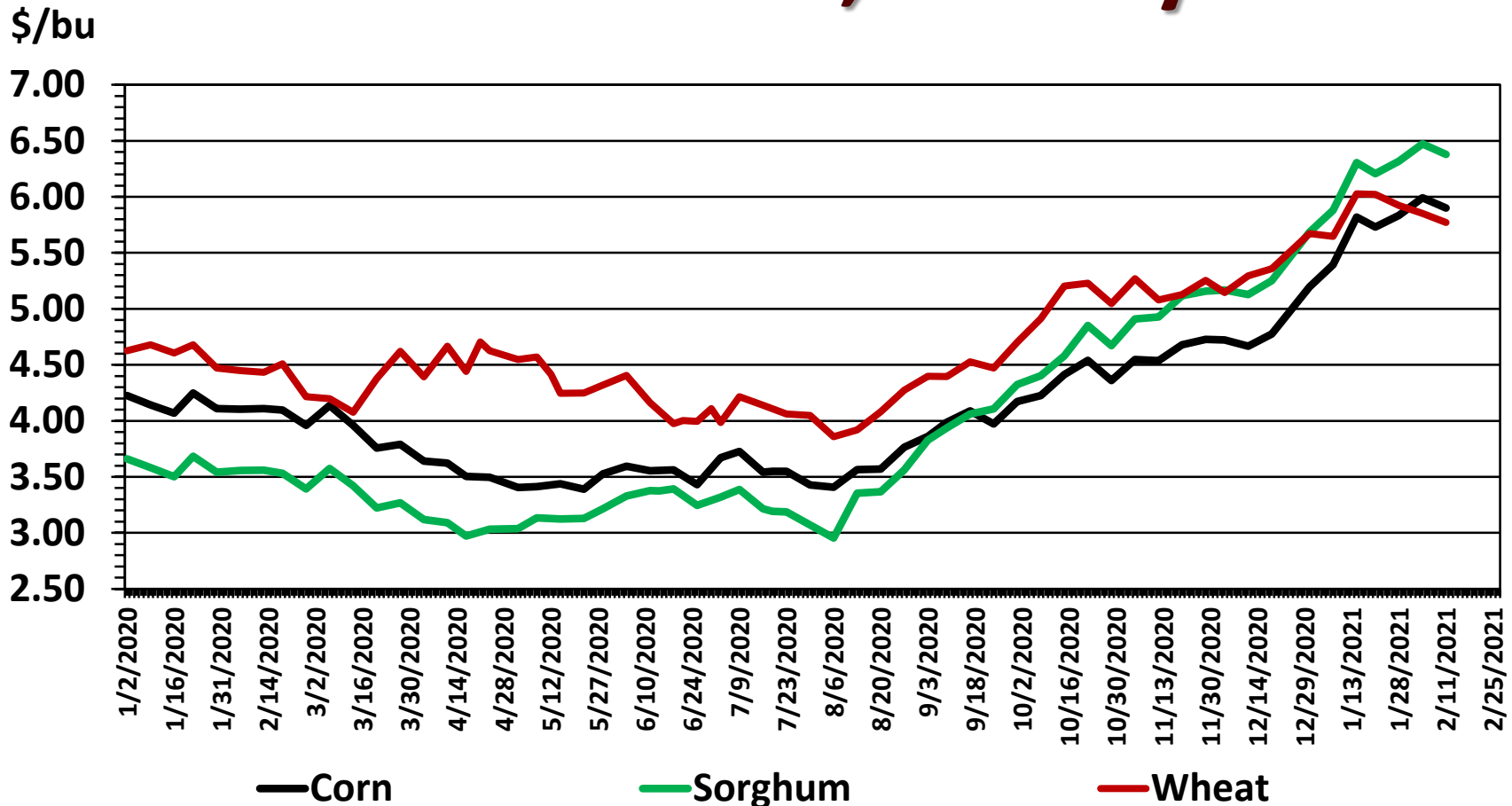


2021 Grain Fundamentals



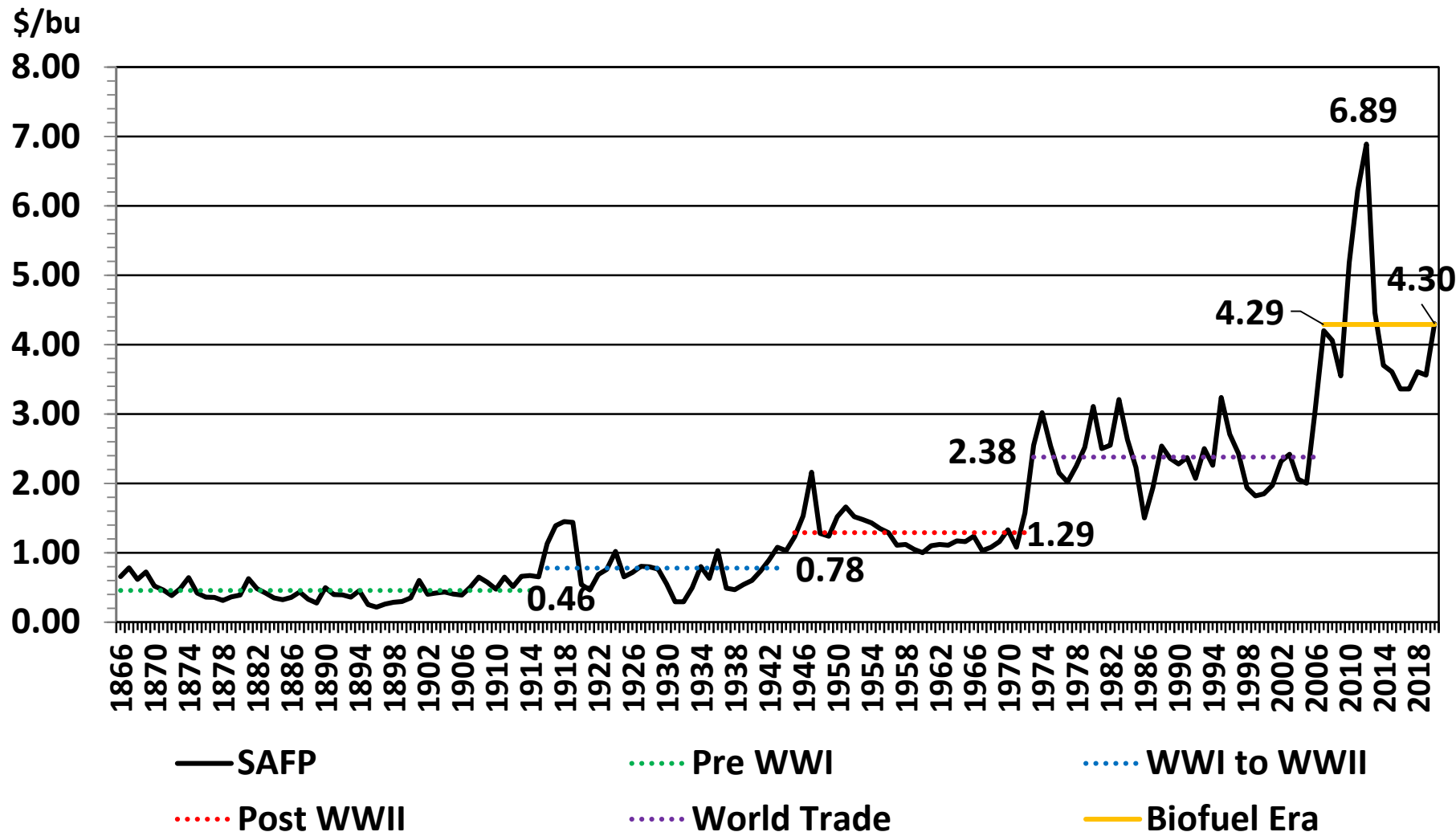
**Mark Welch, Extension Economist—
Grain Marketing
JMWelch@tamu.edu
Office: (979)845-7677
Cell: (806)683-9981**

Texas Cash Corn, Cash Sorghum, Cash Wheat, weekly

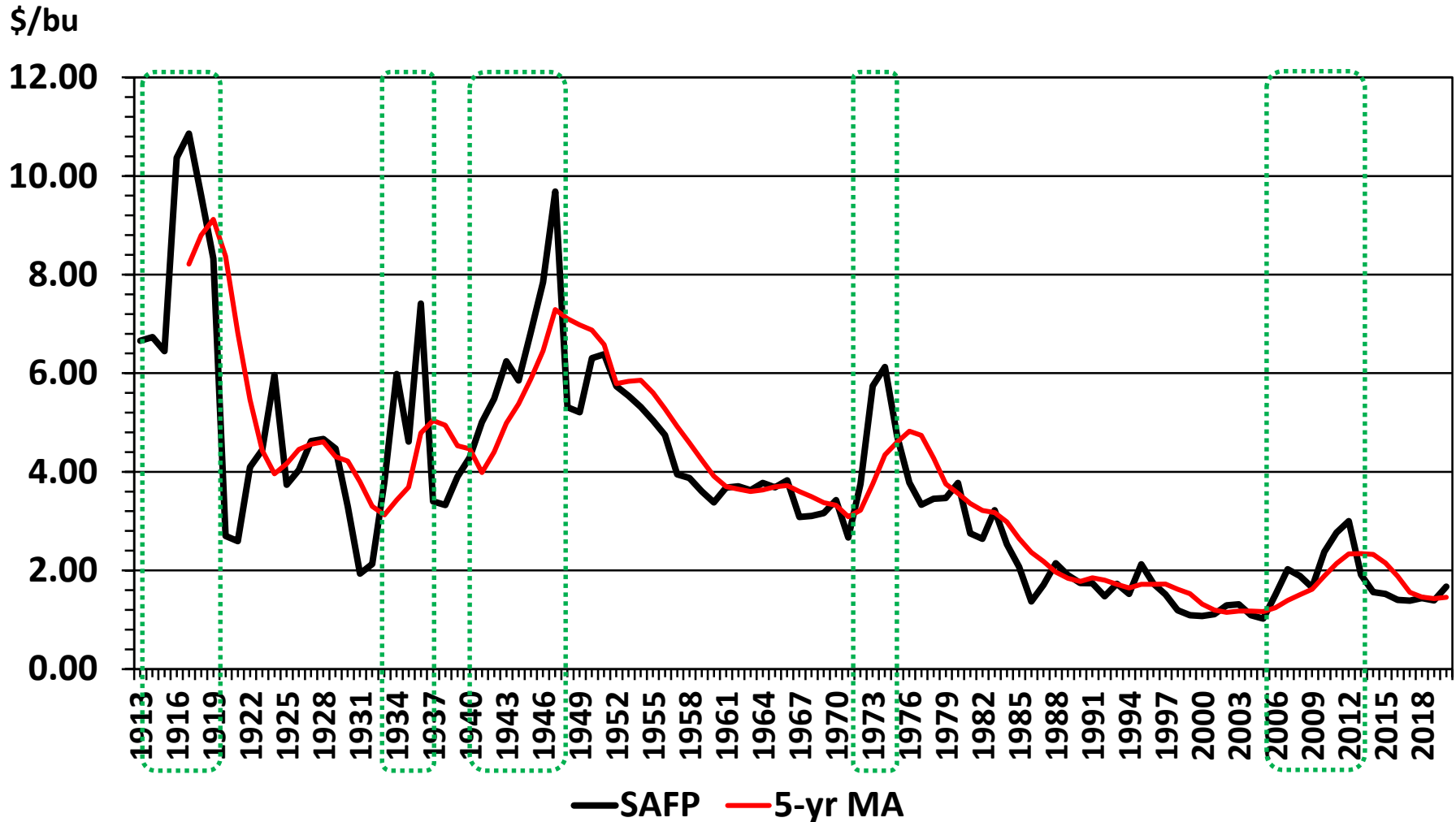


USDA, AMS, Market News: TX cash = average (area North of the Canadian River, Triangle Area from Plainview to Canyon to Farwell, area South of a Line from Plainview to Muleshoe)

Marketing Year Average Corn Prices



Marketing Year Average Corn Prices constant dollars (1982-84=100)



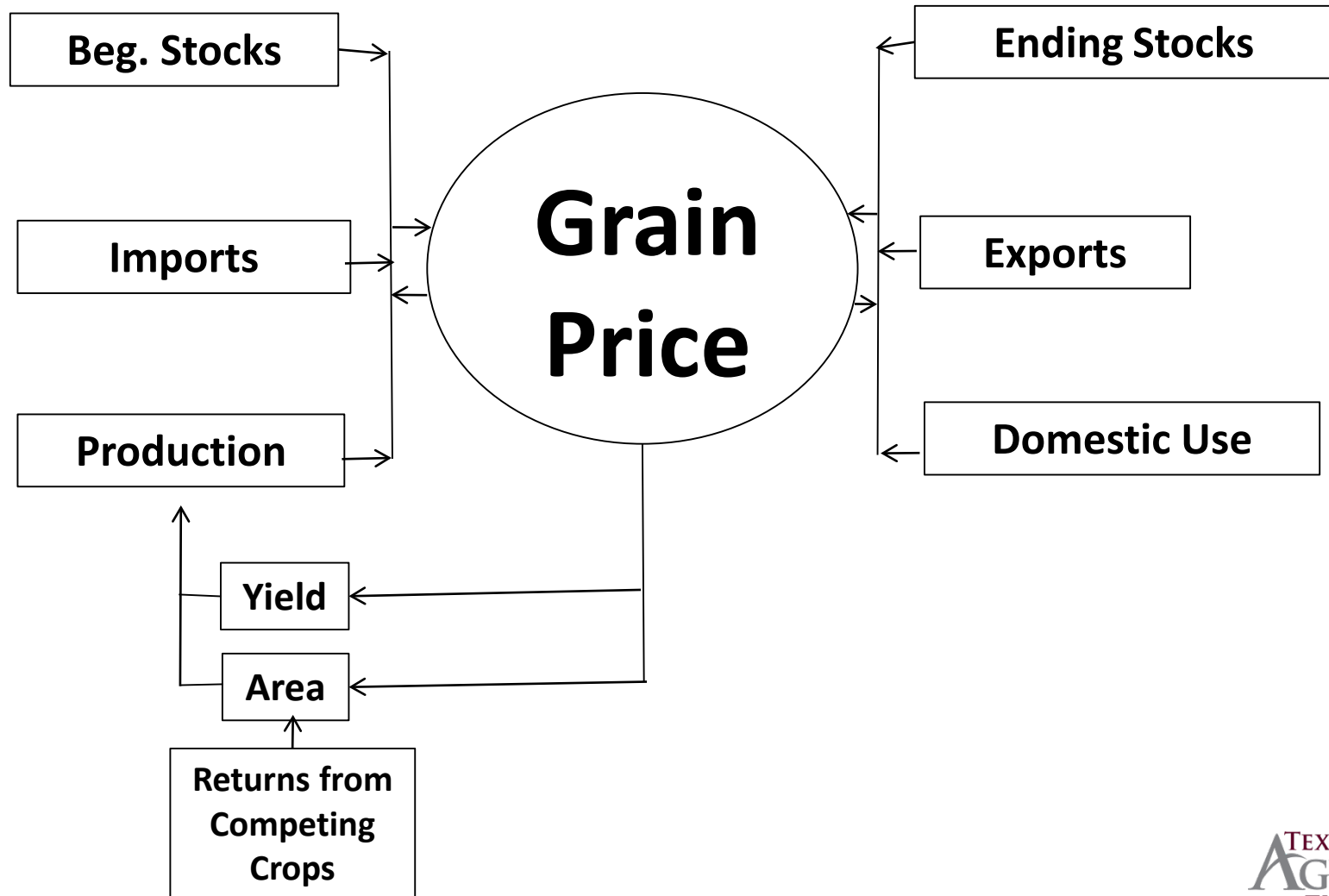
The impact of high prices...

The current high prices have one certain result—more corn acres. To the extent that farmers in Brazil, Argentina, and everywhere else, see these high prices they are going to increase their production.

--Dr. Daryll E. Ray, University of Tennessee

Schematic Representation of the U.S. Grain Market

Factors of Supply = Factors of Demand

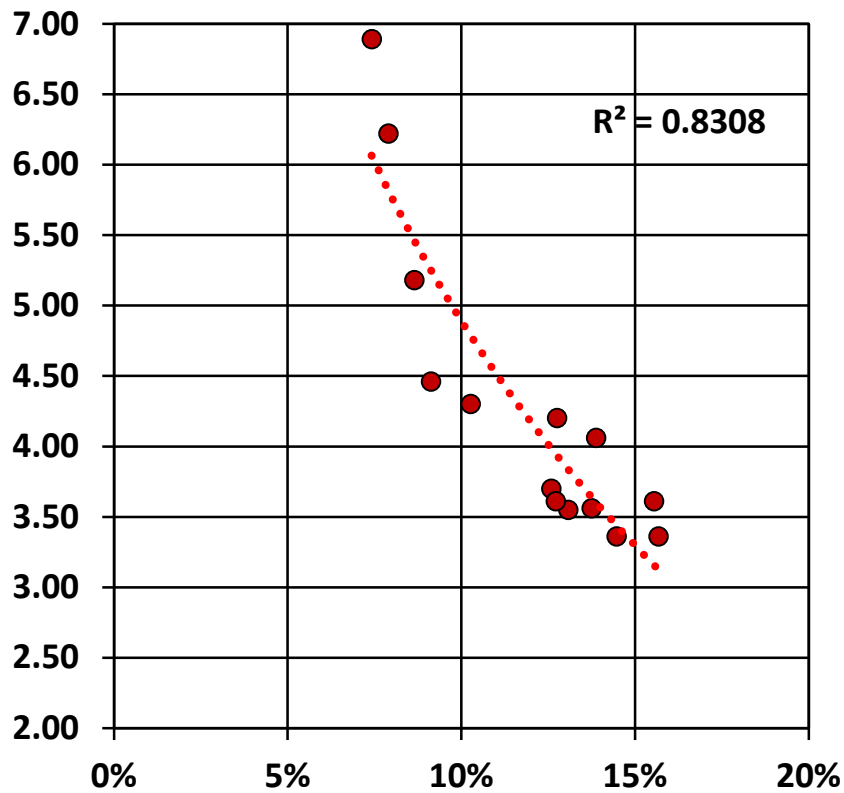


Do Fundamentals Matter?

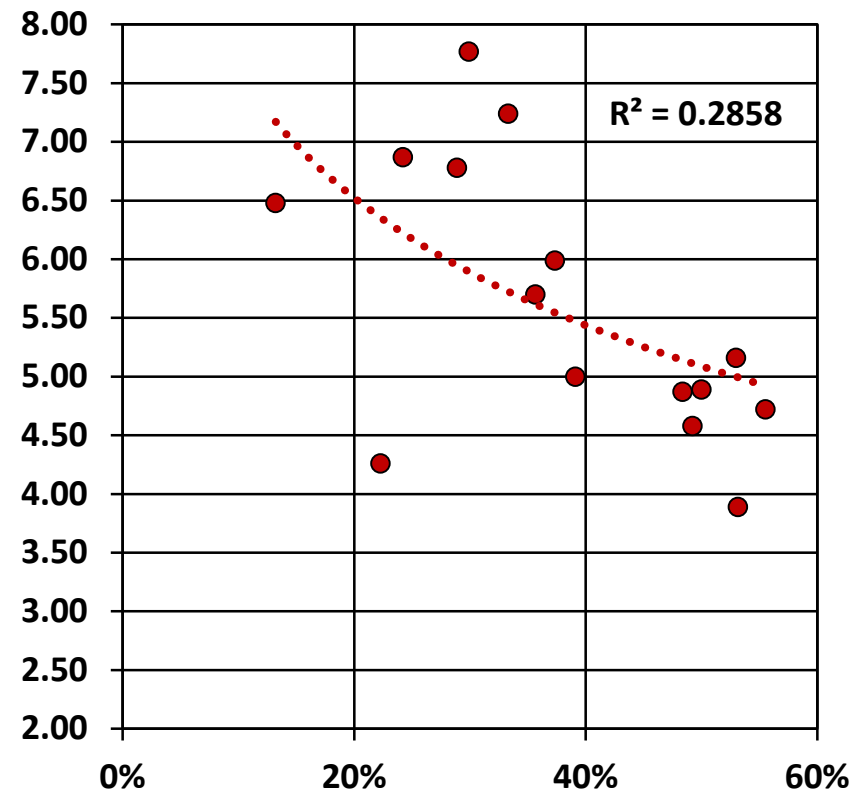
Stocks to Use Ratio and Grain Prices

US Season Average Farm Price 2006/07-2020/21

Corn



Wheat



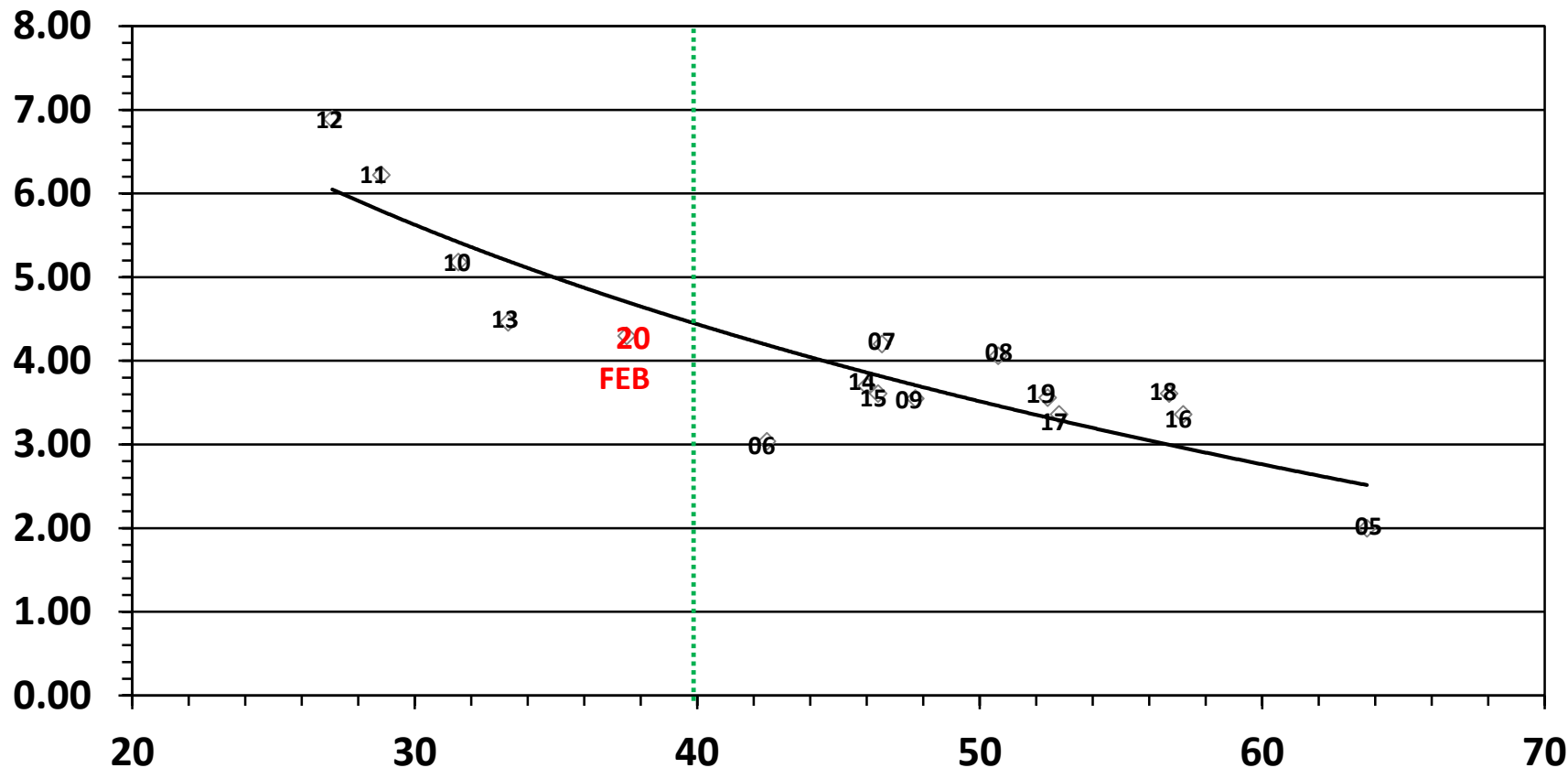
Stocks to Use Ratio = MY ending stocks/MY total use

U.S. Corn Average Farm Price and Days of Use on Hand

2005/06-2019/20, 2020/21 estimate

"When will we get \$5 corn?"

SAFP, \$/bu

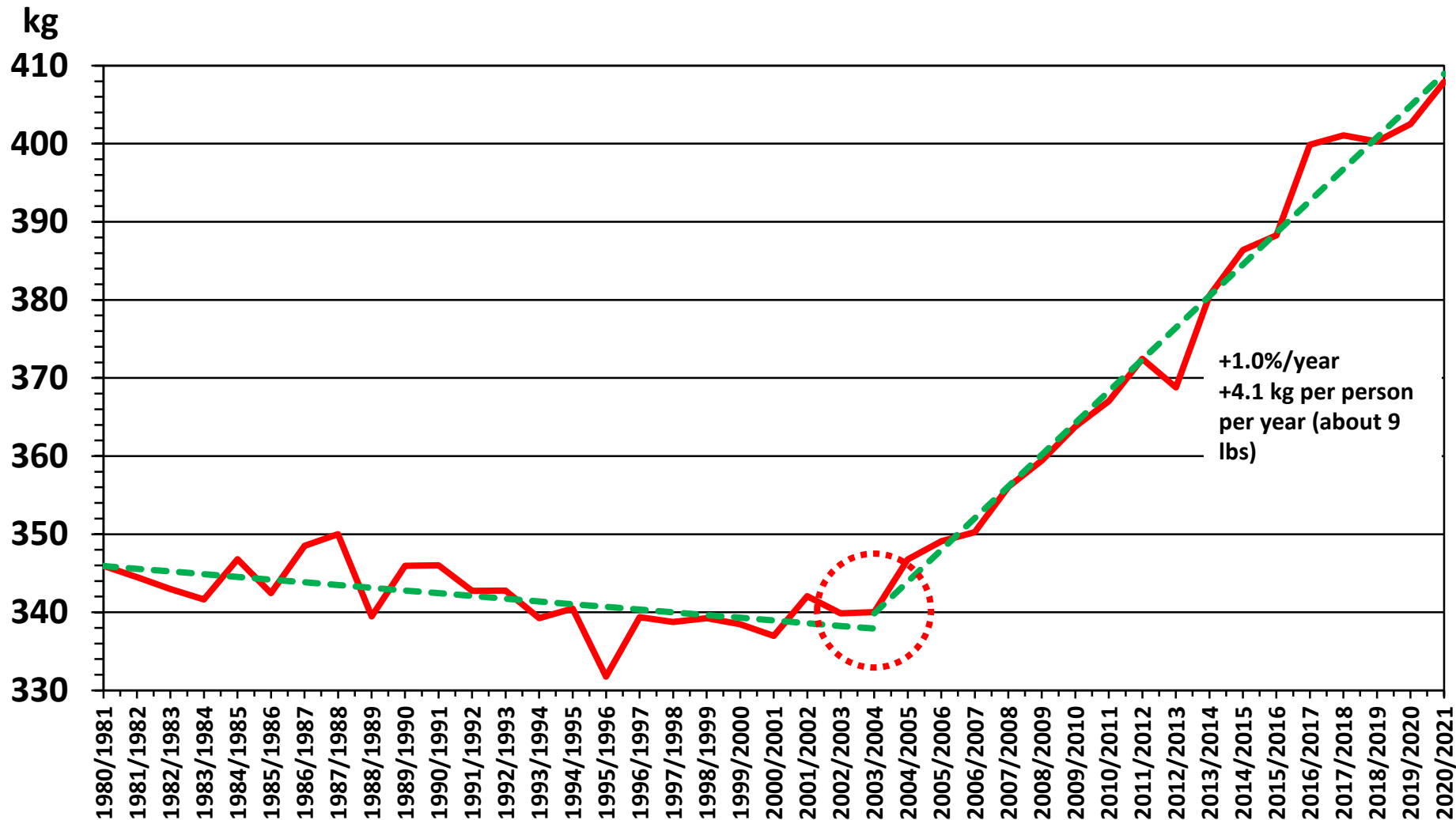


Days of Use on Hand at the End of the Marketing Year

Source: USDA, WASDE, 1/12/2021, days dropped below 40 (38.9)

Same day March corn closed above \$5.00

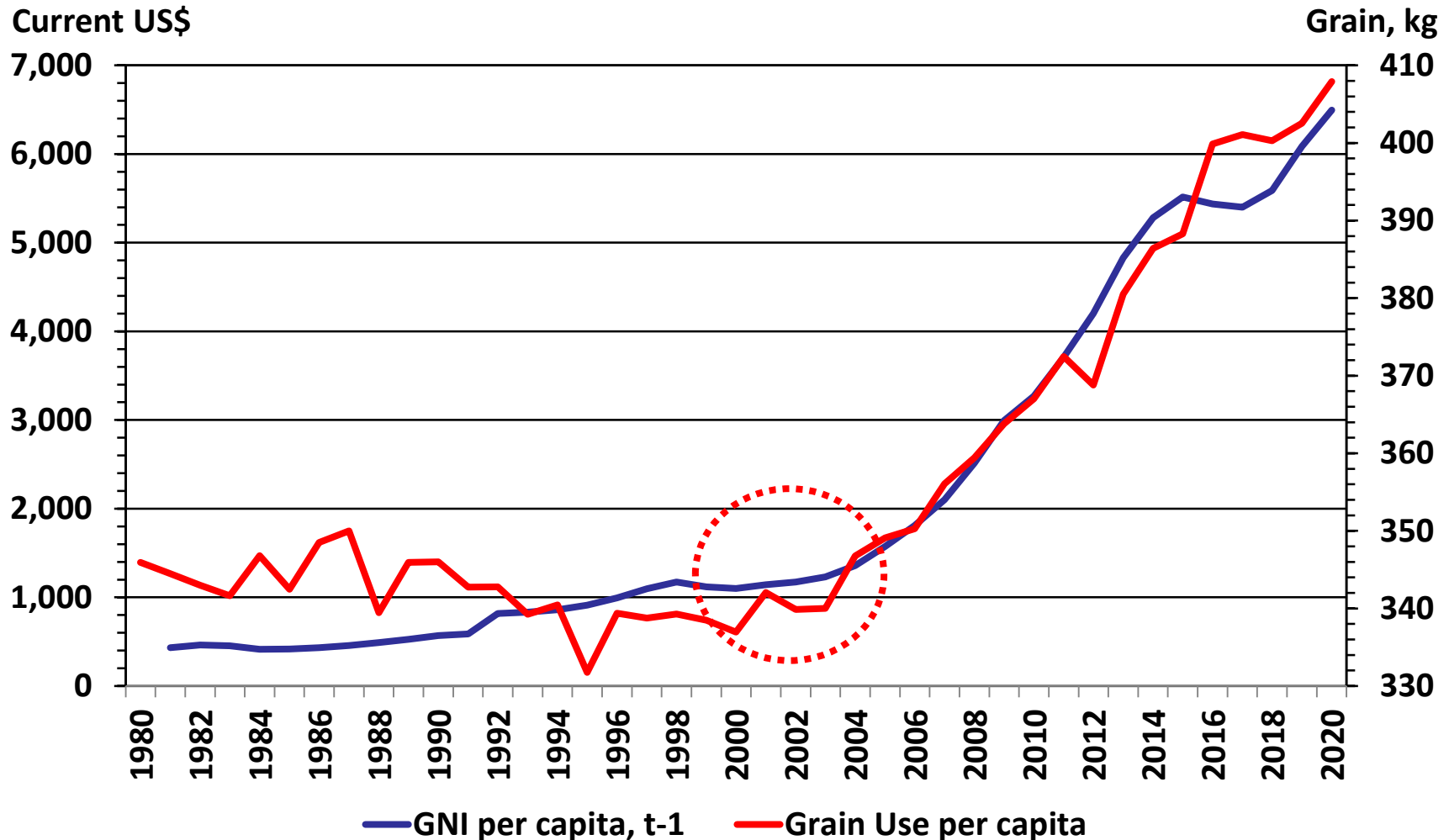
World Per Capita Grain Use



barley, corn, millet, mixed grains, oats, rice, rye, sorghum, soybeans, and wheat

USDA, Foreign Agricultural Service, PSD, 2/9/2021

Emerging Economies Weighted Average Income, t-1, and World Per Capita Grain Consumption Brazil, Russia, India, China, Mexico, Other SE Asia*



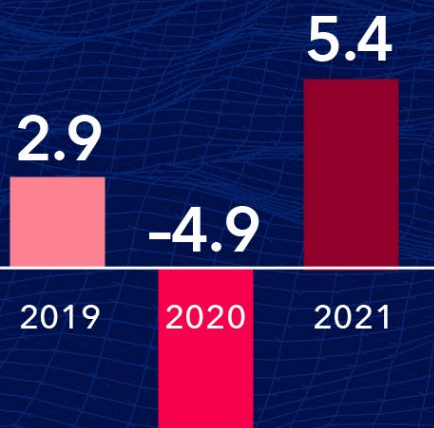
*Other Southeast Asia: Indonesia, Vietnam, Philippines, Thailand, Malaysia
World Bank, GNI per capita, 9/16/2020; Grain Use USDA, FAS, PSD 2/9/2021

