

Prices, Costs, and Profitability: Where are Markets Headed and How Can Risk be Mitigated

February 3, 2023

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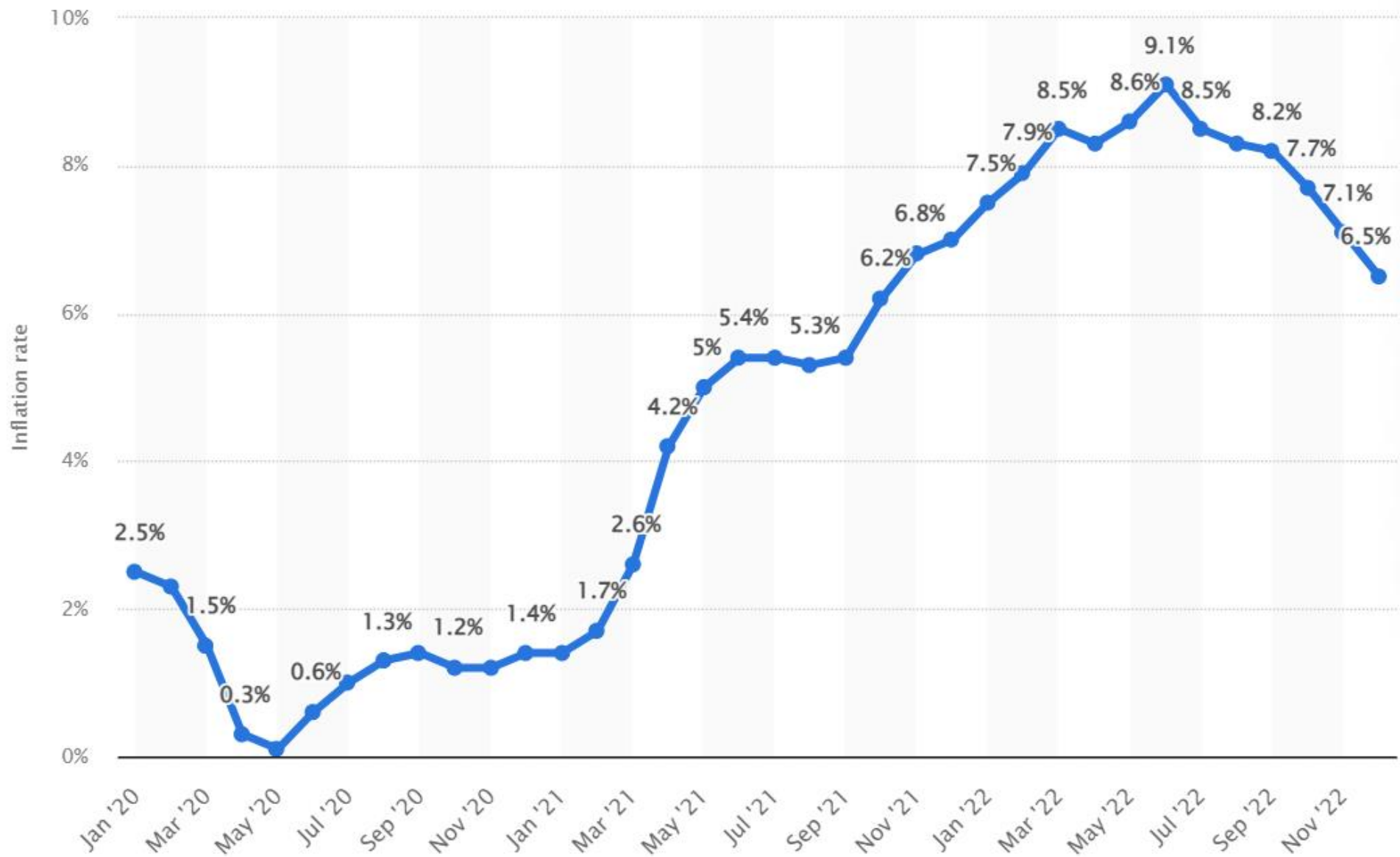
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Overview

- Input Costs
- Corn and Soybean Prices
- Profitability
- Marketing and Risk Management





Monthly Inflation Rate 2020- 2022

Source: <https://www.statista.com/statistics>

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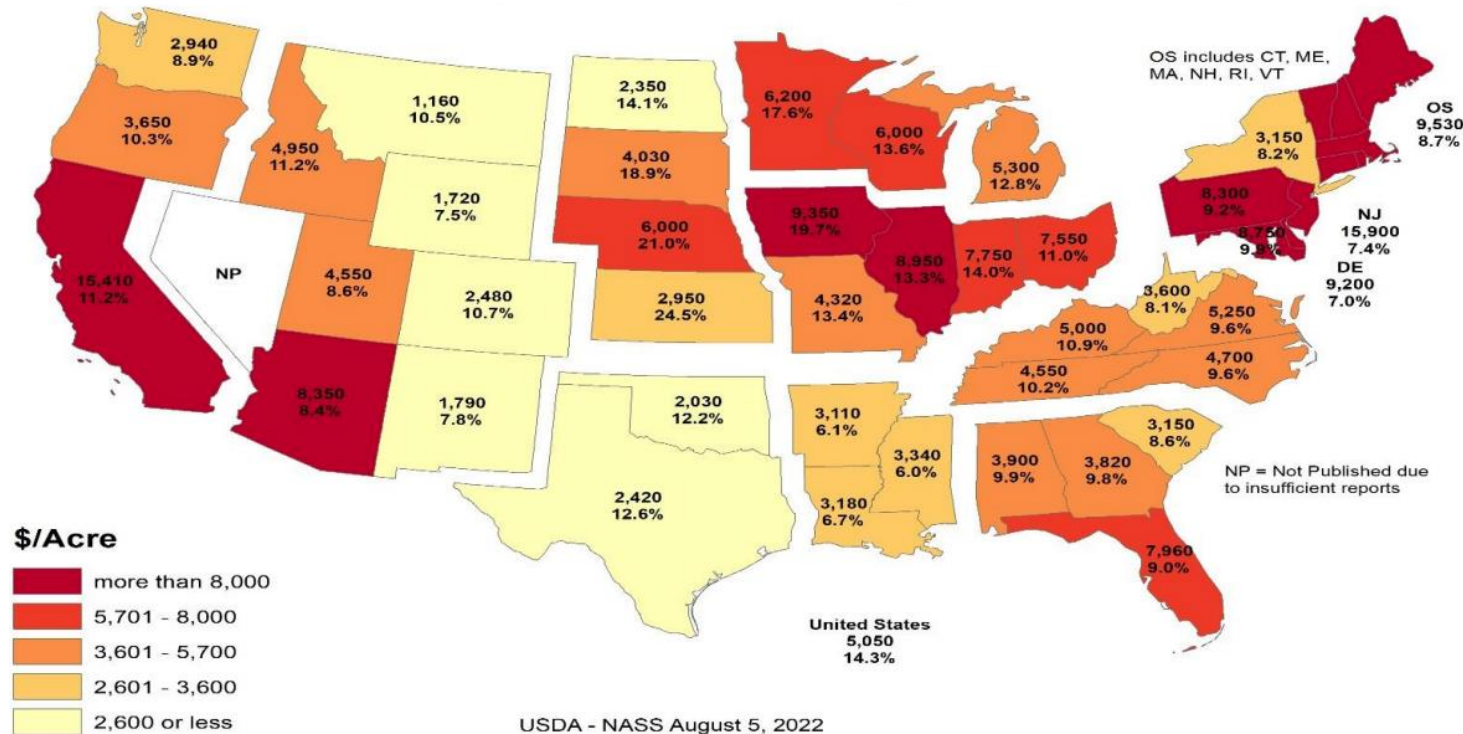
Inputs Prices

- Land prices and rents are up.
 - Prices for most crop protection products and fertilizers are down from highs but remain elevated relative to 2020.
 - Interest rates are up substantially.
 - Diesel fuel and machinery cost is up.
 - Labor and trucking shortages.
-
- Will prices be cheaper between now and planting?

Land and Cash Rental Rates

2022 Cropland Value by State

Dollars per Acre and Percent Change from 2021



USDA - NASS August 5, 2022

In Tennessee, cropland cash rents averaged **\$111/acre** (\$21/acre to \$187/acre). KY \$156/acre (\$21/acre to \$231/acre). NASS.

1/4 share:

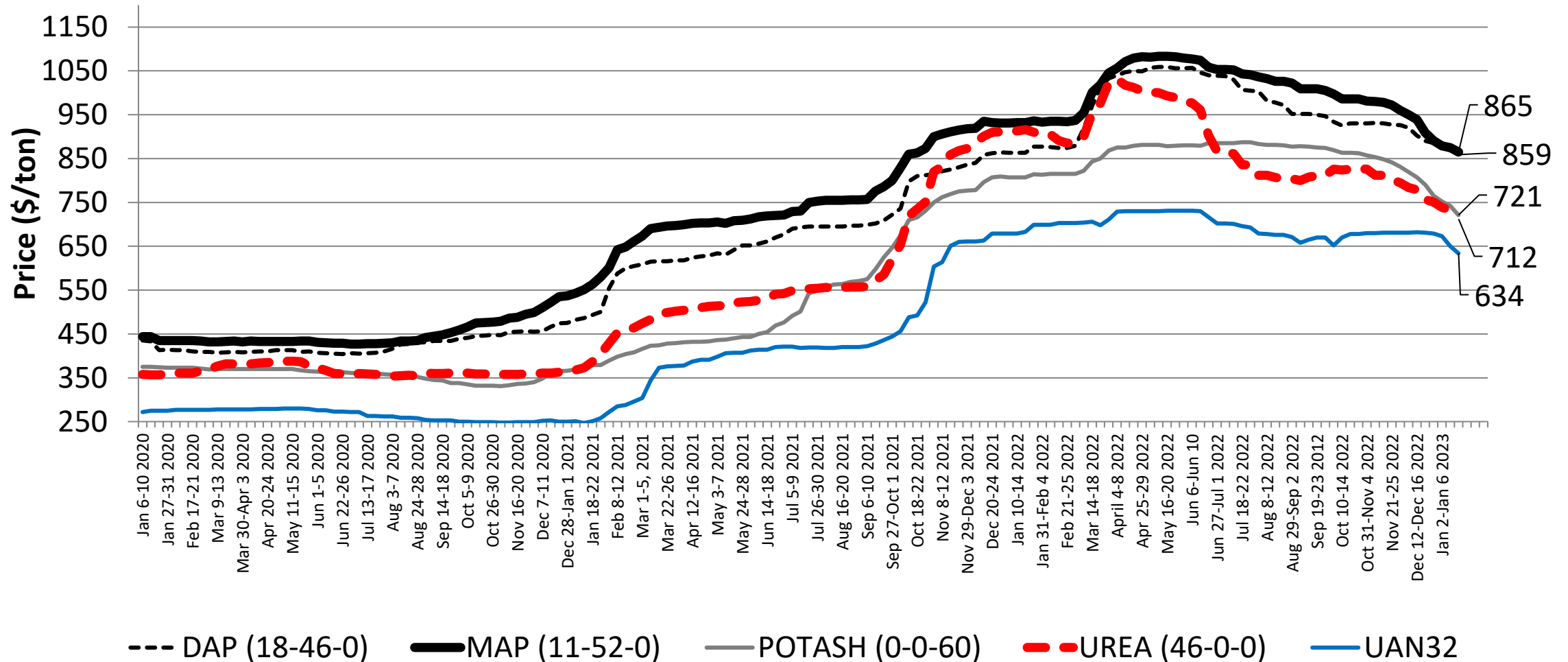
Corn: 200 bu/acre at \$6.00/bu ~ **\$300/acre**

