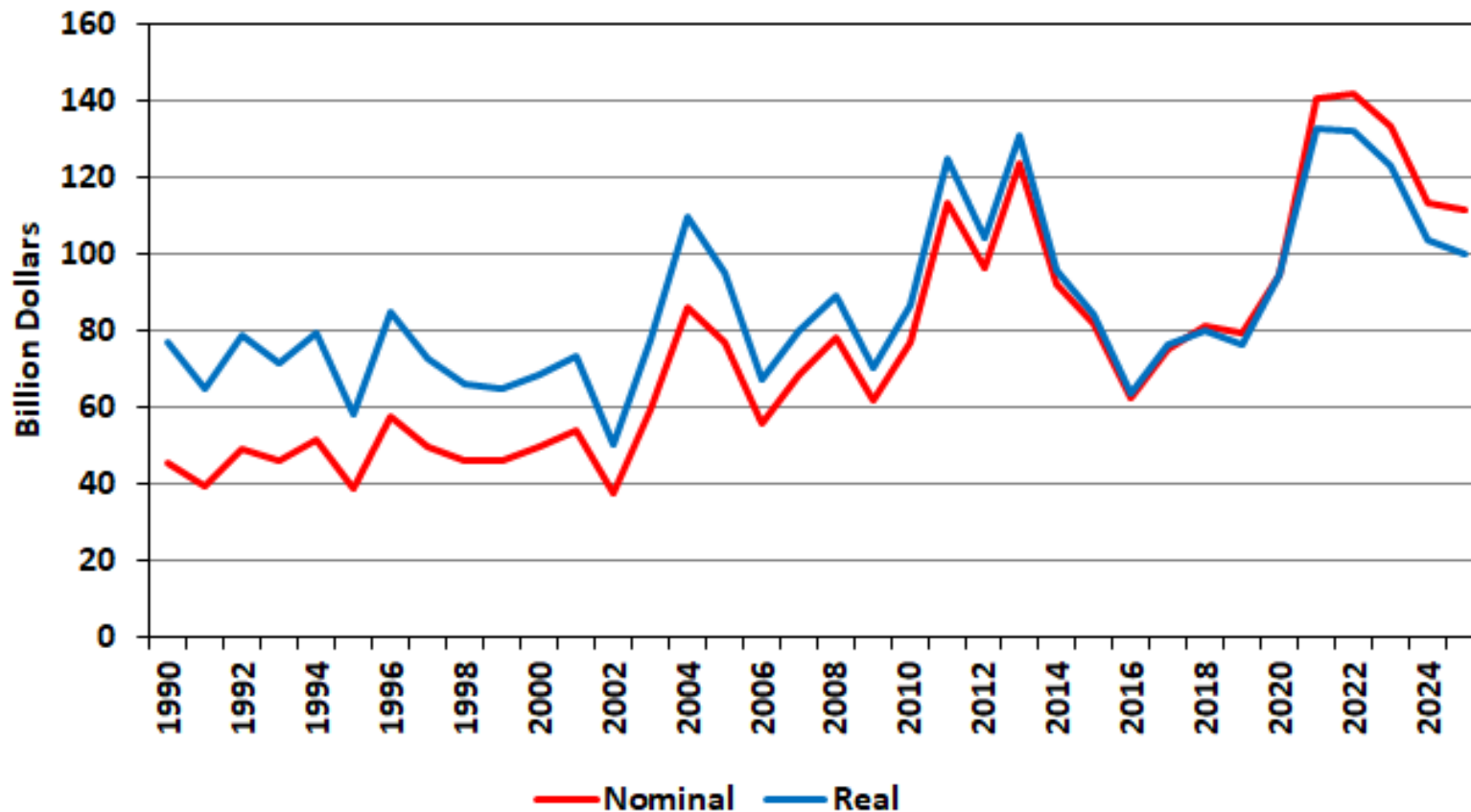
WAEES Nov 2022 Baseline Projections



Projections of government payments do not include possible payments for GHG reductions and/or carbon sequestration.