<http://data.worldbank.org/indicator/>

GROWTH PROJECTIONS

A Crisis Like No Other, An Uncertain Recovery

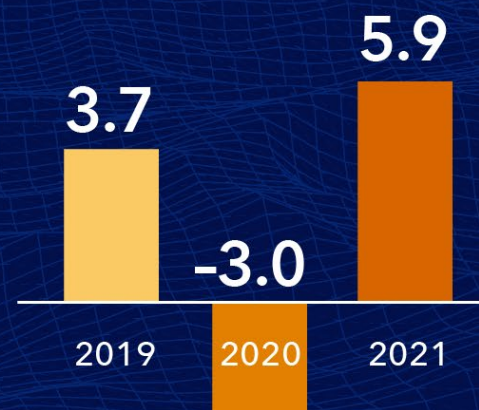
GLOBAL ECONOMY



ADVANCED ECONOMIES



EMERGING MARKETS & DEVELOPING ECONOMIES



INTERNATIONAL MONETARY FUND

IMF.org #WEO

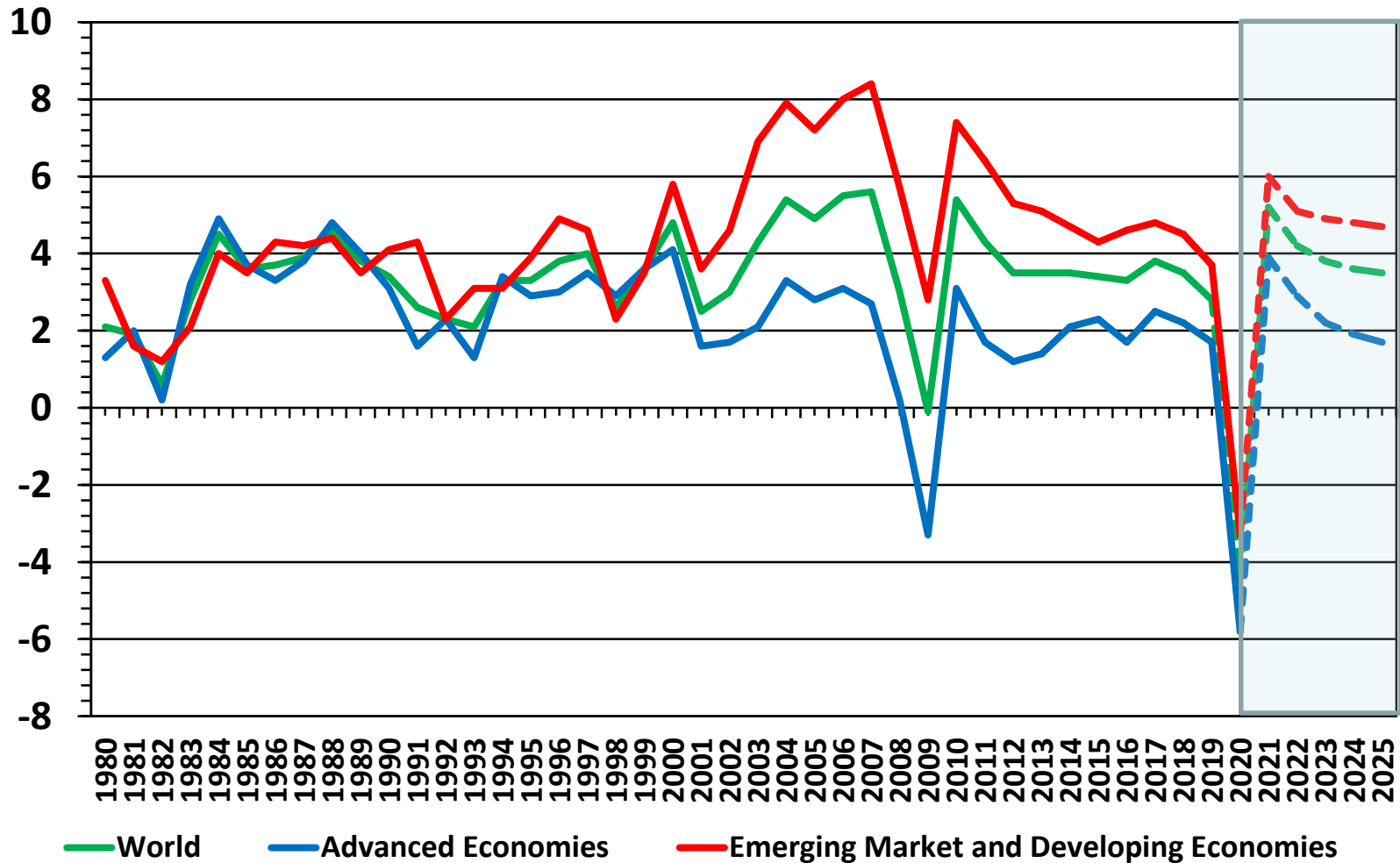
OECD Economic Outlook September 2020:

Country	2019	2020	2021
 China	6.1	1.8	8.0
 United States	2.2	-3.8	4.0
World	2.6	-4.5	5.0

Global Economic Growth

Real GDP Growth, 1980 - 2025

Percent Change

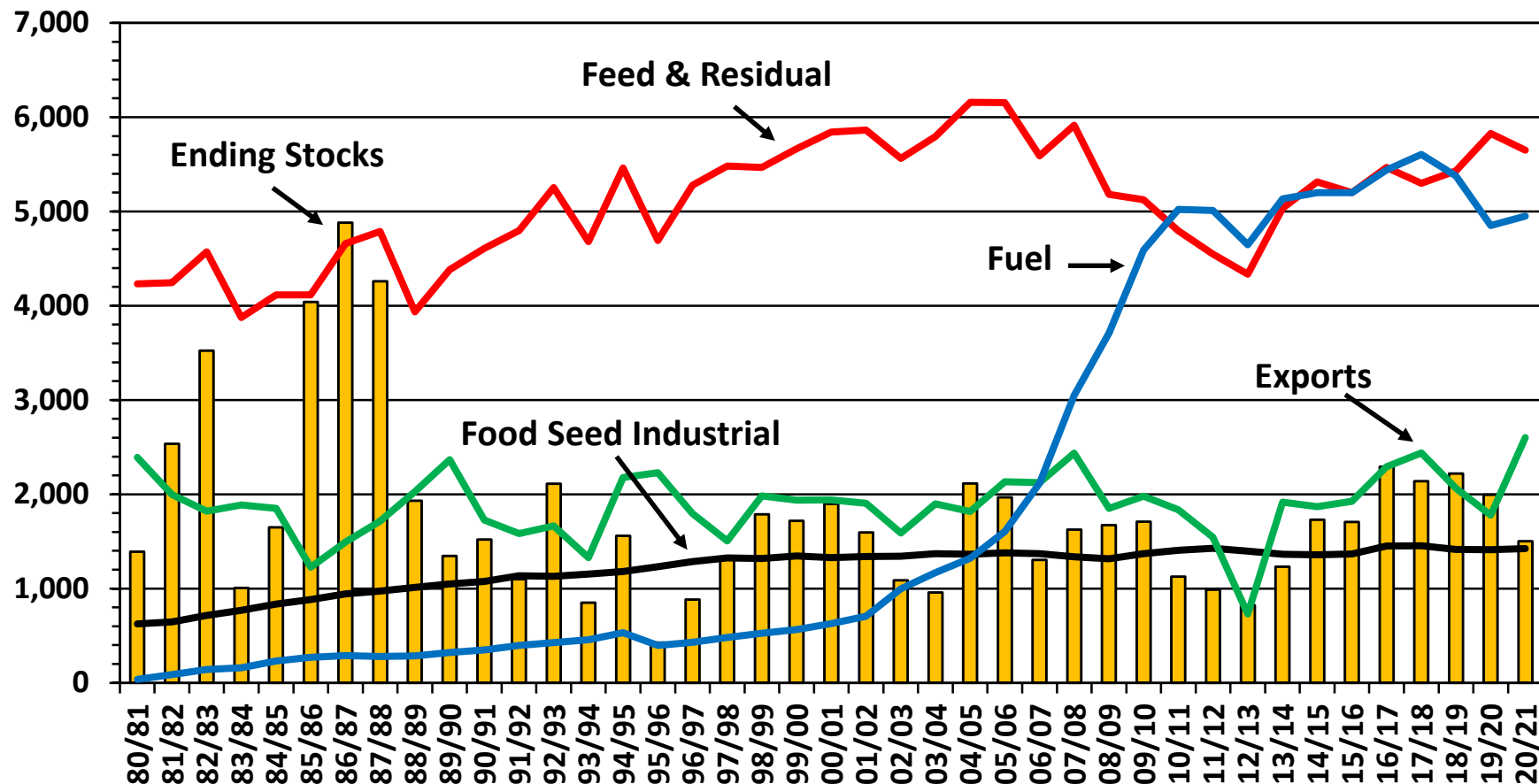


World Economic, Outlook, October 2020 <http://www.imf.org>

http://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD

U.S. Corn: Disappearance, 2/9/2021

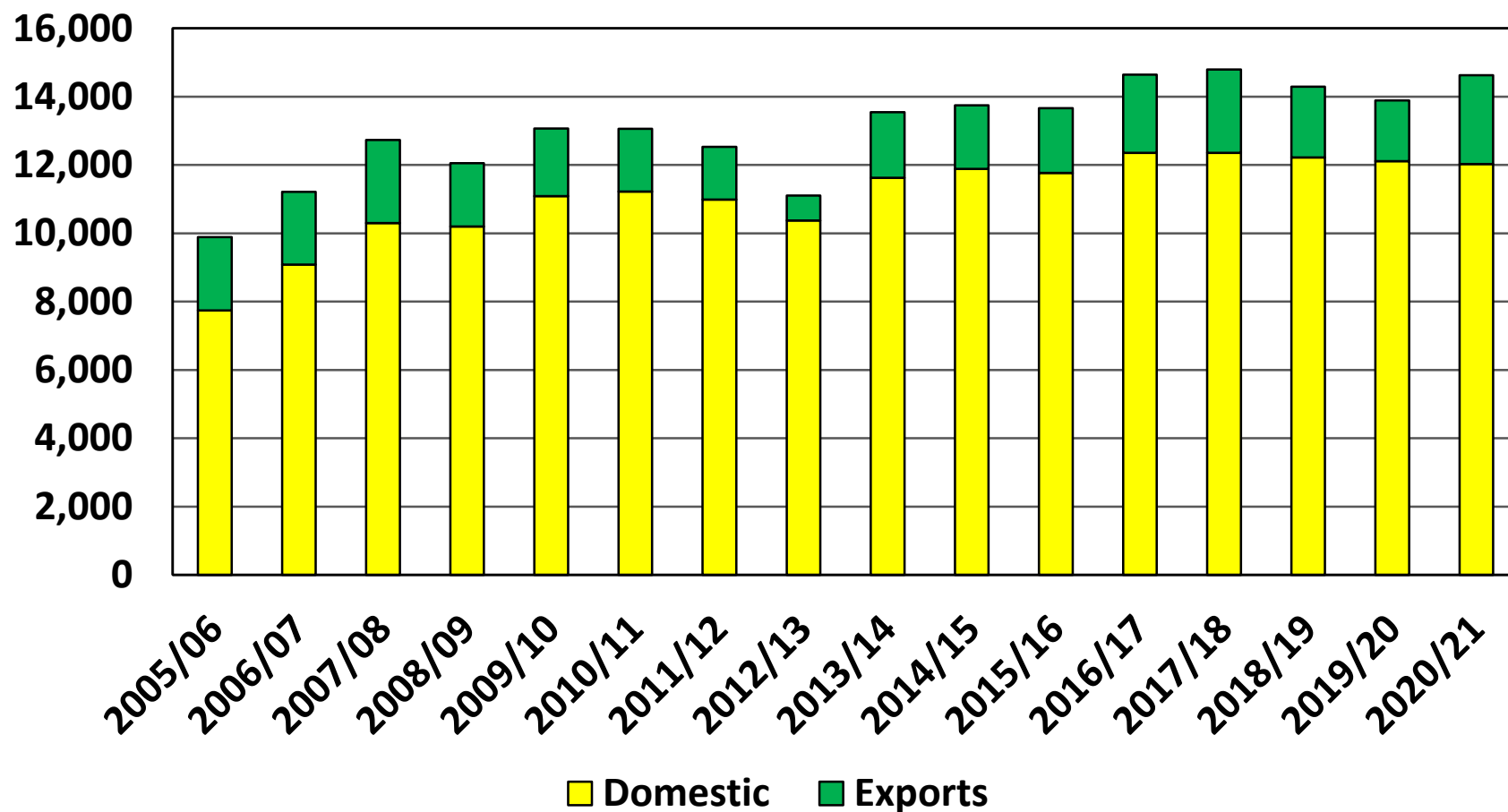
Million Bushels



Source: USDA WASDE

U.S. Corn Use

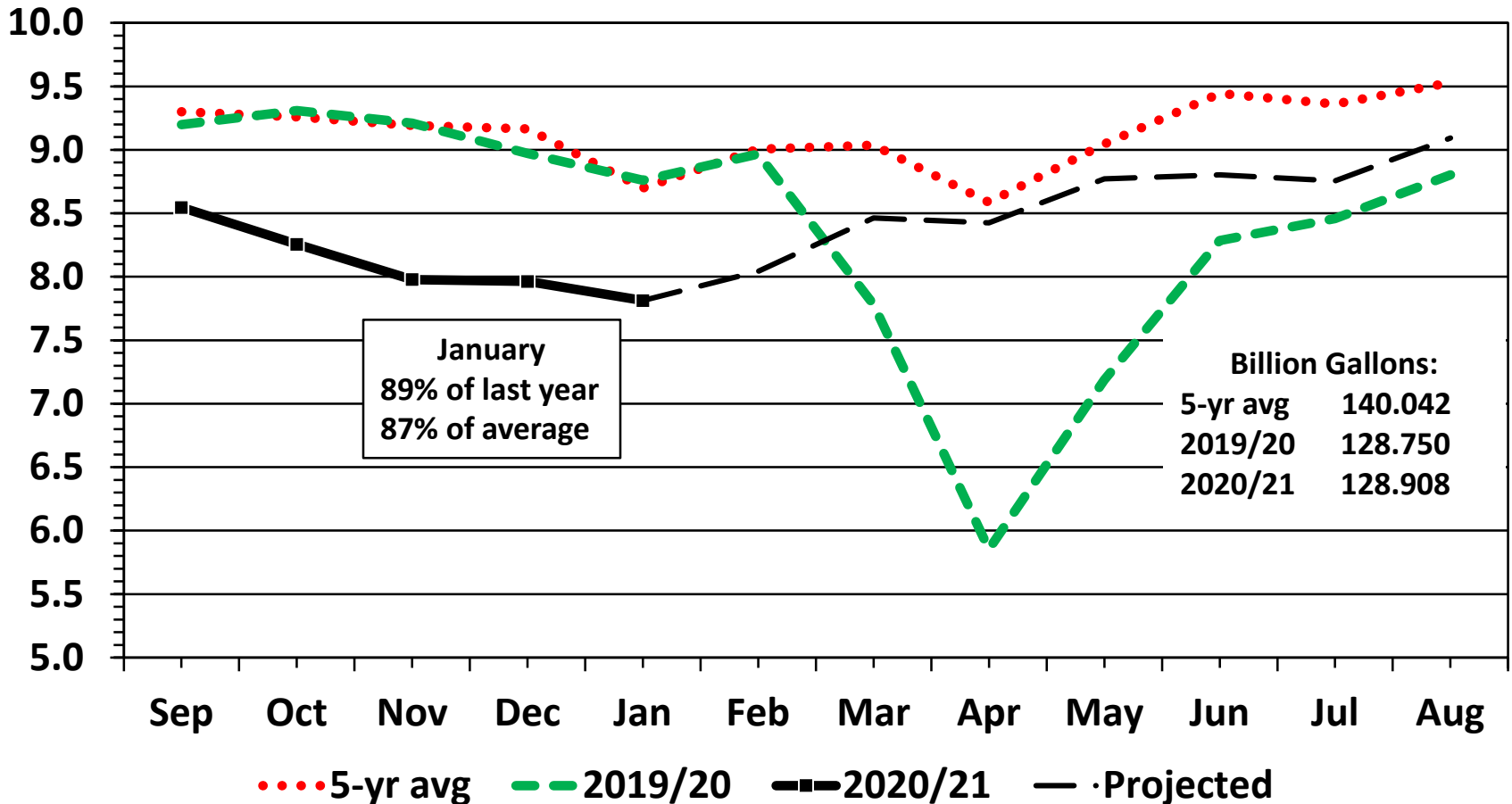
Million bushels



Source: USDA, *World Agricultural Supply and Demand Estimates*, 2/9/2021

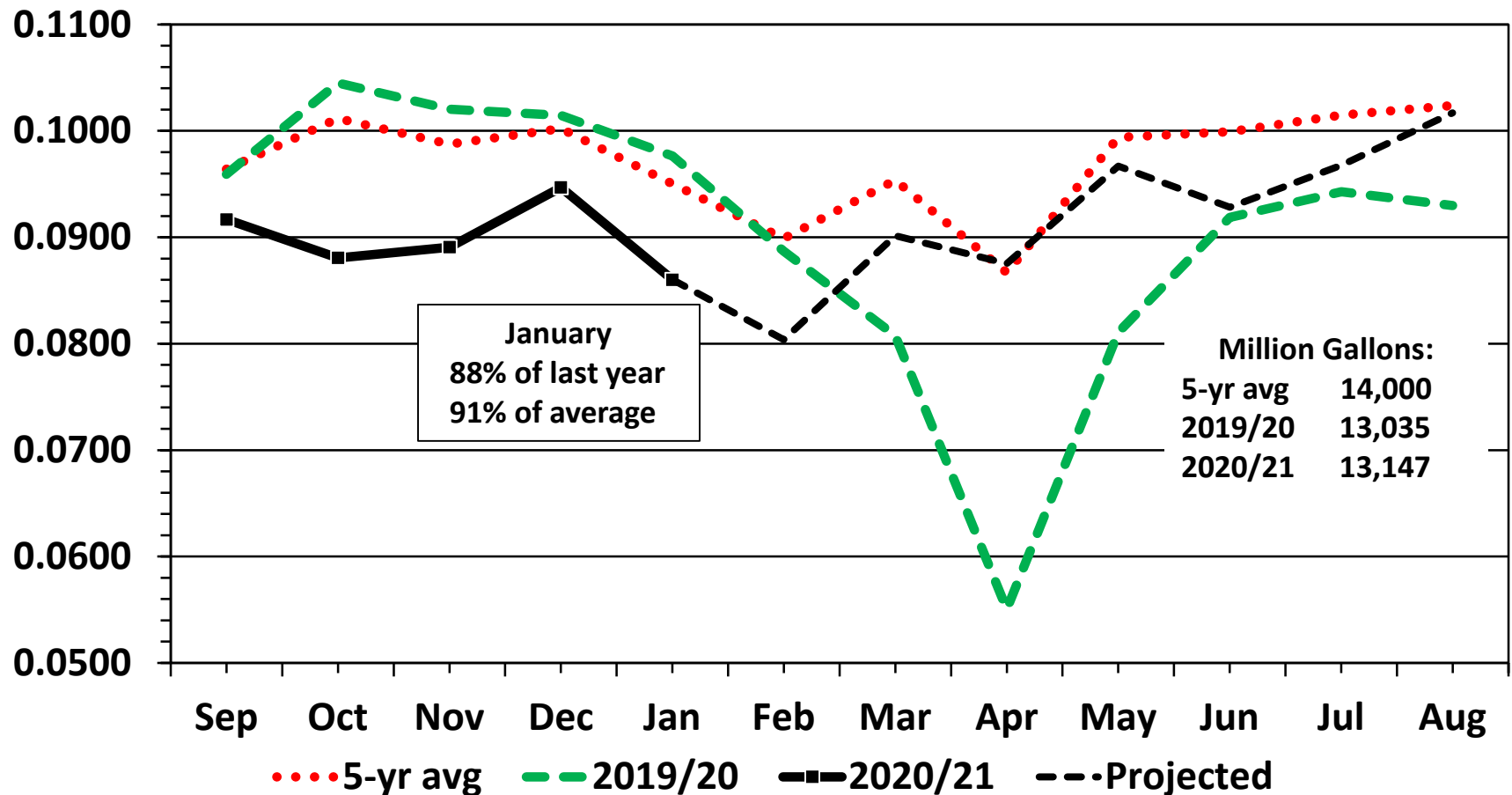
U.S. Motor Gasoline Consumption Monthly by Corn Marketing Year

Mil barrels per day



U.S. Ethanol Consumption Monthly by Corn Marketing Year

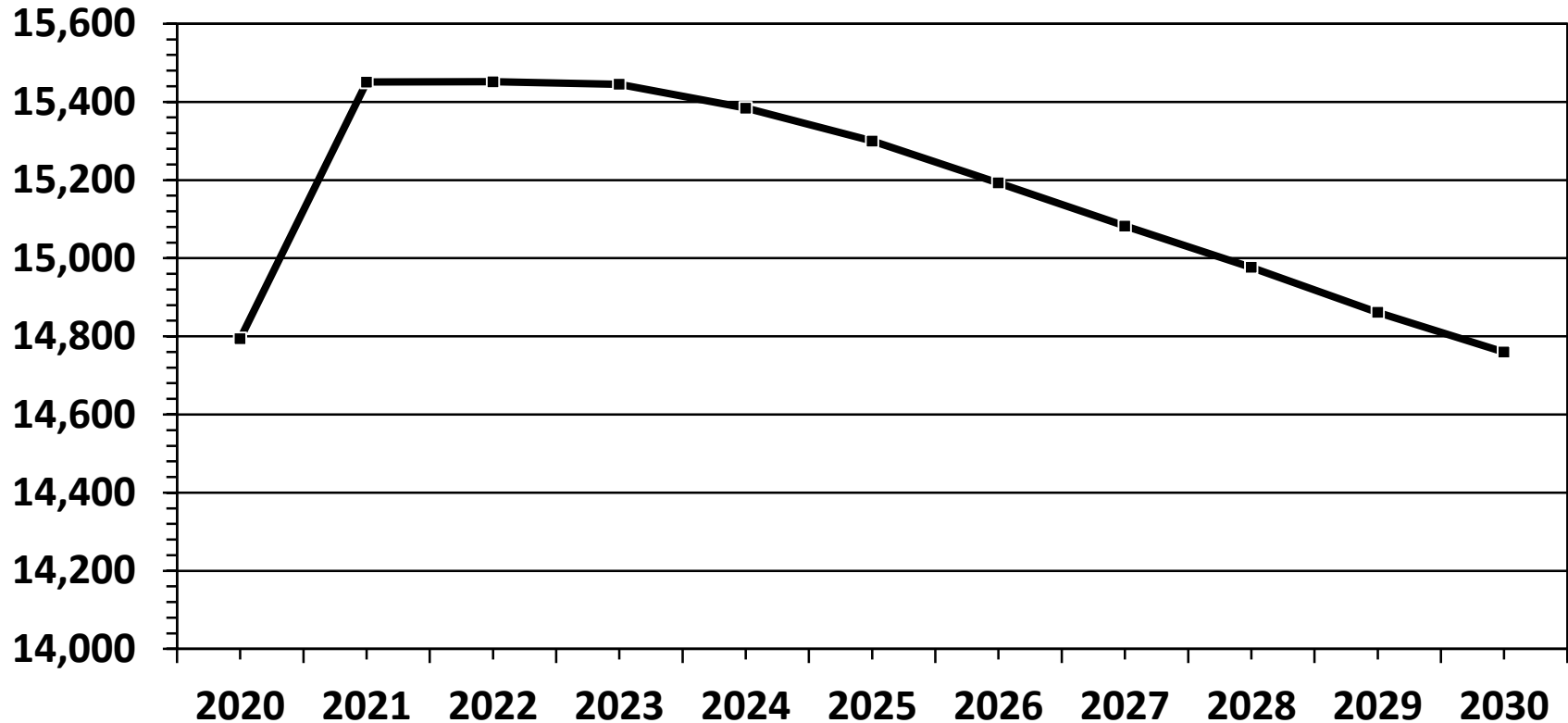
Quadrillion Btu



EIA, Short Term Energy Outlook, February 9, 2020
<http://www.eia.gov/>

Energy Use: Motor Gasoline

trillion Btu

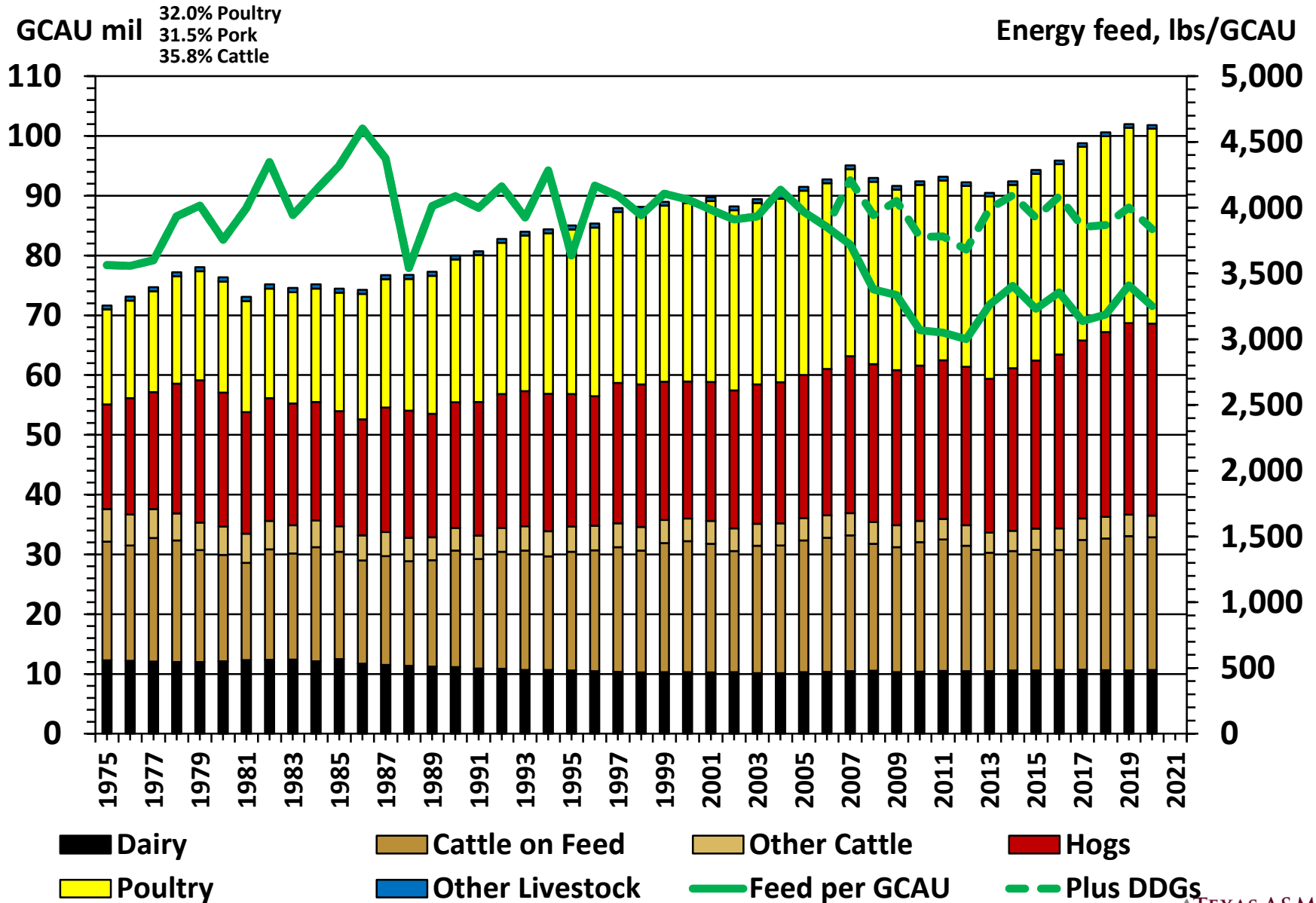


Source: U.S. Energy Information Administration, Annual Energy Outlook 2021, 2/4/2021

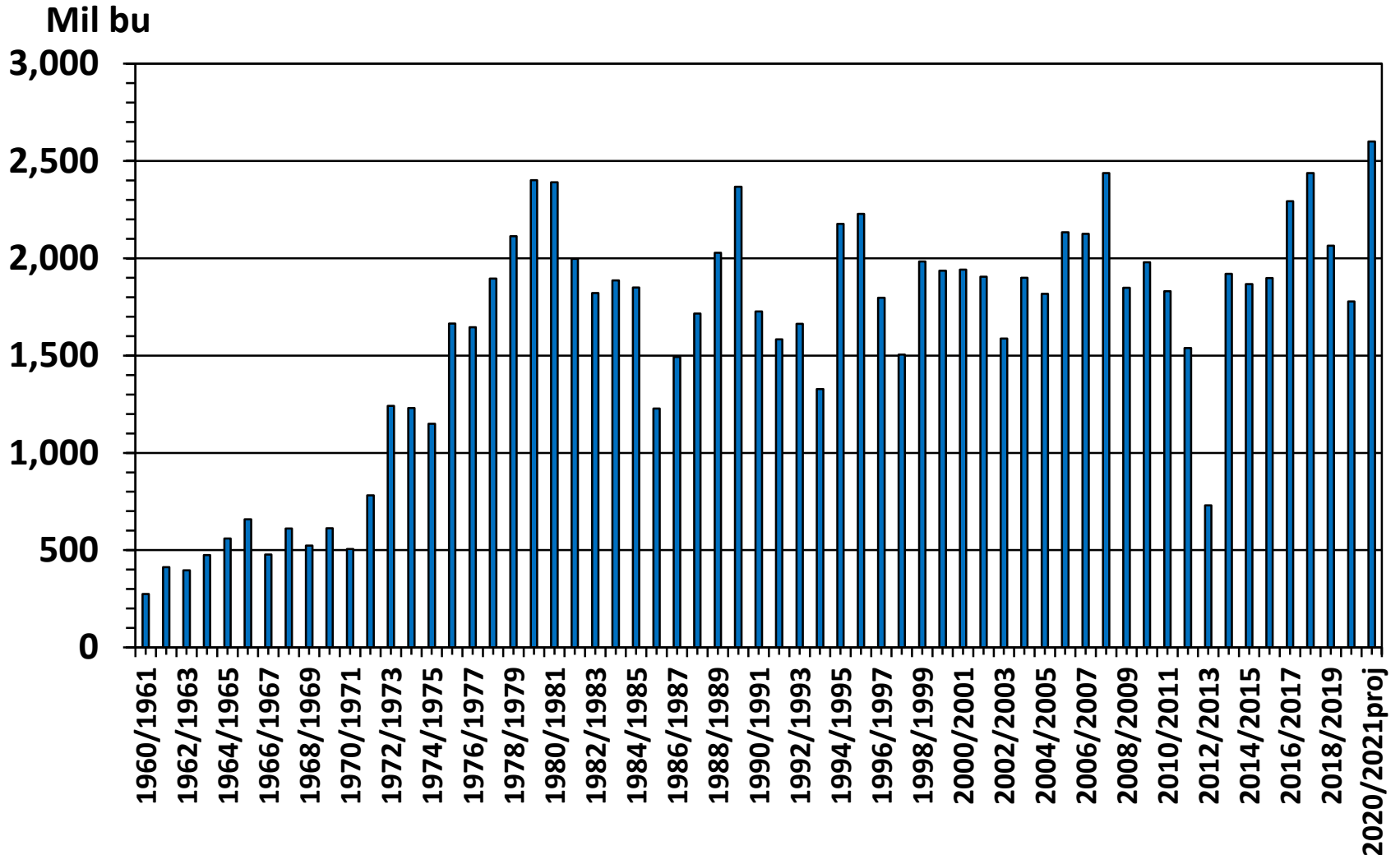
Table 35: Transportation Sector Energy Use by Mode and Type