Soybeans: 60 bu/acre at \$14.00 ~ **\$210/acre**

Land Values 2022 Summary (August 2022)

USDA, National Agricultural Statistics Service

Select Fertilizer Prices, 2020-2023



--- DAP (18-46-0)

— MAP (11-52-0)

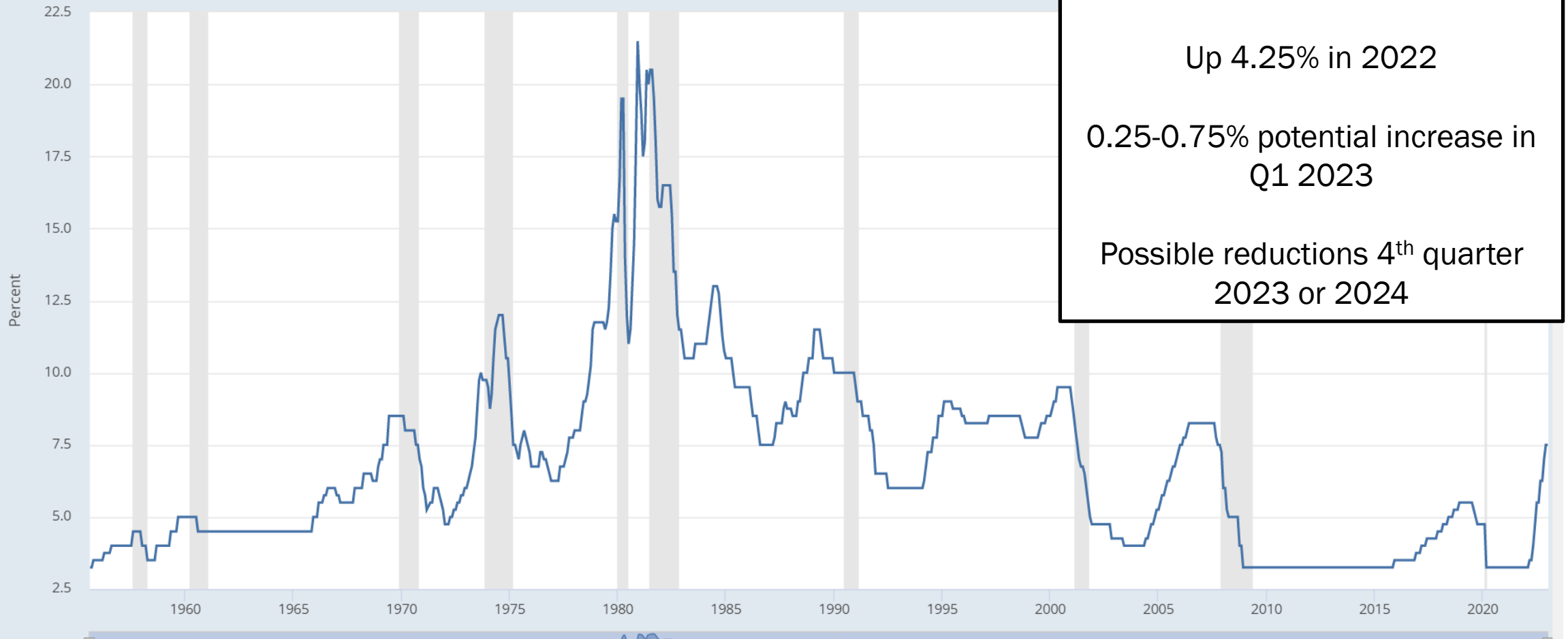
— POTASH (0-0-60)

- - - UREA (46-0-0)

— UAN32

Bank Prime Loan Rate

FRED  — Bank Prime Loan Rate



Source: <https://fred.stlouisfed.org/series/DPRIME>

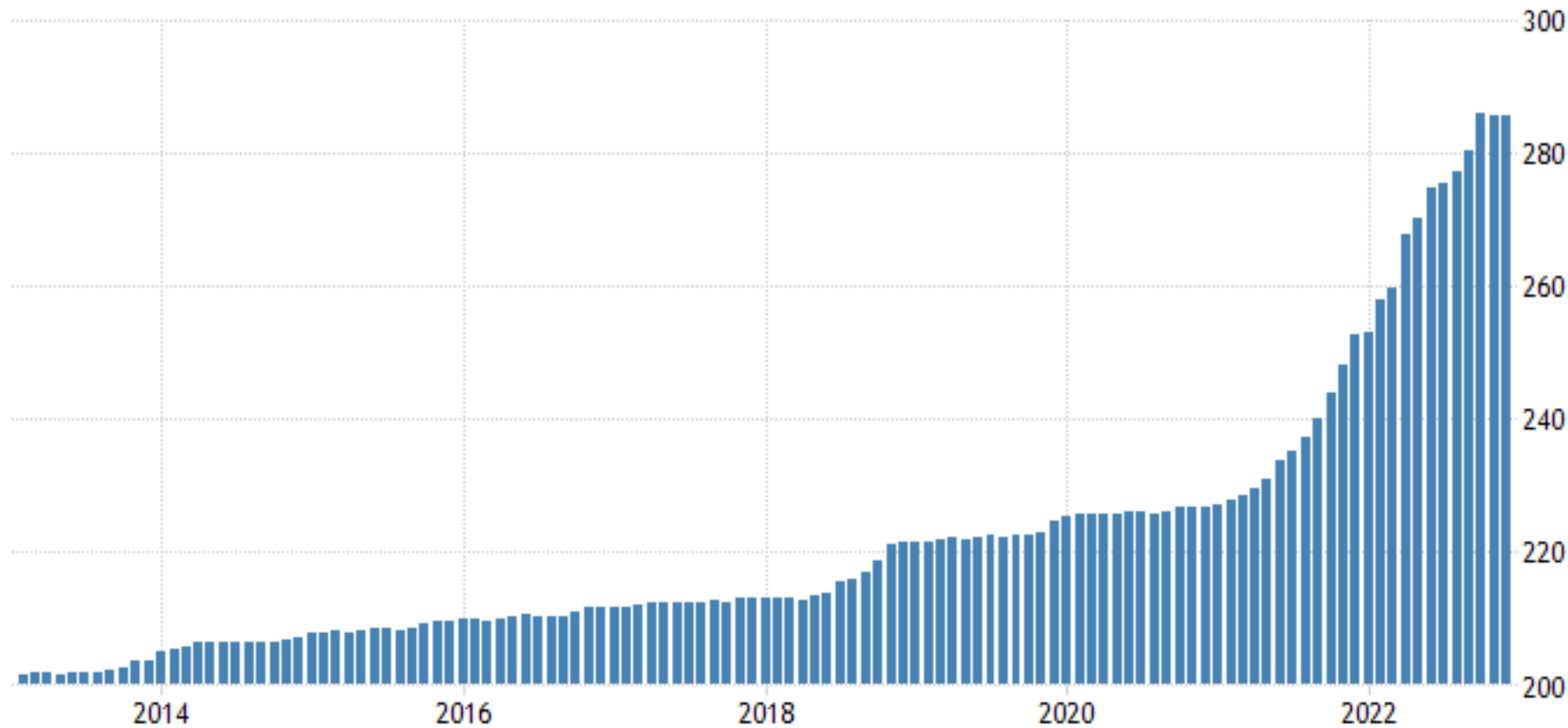
Rising interest rates will cost you money

\$1,250,000 Operating Utilization

Interest Rate	3.25%	5.5%	7.5%
Interest	\$40,750	\$68,750	\$93,750
Change	-	\$28,000	\$53,000
Increase (\$/acre)	-	\$11.20	\$21.20

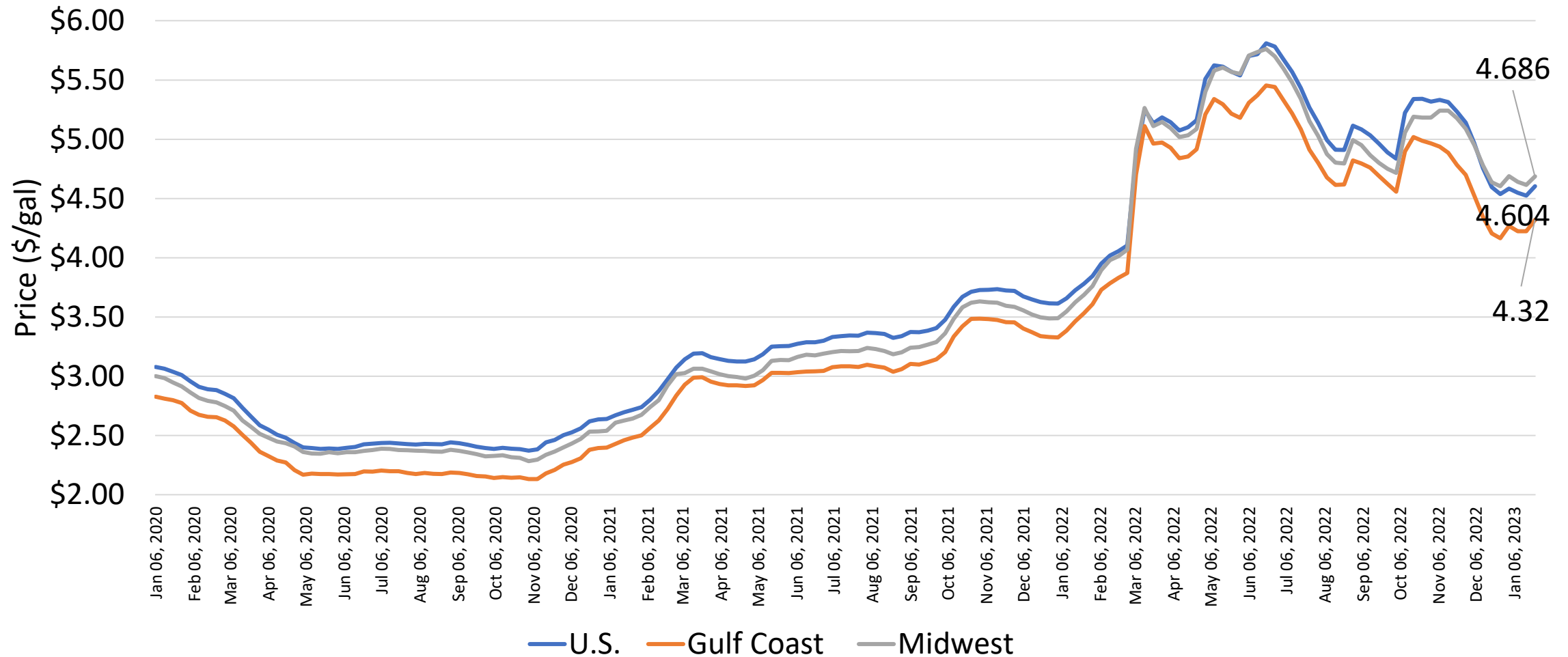
Assumptions: 2,500 acres.