U.S. Net Farm Income

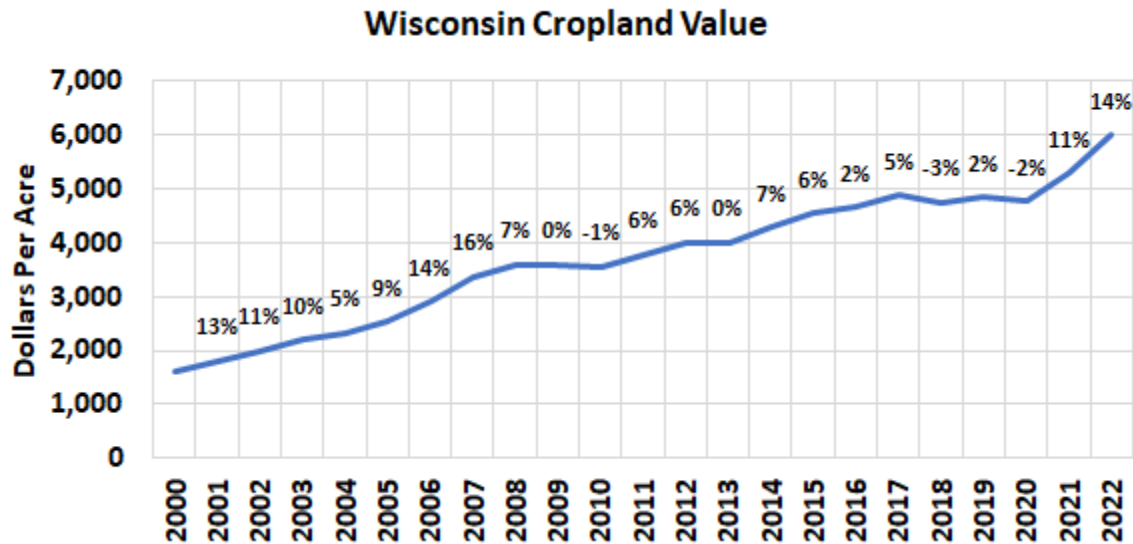
WAEES Nov 2022 Baseline Projections



2022 net farm income expected to reach a new record in nominal terms

Incomes remaining relatively healthy although falling over the next 3 years.

Wisconsin land values higher in the 3rd quarter 2022



Source: USDA-NASS Annual Survey

Land values have grown in recent years, but rising interest rates are likely to slow this growth.

Interest rates are not projected to rise to the levels of the early 1980's, but rising rates will dampen the growth in land values possibly affecting balance sheets.

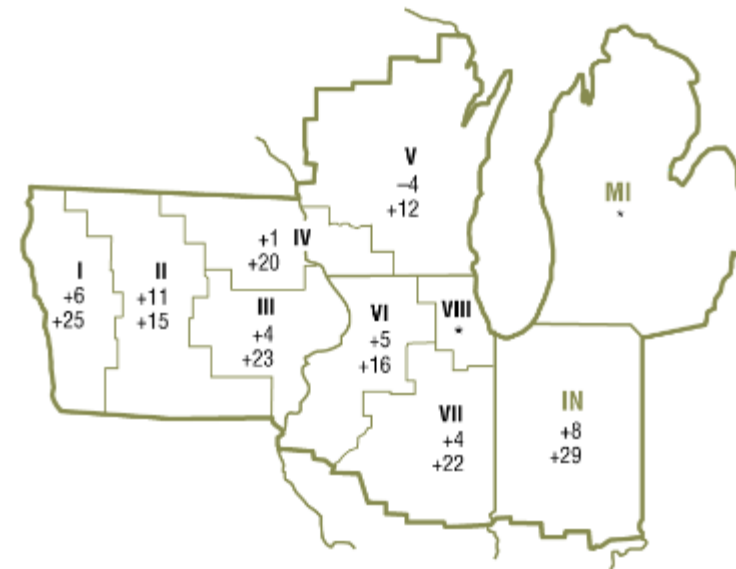
Wisconsin Land Values (Y-o-Y Change)

2022

2nd Quarter -4%

3rd Quarter +12%

Source: Federal Reserve Survey, 7th District, October 1, 2022.



