

What Farmers Are Telling Us About Their Farms & The Ag Economy

The Purdue University-CME Group Ag Economy Barometer

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Center for Commercial Agriculture

Origin of Sentiment Indices

U. of Michigan's *Survey of Consumers* started after WWII

Goal: Incorporate empirical measures of consumers' income expectations into models of U.S. business cycle

Index of Consumer Sentiment dates to 1950s

Purdue-CME Group Ag Economy Barometer methodology

Similar to U. of Michigan's *Index of Consumer Sentiment*

Instead of consumers, survey is focused on agricultural producers

Instead of focusing on U.S. economy, focus is on U.S. agricultural economy

Ag Economy Barometer's Goal:

Provide empirical measure of U.S. production agriculture sector's health

Nationwide survey launched in October 2016

Ag Economy Barometer Monthly Questions

Barometer is a composite index composed of indices derived from responses to each of the 5 questions

1. Would you say your operation today is better off or worse off financially than a year ago?
2. Do you think that a year from now your operation will be better off financially, worse off, or just about the same as now?
3. Do you think that during the next 12 months there will be good times or bad times?
4. Which would you say is more likely, US agriculture during the next five years will have widespread good times or widespread bad times?
5. Thinking about large farm investments – like buildings and machinery -- generally speaking, do you think now is a good time or bad time to buy such items?

Ag Economy Barometer Survey Details

Monthly phone survey of 400 U.S. agricultural producers, focused on major crop & livestock enterprises

Respondents estimated value of production is equal to or greater than U.S. \$500,000

Not same producers surveyed each month, but characteristics of survey sample are held constant from month-to-month

Respondents are stratified by enterprise, based on USDA's *Census of Agriculture*

Representative of U.S. producers that provide vast majority of U.S. agricultural production

Survey accuracy is +/- 5% @ 95% confidence level for population we sample

Survey Respondents By Enterprise Every Month

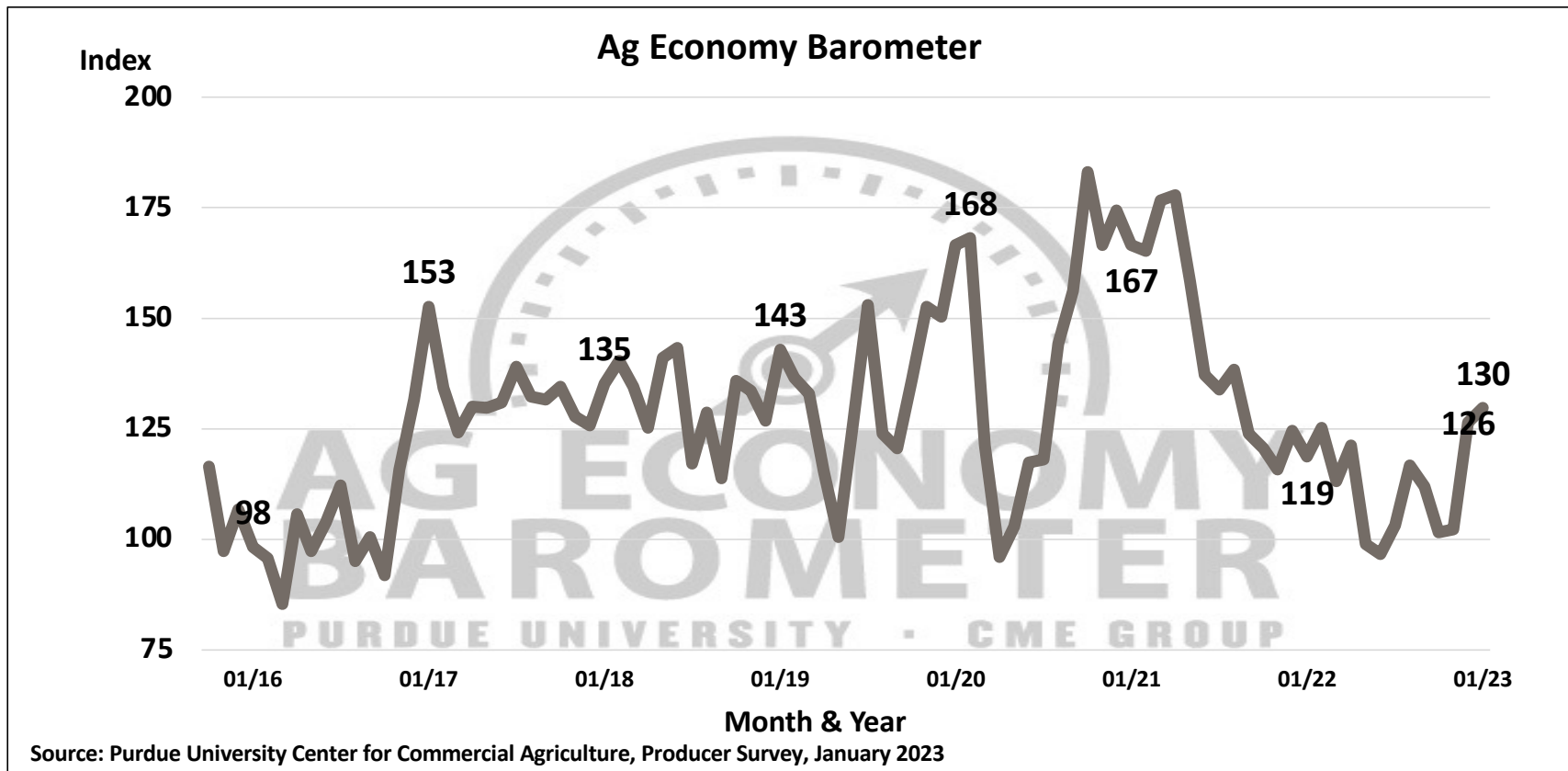
Corn/Soybeans	53%
Beef	19%
Wheat	14%
Hogs	6%
Dairy	5%
Cotton	<u>3%</u>
	100%