Feed and Residual Use/GCAU

Year to Year Change: GCAU: -0.2%
Feed/GCAU: -4.1%

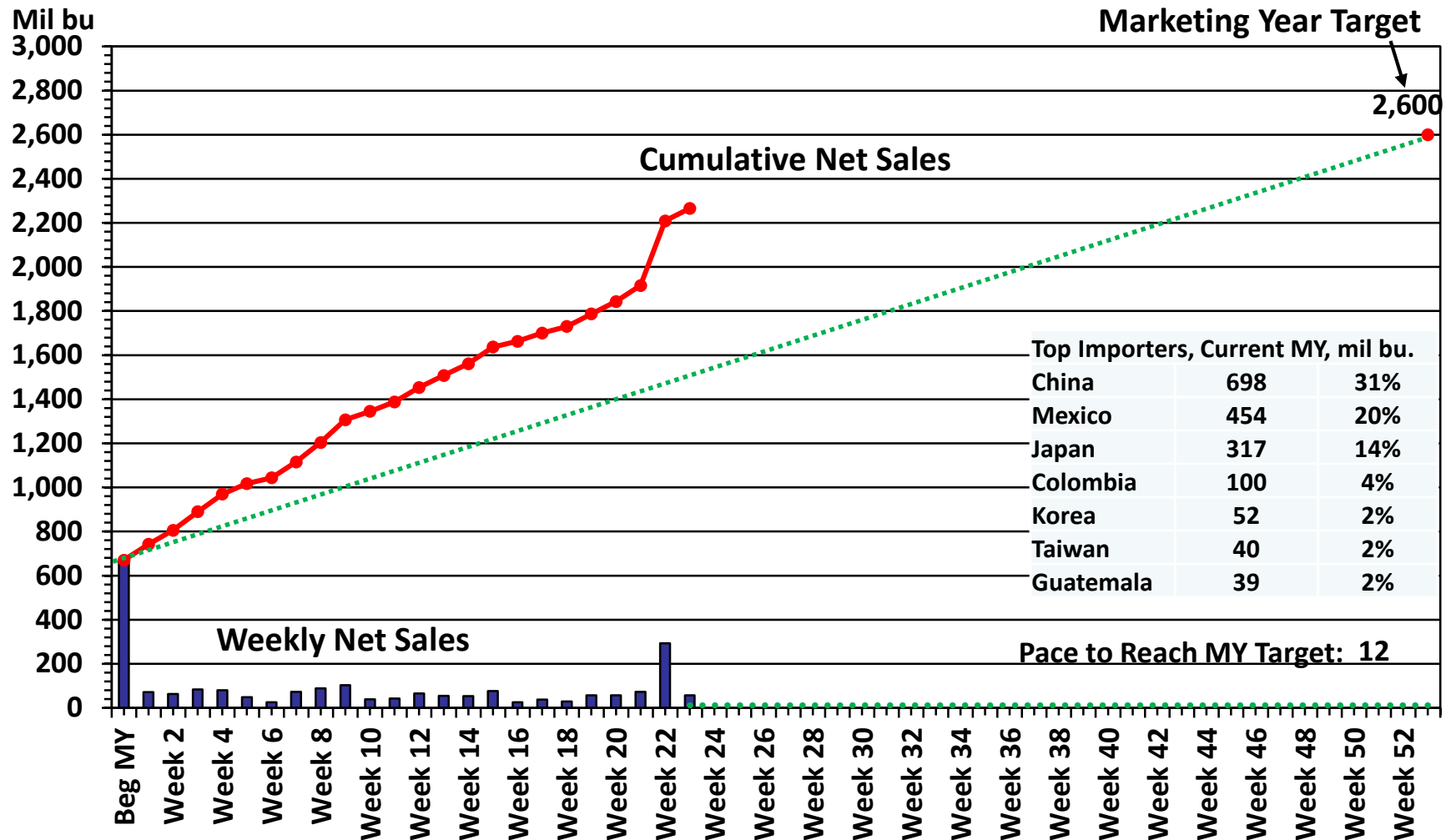


US Corn Exports



USDA, 2/9/2021

U.S. Corn Export Sales Commitments, 2020/21 MY



Export Sales Commitments reported 02/04/2021: 57 million bushels

Total Export Sales Commitments this marketing year: 2,266 million bushels

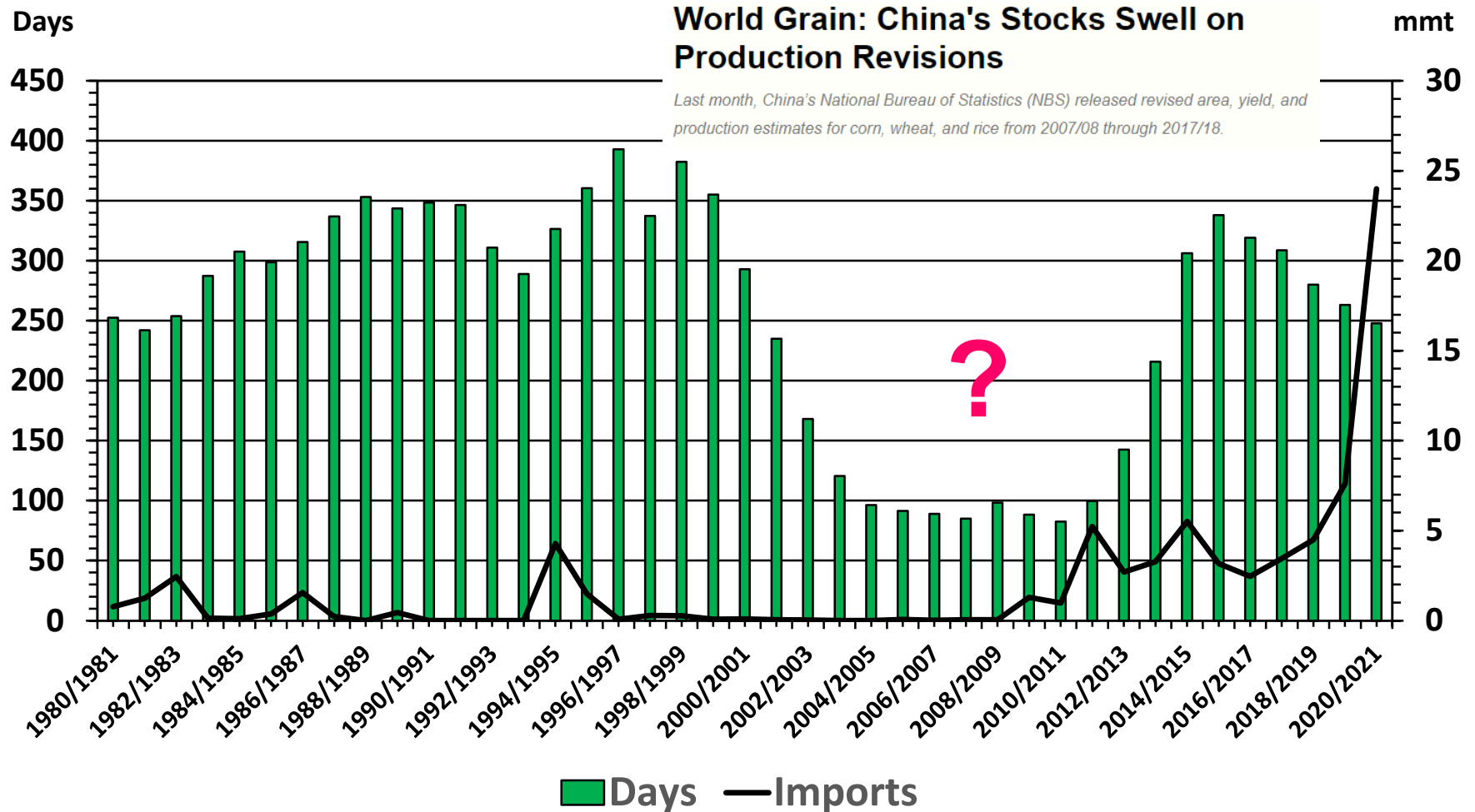
87% of the 2020/21 MY Export Sales Target of 2,600 million bushels (February WASDE)

Average cumulative sales at the end of February: 70% of the marketing year target

USDA, Foreign Agricultural Service: February 11, 2021

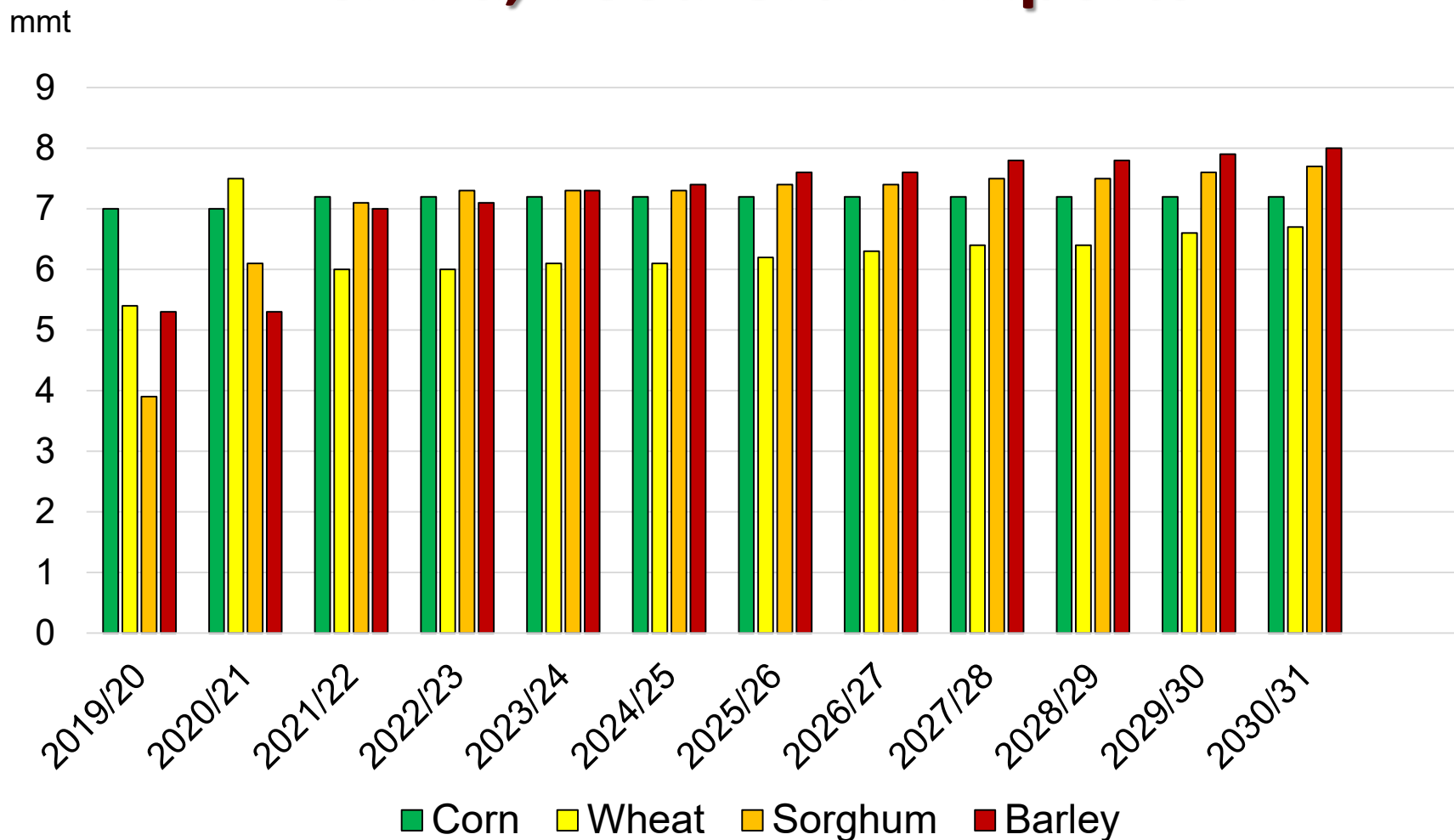
China Corn

Days of use and Imports



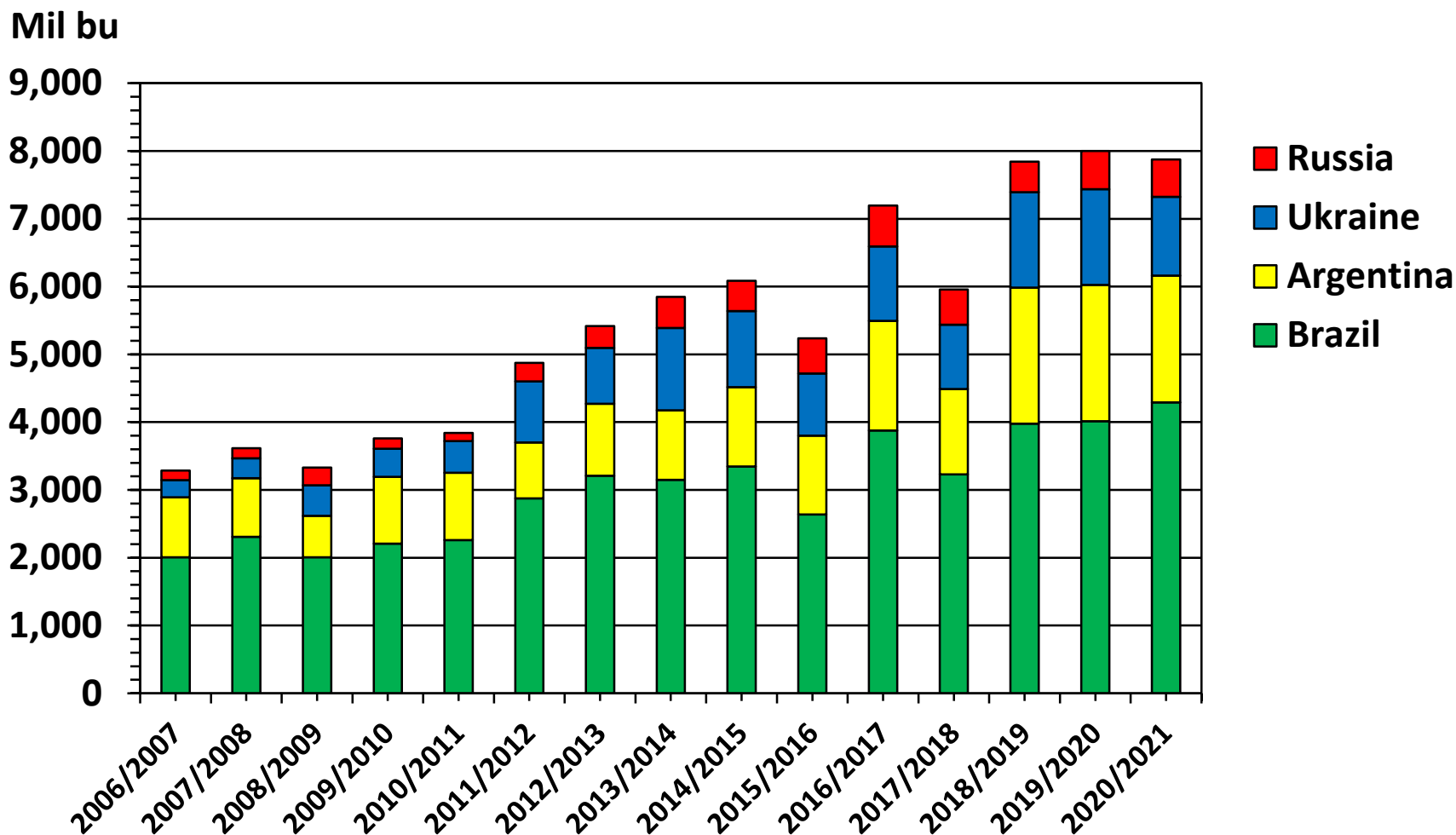
USDA, FAS, PS&D, 2/9/2021

China, Feed Grain Imports

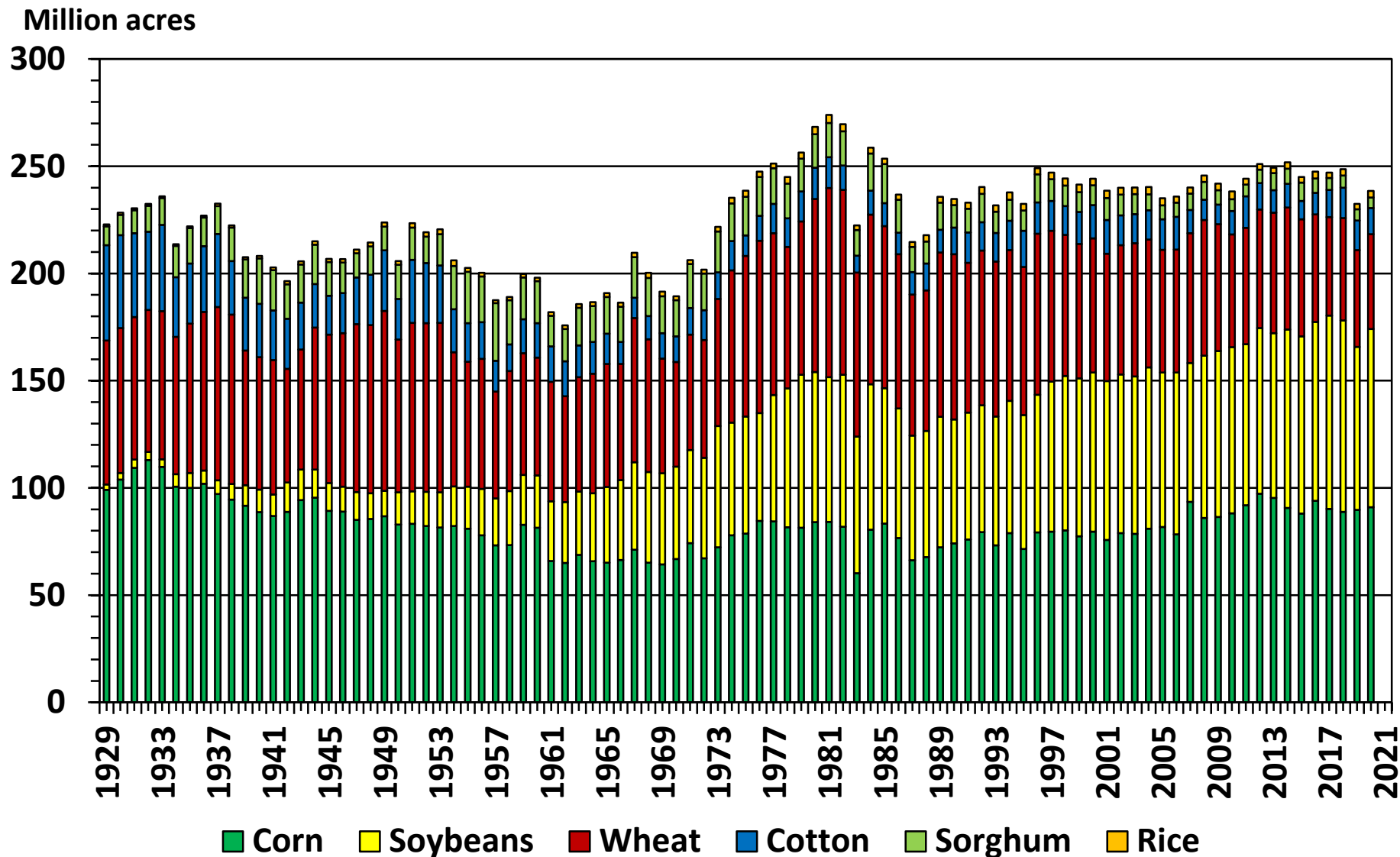


USDA, Long-term Projections, updated February 2021

Brazil, Argentina, Ukraine, and Russia Corn Production

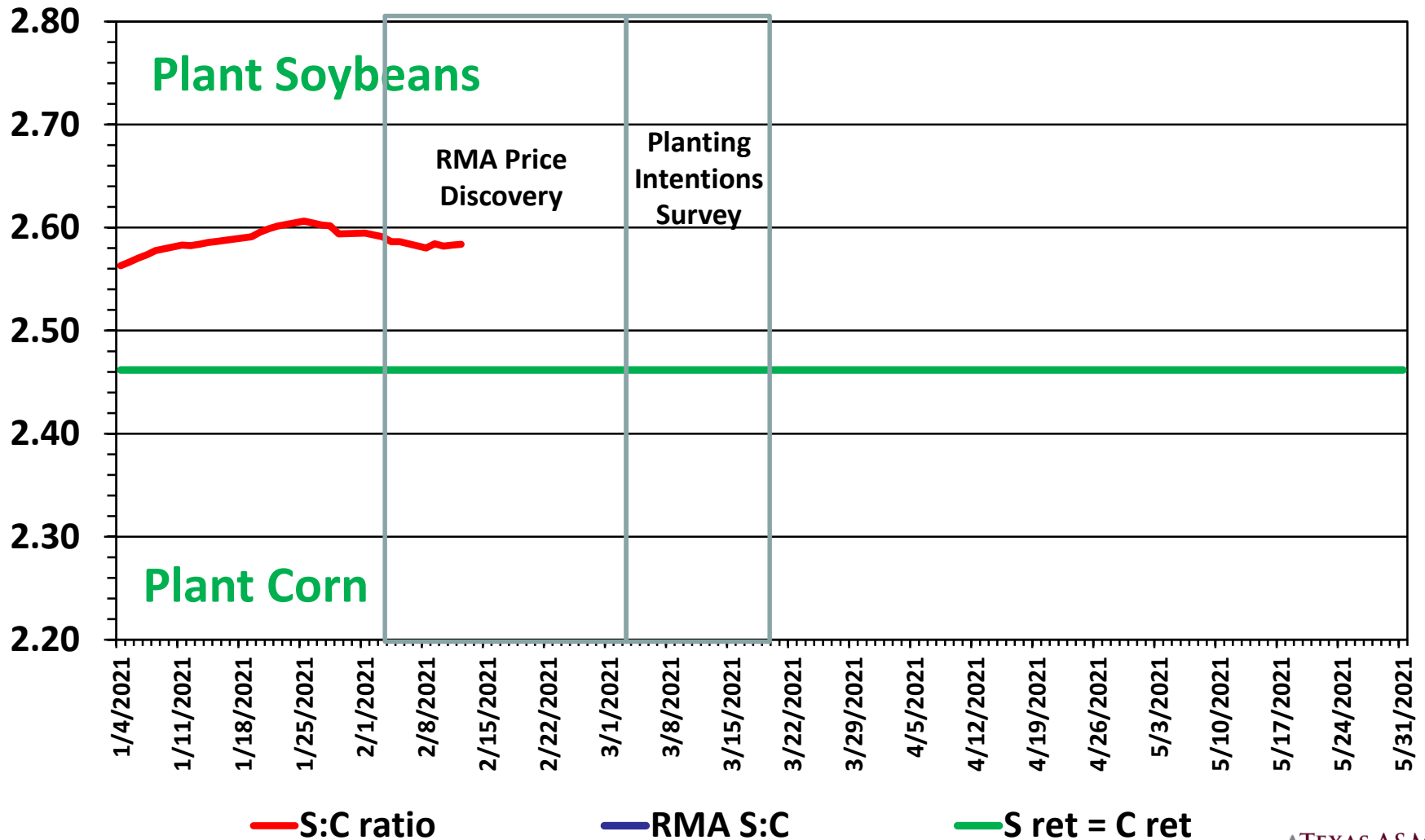


U.S. Planted Acres, 2020: 238 million, 10-yr avg: 246

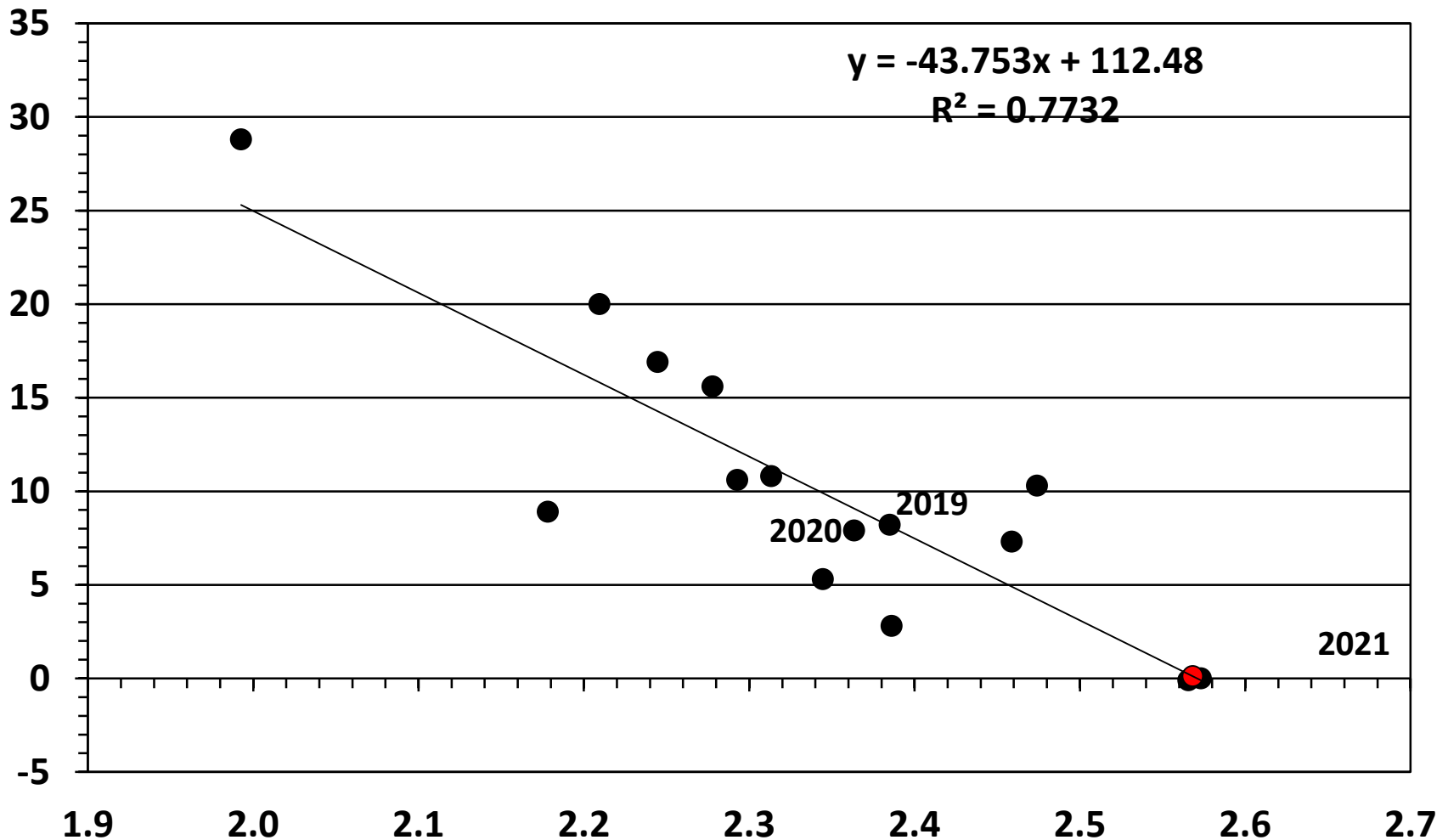


USDA, WASDE, October 9, 2020

2021 Nov Soybean:Dec Corn Price Ratio 20-day moving average



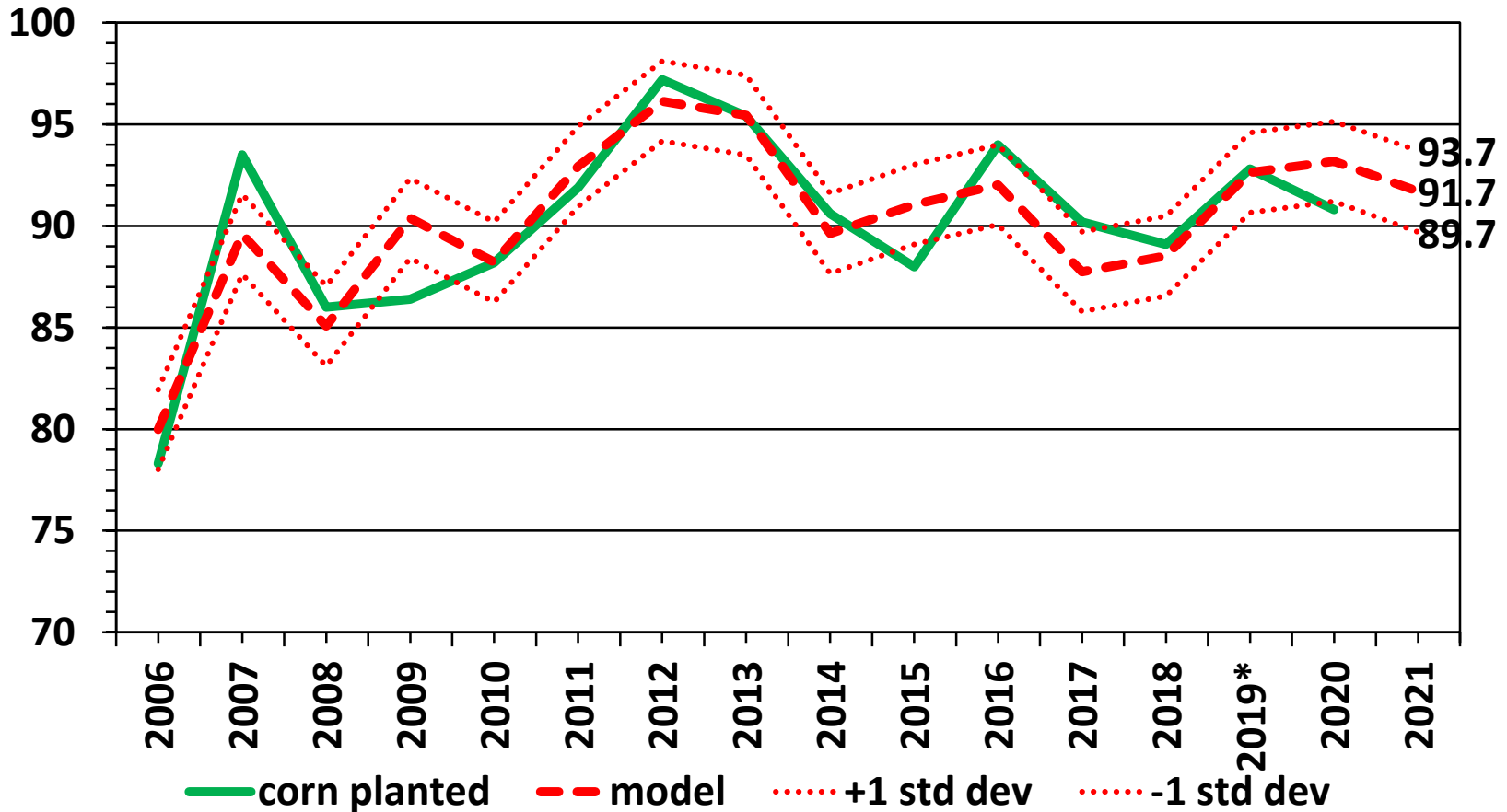
2021 Corn acres minus Soybean acres, mil 2019 intended, all other actual



Soybean to Corn RMA Base Price Ratio, 2006-2020

U.S. Corn Acres

Mil acres



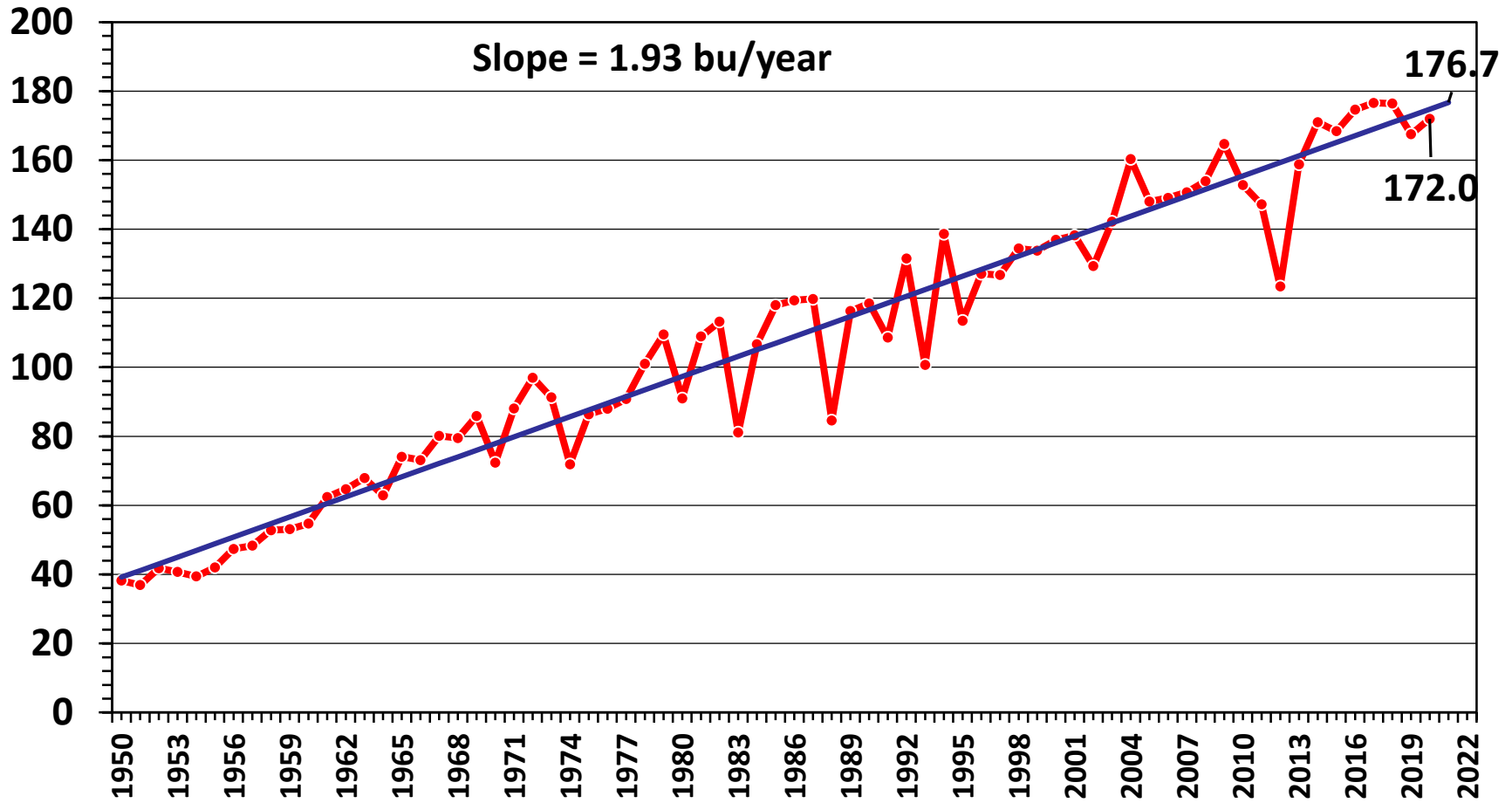
Corn acres = $114 + (2 * \text{safp}, t-1) + (-17 * \text{RMA S:C ratio}) + (11 * \text{yield dev. } t-1) + (0.7 * \text{trend})$