Producer Price Index by Industry: Farm Machinery and Equipment Manufacturing was 285.735 Index Dec 1982=100 in December of 2022

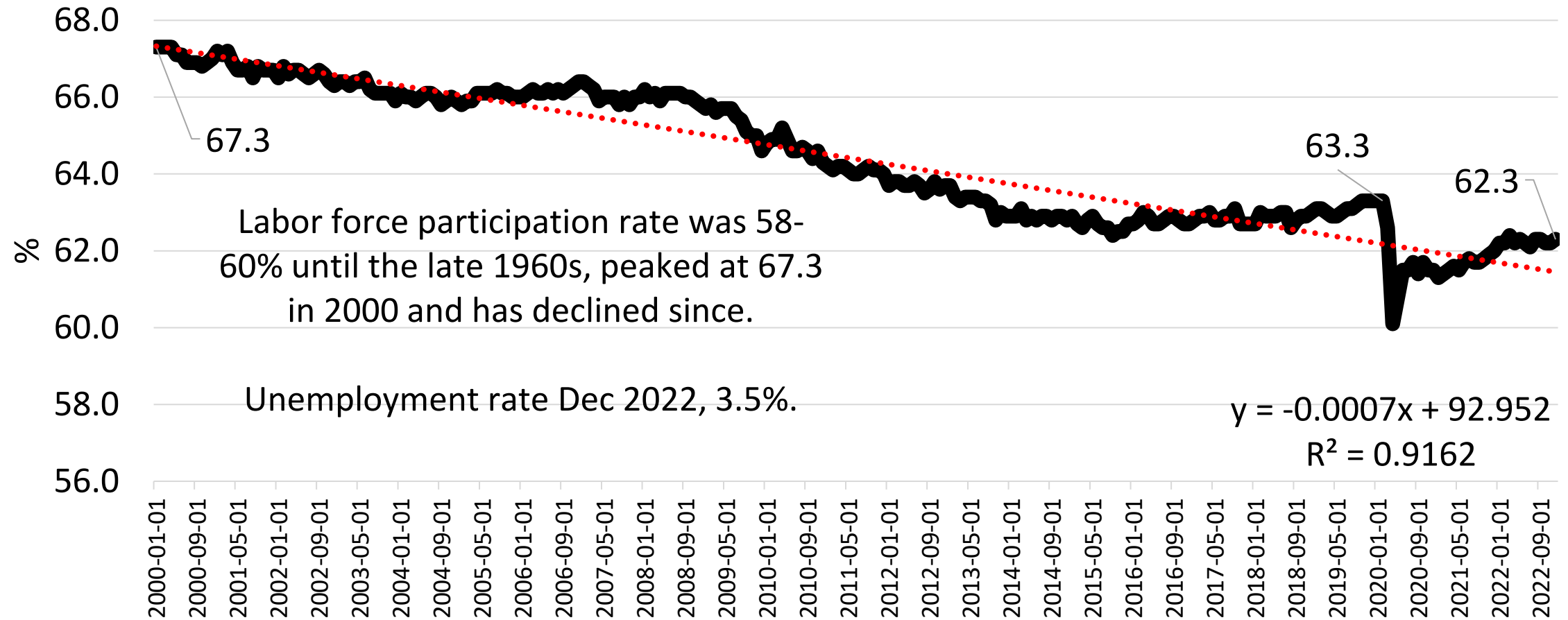


Farm machinery in December 2022 was up ~ 30% compared to 2020.

Weekly Retail No 2 Diesel Prices (\$/gal), 2020-2023



U.S. Labor Force Participation Rate, 2000-2022



Source: <https://fred.stlouisfed.org/series/CIVPART>

Reducing Input Costs

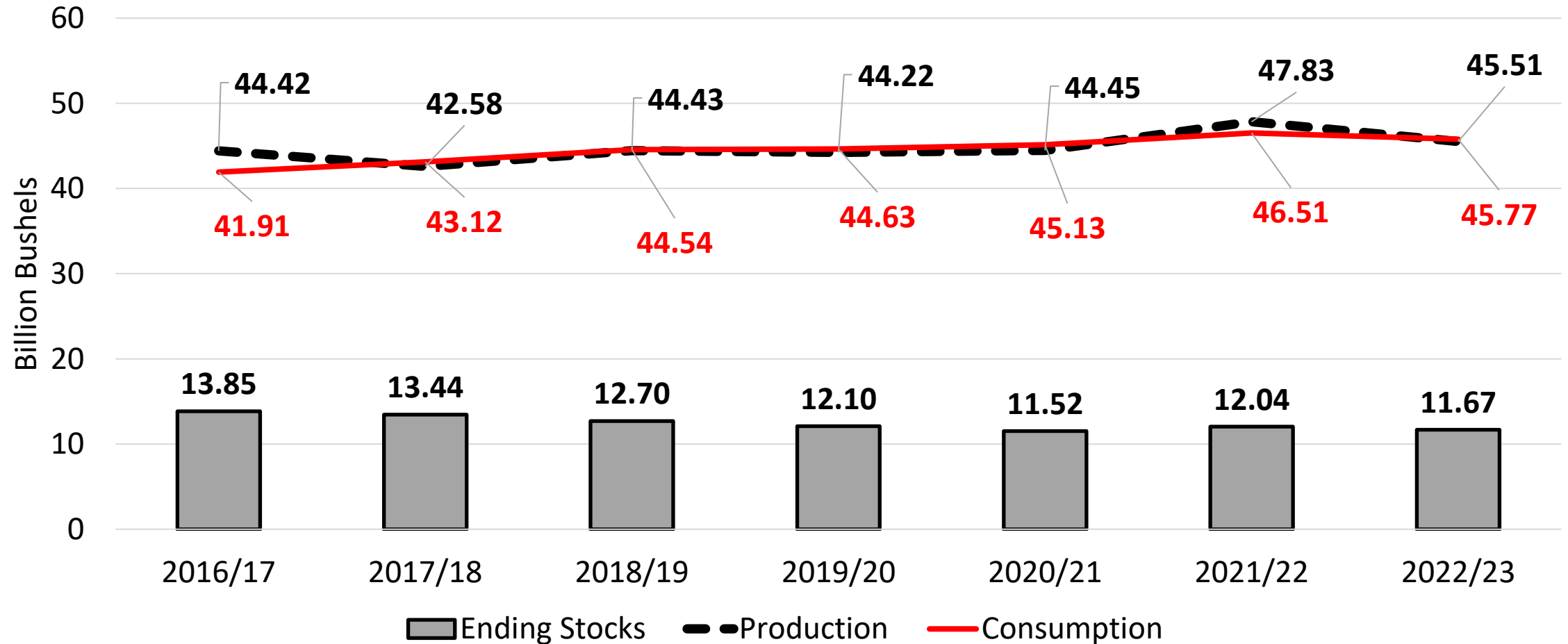
- Soil testing – know what you have.
- Alternative nutrient sources – poultry litter, manure, other.
- Eliminate products that are not contributing to sufficient yield gains relative to costs.
 - Max returns to N.
- Evaluate financing alternatives.
- Crop rotation.
 - High input cost versus low input cost commodities.
 - Profitability comparison and manage price risk.
- Crop share leases versus cash rent – balance the risk/reward.