Lending Implications

- ❑ Record level on farm income expected for 2022.
- ❑ Strong price volatility is very likely suggesting farmers need to continue to use risk management tools – crop/livestock insurance are a must and using the futures market to lock in profits on a portion of the crop should be strongly considered (high input costs need to be covered).
- ❑ Cutting edge producers will be micromanaging their operations to insure that each acre and each animal is contributing to their profit margins as well as investigating new revenue stream opportunities to get paid for carbon emission reductions and/or carbon sequestration.
- ❑ Without the Russia/Ukraine war it would seem likely that the fundamentals are leaning towards lower commodity prices – slowdown in economic growth, large forthcoming production from South America, Chinese demand uncertainty, large US crop plantings, etc.
- ❑ Managing debt load and creating cash reserves would be good insurance against the impending roller coaster ride on commodity prices.

Thanks!

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Argentina 2022/23 Crop Area, Yield, and Production

(December 2022 Estimates)

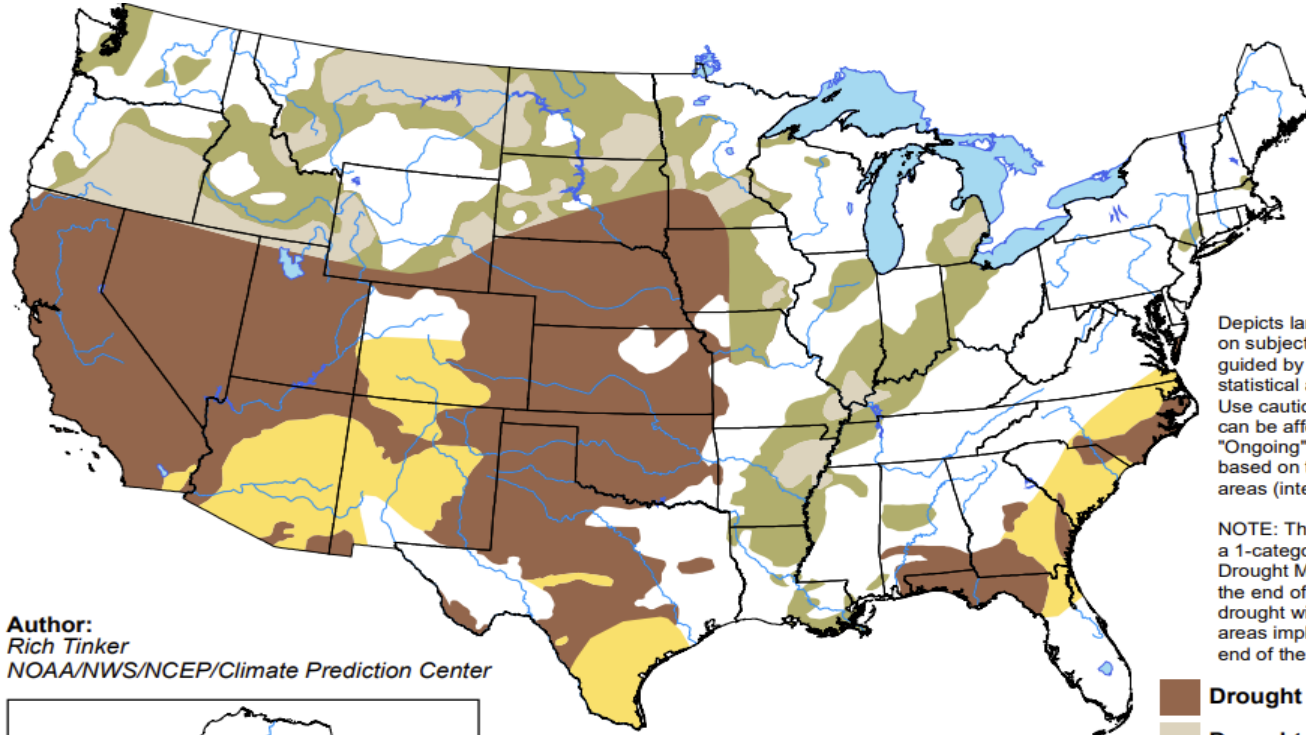
	Official Argentina Source - Bolsa de Cereales						USDA - PSD Database					
	Area Harvested		Yield		Production		Area Harvested		Yield		Production	
	Mil Acres		Bu/Acre		Mil Bu		Mil Acres		Bu/Acre		Mil Bu	
	2021/22	2022/23	2021/22	2022/23	2021/22	2022/23	2021/22	2022/23	2021/22	2022/23	2021/22	2022/23
<i>english units</i>												
Corn	18.4	17.4	111.4	112.8	2,047	1,968	18.3	17.3	110.9	125.2	2,027	2,165
Soybeans	37.7	39.4	45.3	44.2	1,705	1,742	39.3	40.8	41.1	44.6	1,613	1,819
	Area Harvested		Yield		Production		Area Harvested		Yield		Production	
	1000 HA		MT/HA		1000 MT		1000 HA		MT/HA		1000 MT	
	2021/22	2022/23	2021/22	2022/23	2021/22	2022/23	2021/22	2022/23	2021/22	2022/23	2021/22	2022/23
<i>metric units</i>												
Corn	7,440	7,059	6.99	7.08	52,000	50,000	7,400	7,000	7.89	8.02	51,500	55,000
Soybeans	15,243	15,949	2.84	2.77	43,300	44,237	15,900	16,500	2.76	3.00	43,900	49,500