$R^2 = 0.79$

* = planting intentions

US Average Corn Yield, 1950-2020

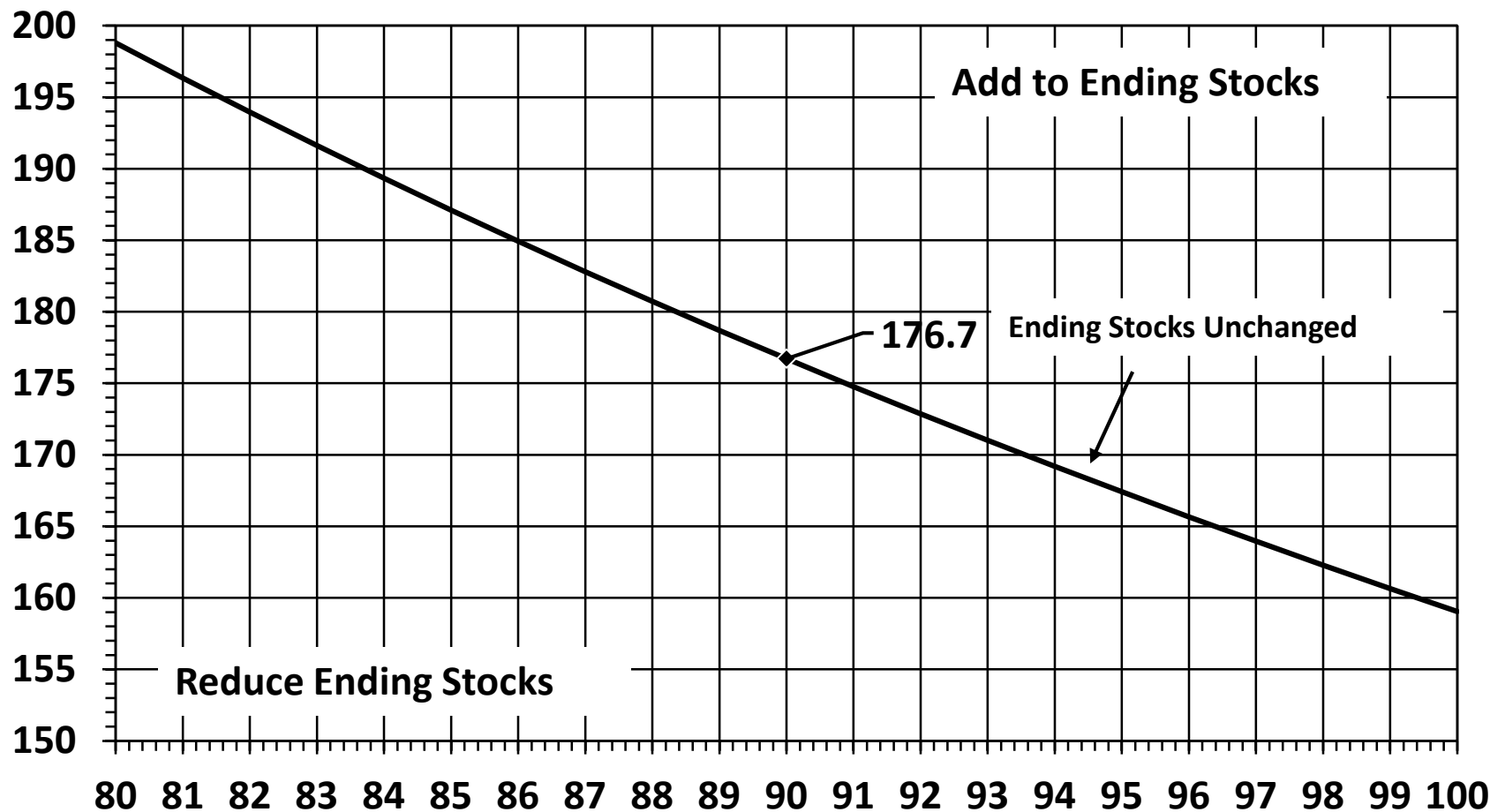
Bushels per acre



USDA, WASDE, 2/9/2021

Area and Yield Needed to Keep Ending Stocks Unchanged 14.625 billion bushel crop (use estimate from February WASDE)

Bushels per acre



Planted acres, millions

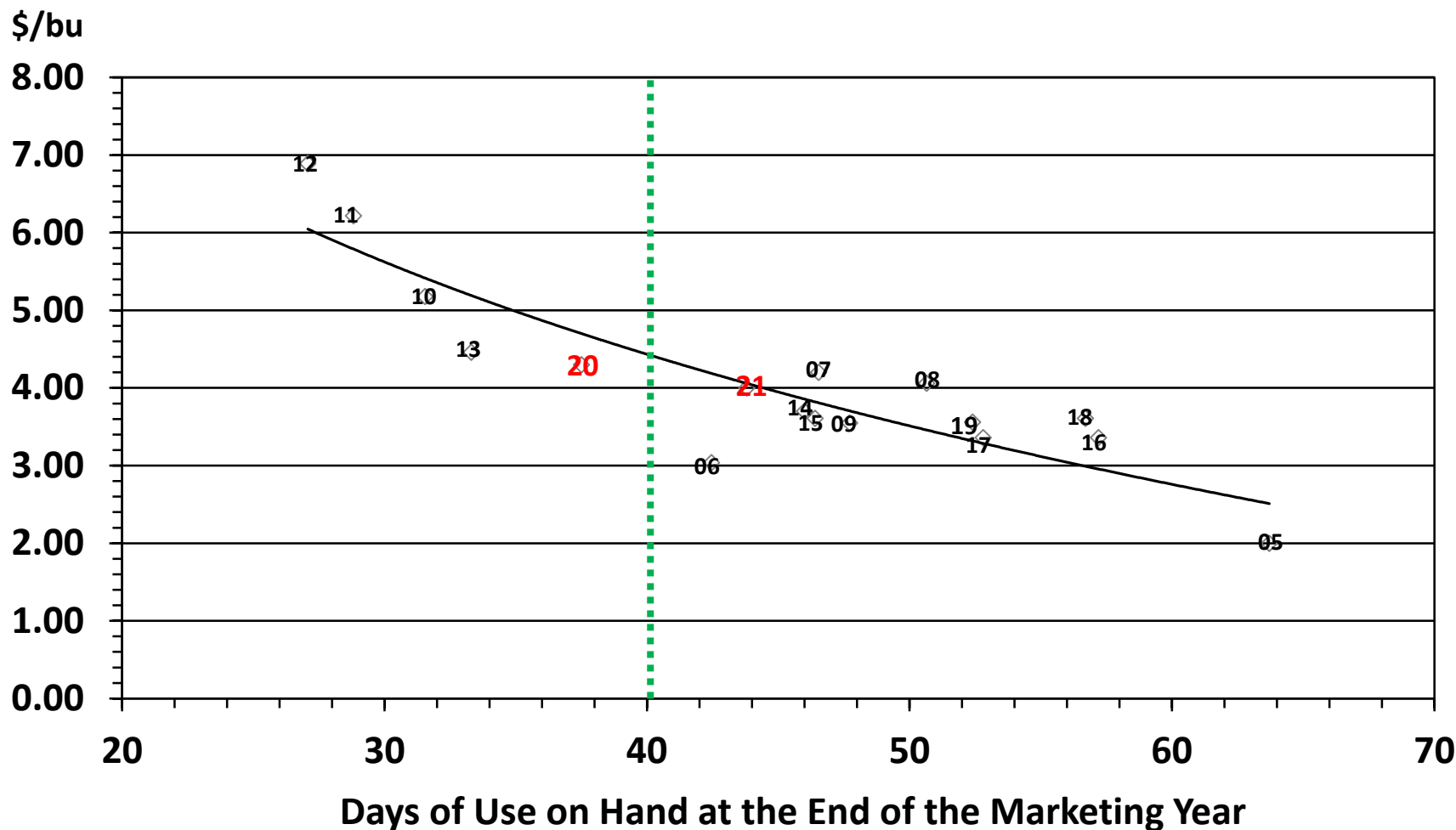
92 percent planted harvested for grain

			USDA		USDA	Welch
			Final		February	2/10/2021
			2018/19	2019/20	2020/21	2021/22
AREA						
	Planted	mil acres	88.9	89.7	90.8	92.0
	Harvested	mil acres	81.3	81.3	82.5	83.9
	% harvested		91.5%	90.6%	90.9%	91.2%
YIELD	Harvested acre	bu/ac	176.4	167.5	172.0	177.0
	Beginning stocks	mil bu	2,140	2,221	1,919	1,502
	Production	mil bu	14,340	13,620	14,182	14,851
	Imports	mil bu	28	42	25	25
	Total Supply	mil bu	16,509	15,883	16,127	16,378
DEMAND						
	Feed and residual	mil bu	5,429	5,903	5,650	5,675
	Food, seed, and indust	mil bu	1,415	1,430	1,425	1,425
	Ethanol	mil bu	5,378	4,852	4,950	5,200
	Total Domestic Use	mil bu	12,222	12,185	12,025	12,300
	Exports	mil bu	2,066	1,778	2,600	2,325
	Total Use	mil bu	14,288	13,963	14,625	14,625
	Ending stocks	mil bu	2,221	1,919	1,502	1,753
	Stocks to Use ratio	percent	15.5%	13.7%	10.3%	12.0%
	Days of use on hand		56.7	50.2	37.5	43.8
PRICE	Oct avg of Dec futures		368	390	399	406
	USDA SAFF	\$/bu	\$ 3.61	\$ 3.56	\$ 4.30	\$ 4.00
	Reference Price	\$/bu	\$ 3.70	\$ 3.70	\$ 3.70	\$ 3.70
	PLC Payment	\$/bu	\$ 0.09	\$ 0.14	\$ -	\$ -

**U.S. Corn
S&D
2/9/2021**

Do Fundamentals Matter?

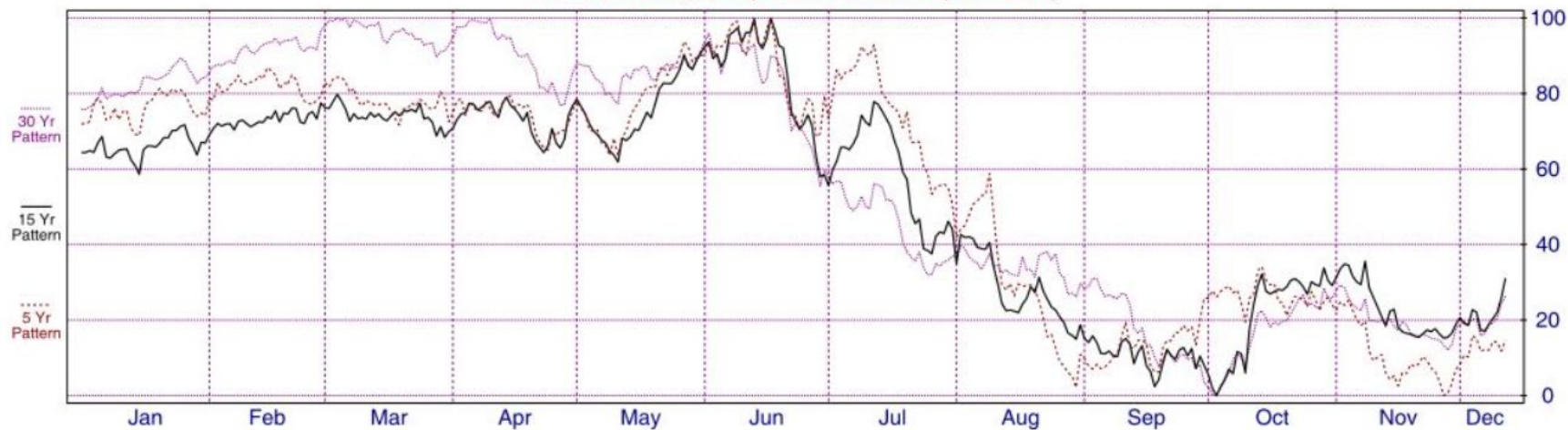
U.S. Corn Season Average Farm Price and Days of Use on Hand
2005/06-2019/20, 2020/21 estimate, 2021/22 forecast



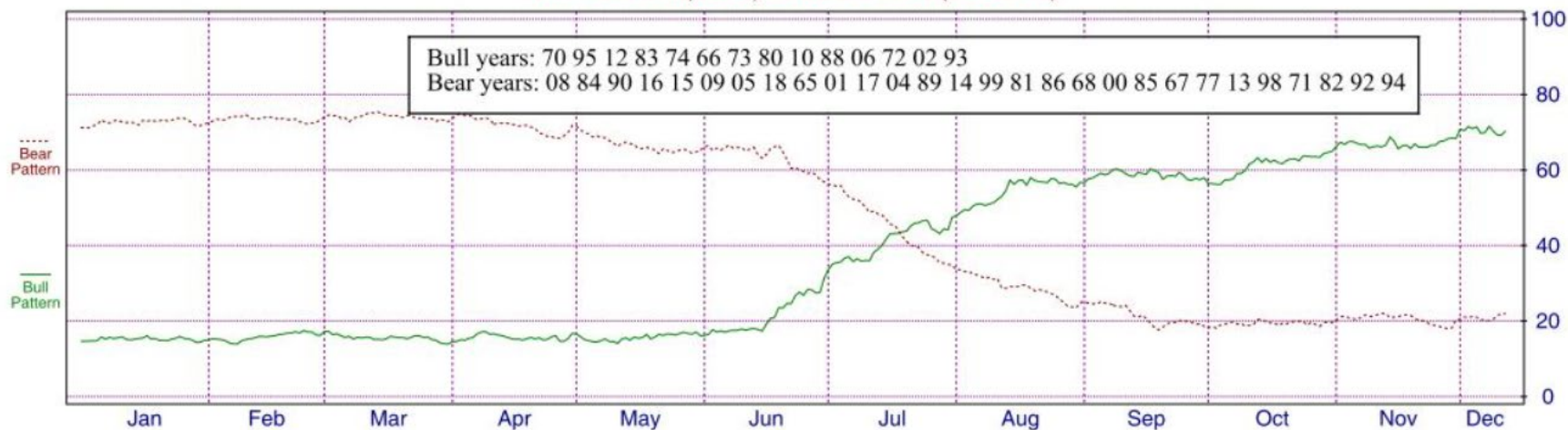
Source: USDA, WASDE, 2/9/2021

CORN

December Corn(CBOT) Seasonal Patterns(1990-2019)



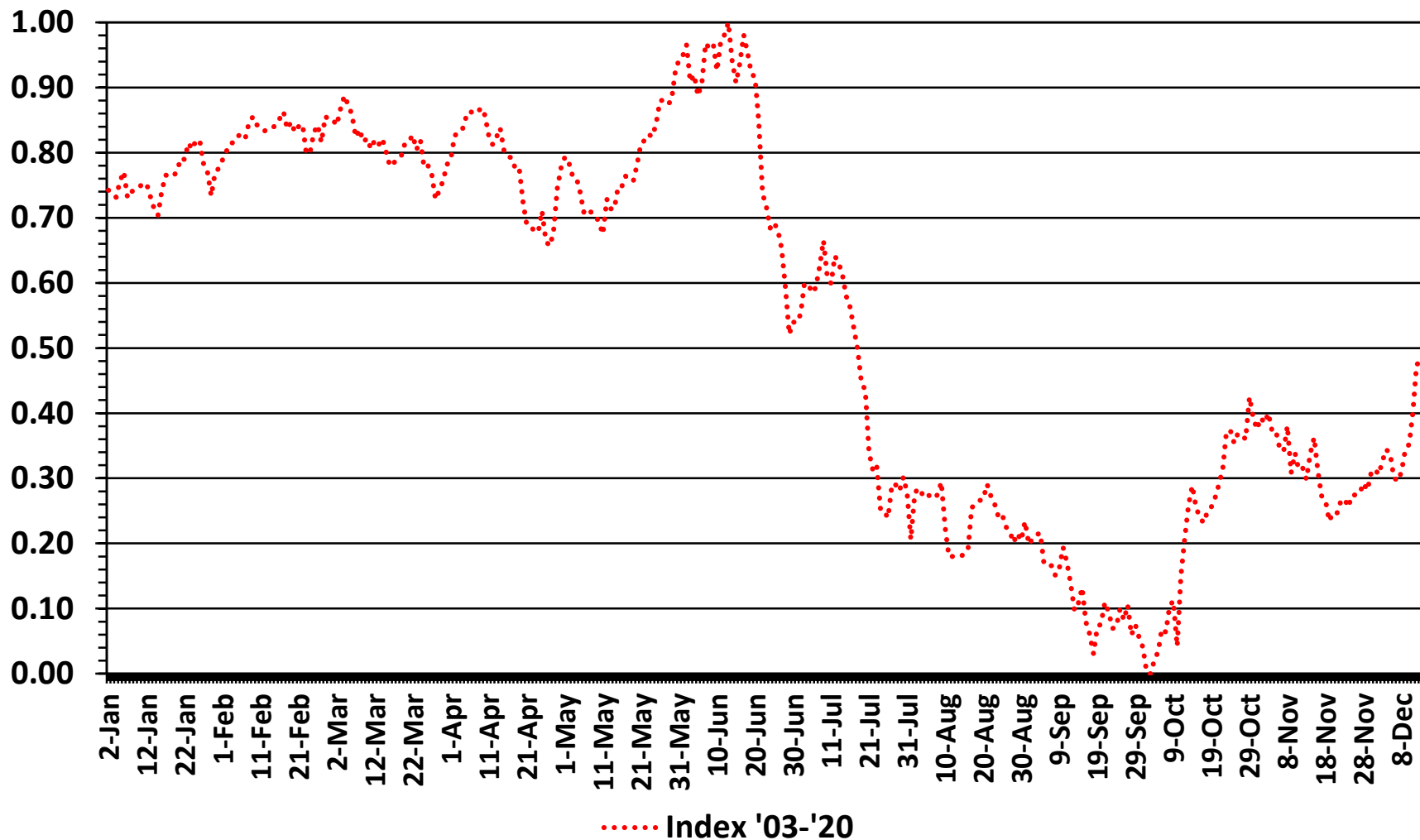
December Corn(CBOT) Bull/Bear Patterns(1965-2019)



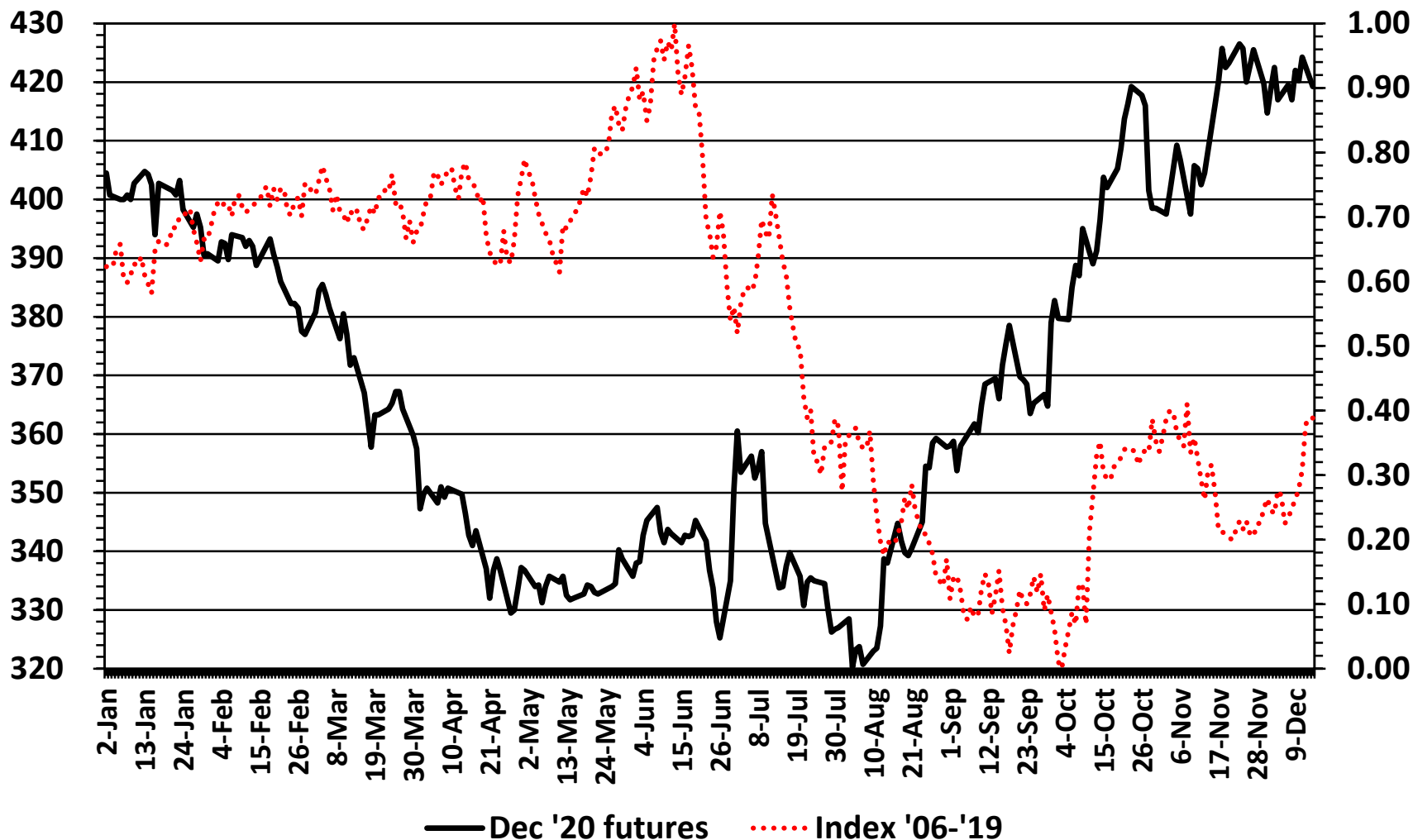
15 out of 55 were bull years: 25%

28 out of 55 were bear years: 51%

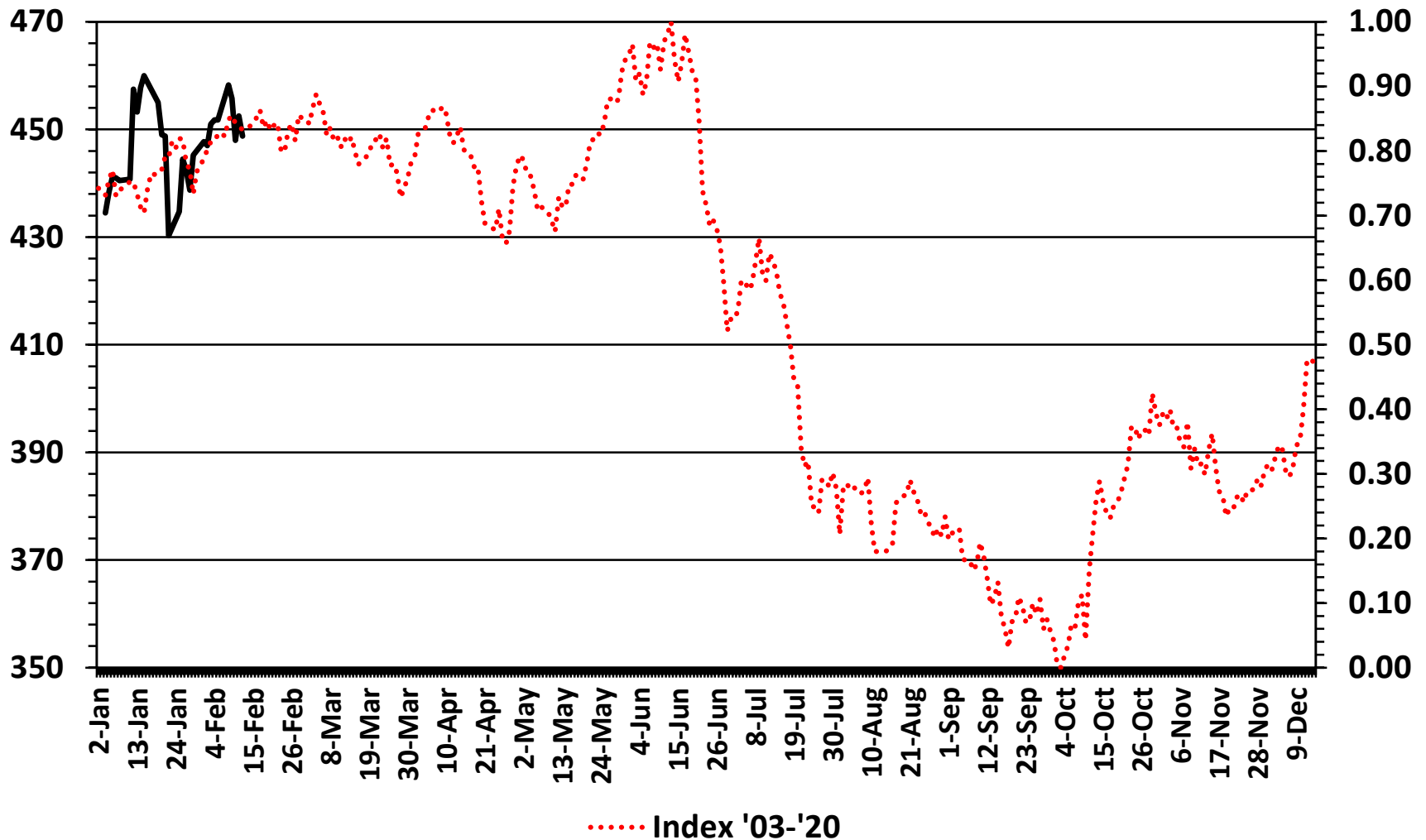
December Corn Futures Seasonal Index Pattern



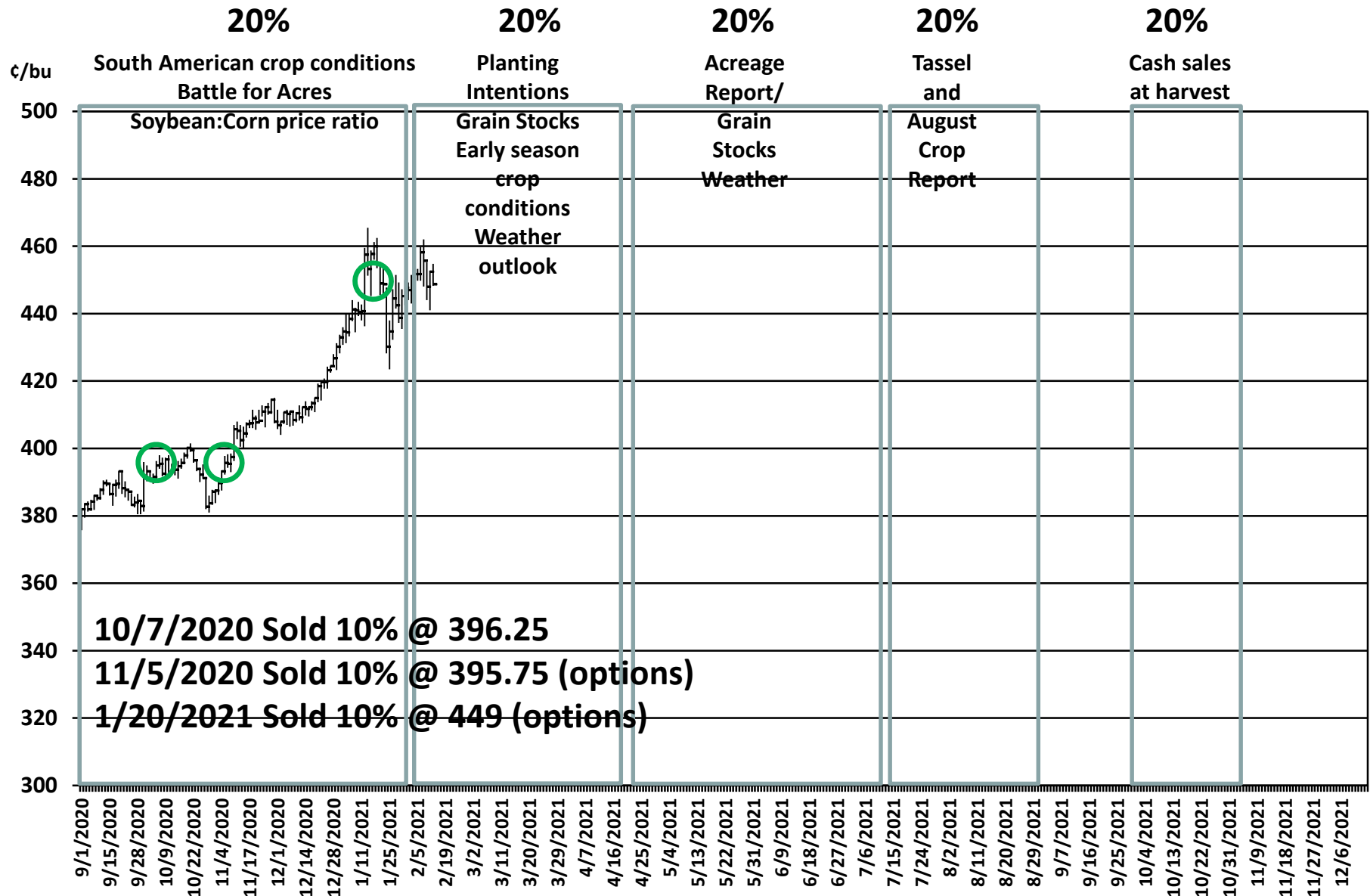
2020 December Corn Futures and Seasonal Index Pattern



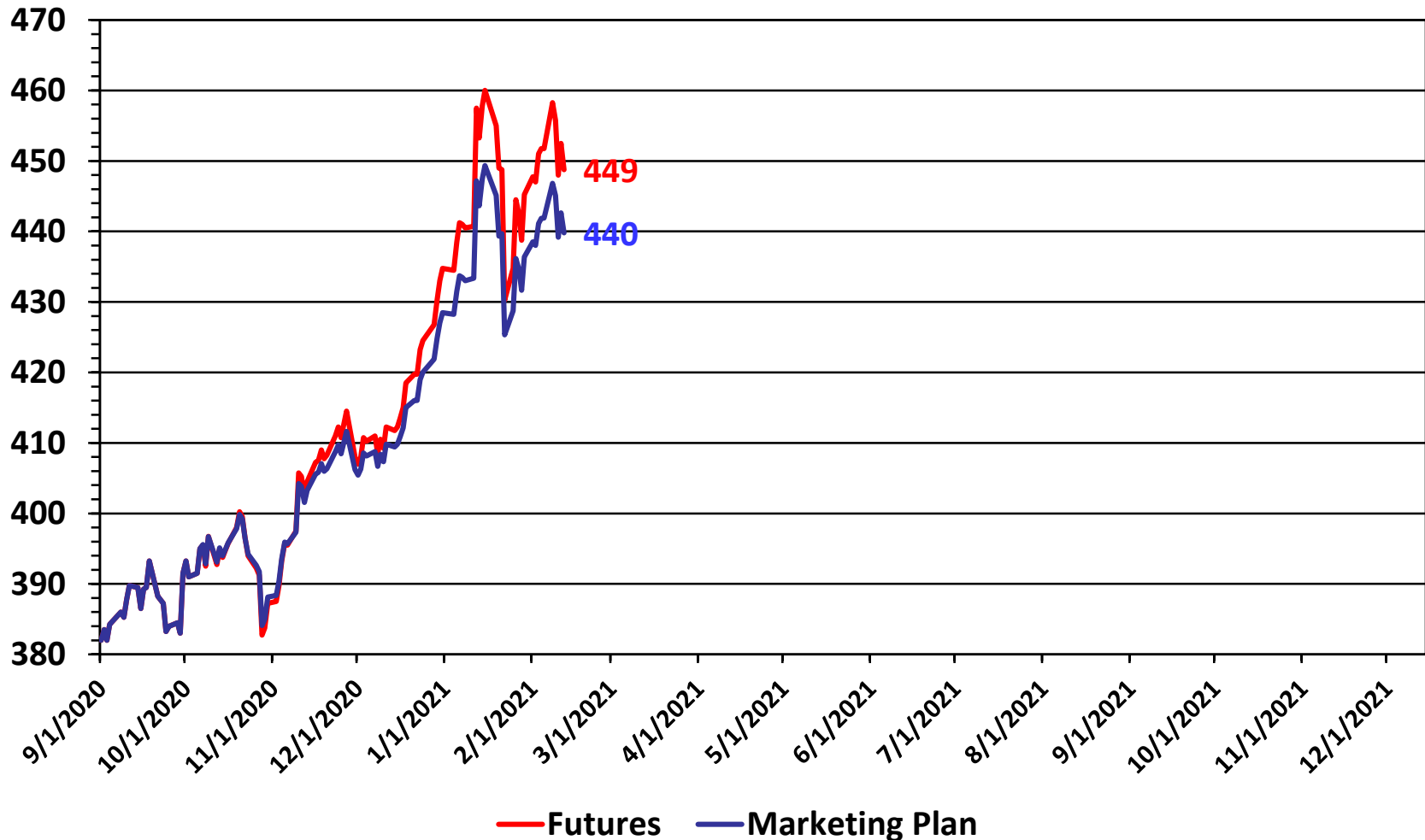
2021 December Corn Futures and Seasonal Index Pattern