Corn and Soybeans

SUPPLY AND DEMAND

Global Corn Production, Consumption, and Ending Stocks, 2016/17 to 2022/23

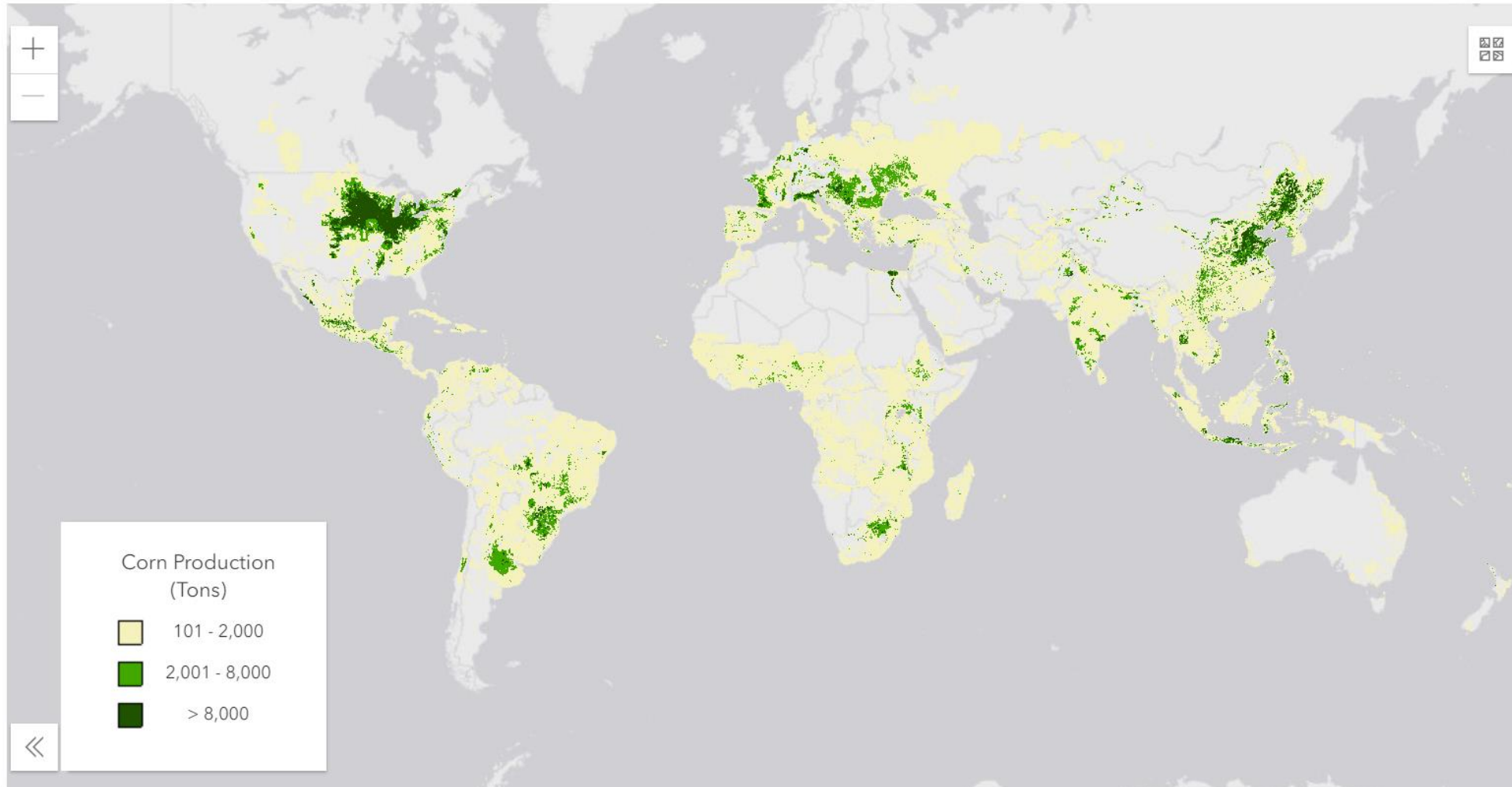


Data Source: <https://apps.fas.usda.gov/psdonline/app/index.html#/app/advQuery>

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Global Corn Production

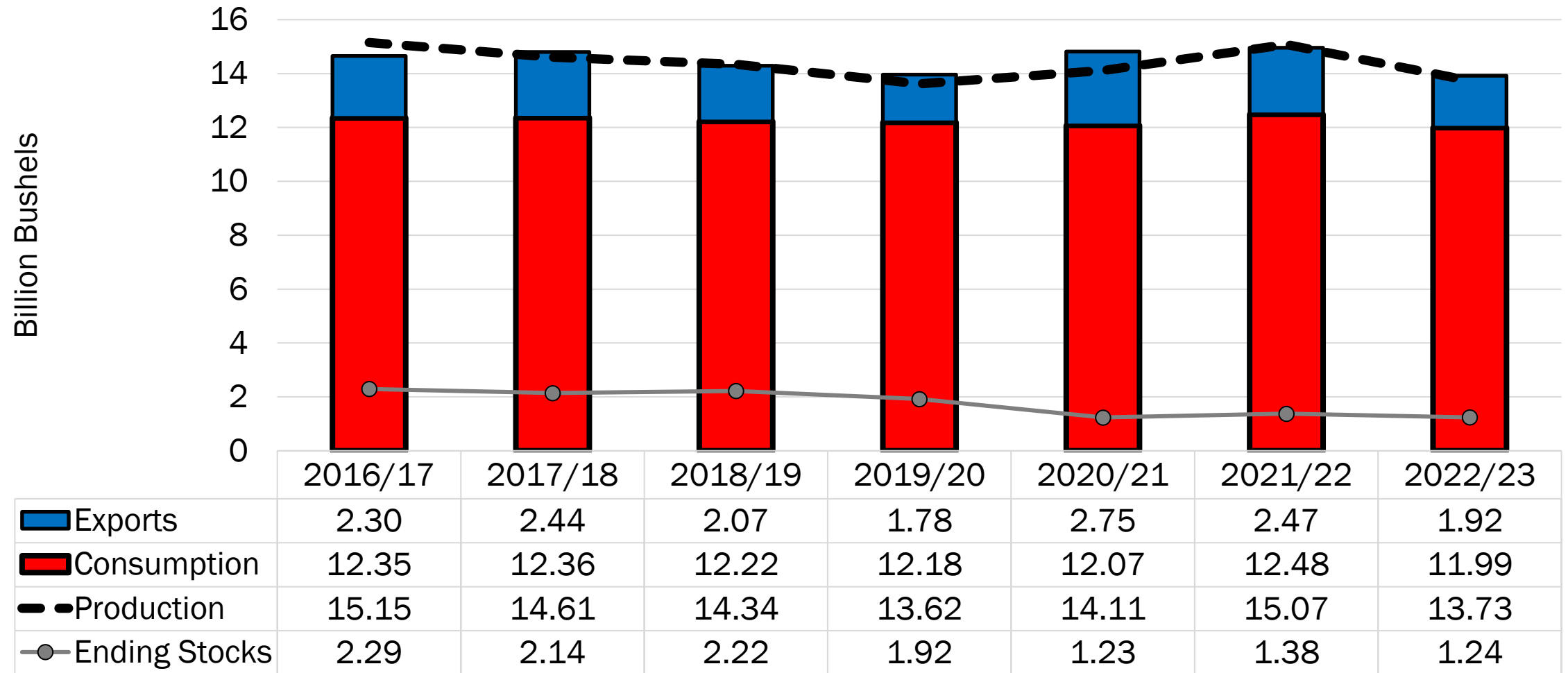
Corn Map Explorer



Source: <https://ipad.fas.usda.gov/cropexplorer/cropview/commodityView.aspx?cropid=0440000>

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U.S. Corn Production, Consumption, Exports, Ending Stocks, 2016/17 to 2022/23



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

U.S. Corn, 2021 & 2022

	2021/22	2022/23 Projected	2022/23- 2021/22
Planted (Million)	93.3	88.6	-4.7
Harvested (Million)	85.3	79.2	-6.1
U.S. Avg. Yield (Bu/Acre)	176.7	173.3	-3.4
Beg. Stocks	1,235	1,377	142
Production	15,074	13,730	-1,344
Imports	24	50	26
Total Supply	16,333	15,157	-1,176
Feed and Residual	5,718	5,275	-443
Ethanol	5,326	5,275	-51
Food, Seed & Industrial	1,440	1,440	0
Exports	2,471	1,925	-546
Total Use	14,956	13,915	-1,041
U.S. Ending Stocks	1,377	1,242	-135
Foreign Stocks	10,668	10,428	-240
U.S. Avg. Season Price (\$/Bu)	\$6.00	\$6.70	\$0.70
U.S. Stocks/Use	9.21%	8.93%	-0.28%

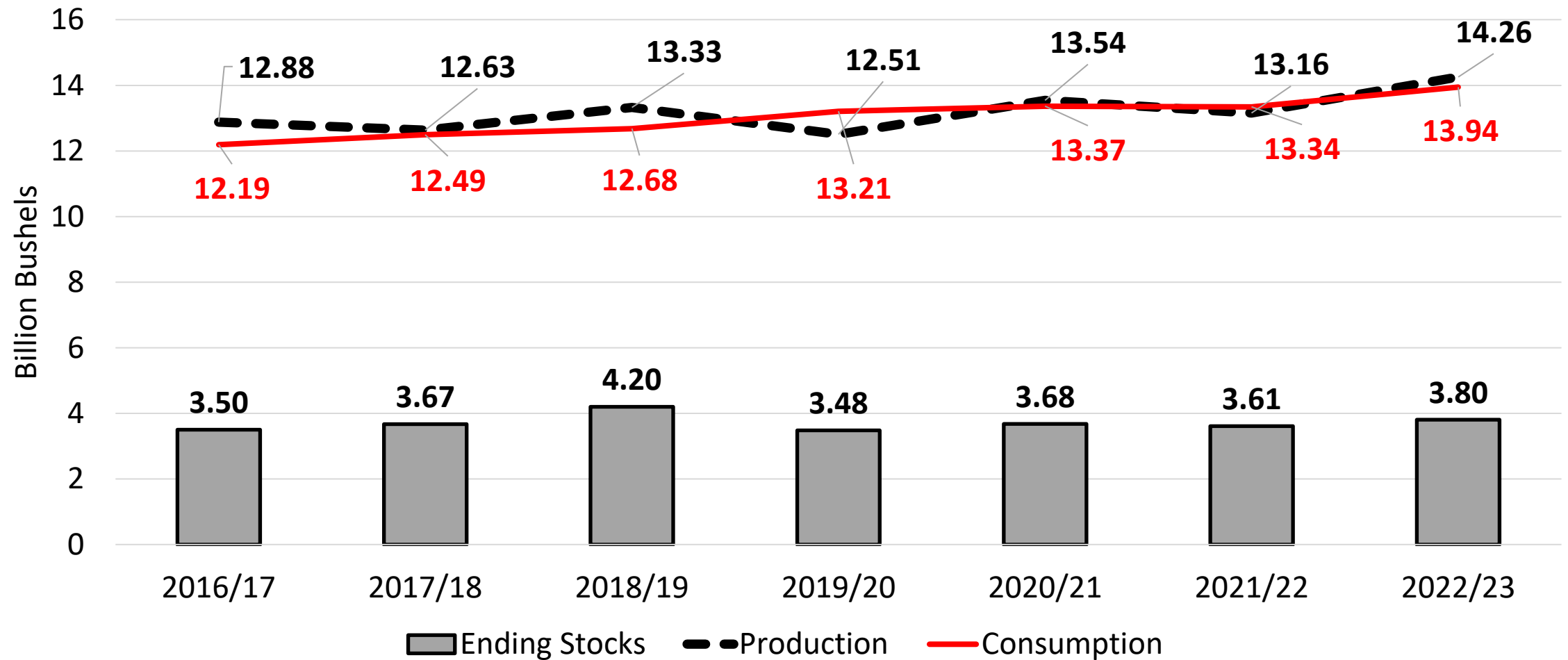
Data Source: <https://apps.fas.usda.gov/psdonline/app/index.html#/app/advQuery>

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Corn Supply and Demand

- Russia's invasion of Ukraine continues to influence grain, energy, and fertilizer markets.
- Global economic forces continue to exert a strong influence in agricultural markets.
- U.S. ending stocks are lower than last year with stocks-to-use projected at 9%.
- Projected planted acreage in 2023?