Sources: USDA-FAS, PSD Database, 12/2022, and Bolsa de Cereales, 12/2022.

Weblinks: <https://apps.fas.usda.gov/psdonline/app/index.html#/app/advQuery>
<https://www.bolsadecereales.com/estimaciones-informes>

U.S. Seasonal Drought Outlook

Valid for January 1 – March 31, 2022

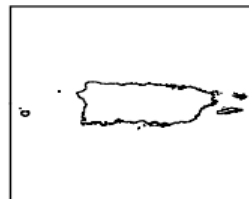
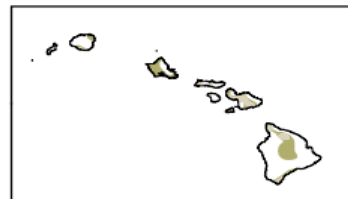
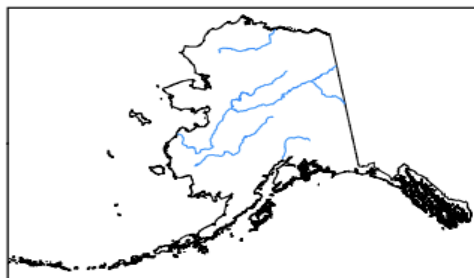






Conditions projected to be dry for early planting phase

Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

Author:
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NOAA/NWS/NCEP/Climate Prediction Center