December Corn Futures and 2021 Marketing Plan



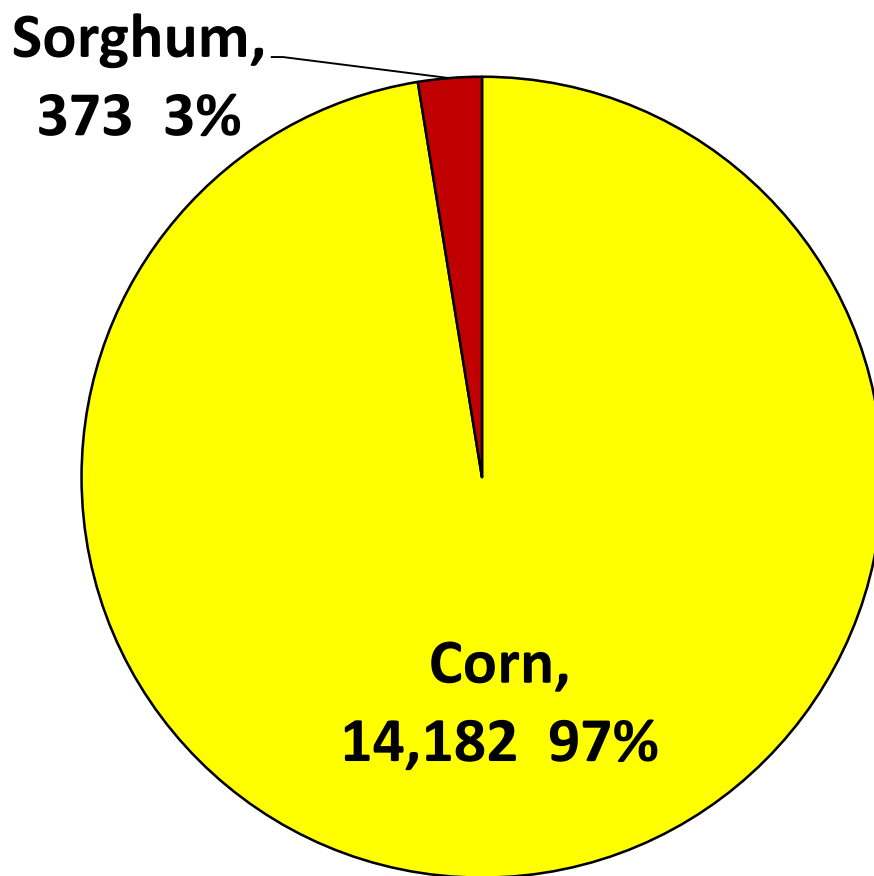
Futures vs Hedged Price 2021 Marketing Plan



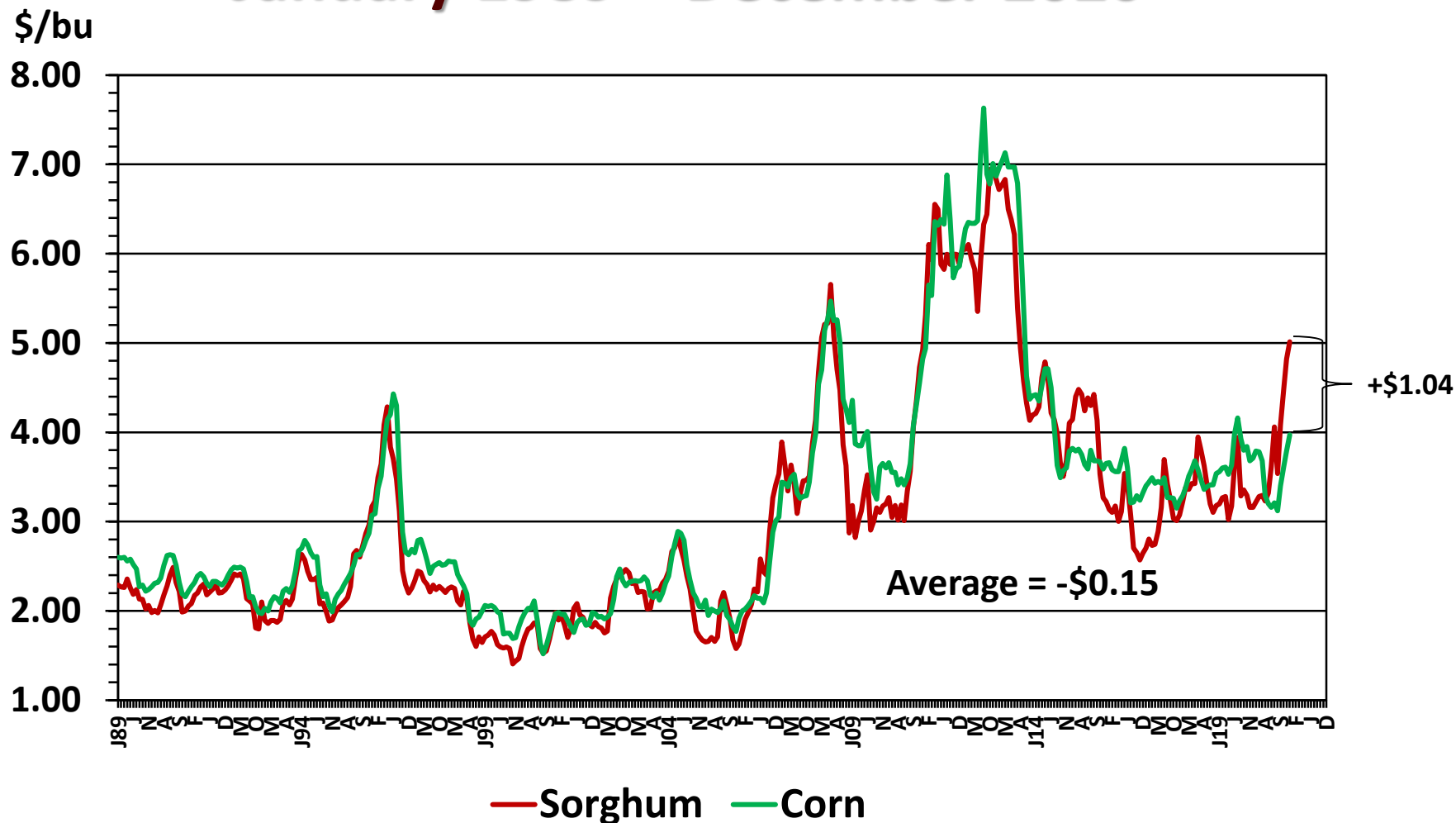
Corn Market Factors for 2021

- Increase in corn acres; trend yield
- Energy feed use steady
- Fuel use increase (but not to previous levels)
- Exports face increasing global competition
- U.S. corn stocks to use higher
- Prices moderately lower
- Global Economy—recession impacts
- Trade—disputes, disruptions, uncertainty, new agreements
- Weather

2020 U.S. Feed Grain Production (million bushels)

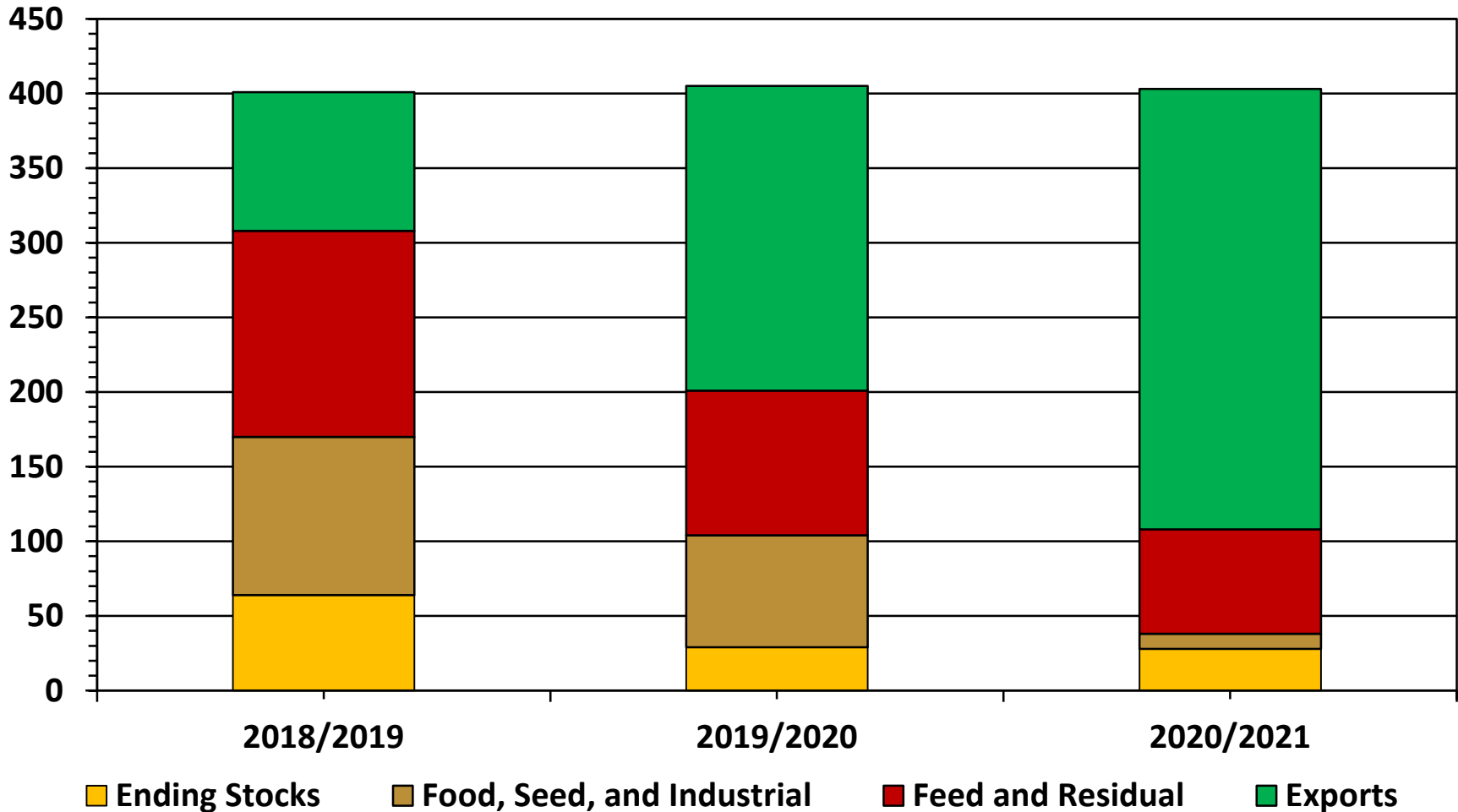


U.S. Average Prices Received by Farmers for Sorghum and Corn January 1989 – December 2020

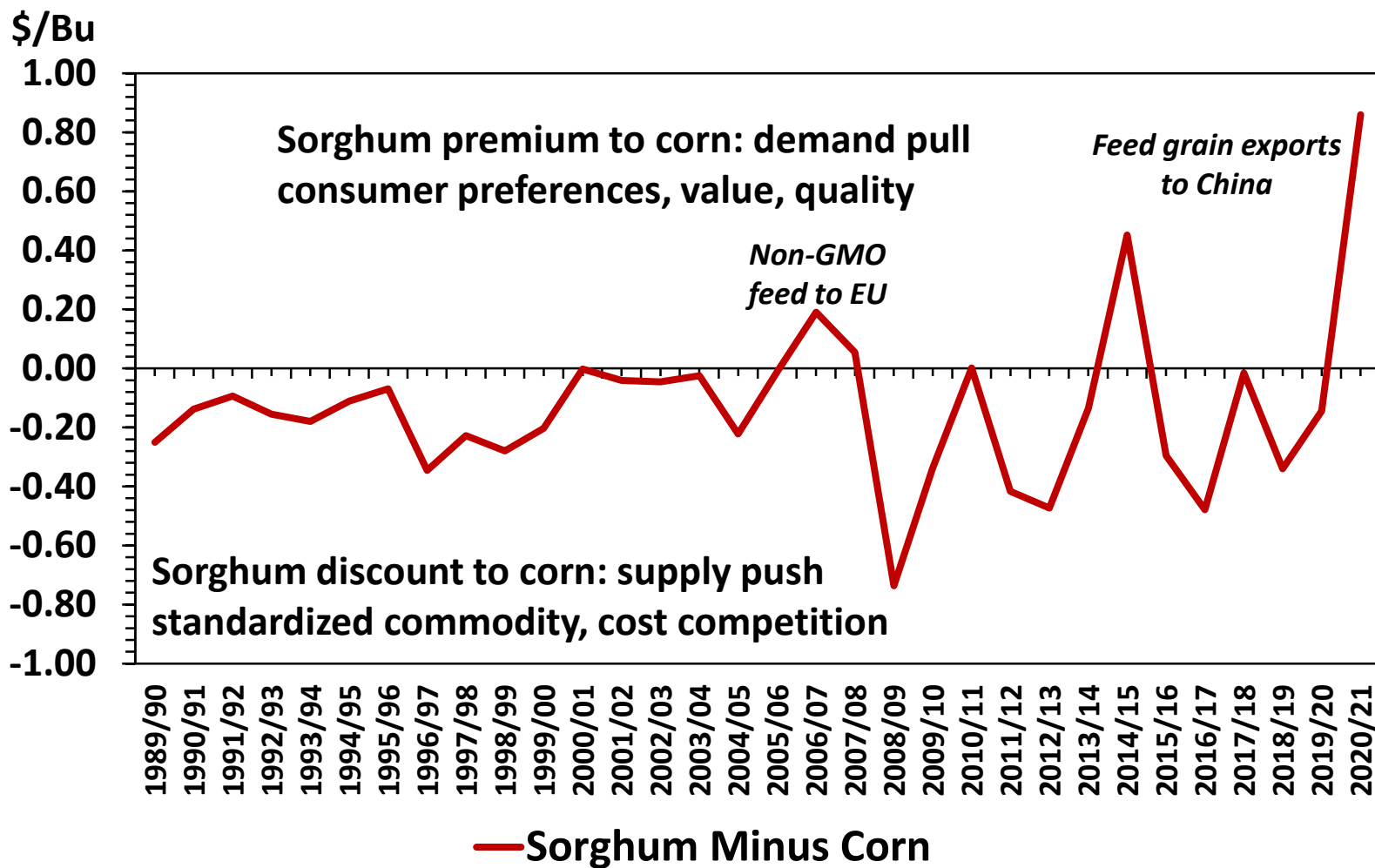


U.S. Sorghum Disappearance, 2/9/2021

Million bushels



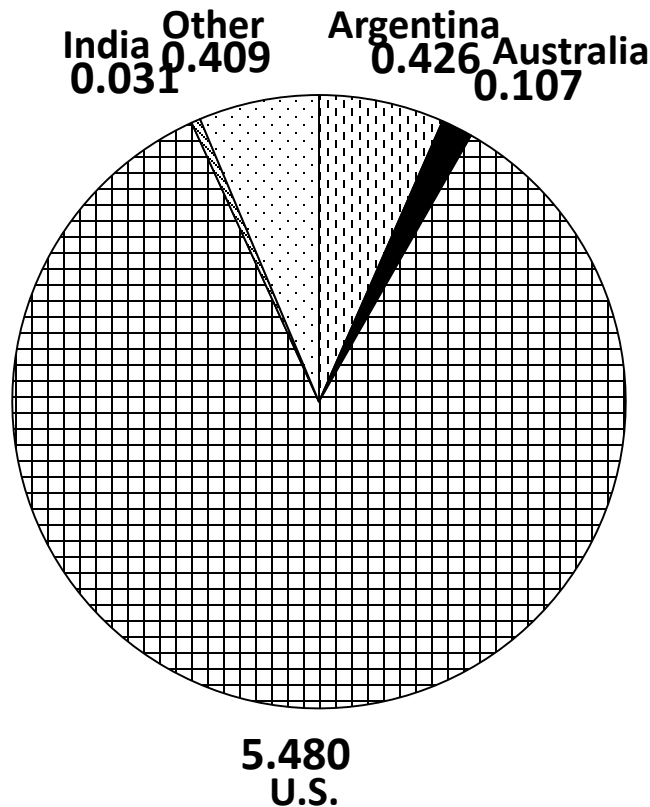
U.S. Average Prices Received by Farmers Sorghum Minus Corn Spread Marketing Year Average



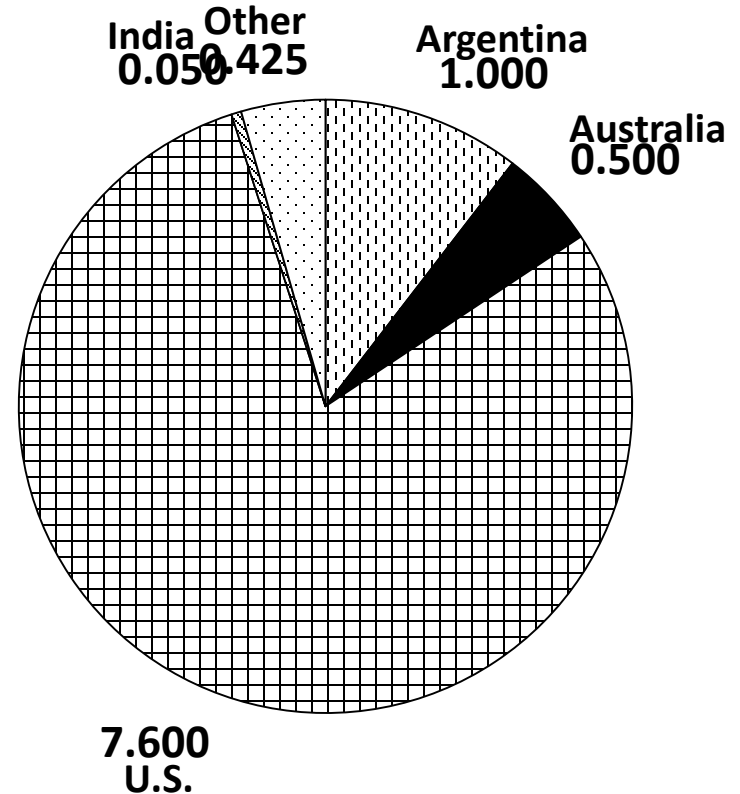
Sorghum: Major Exporters

2019/20 and 2020/21

(million metric tons)



2019/20 (estimated)
Total = 6.453

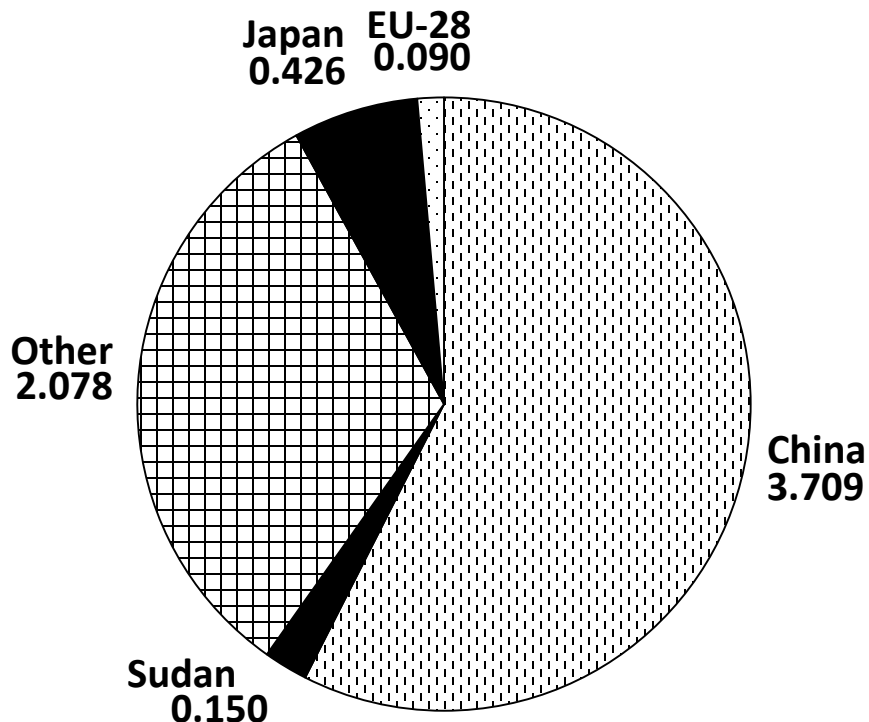


2020/21 (projected)
Total = 9.575

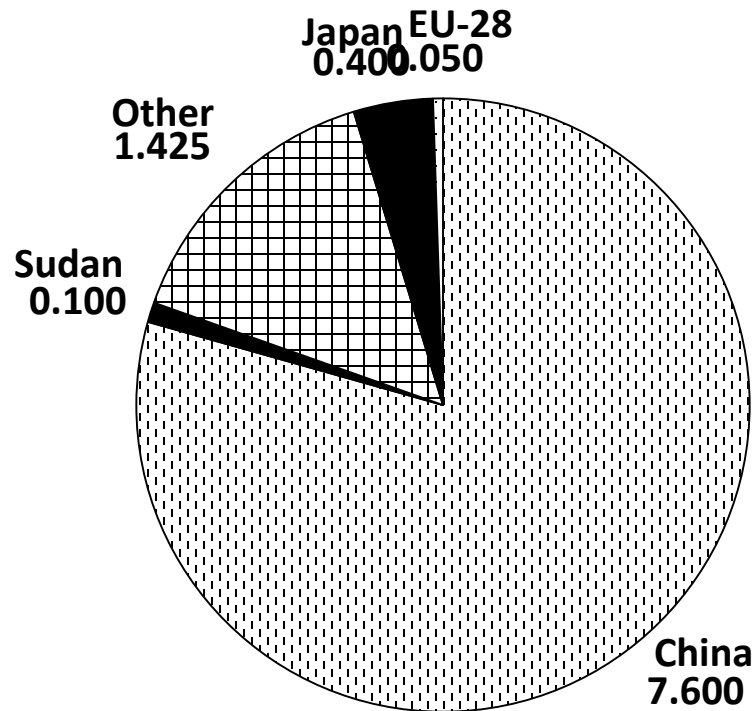
Sorghum: Major Importers

2019/20 and 2020/21

(million metric tons)

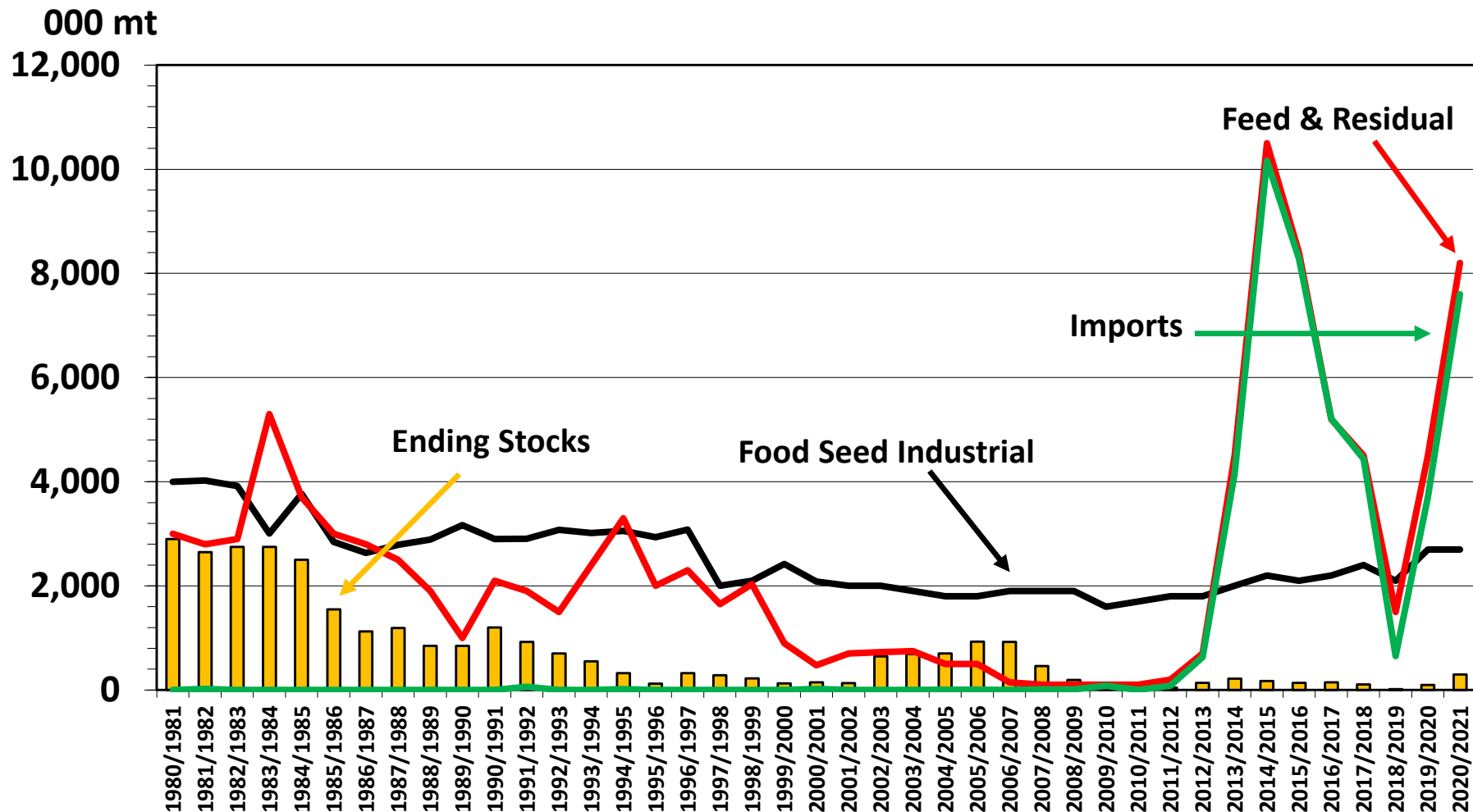


2019/20 (estimated)
Total = 6.453



2020/21 (projected)
Total = 9.575

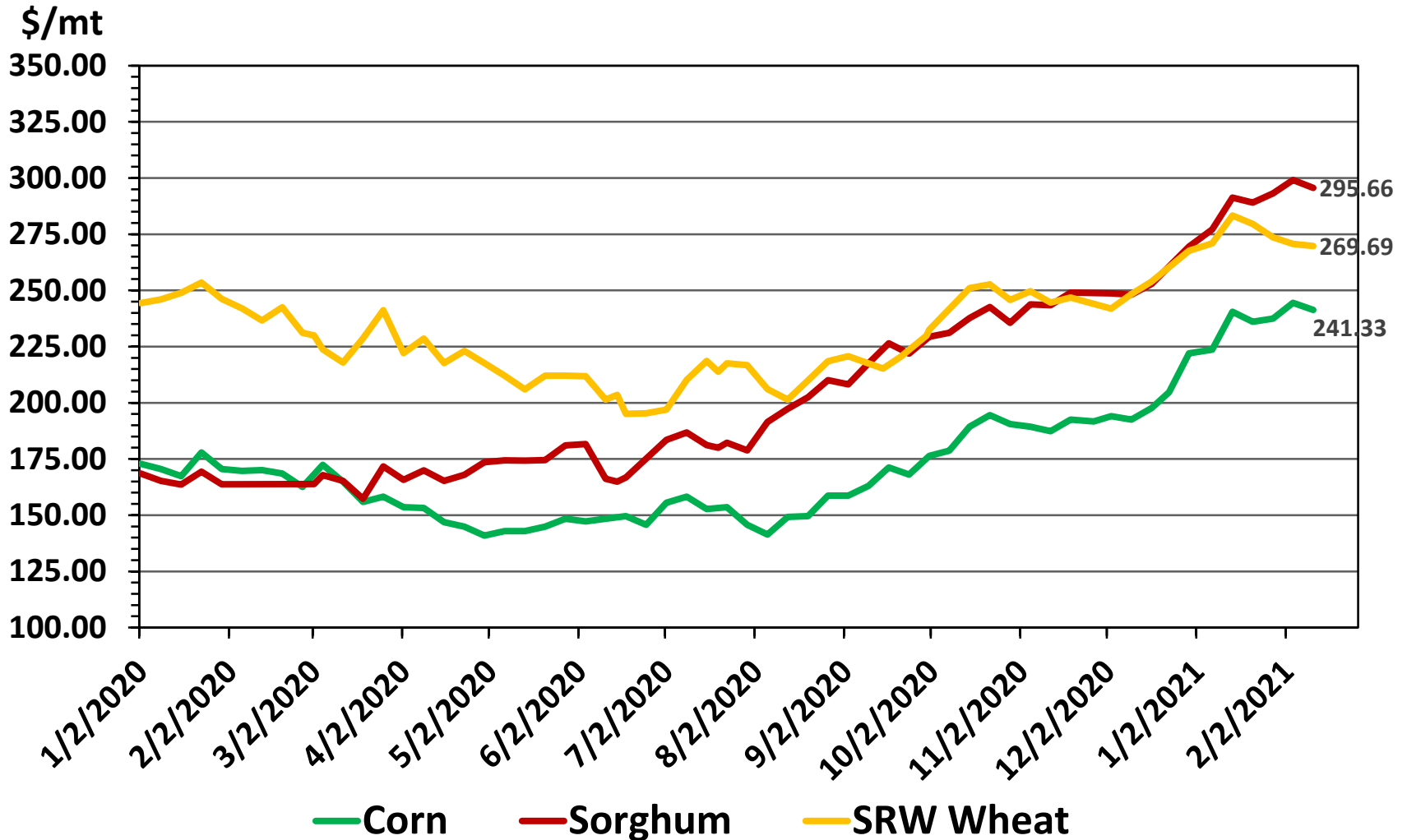
China Sorghum: Use and Imports



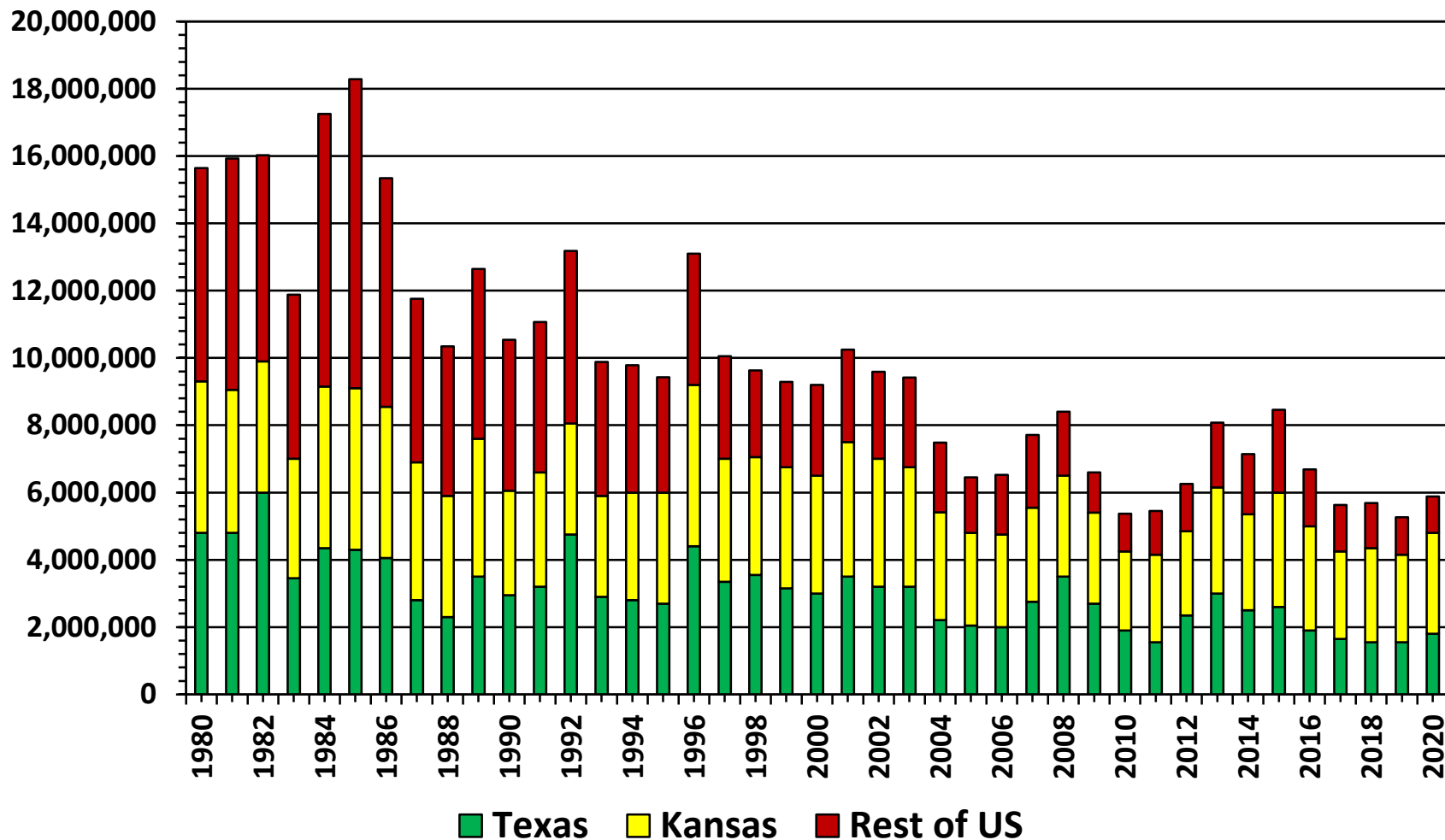
Source: USDA FAS PS&D, 2/11/2021

Threat of substitutes...