Global Soybeans Production, Consumption, and Ending Stocks, 2016/17 to 2022/23

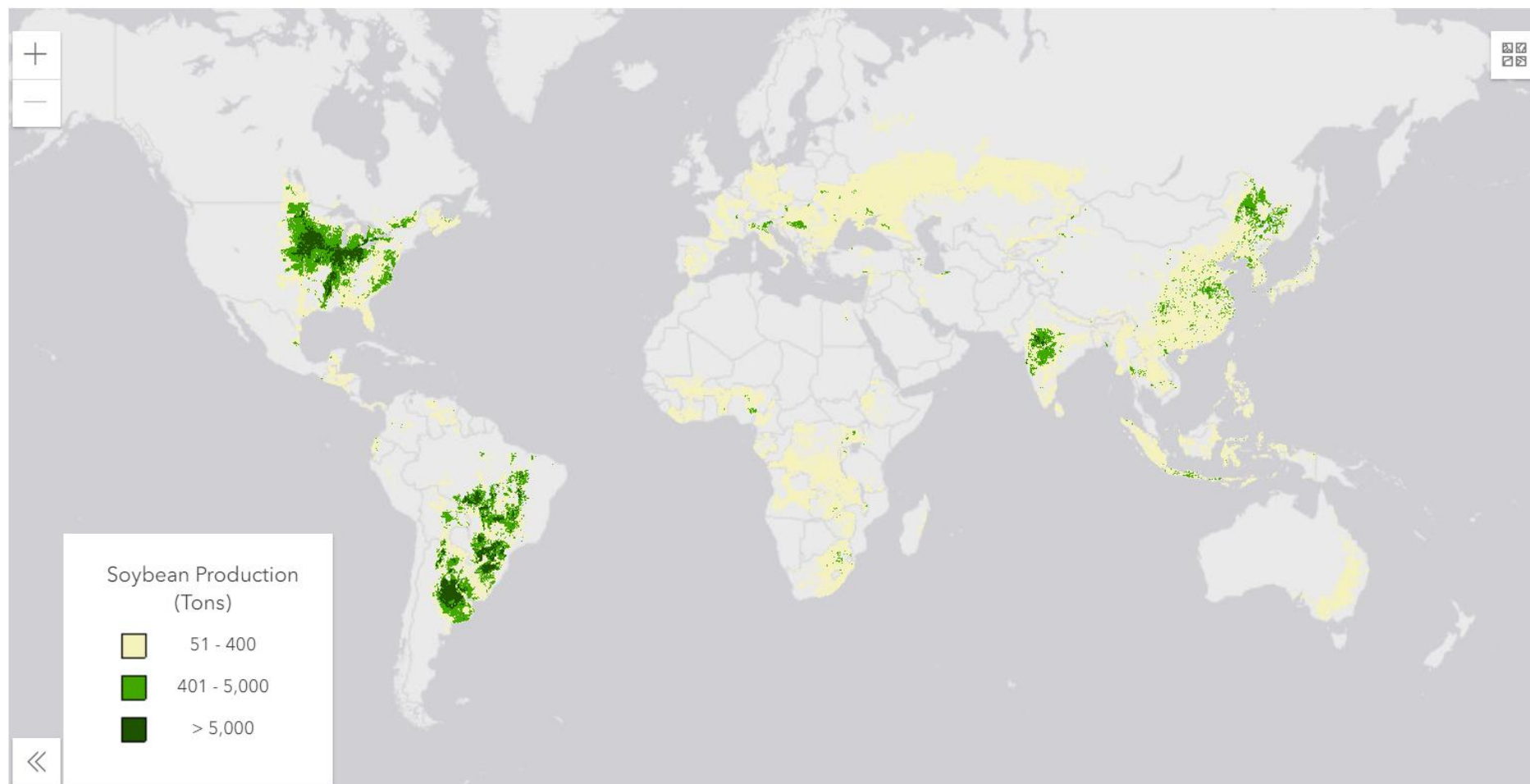


Data Source: <https://apps.fas.usda.gov/psdonline/app/index.html#/app/advQuery>

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Global Soybean Production

Soybean Map Explorer



Source: <https://ipad.fas.usda.gov/cropexplorer/cropview/commodityView.aspx?cropid=0440000>

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Global Drought Conditions

[Daily SPI \(CMORPH\)](#) [Monthly SPI \(GPCC\)](#) [Vegetation Health Index](#)

CMORPH (CPC MORPHing technique) produces global precipitation analyses at very high spatial and temporal resolution. This technique uses precipitation estimates that have been derived from low orbiter satellite microwave observations exclusively, and whose features are transported via spatial propagation information that is obtained entirely from geostationary satellite IR data.

This map shows the 3-month Standardized Precipitation Index (SPI) and is updated daily with a delay of 2-3 days. [Learn more.](#)

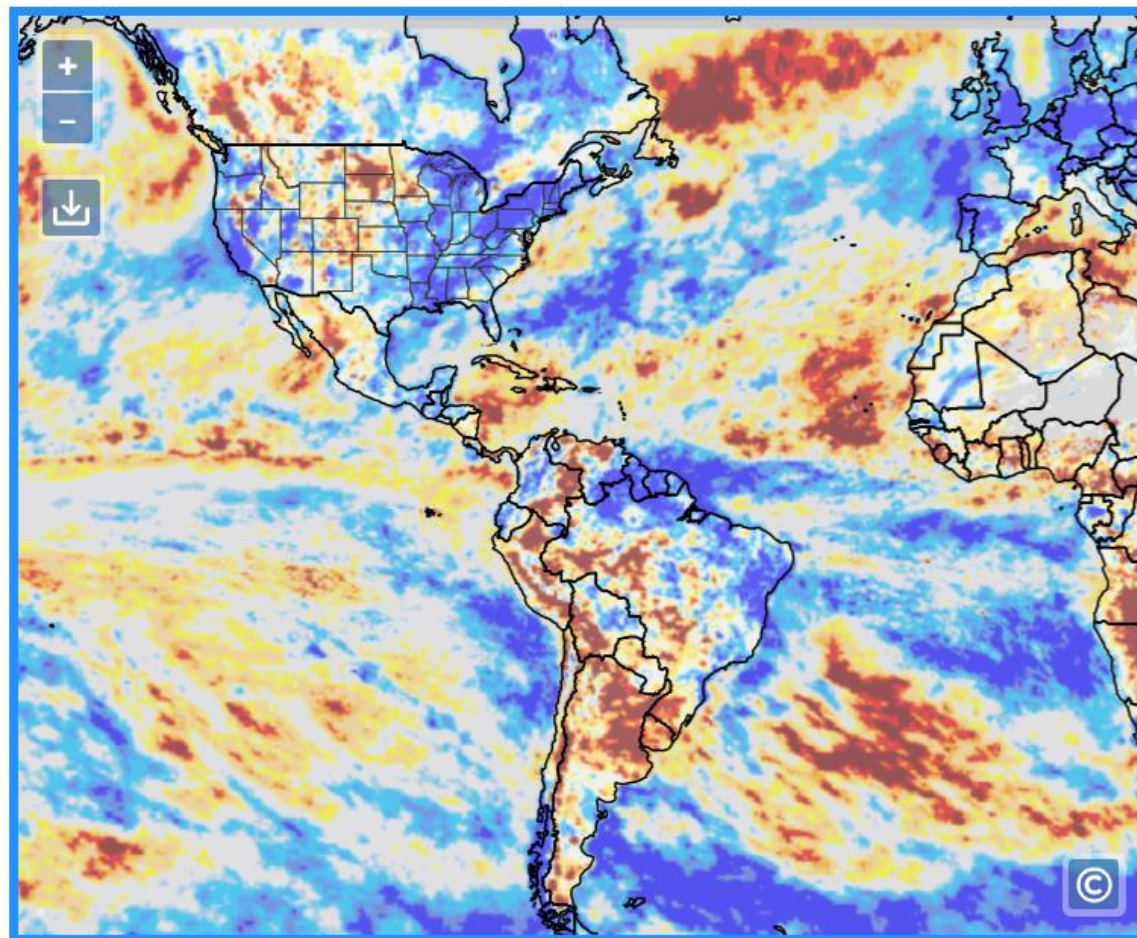
Drought Categories



Wetness Categories

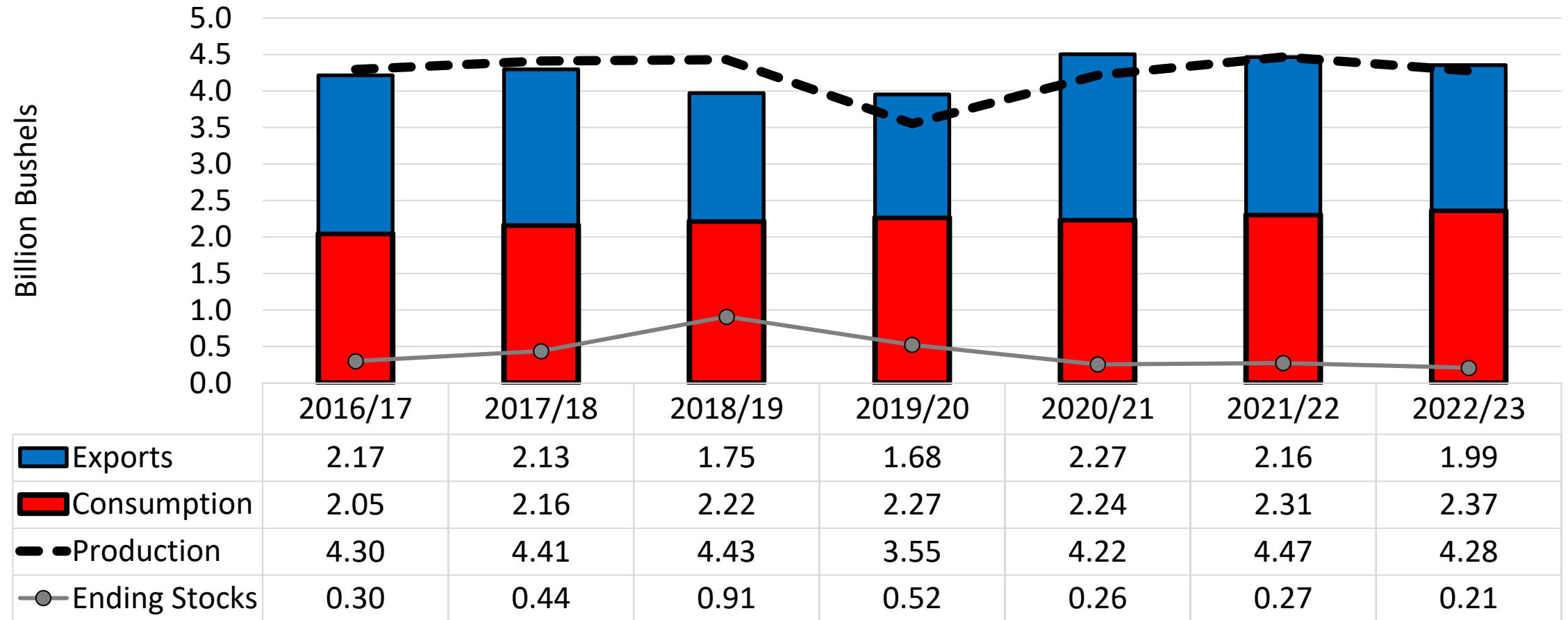


Source(s): [CPC](#)



Updates Daily - 01/15/23

U.S. Soybeans Production, Consumption, Exports, Ending Stocks, 2016/17 to 2022/23



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

U.S. Soybean, 2021 & 2022

	2021/22	2022/23 Projected	Change 2022/23- 2021/22
Planted (Million)	87.2	87.5	0.3
Harvested (Million)	86.3	86.3	0.0
U.S. Avg. Yield (Bu/Acre)	51.7	49.5	-2.2
Beg. Stocks	257	274	17
Production	4,465	4,276	-189
Imports	16	15	-1
Total Supply	4,738	4,566	-172
Crushing	2,204	2,245	41
Exports	2,158	1,990	-168
Seed and Residual	103	120	17
Total Use	4,464	4,355	-109
U.S. Ending Stocks	274	210	-64
Foreign Stocks	3,334	3,594	260
U.S. Average Season Price (\$/Bu)	\$13.30	\$14.20	\$0.90
U.S. Stocks/Use	6.14%	4.82%	-1.32%