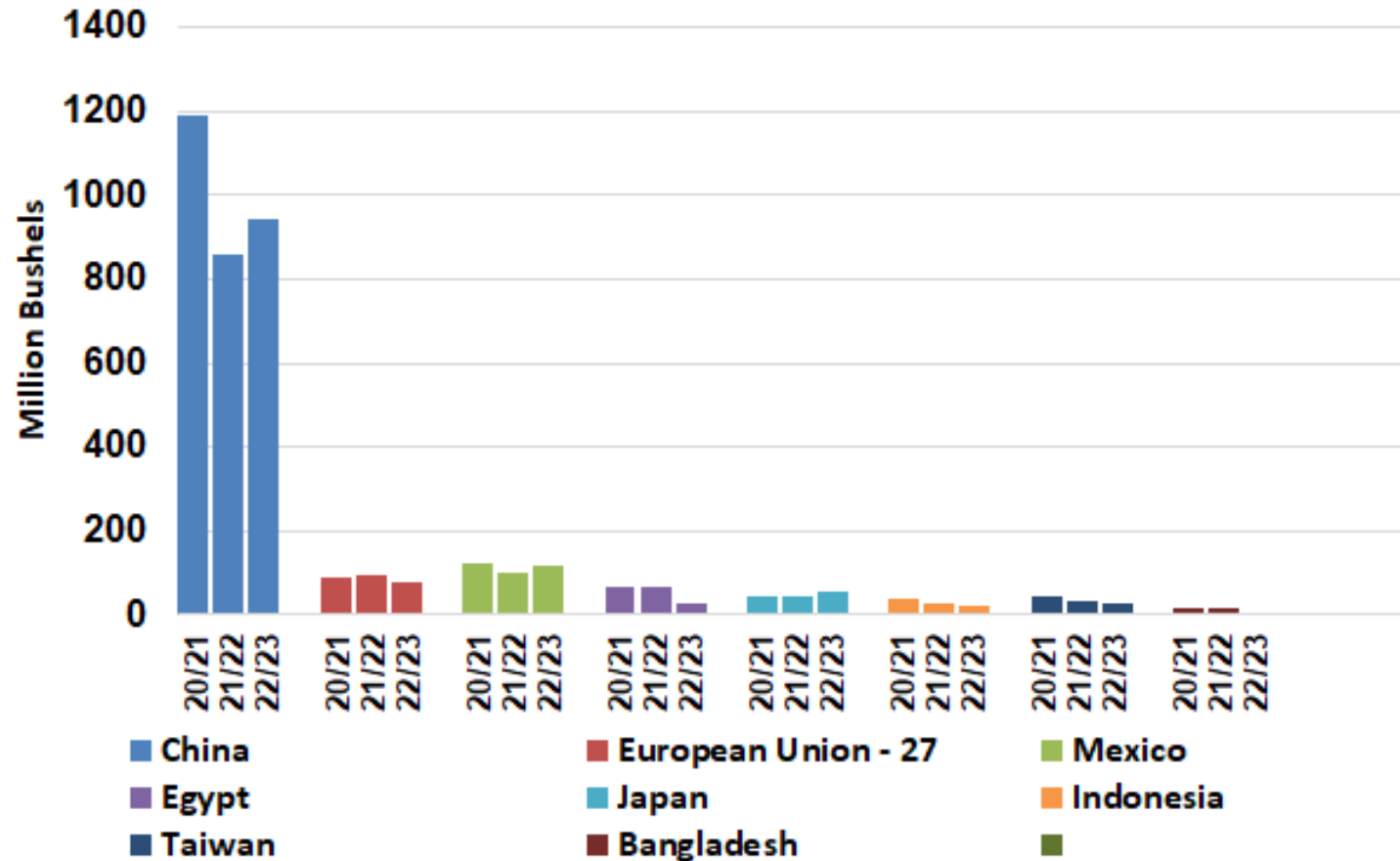


-  Drought persists
-  Drought remains but improves
-  Drought removal likely
-  Drought development likely