LA Gulf and TX Gulf Export Prices



Sorghum Acres

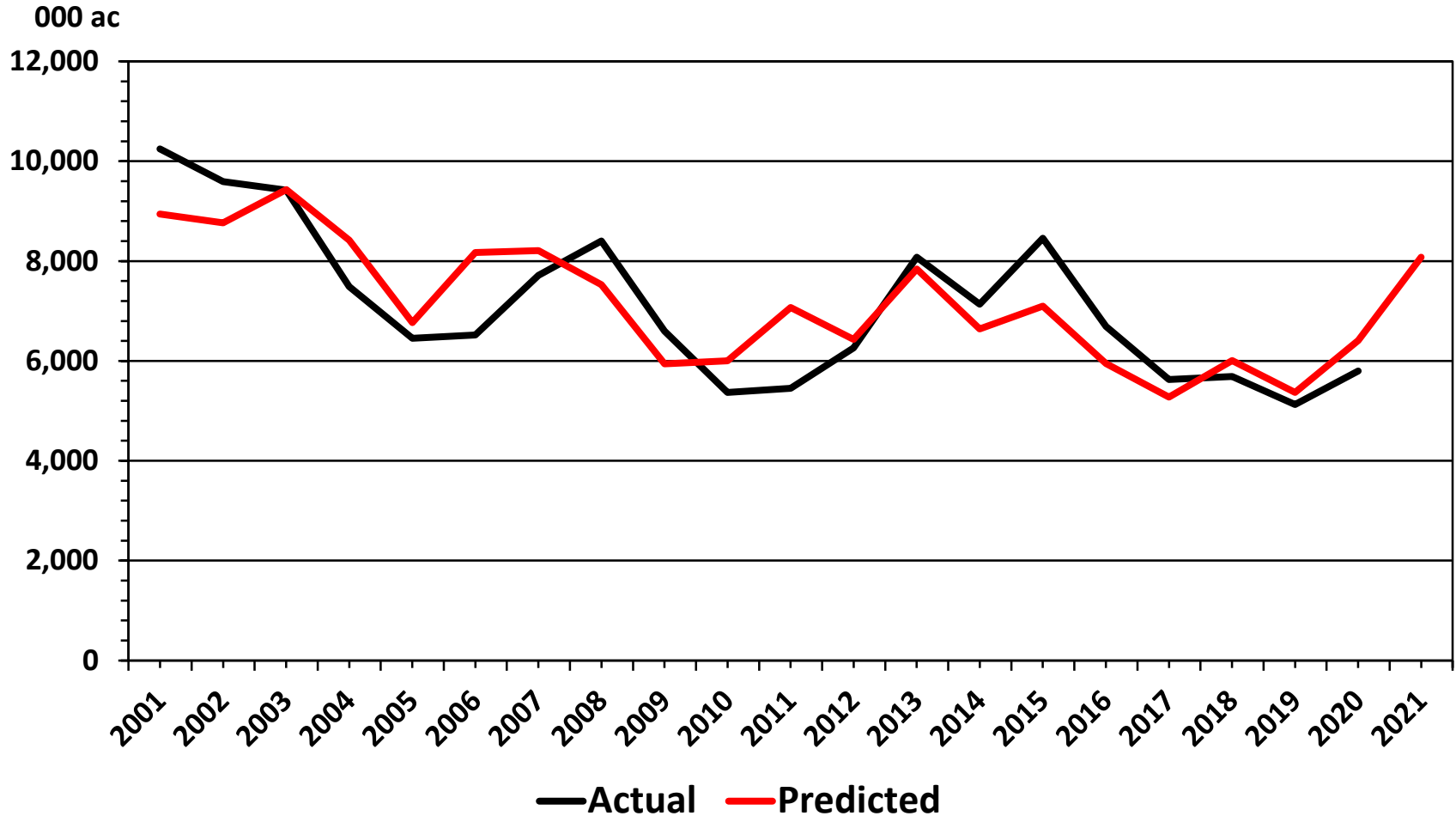


USDA, NASS Quick Stats, 1/24/2021

U.S. Sorghum Acres

acres = 9525 + -116 trend + 1838 sor_corn spread, t-1 + -282 corn SAFP, t-1 + -11,314 C yield dev from trend, t-1

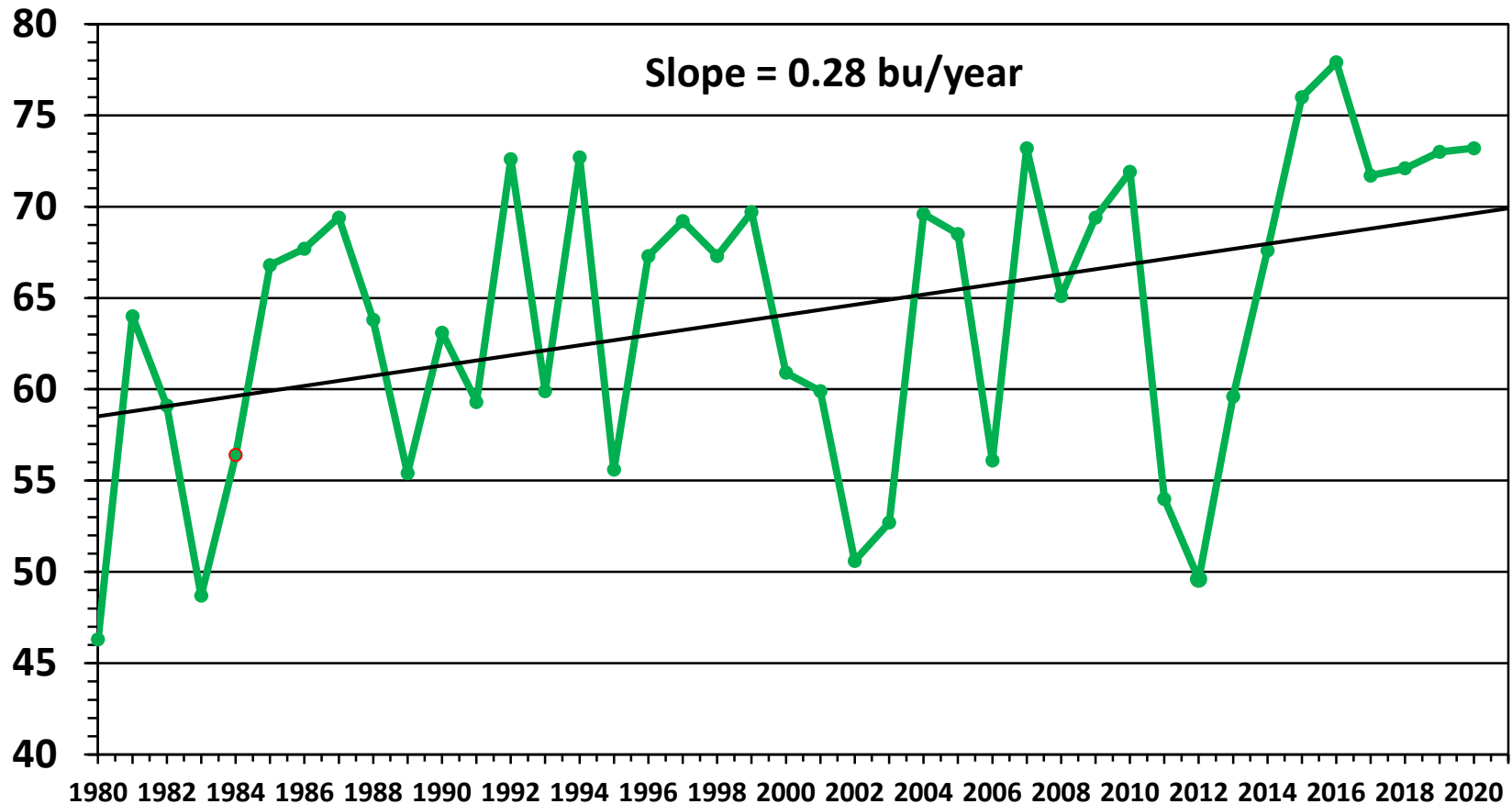
Prob(t) 0.000 0.03 0.06 0.30 0.02



Updated 2/9/2021

U.S. Grain Sorghum Yields

Bushels per acre

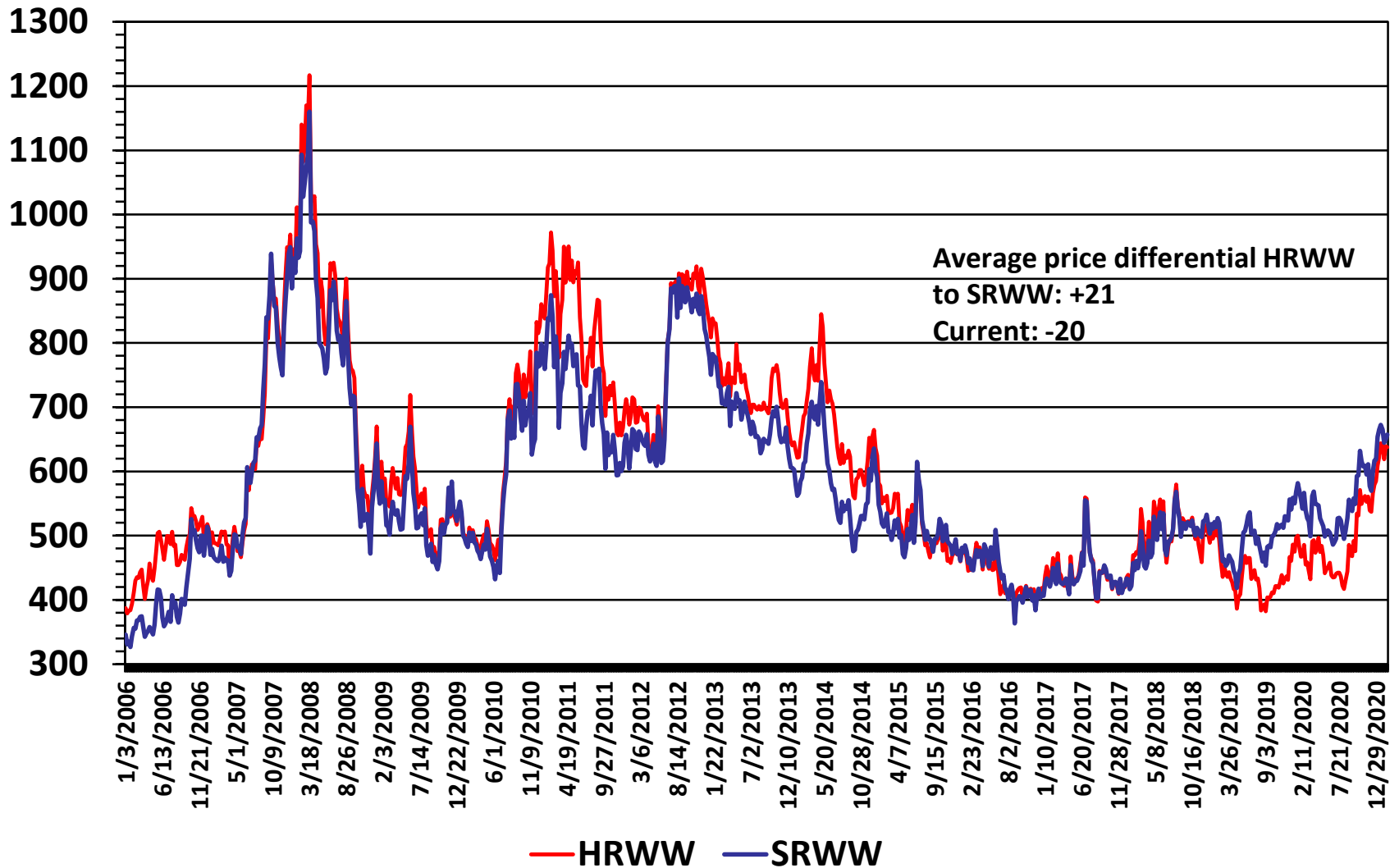


USDA, National Agricultural Statistic Service, 1/24/2021

Sorghum Market Factors for 2021

- **Increase in acres, yield lower, production up**
- **Total use steady**
- **Stocks to use ratio higher**
- **Prices lower in the new crop (premium fades)**
- **Global Economy**
- **Trade—disputes, disruptions, new agreements**
- **Weather**

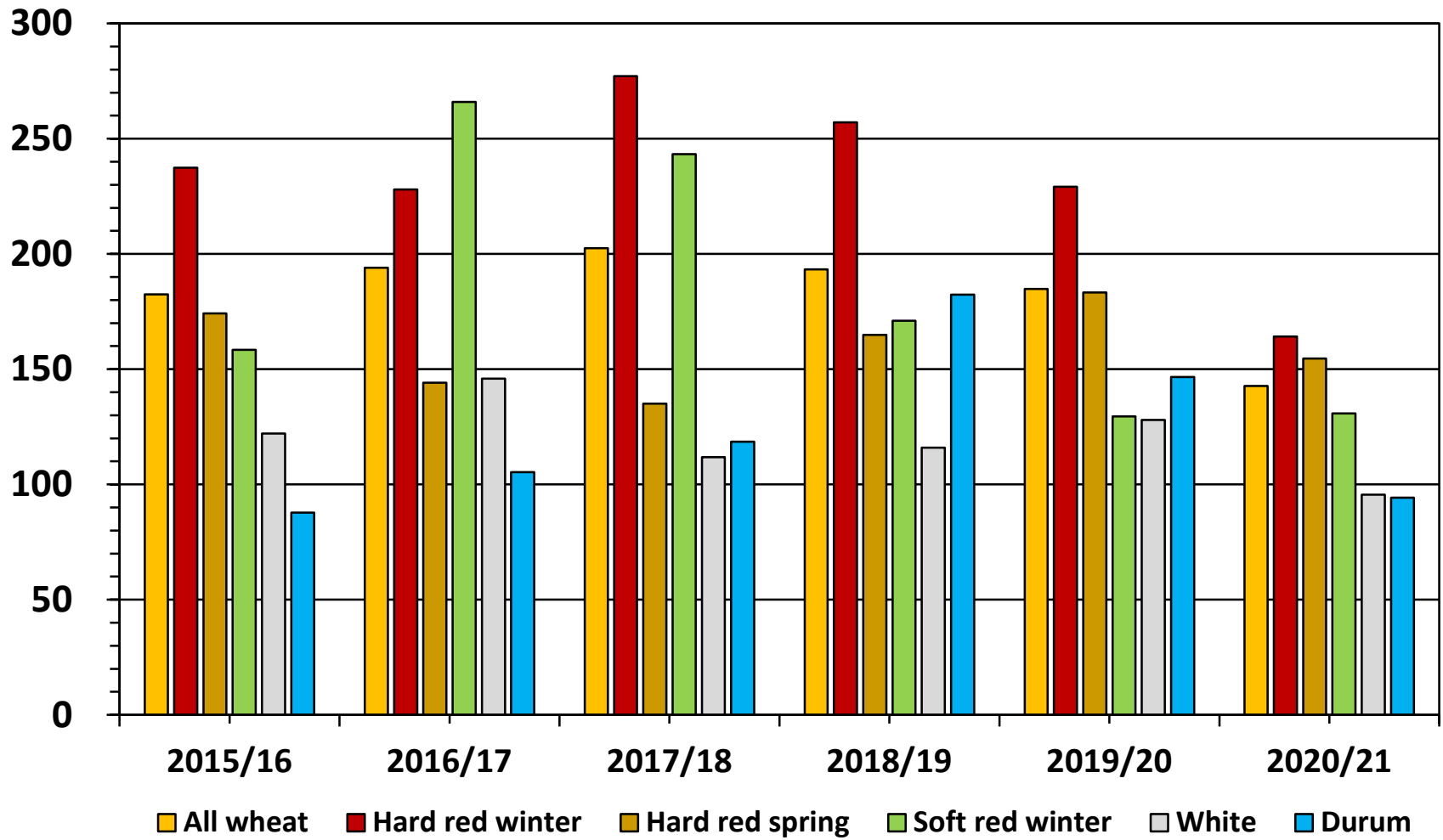
Wheat Prices



Tuesday closing futures prices, KC wheat and Chicago wheat

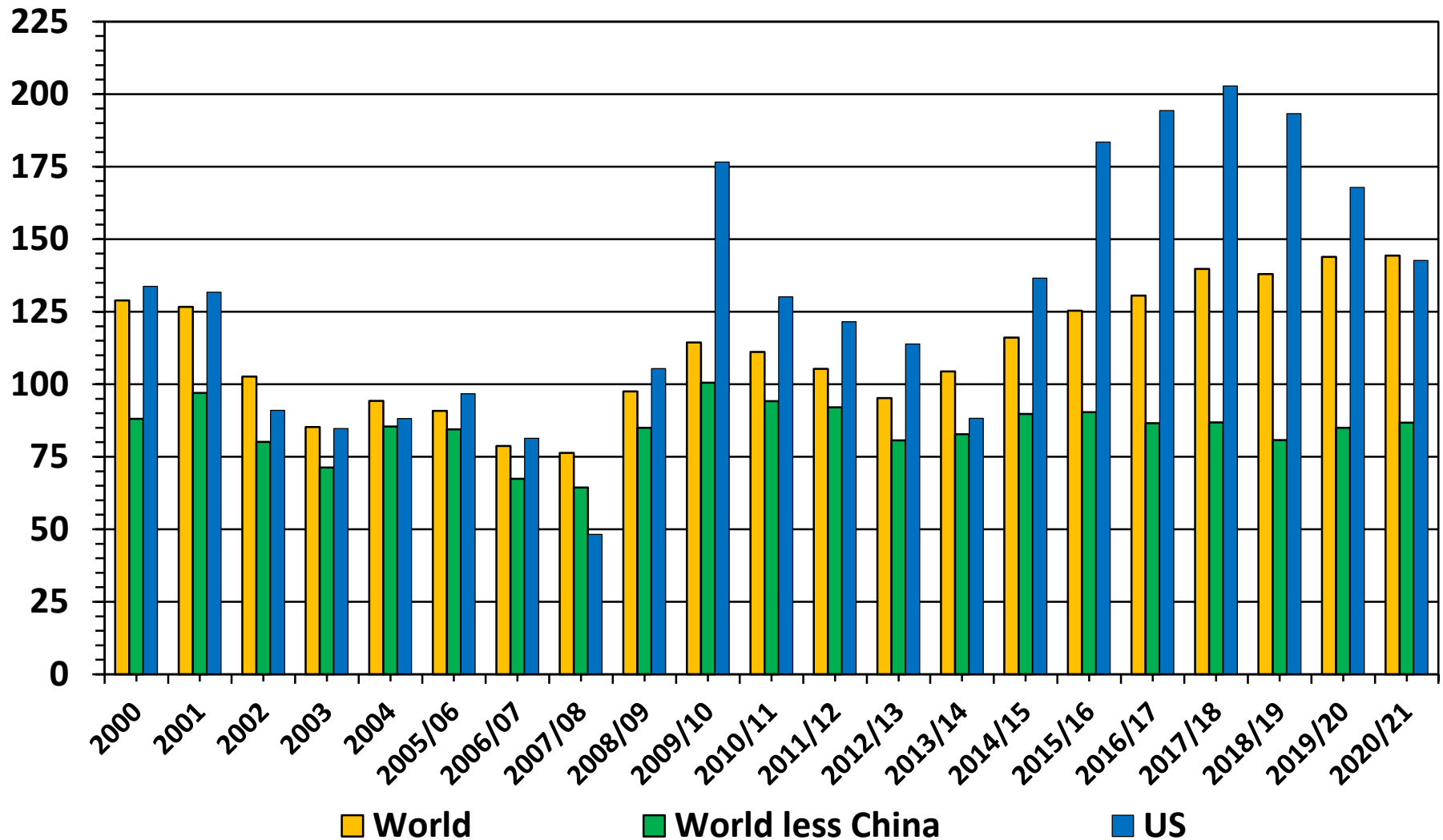
Wheat by Class:

Days of Use on Hand at the End of the Marketing Year



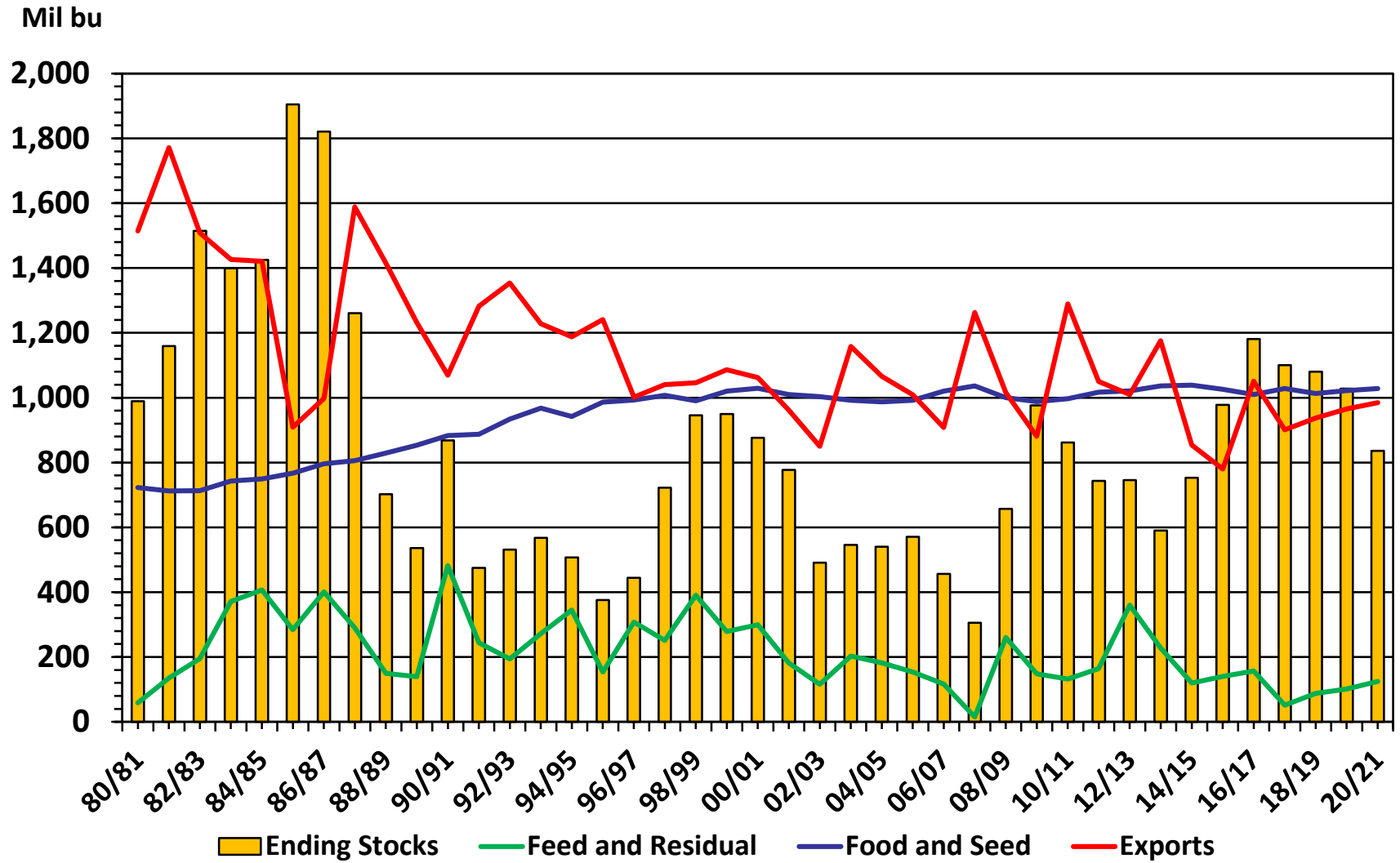
USDA, WASDE, February 2021

World Wheat: Days of Use on Hand

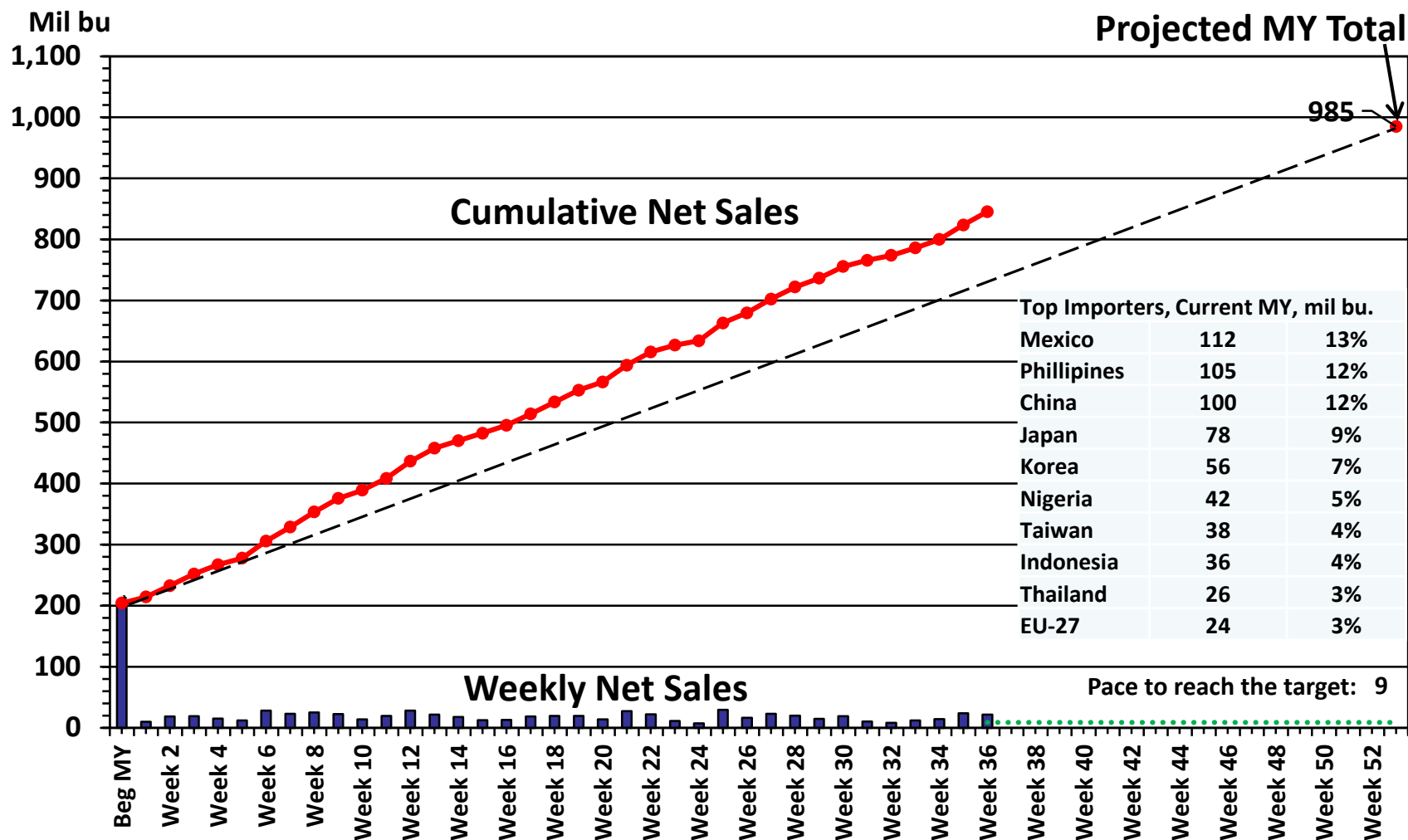


WASDE, 2/9/2021

U.S. Wheat Use, 2/9/2021



2020/21 U.S. All Wheat Export Sales Commitments

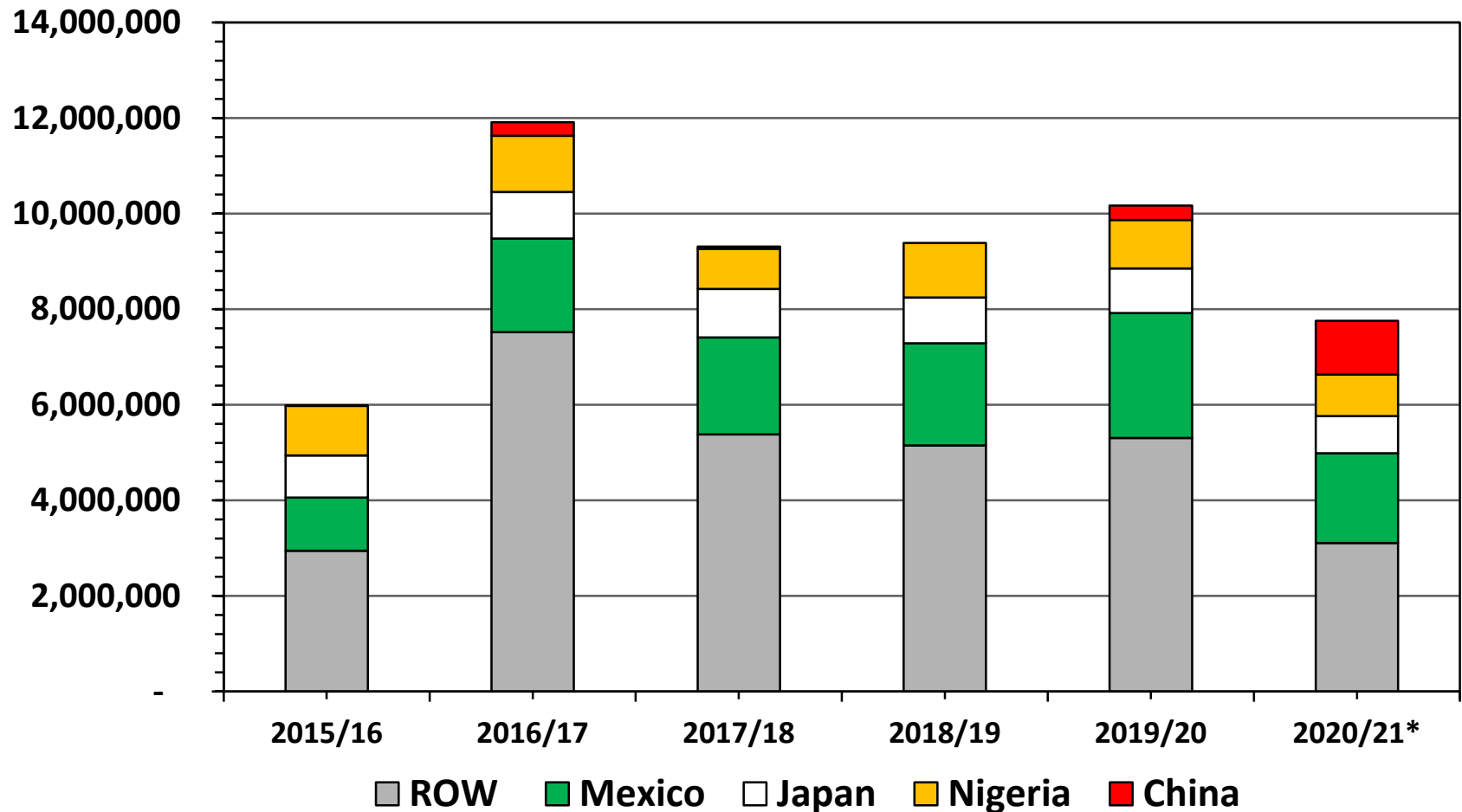


Export Sales Commitments reported for the week 02/04/2021: 22 million bushels
 Total Export Sales Commitments this marketing year: 845 million bushels
 87% of the 2020/21 MY Export Sales Target of 985 million bushels (February WASDE)
 Normal rate of sales by end of February (week 39) : 88% ($\approx$ 867 mil bu)