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

Soybean Supply and Demand

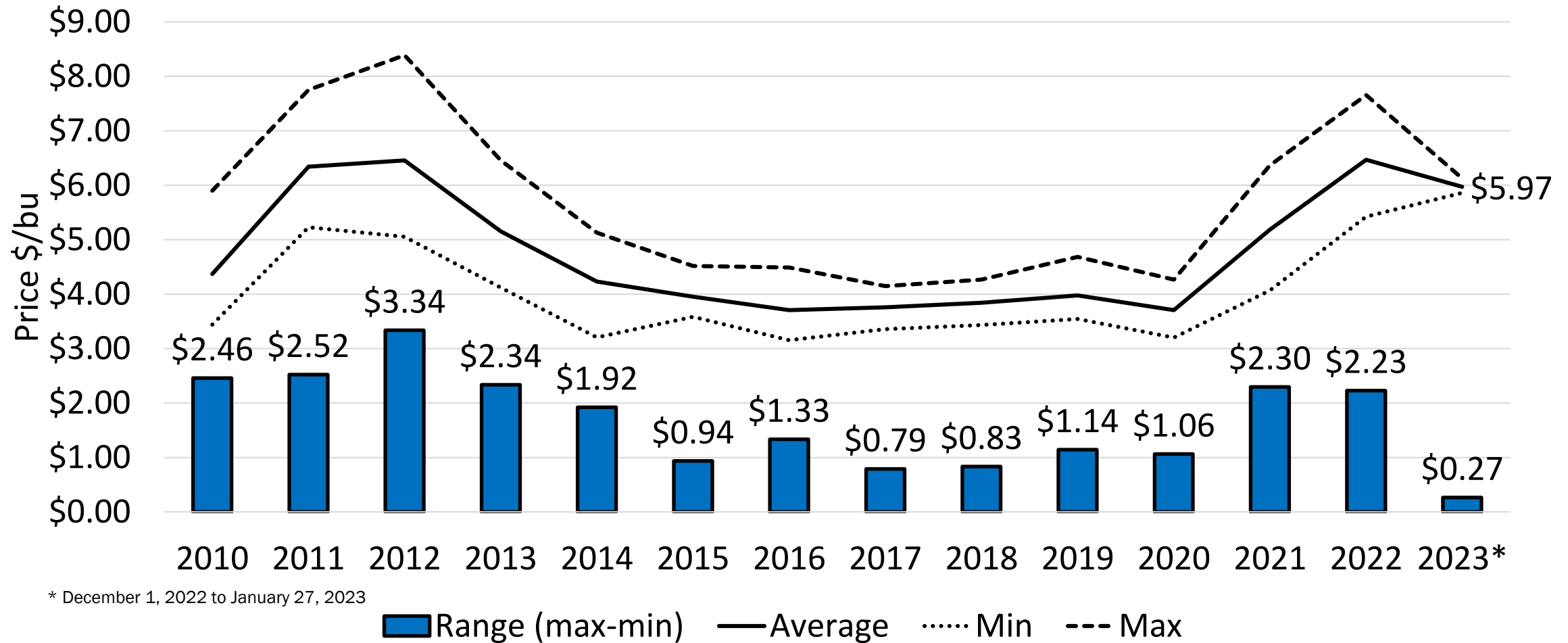
- South American production and exports.
- Global economic forces influence on agricultural markets in 2023.
- U.S. ending stocks are projected lower, global stocks project higher.
- Increased U.S. domestic crushing.
- Projected planted acreage in 2023?



Old Crop - New Crop

PRICES

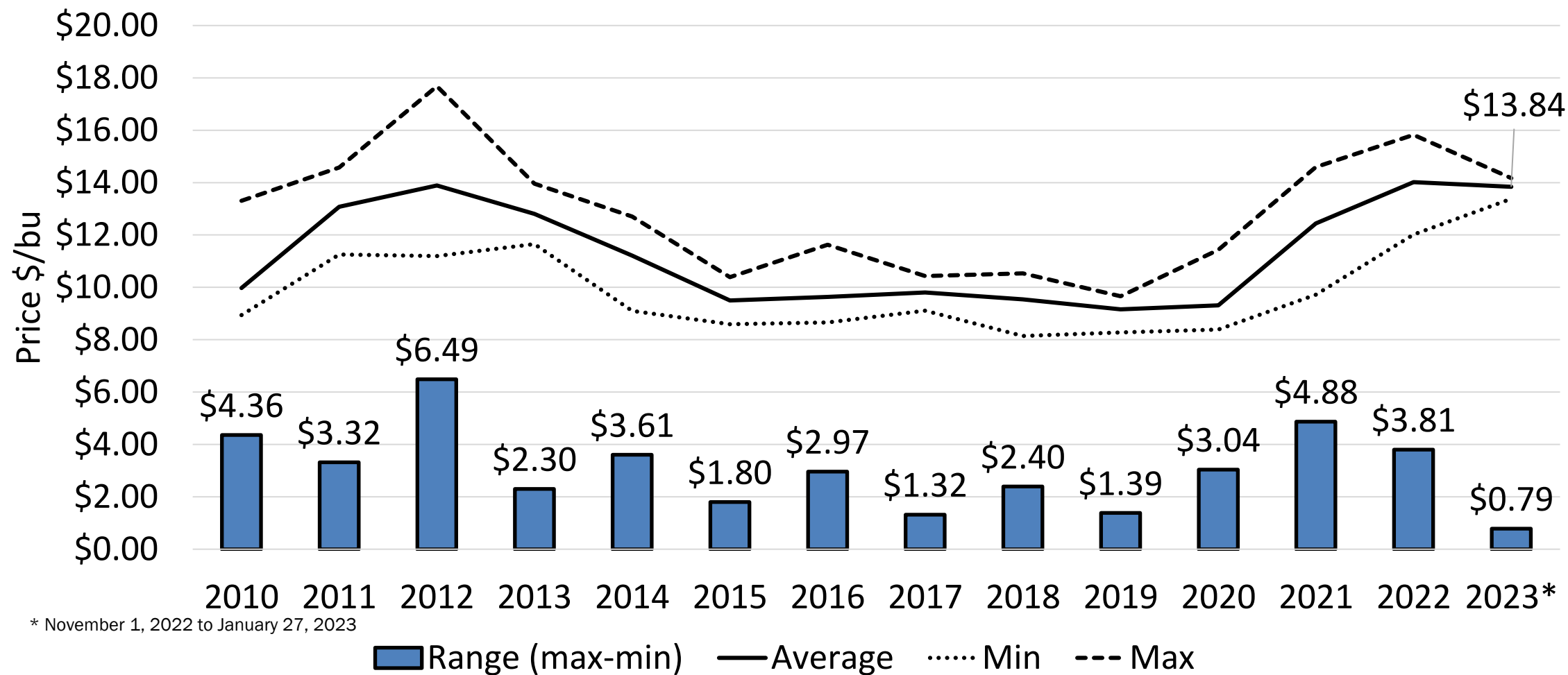
December Corn Futures Contract, Dec 1 to Expiration, 2010-2023*



Corn March and December Futures Contract



November Soybean Futures Contract, Nov 1 to Expiration, 2010-2023*



Soybean March and November Futures Contract

Soybean (ZSX23) 1367-2 -0-2 (-0.02%) 1366-6 x 7 1367-4 x 11 21:59 CT [CBOT] DELAYED

Q ZSX23

1D 5D 1M 3M 6M 9M 1Y 2Y 3Y 5Y 10Y 20Y MAX

Daily 1Y

+Study

Tools

Settings

Cor

Contract

Last

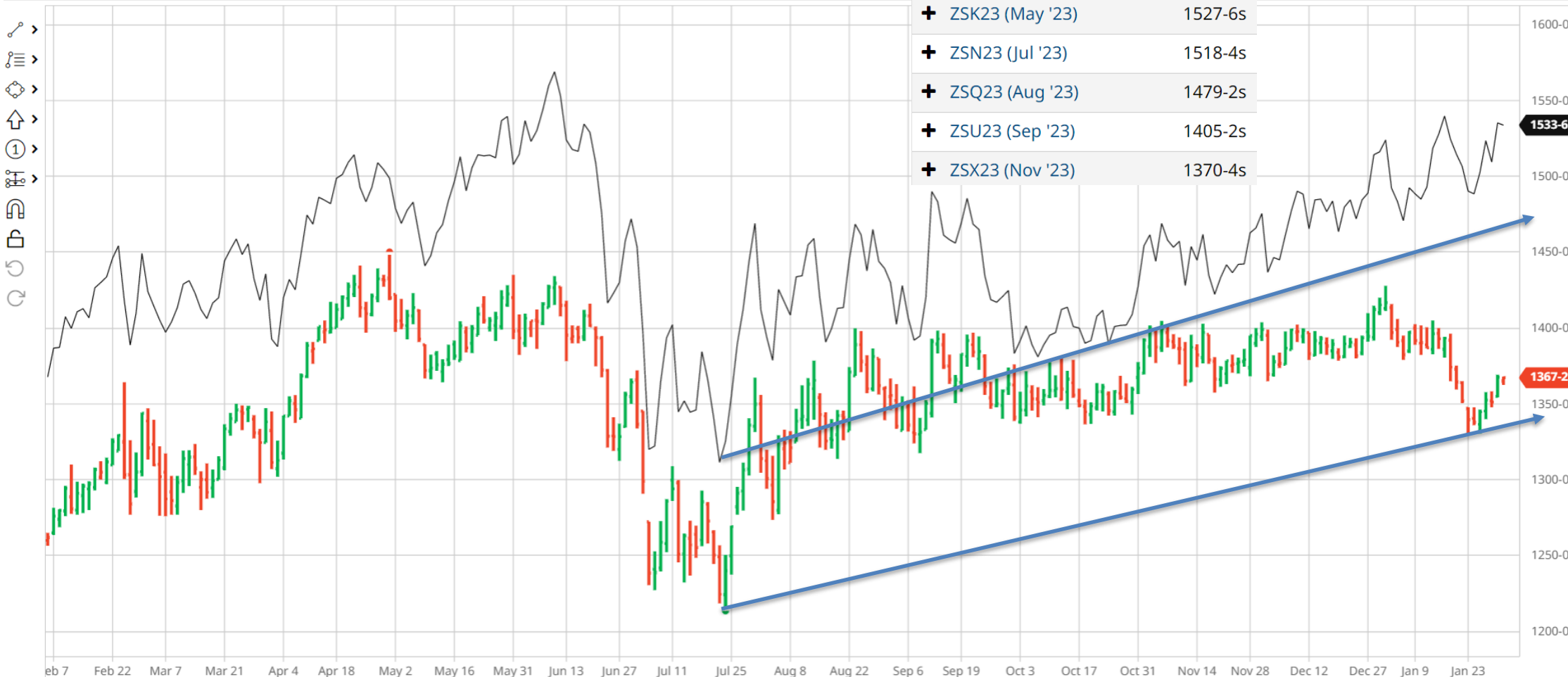
+ ZSY00 (Cash)	1500-0s
+ ZSH23 (Mar '23)	1534-2s
+ ZSK23 (May '23)	1527-6s
+ ZSN23 (Jul '23)	1518-4s
+ ZSQ23 (Aug '23)	1479-2s
+ ZSU23 (Sep '23)	1405-2s
+ ZSX23 (Nov '23)	1370-4s

Mode

Templates

Clear

≡



Managing Price Risk In 2023

- High cost of production
 - Volatile commodity prices
 - Downside price risk
-
- Risk management tools need to be utilized this winter/spring to protect against price declines and avoid a potential margin squeeze.