<http://go.usa.gov/3eZ73>

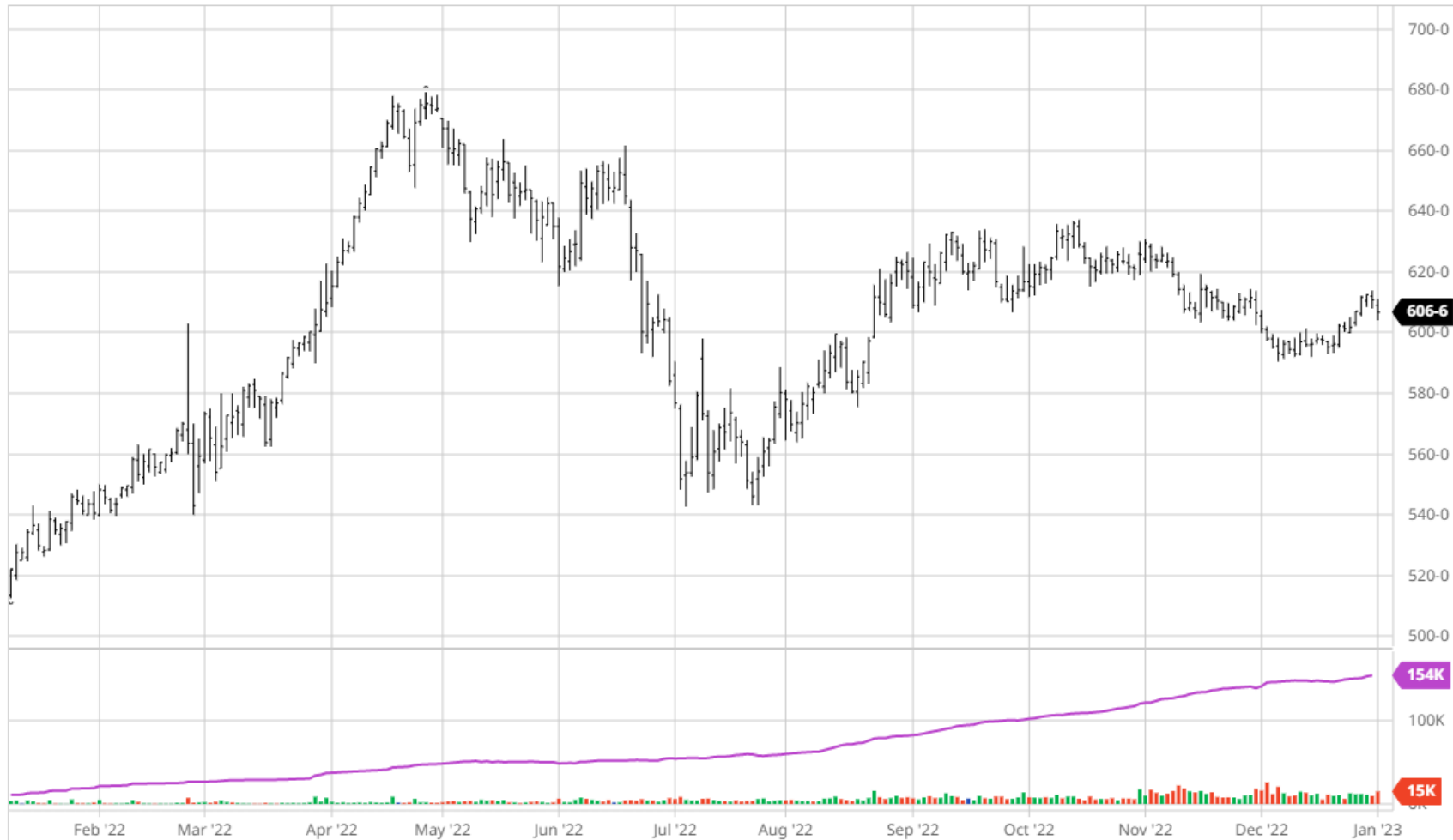
Accumulated Soybean Exports and Outstanding Sales (Sep 1, 2021 to Dec 23, 2021)



Source: USDA-FAS, US Export Sales, Accessed 1-3-2023

December 2023 Corn Futures

(Barchart (CME) 1-3-2023)



November 2023 Soybean Futures

Source: CBOT: ZSX23 1-3-2023