USDA, Foreign Agricultural Service: February 11, 2021

Hard Red Winter Wheat Export Sales

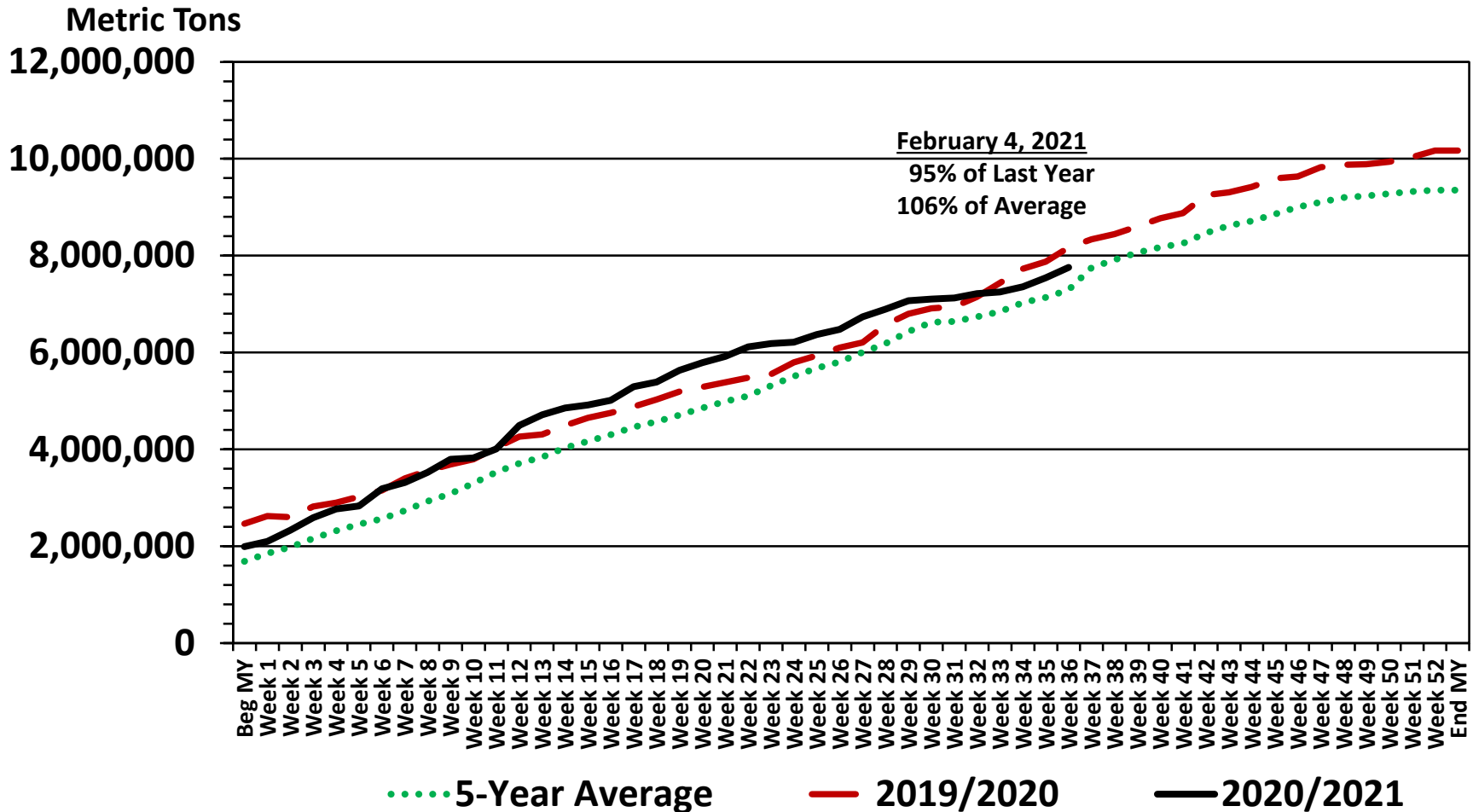
Metric Tons



* Current marketing year to date

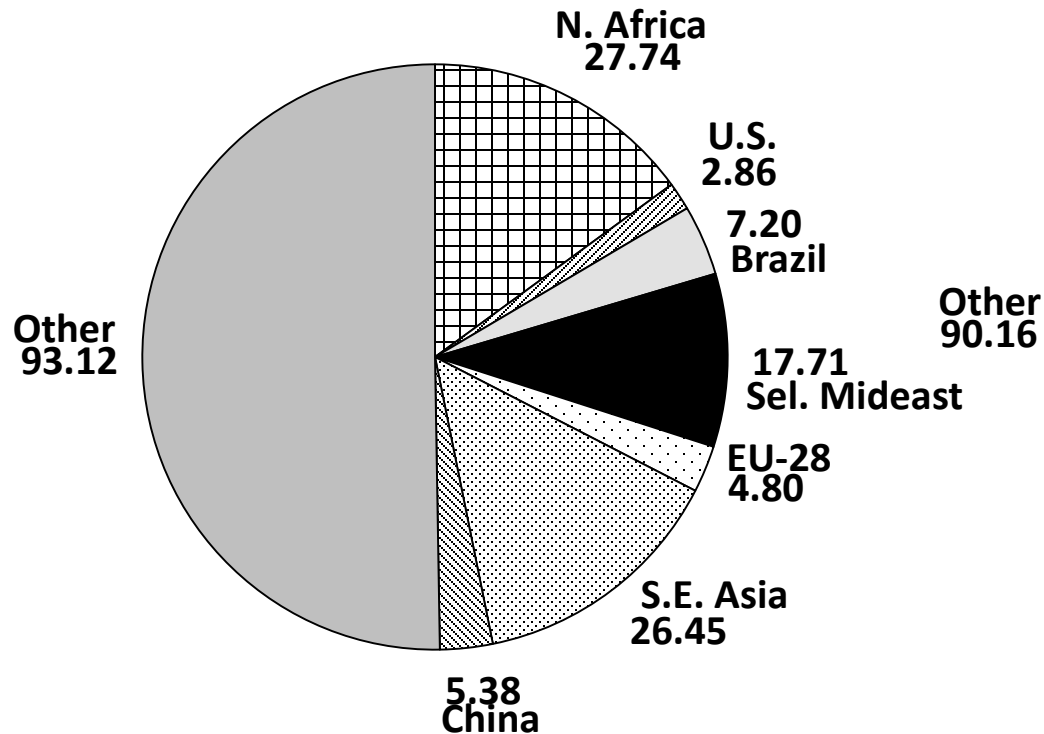
Source: USDA/FAS/Exports Sales Reporting 02/11/2021

Cumulative Net Sales – World Total HRW Wheat 2015/2016 – 2020/2021

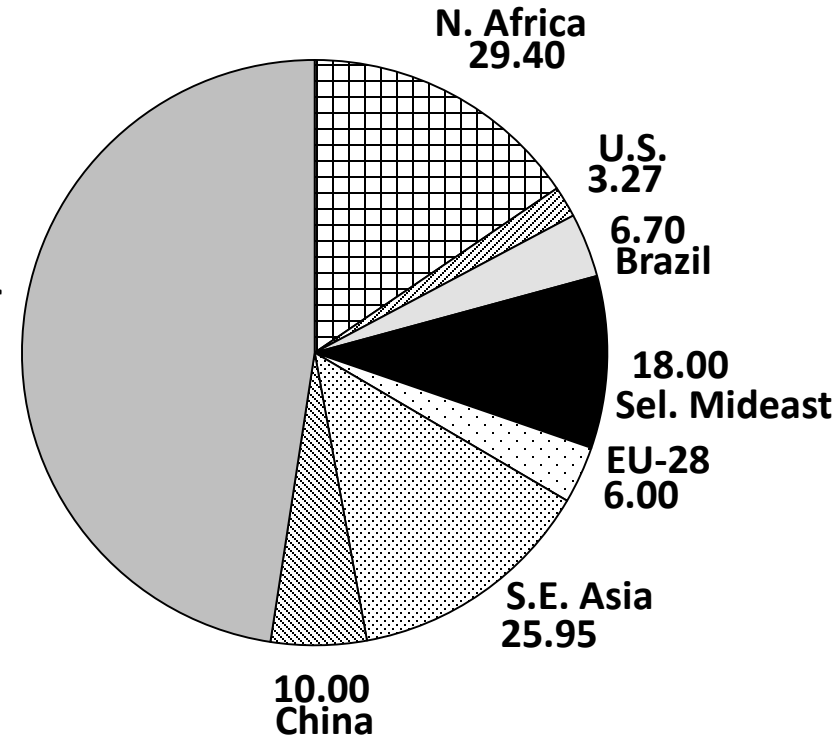


Source: USDA/FAS/Exports Sales Reporting February 11, 2021

Wheat: Major Importers 2019/20 and 2020/21 (million metric tons)

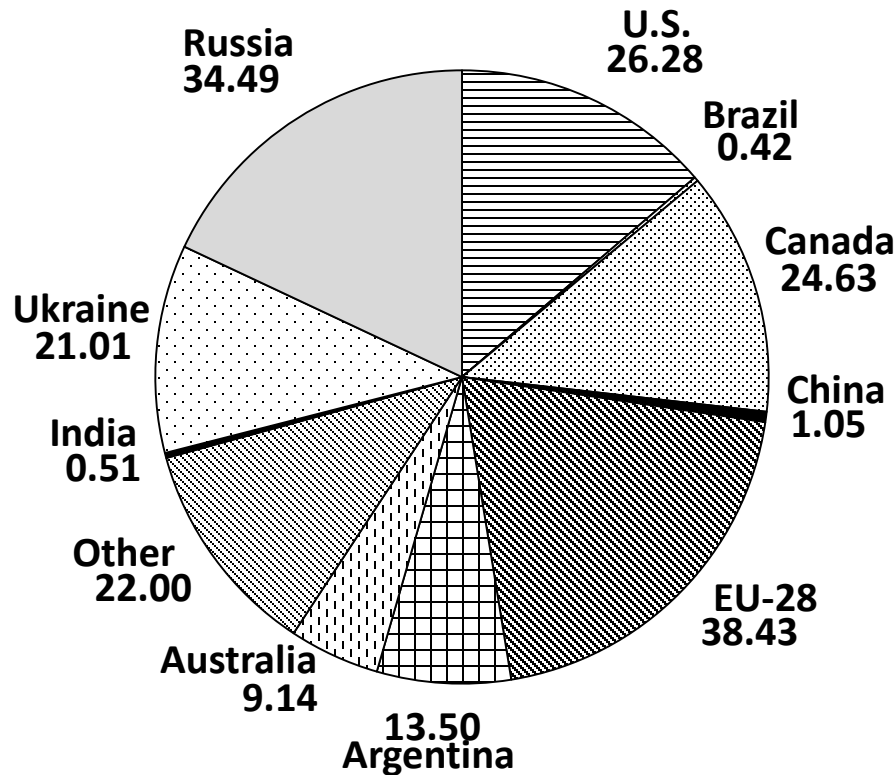


2019/20 (estimated)
Total = 185.26

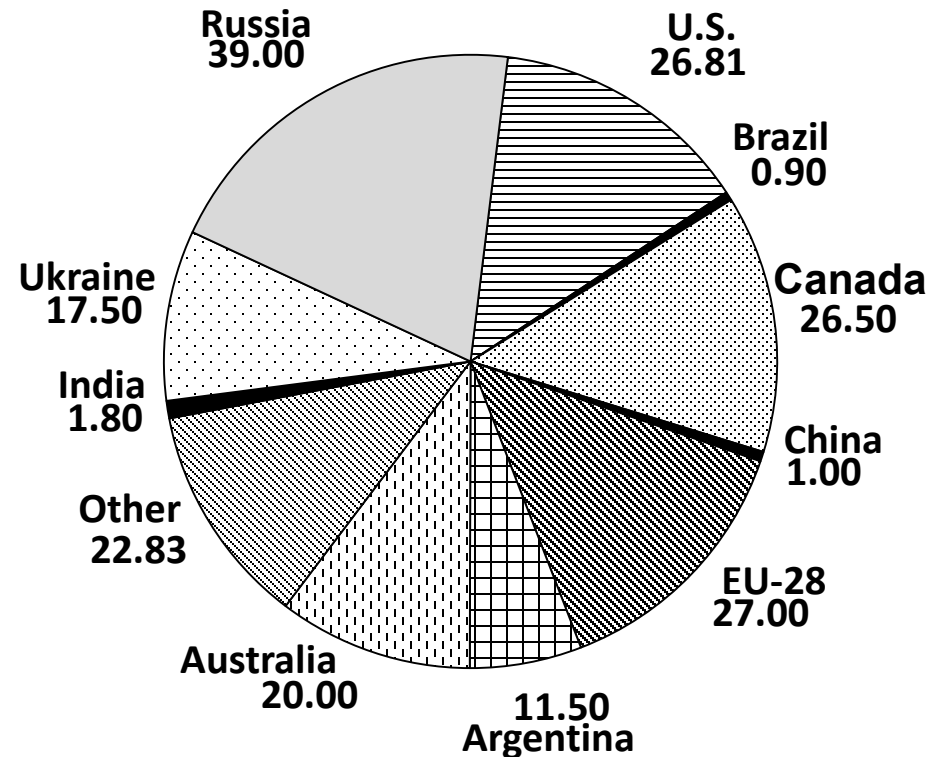


2020/21 (projected)
Total = 189.48

World Wheat Exporters 2019/20 - 2020/21 (million metric tons)



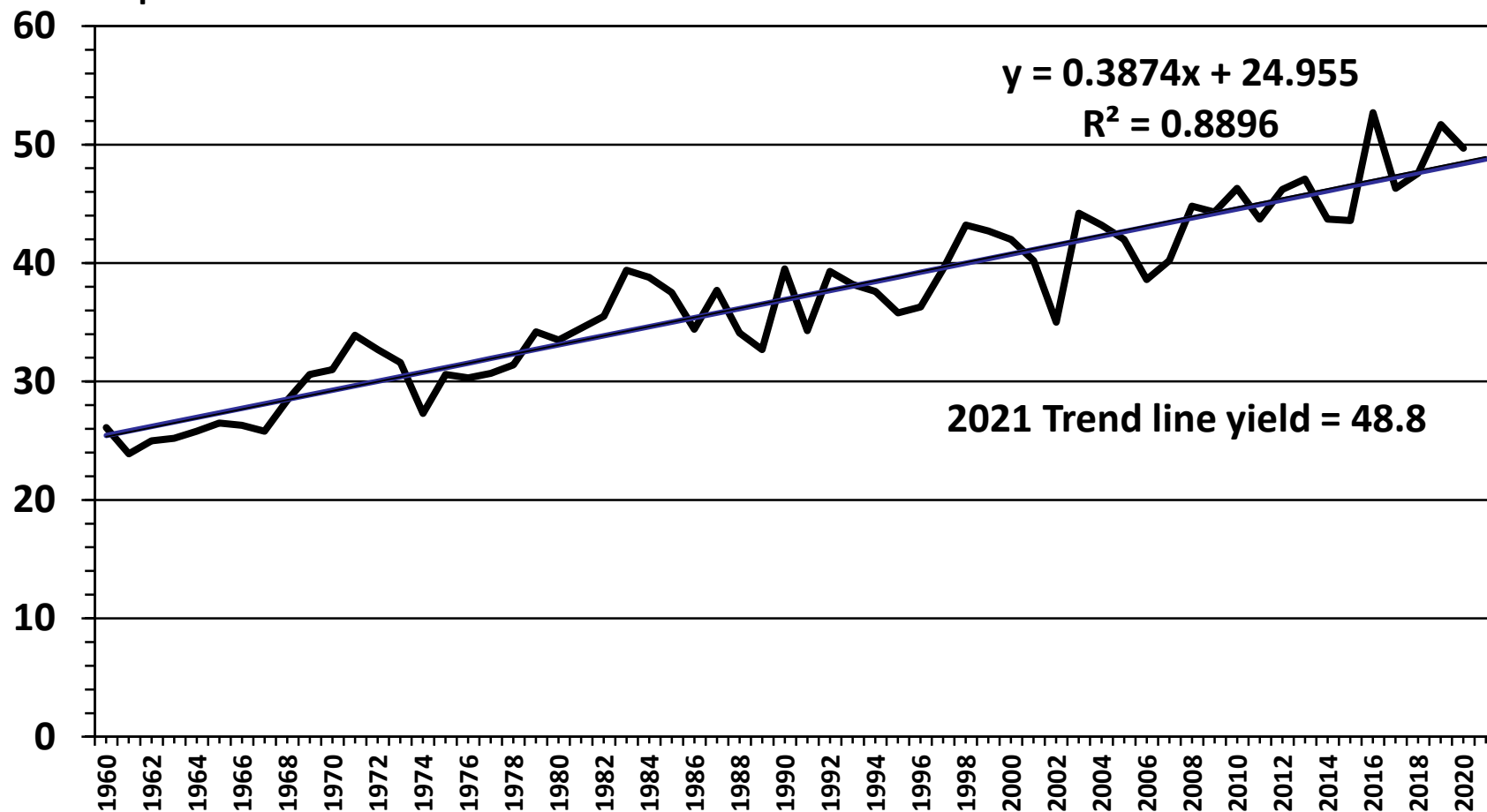
2019/20 (estimated)
Total = 191.46



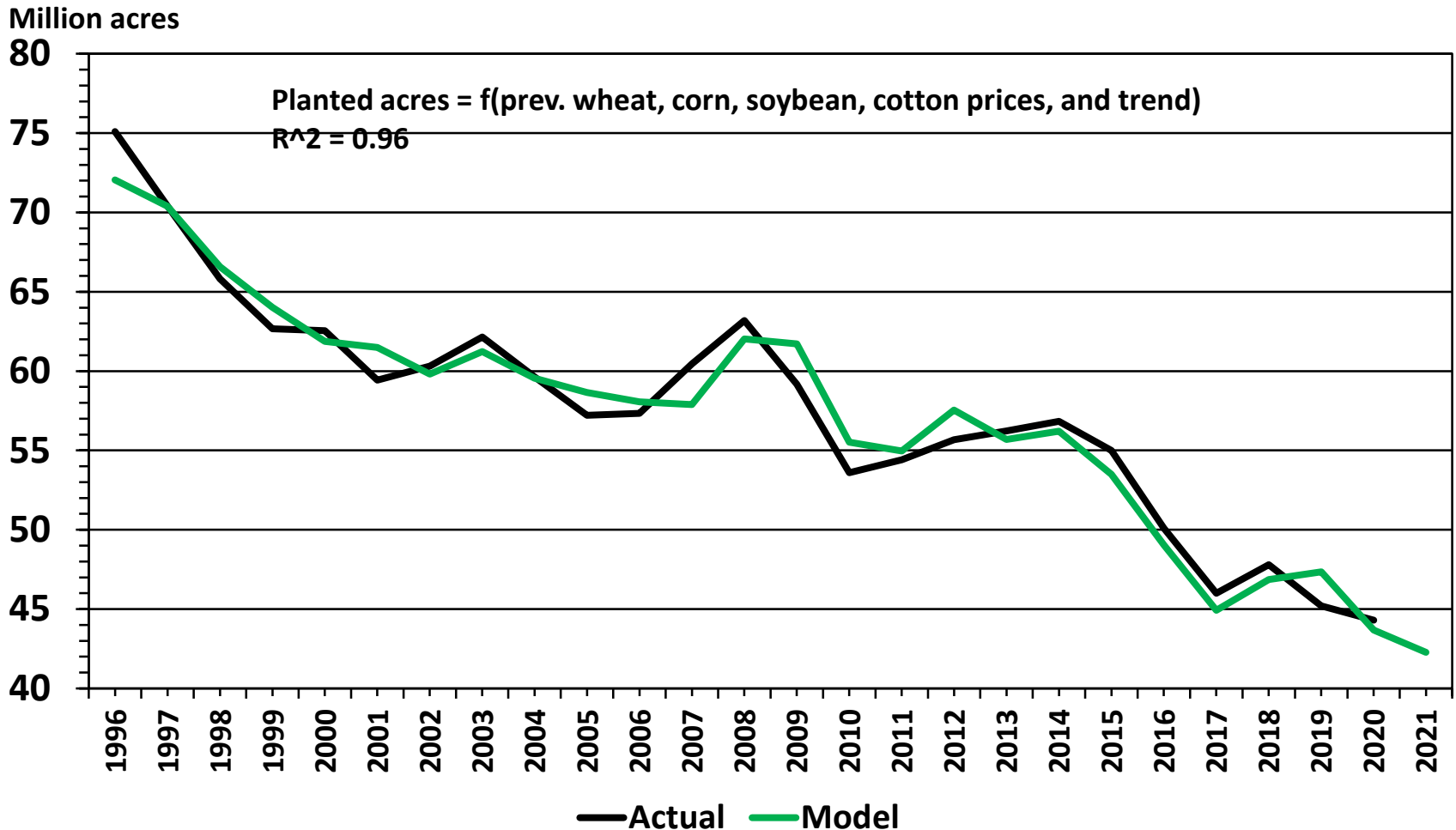
2020/21 (projected)
Total = 194.84

US Average Wheat Yield

Bushels per acre



U.S. Wheat Planted Acres

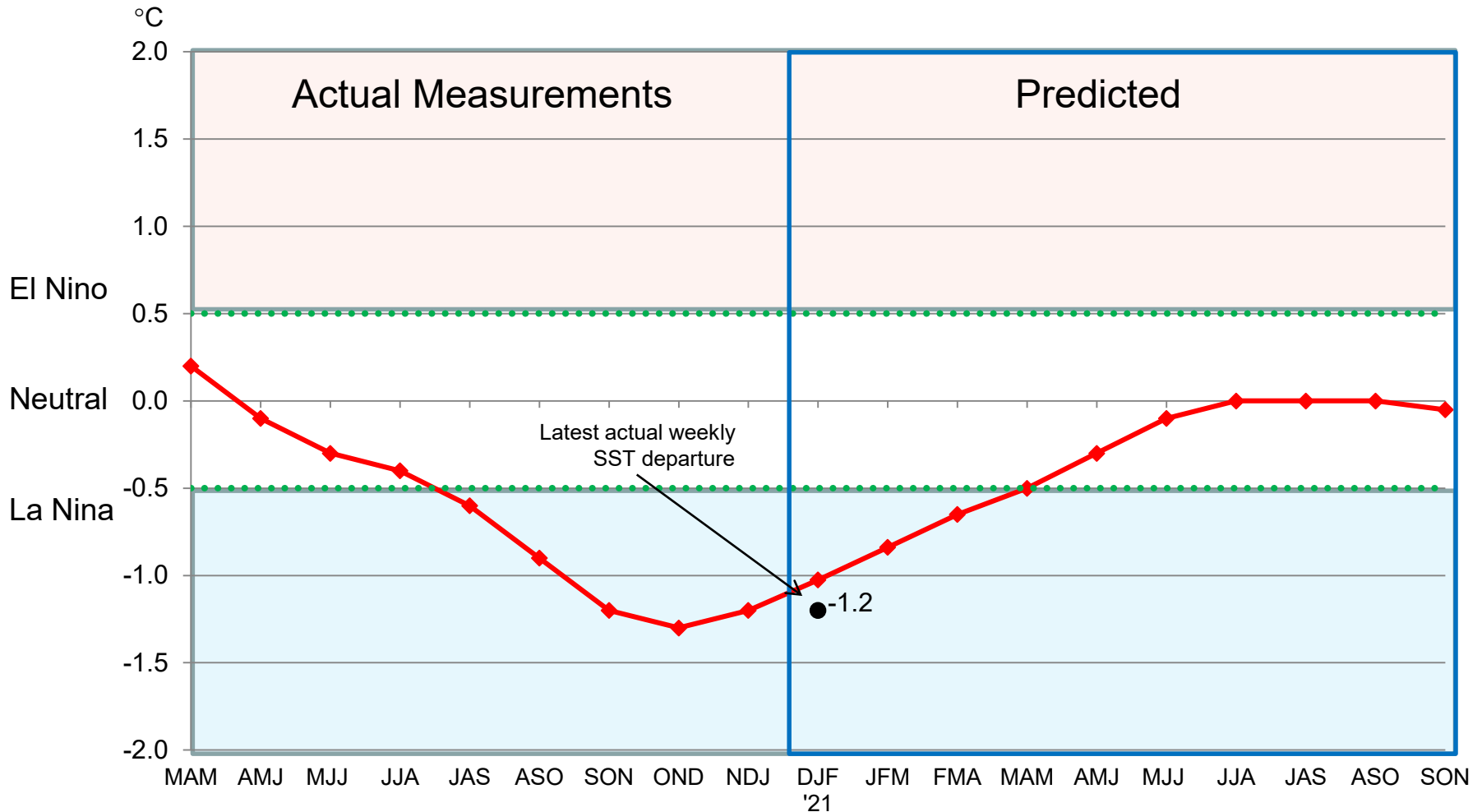


USDA, NASS, updated 2/9/2021

Oceanic Nino Index (ONI)

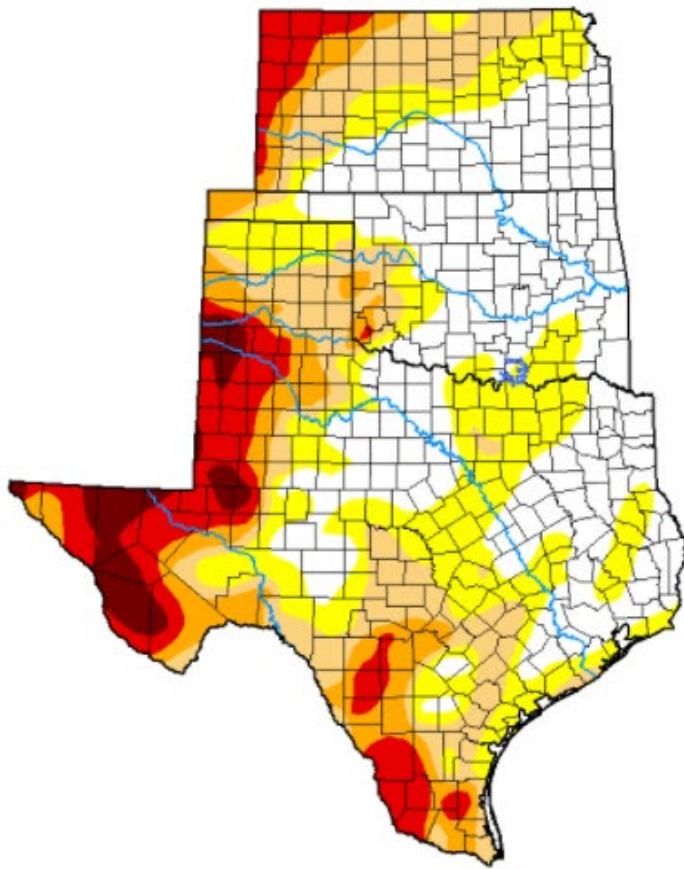
The IRI/CPC Pacific Nino 3.4 SST Model Outlook

The model averages predict La Niña to continue into the Northern Hemisphere spring 2021, returning to ENSO-neutral during summer and fall 2021.

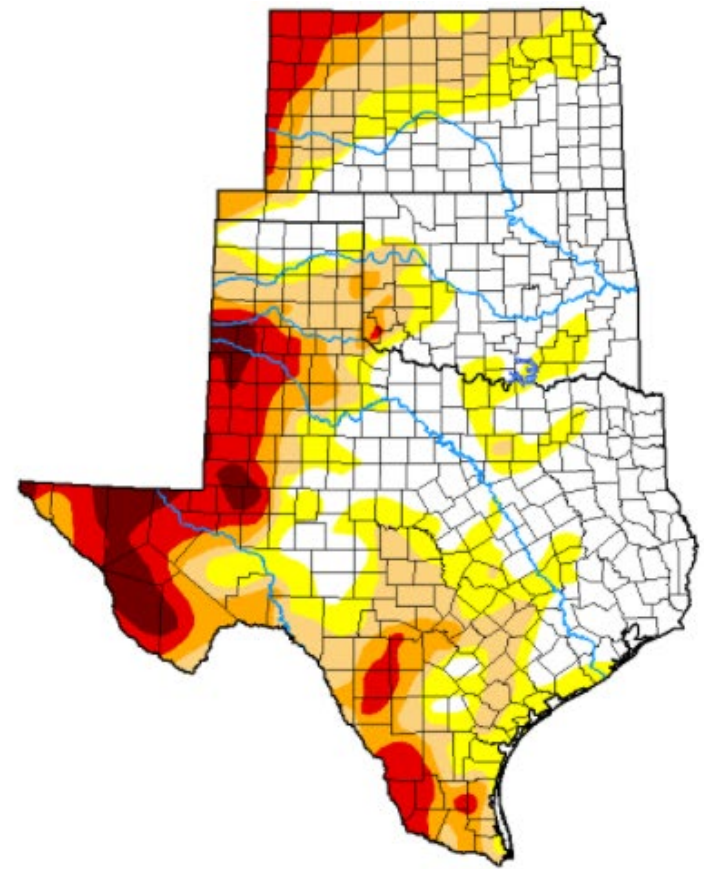


El Niño/Southern Oscillation (ENSO) Diagnostic Discussion, February 15, 2021

http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/



February 9, 2021



February 2, 2021

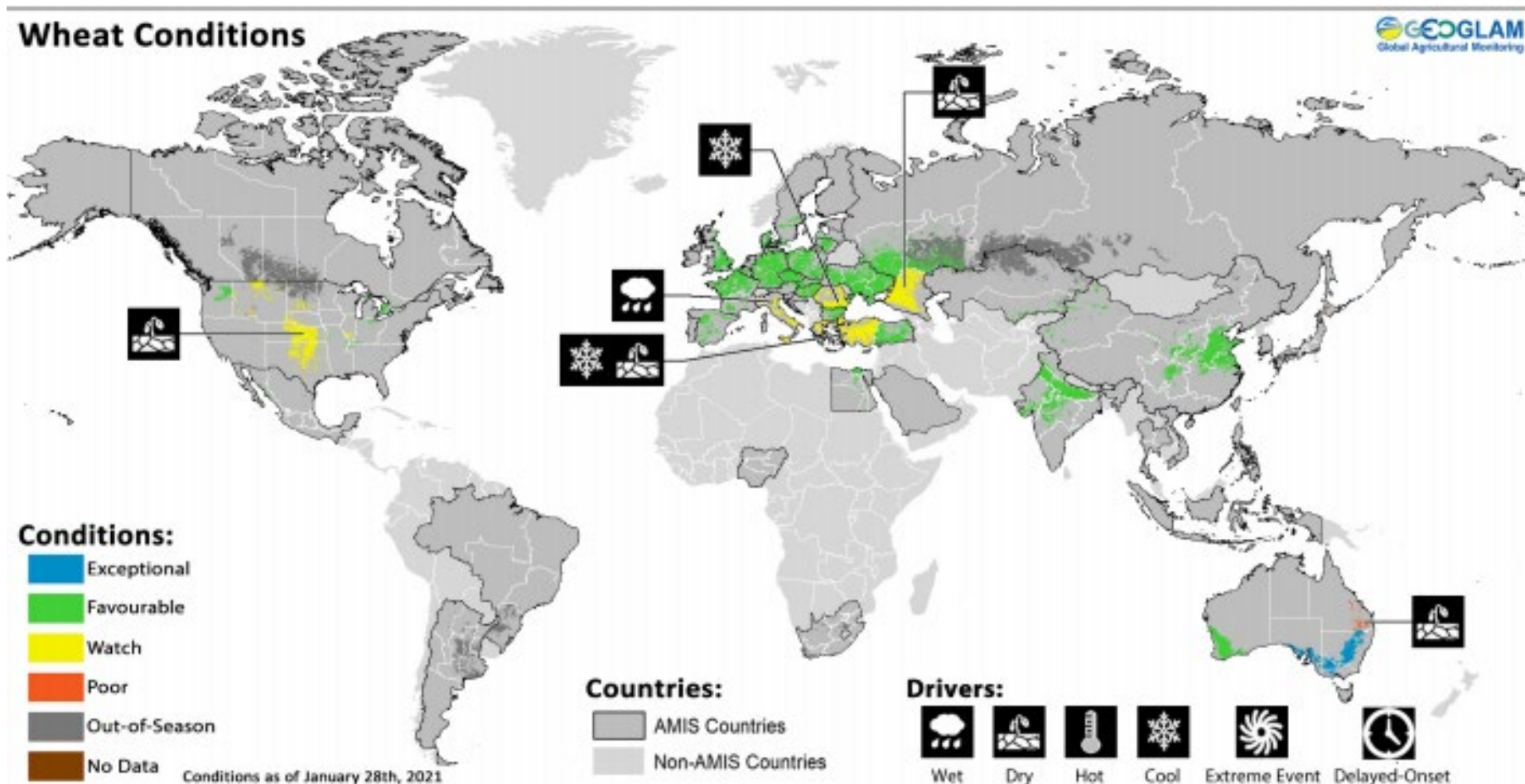


Statistics Comparison

Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4	DSCI
2021-02-09	36.44	63.56	39.69	23.28	13.55	3.53	144
2021-02-02	42.79	57.21	38.32	22.30	13.12	3.48	134
Change	6.35	-6.35	-1.37	-0.98	-0.43	-0.05	-10