Managing Price Risk

- Identify risk intervals and develop a marketing and risk management plan.
- Crop insurance protection.
- In season marketing.
- Storage.
- Price protection versus establishing a final price

Revenue		Quantity	Price	Total
		175	5.99	1,048.25
Total Revenue				1,048.25
Variable Expenses				
	Seed	32	3.60	115.20
	Fertilizer & Lime	1	243.00	243.00
	Chemical	1	64.79	64.79
	Crop Scout or Consultant	1	18.00	18.00
	Repair & Maintenance	1	43.89	43.89
	Fuel, Oil & Filter	1	29.80	29.80
	Operator Labor	1	13.98	13.98
	Crop Insurance	1	21.47	21.47
	Operating Interest	621	8%	24.05
Total Variable Expenses				574.18
Return Above Variable Expenses				474.07
Fixed Expenses				
	Machinery			
	Capital Recovery	1	120.73	120.73
	General Overhead	1	20	20.00
	Cash Rent	1	120	120.00
	Management Labor	1	25	25.00
Total Fixed Expenses				285.73
Total Expenses				859.92
Return Above Specified Expenses				188.33

2023 Corn Cost of Production

What's your projected cost of production?

Track actual versus budgeted.

Use your budget and actual expenses to guide risk management and marketing decisions.

Corn - Net Return Table (\$/acre); \$860/acre Cost of Production

Yield (bu/acre)

		120	130	140	150	160	170	180	190	200	210	220	230
<u>Price</u> (\$/bu)	4.00	(380)	(340)	(300)	(260)	(220)	(180)	(140)	(100)	(60)	(20)	20	60
	4.25	(350)	(307)	(265)	(222)	(180)	(137)	(95)	(52)	(10)	33	75	118
	4.50	(320)	(275)	(230)	(185)	(140)	(95)	(50)	(5)	40	85	130	175
	4.75	(290)	(242)	(195)	(147)	(100)	(52)	(5)	43	90	138	185	233
	5.00	(260)	(210)	(160)	(110)	(60)	(10)	40	90	140	190	240	290
	5.25	(230)	(177)	(125)	(72)	(20)	33	85	138	190	243	295	348
	5.50	(200)	(145)	(90)	(35)	20	75	130	185	240	295	350	405
	5.75	(170)	(112)	(55)	3	60	118	175	233	290	348	405	463
	6.00	(140)	(80)	(20)	40	100	160	220	280	340	400	460	520
	6.25	(110)	(47)	15	78	140	203	265	328	390	453	515	578
	6.50	(80)	(15)	50	115	180	245	310	375	440	505	570	635
	6.75	(50)	18	85	153	220	288	355	423	490	558	625	693
	7.00	(20)	50	120	190	260	330	400	470	540	610	680	750
	7.25	10	83	155	228	300	373	445	518	590	663	735	808
	7.50	40	115	190	265	340	415	490	565	640	715	790	865
	7.75	70	148	225	303	380	458	535	613	690	768	845	923

How Many Bushels to Cover Select Expenses AT \$4, \$5, \$6, and \$7 Corn

Expense	Expense (\$/acre)	\$4.00	\$5.00	\$6.00	\$7.00
Seed	\$115.20	28.8	23.0	19.2	16.5
Fertilizer & Lime	\$243.00	60.8	48.6	40.5	34.7
Chemical	\$64.79	16.2	13.0	10.8	9.3
Variable Cost	\$574.18	143.5	114.8	95.7	82.0
Fixed Cost	\$285.73	71.4	57.1	47.6	40.8
Total Cost	\$859.92	215.0	172.0	143.3	122.8

Breakeven production at:

\$4.00 = 215 bushels

\$5.00 = 172 bushels

\$6.00 = 143 bushels

\$7.00 = 123 bushels

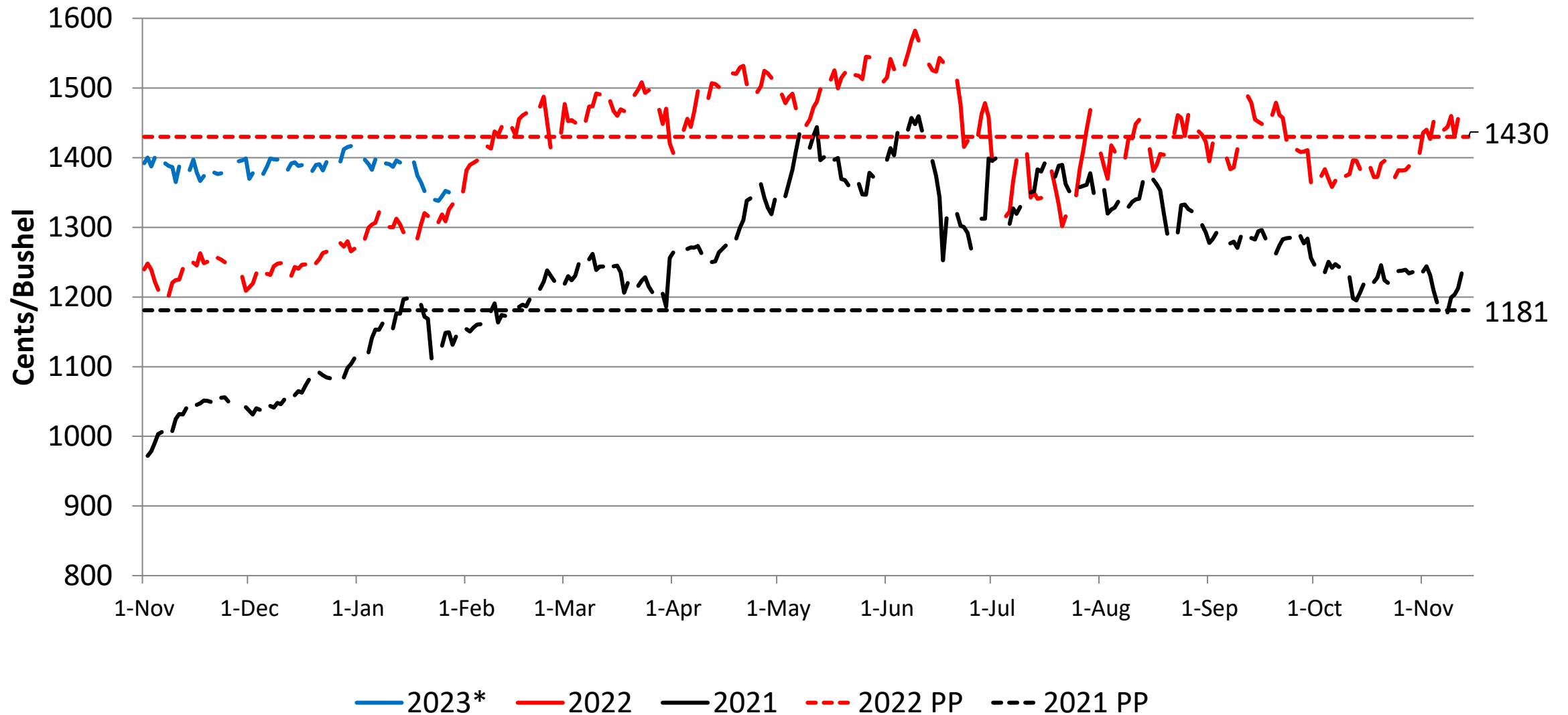
Consider downside price protection when inputs are purchased.

Protect against a margin squeeze.

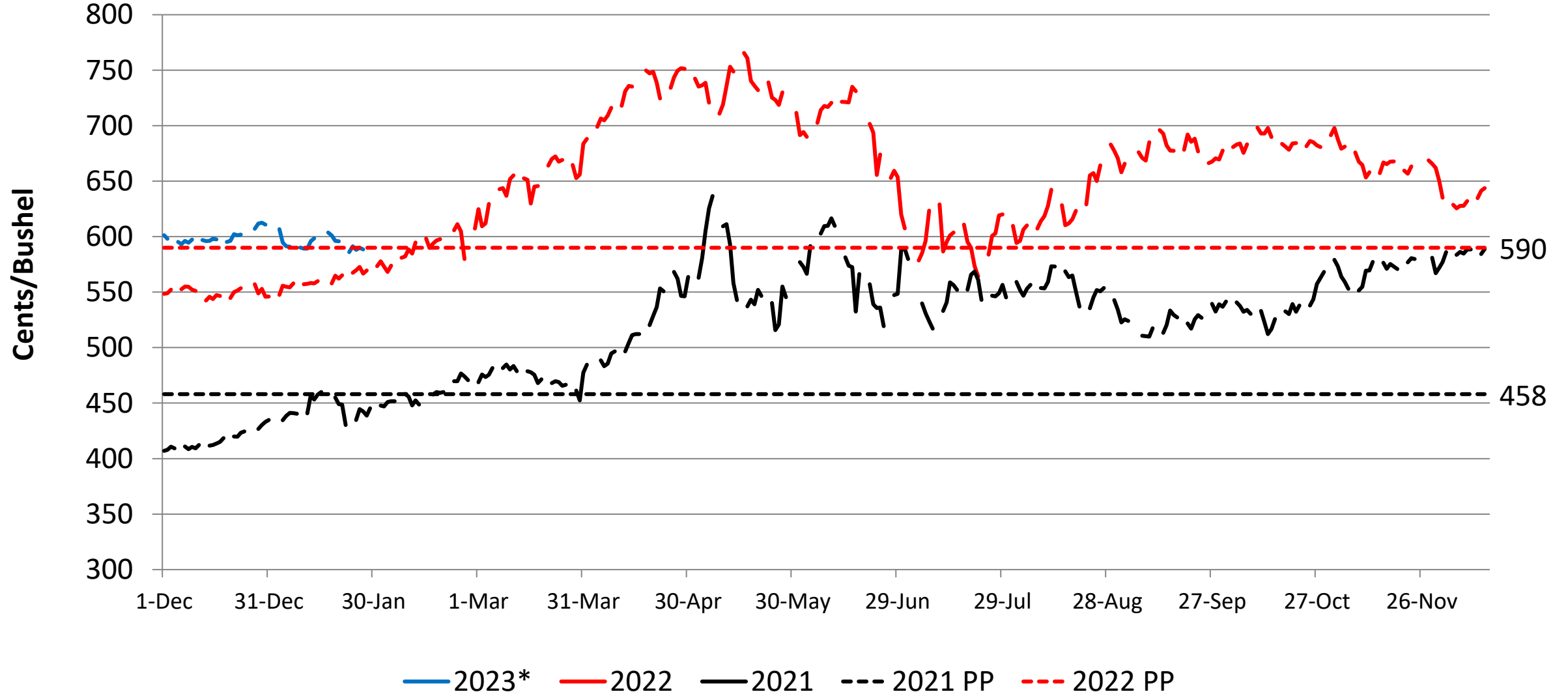
Example: Bridging the price risk gap until crop insurance prices are determined – put option

- On November 11, a \$14.00 November 2023 Put Option cost \$1.06.
- On January 27, a \$14.00 November 2023 Put Option cost \$1.09.
- After crop insurance prices are determined:
 - Out-of-the money: exit options position recoup premium.
 - In-the-money: maintain the position as price protection.

November Soybean Futures and Projected Price for Crop Insurance



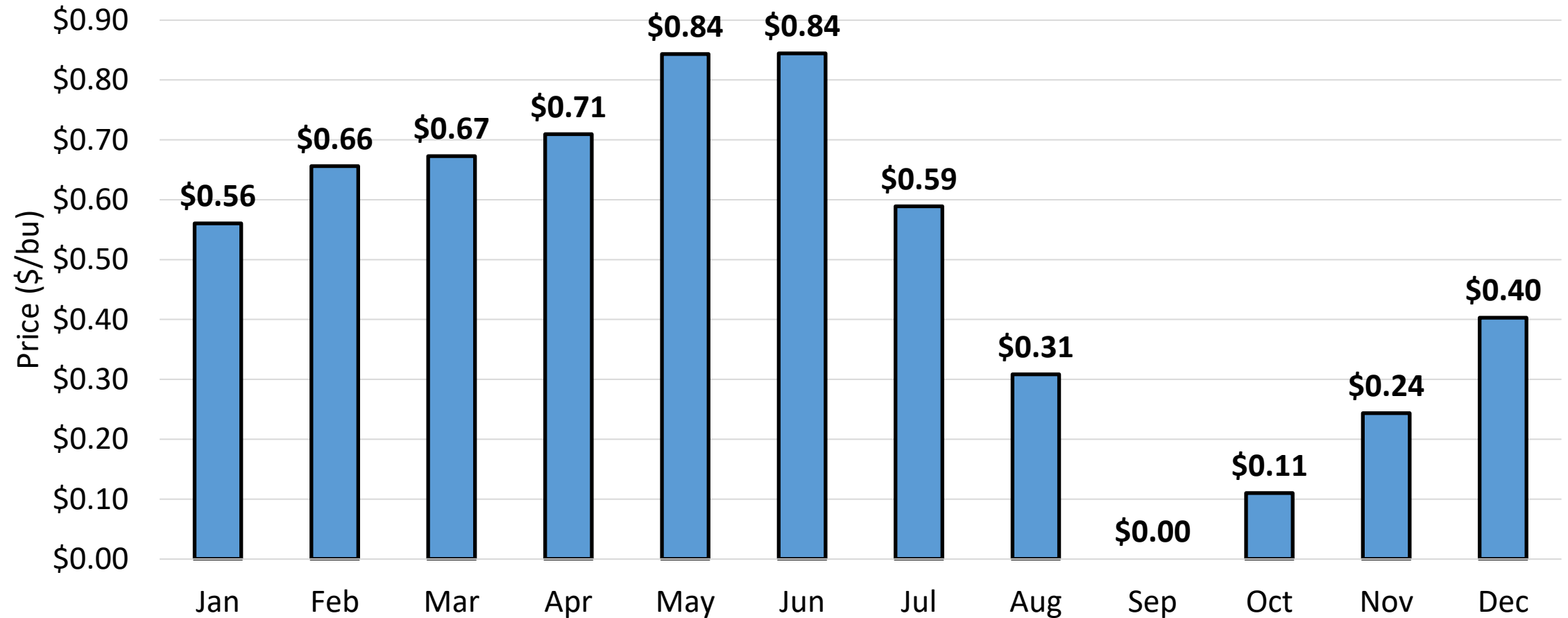
December Corn Futures and Projected Price for Crop Insurance



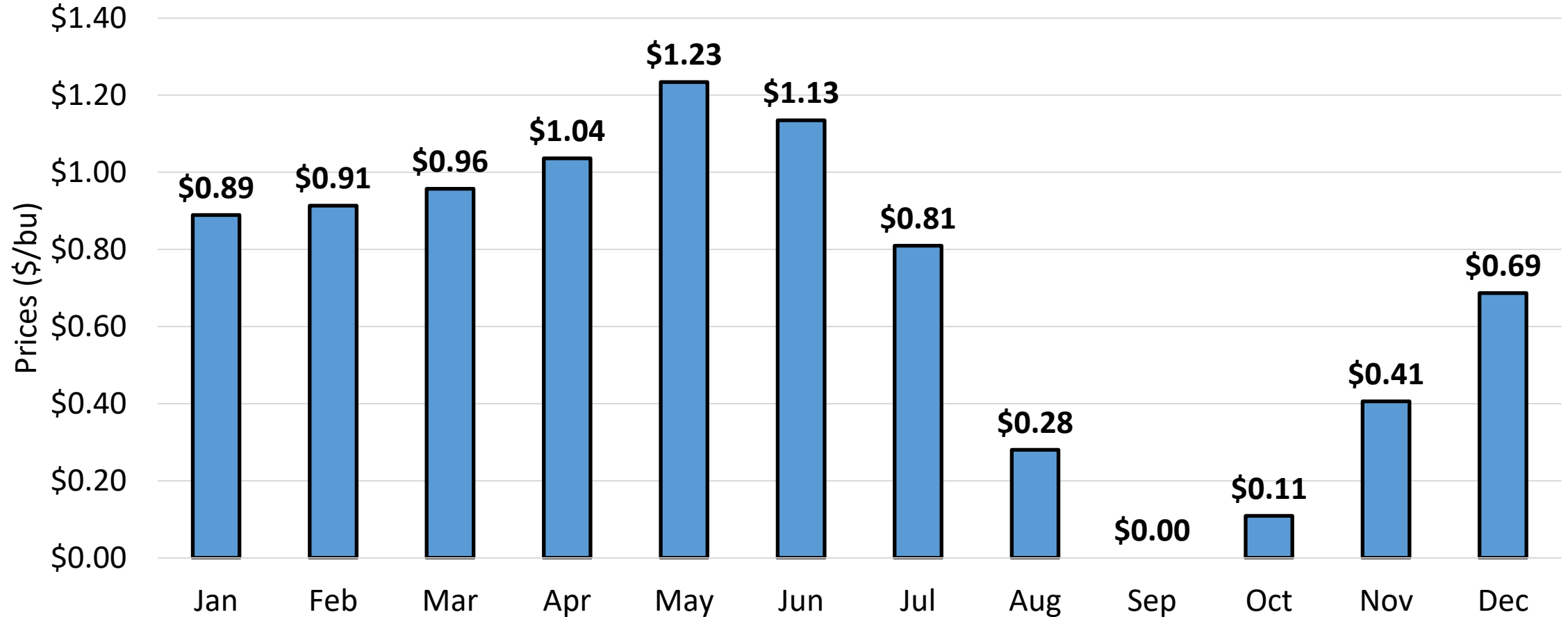
Breaking Down Price Risk

- Cash price for corn of \$7.00
 - \$6.00 futures price (86% of price risk)
 - \$1.00 basis (14% of price risk)
- Buy a \$5.50 December Put Option for 30 cents setting a \$5.20 futures floor.
- This removes 87% ($\$5.20/\6.00) of the futures price risk (74% of total price).
- Leaves the upside open in futures markets and the flexibility to set basis at a later date.

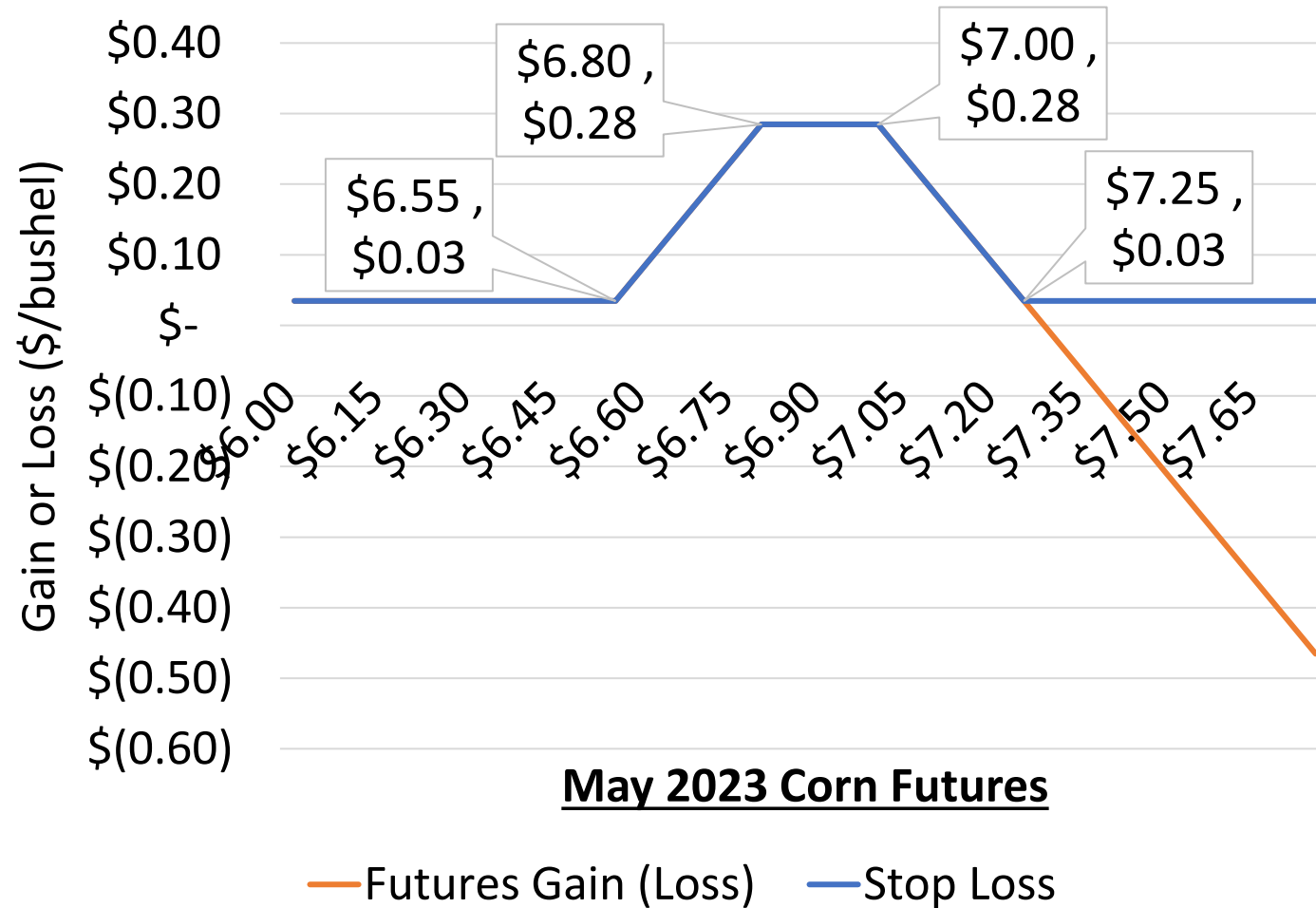
Tennessee Corn 10-Yr Average Improvement in Cash Prices at Elevators and Barge Points



Tennessee Soybean 10-Yr Average Improvement in Cash Prices at Elevators and Barge Points



Example Corn Option Strategy



May Contract		
Action	Strike	Premium
Sell Put	\$ 6.80	\$0.25
Sell Call	\$ 7.00	\$0.17
Buy Put	\$ 6.55	\$0.14
Stop (Buy) @ \$7.25		

Take Home Message

- The general economy has warning signs for 2023-2024.
- Cost of production remains elevated compared to previous years.
- Global events strongly affect markets.
- Corn and soybean price volatility is likely to persist in 2023.
- Crop insurance + price risk management + storage.

February 3, 2023

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THANK YOU