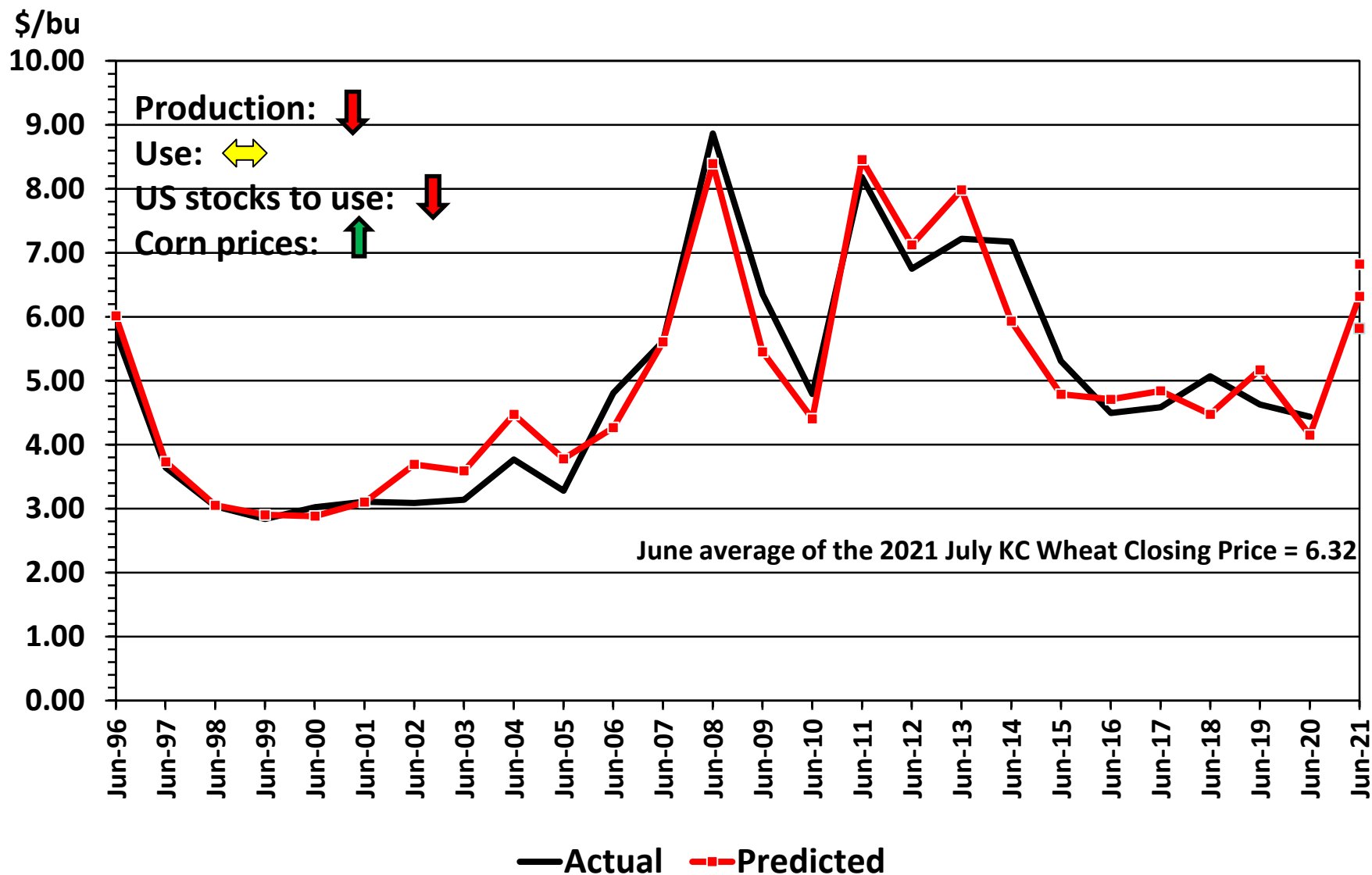
Wheat Conditions

GEOGLAM Crop Monitor, 1/28/2021



<https://cropmonitor.org/>

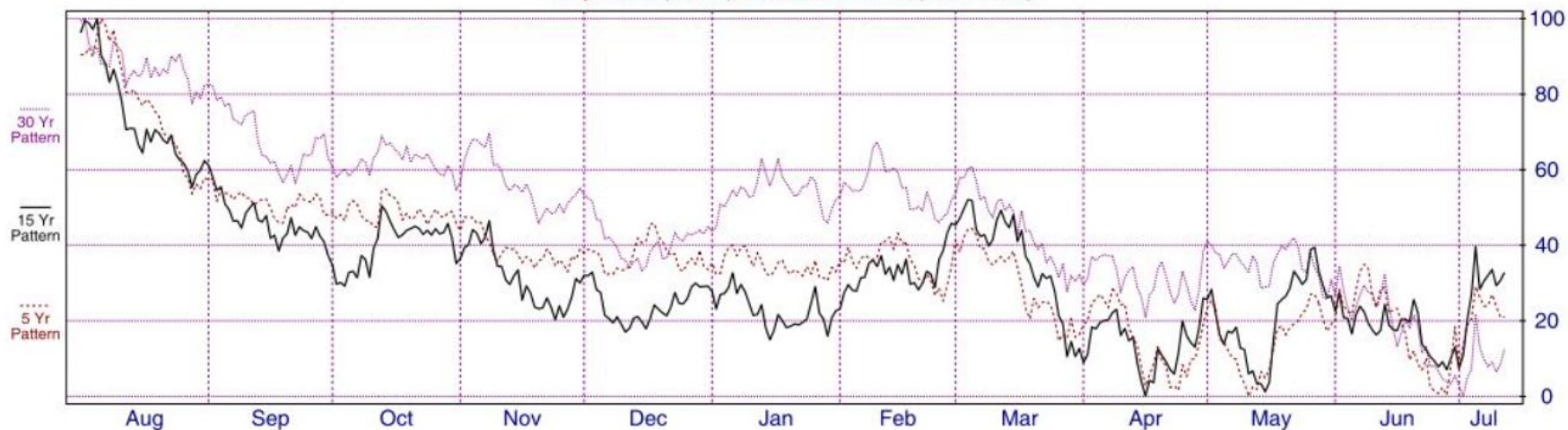
2021 July KC Wheat Futures Price Model ≈ 6.30



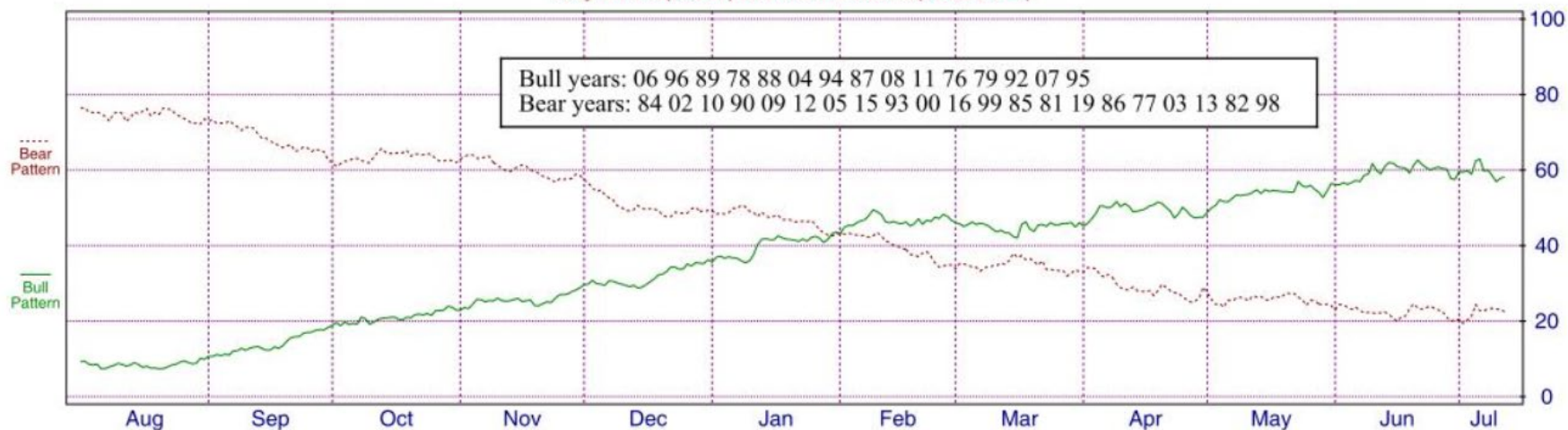
Jun avg price_t = $406 + (-1.3 * USdays_{t-1}) + (0.9 * nearby C_t) + (-0.1 * Prod_t) + (6 * trend)$; $R^2 = 0.92$
 updated 2/11/2021

KC WHEAT

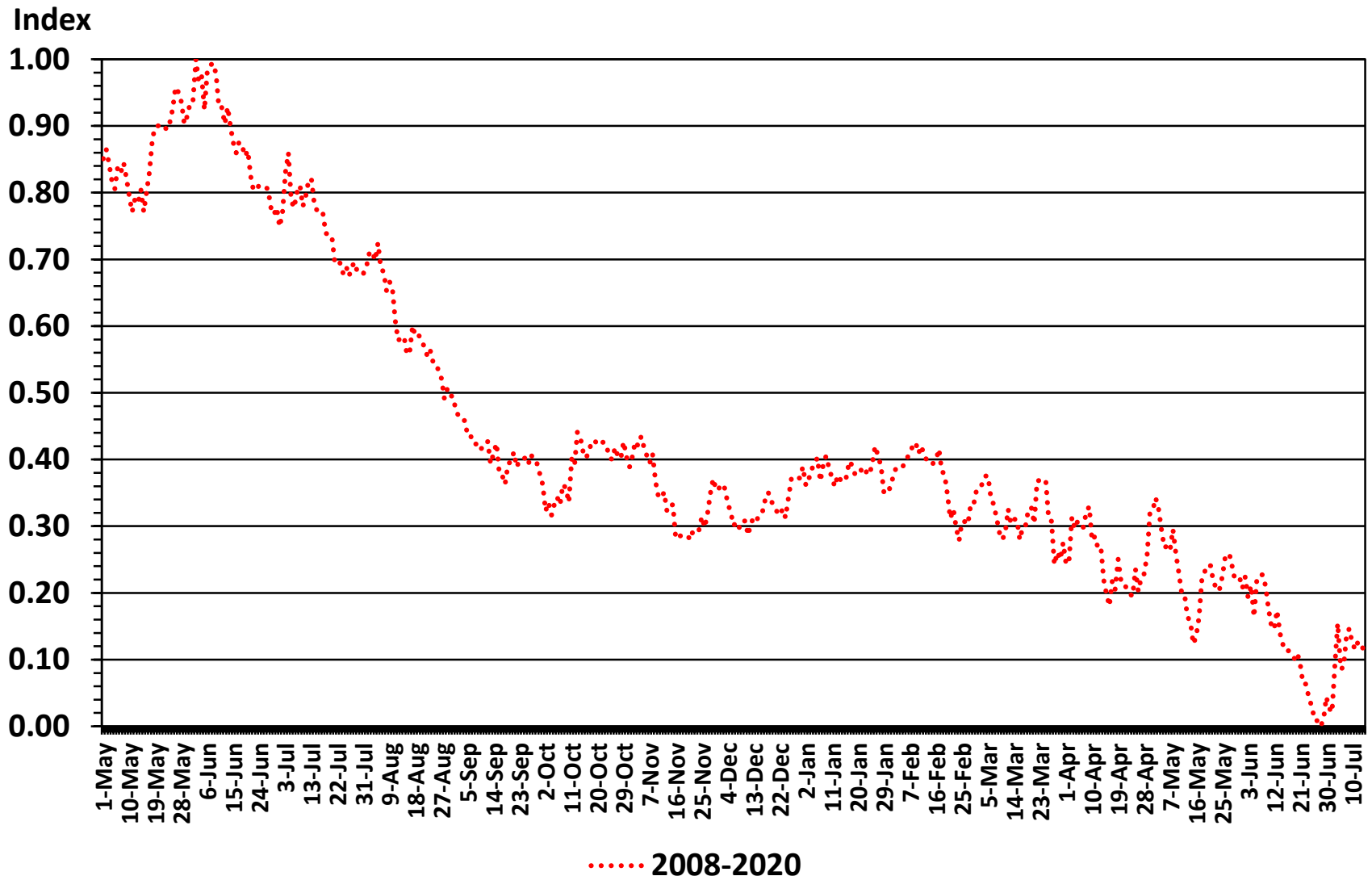
July Wheat(KCBT) Seasonal Patterns(1990-2019)



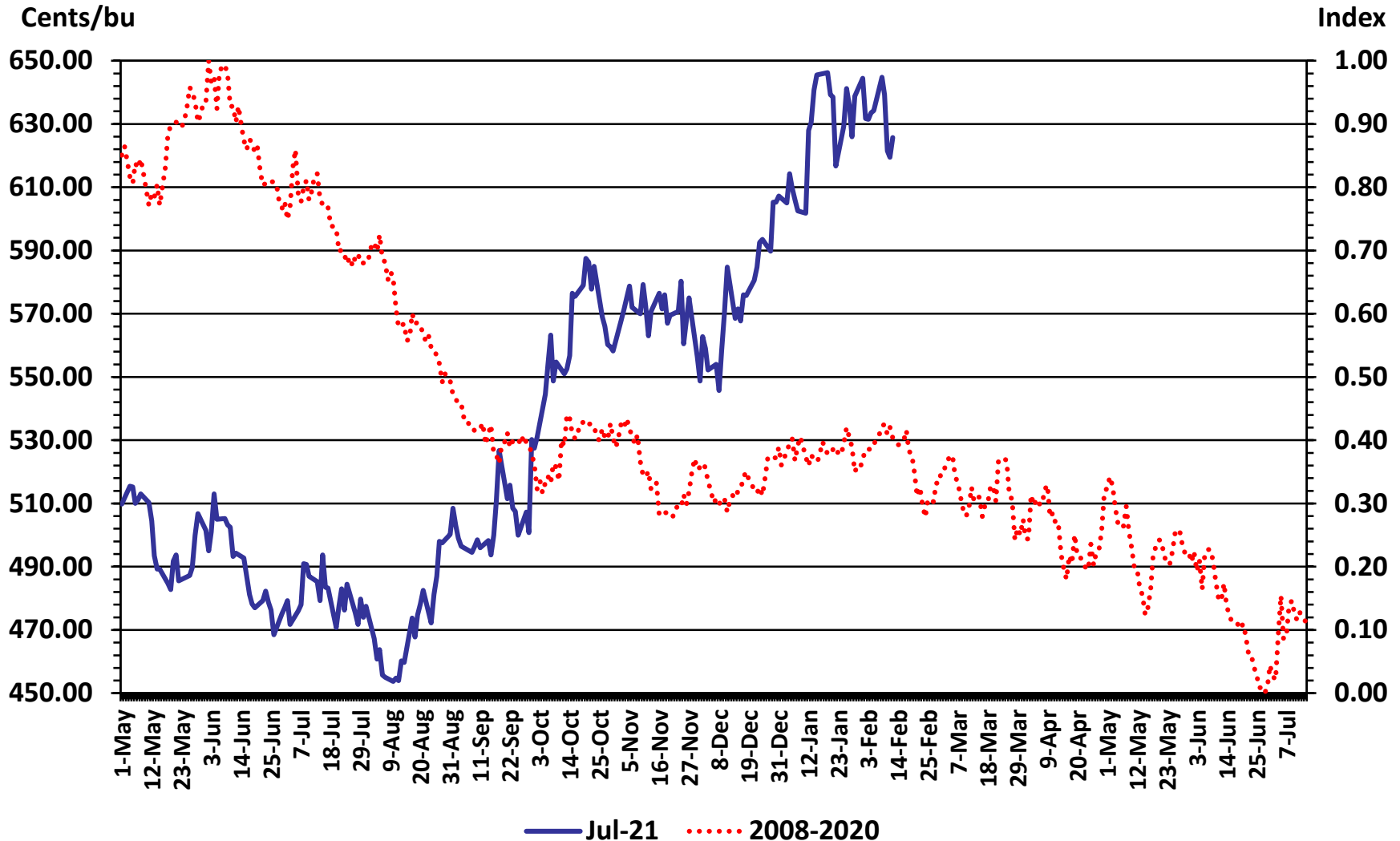
July Wheat(KCBT) Bull/Bear Patterns(1976-2019)



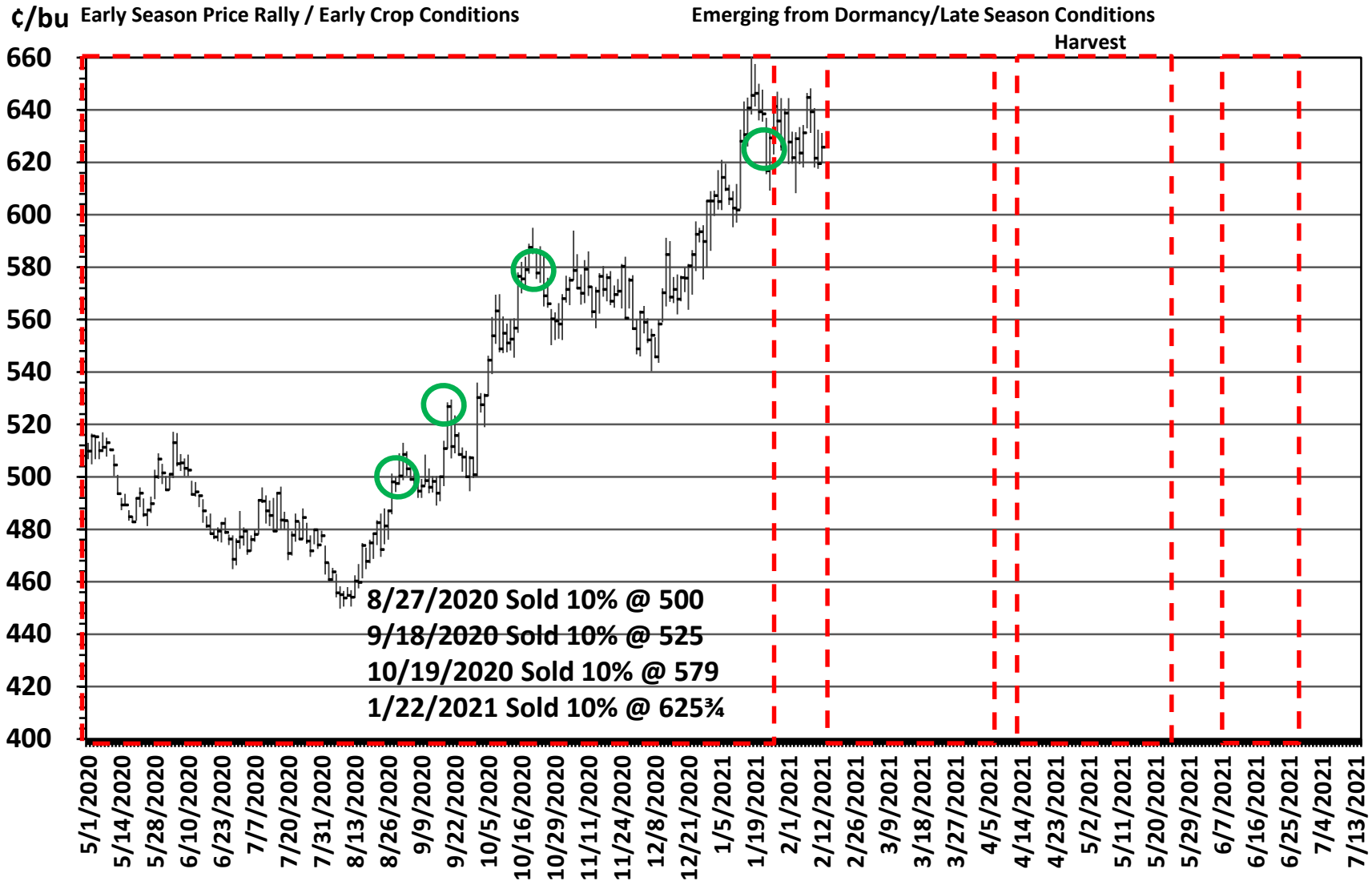
July KC Wheat Seasonal Index 2008-2020



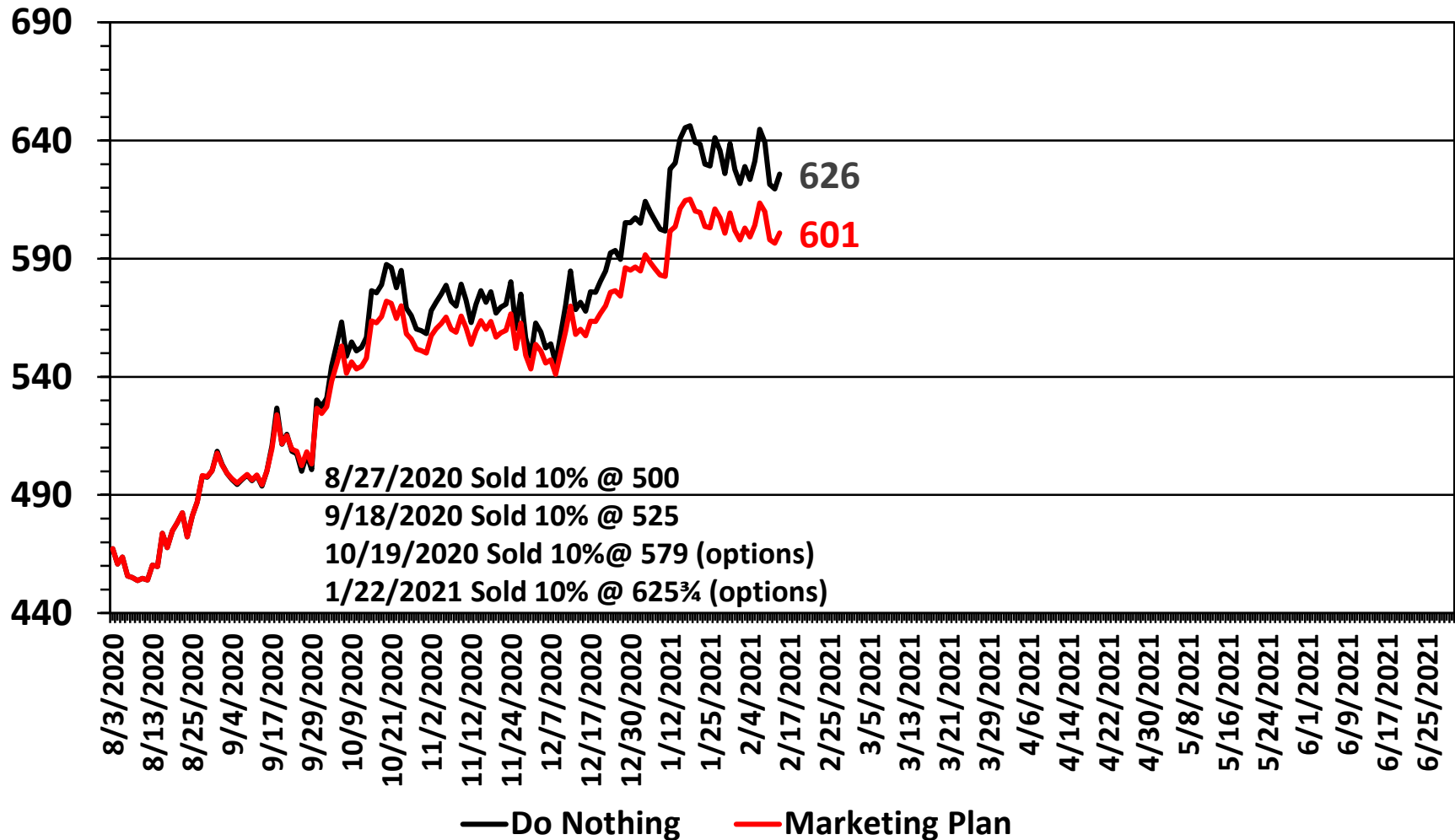
July 2021 KC Wheat Futures and July KC Wheat Seasonal Index 2008-2020



July 2021 KC Wheat and Marketing Plan



2021 Marketing Plan: Wheat Comparison of Returns Futures only (before basis)

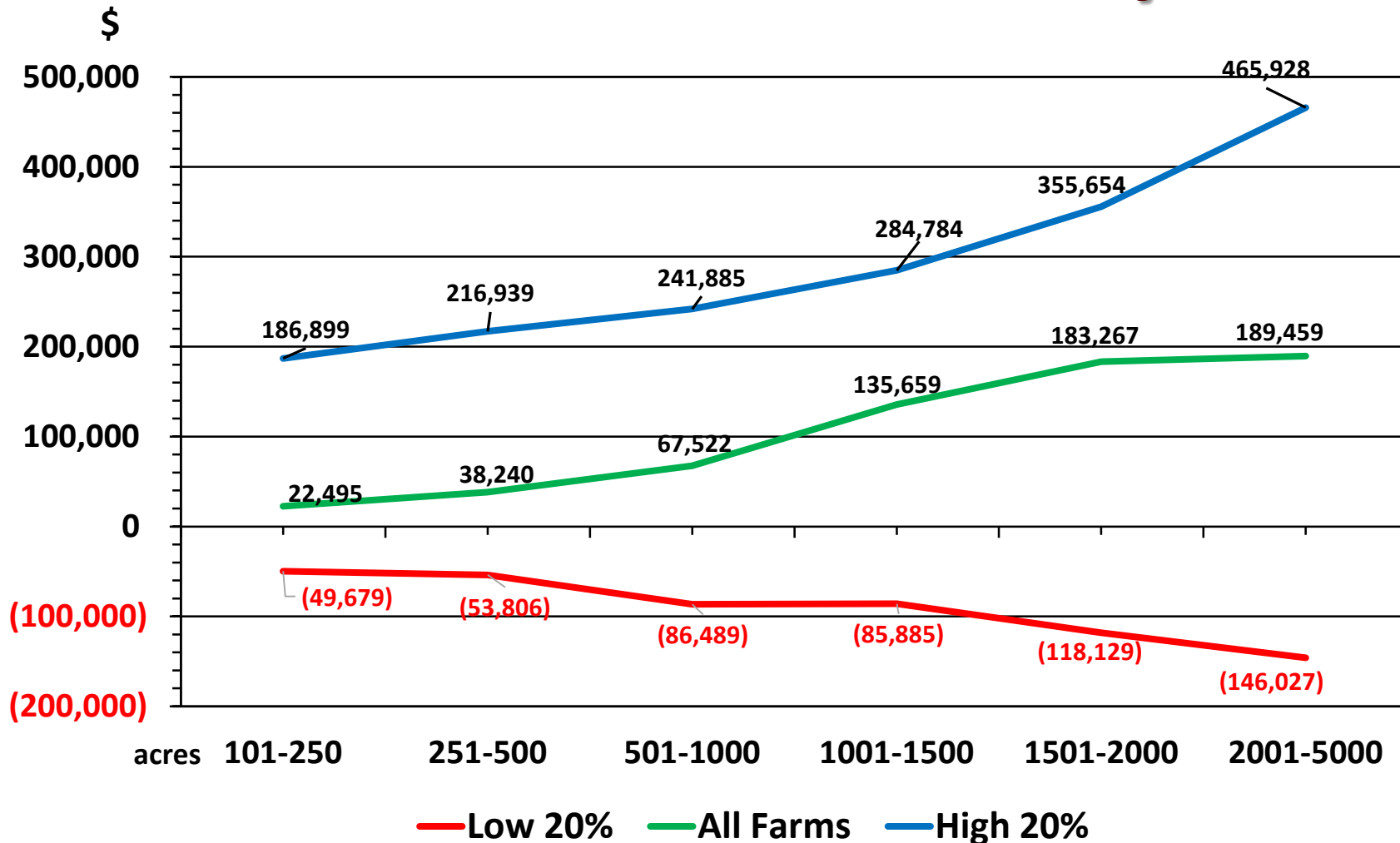


Wheat Market Factors for 2021

- **Production lower**
- **Domestic use steady**
- **Exports steady**
- **Stocks to use ratio lower**
- **Season Average Farm Price higher in the new crop (profitable pre-harvest pricing)**
- **Global Economy**
- **Trade—disputes, disruptions, new agreements**
- **Weather**

Net Whole Farm Income by Acres

2019 Financial Summary



FINBIN (2020). Center for Farm Financial Management: University of Minnesota.

2019 Corn Summary Report

	Low 20%	All Farms	High 20%	Difference
Yield, bu/acre	162	178	191	+7%
Price (incl. hedging, crop ins., gov't payments)	4.10/bu	4.21/bu	4.36/bu	+4%
Cost (incl. mgmt. and labor)	4.81/bu	3.94/bu	3.30/bu	-16%
Net return	-\$111.13	+\$52.98	\$208.39	+\$139

FINBIN (2020). Center for Farm Financial Management: University of Minnesota.

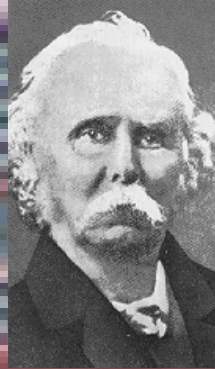
Where Do Prices Go From Here?

1. Be the low cost /high quality producer

- Input Use Efficiency
 - Crop Rotations
 - Hybrids/ Variety
 - Conservation Tillage
 - Soil and Plant Testing
 - Precision Application

2. Lock in profitable prices

- Financial Management
 - Budget/ BE analysis
 - Cash Flow Projections
 - Crop Insurance
 - Price Safety Net
 - Marketing Plan



5% Rule

Corn budgets:

+\$115 per acre

BE \$3.90 drops to \$3.53

Prices will fall back to the cost of production

--Principles of Economics, Sir Alfred Marshall (1890)

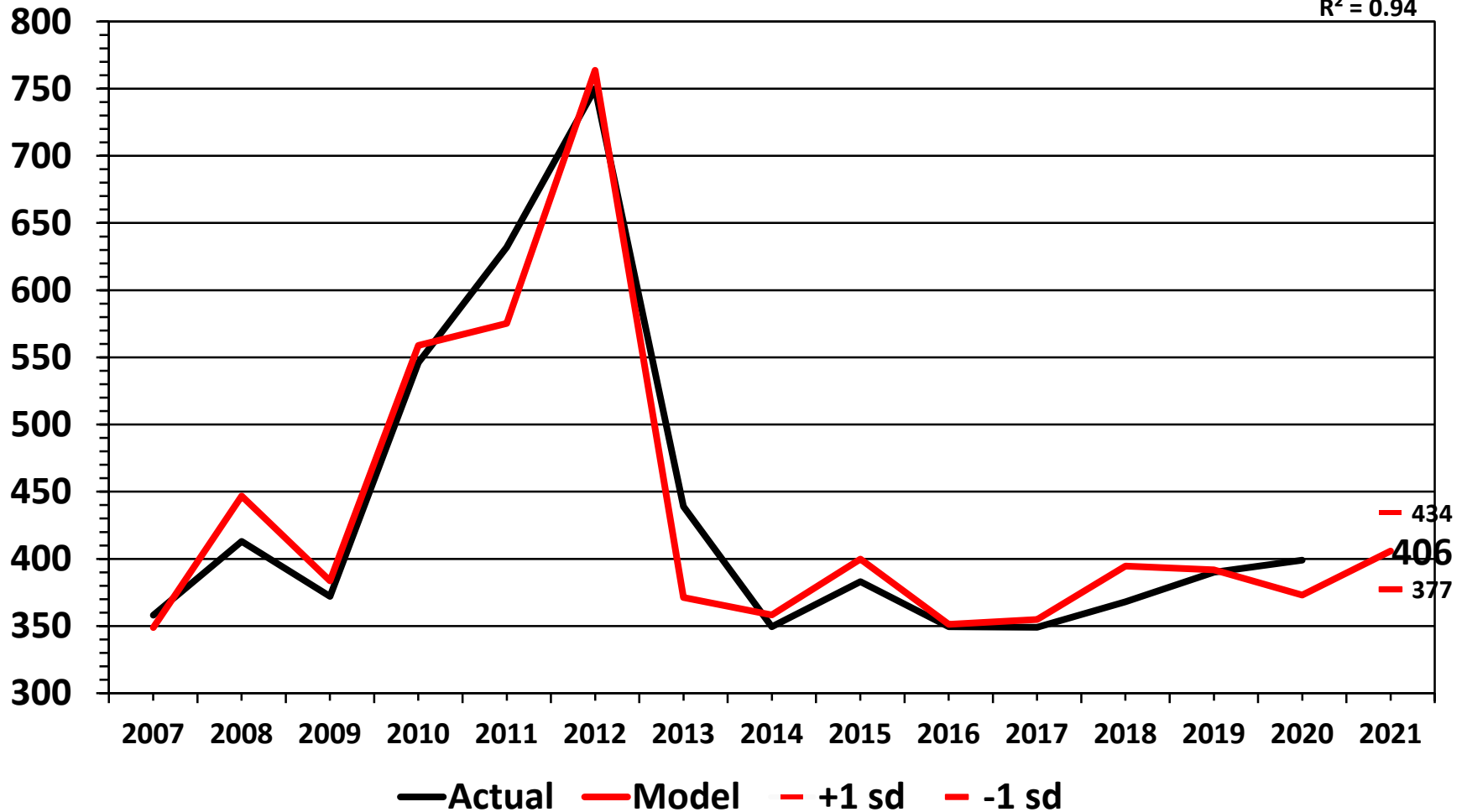
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JMWelch@tamu.edu
Office: (979)845-7677 Cell: (806)683-9981



2021 Corn Price Model: 406

October average of December futures = $(27.1 \times 5\text{-yr average use:stocks}) + 190$

$R^2 = 0.94$



Updated 2/9/2021

92 million planted acres and a yield of 177 bushels per acre

Total Use unchanged