%'s are minimum targets since some farms are engaged in more than 1 enterprise

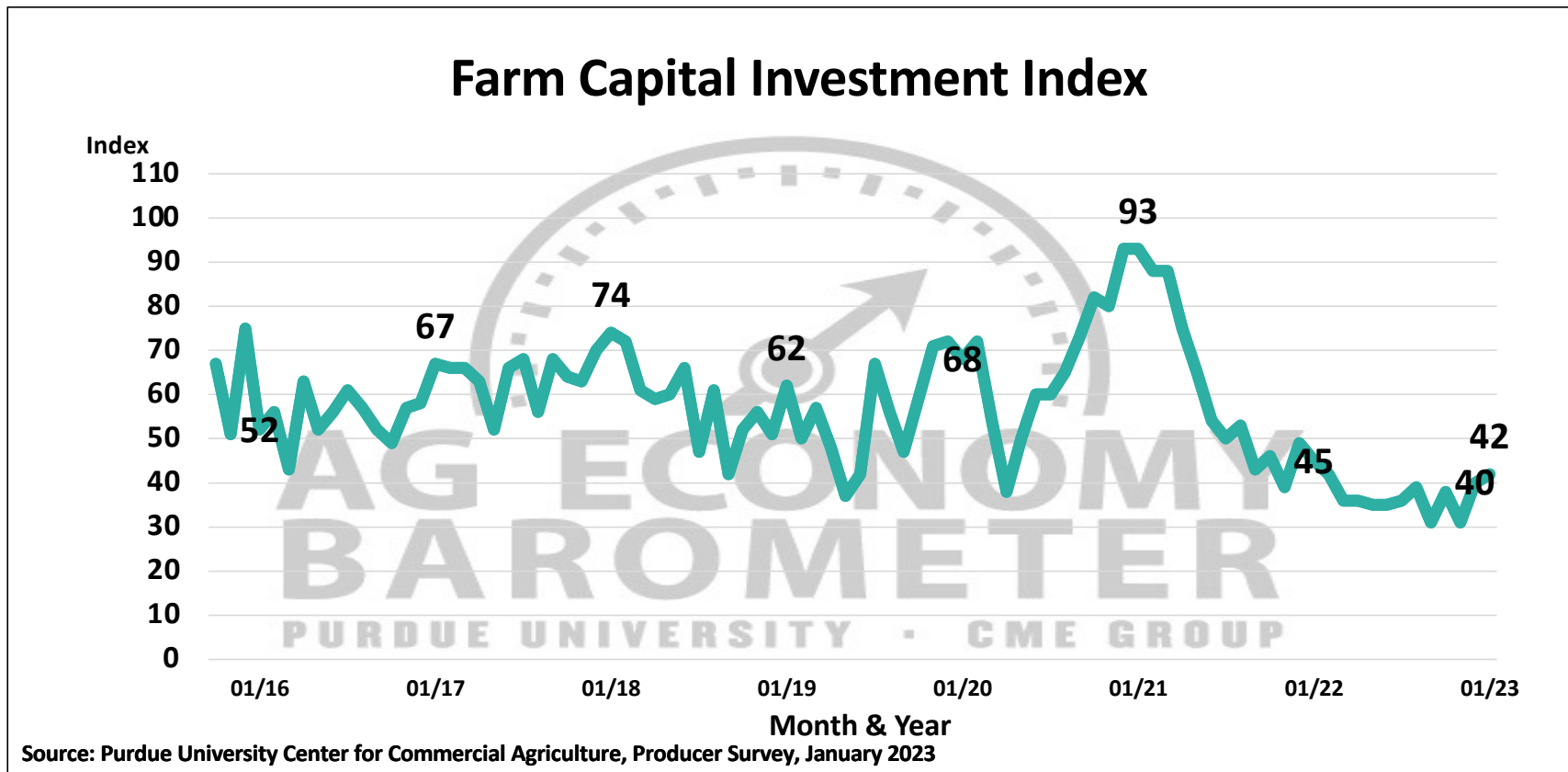


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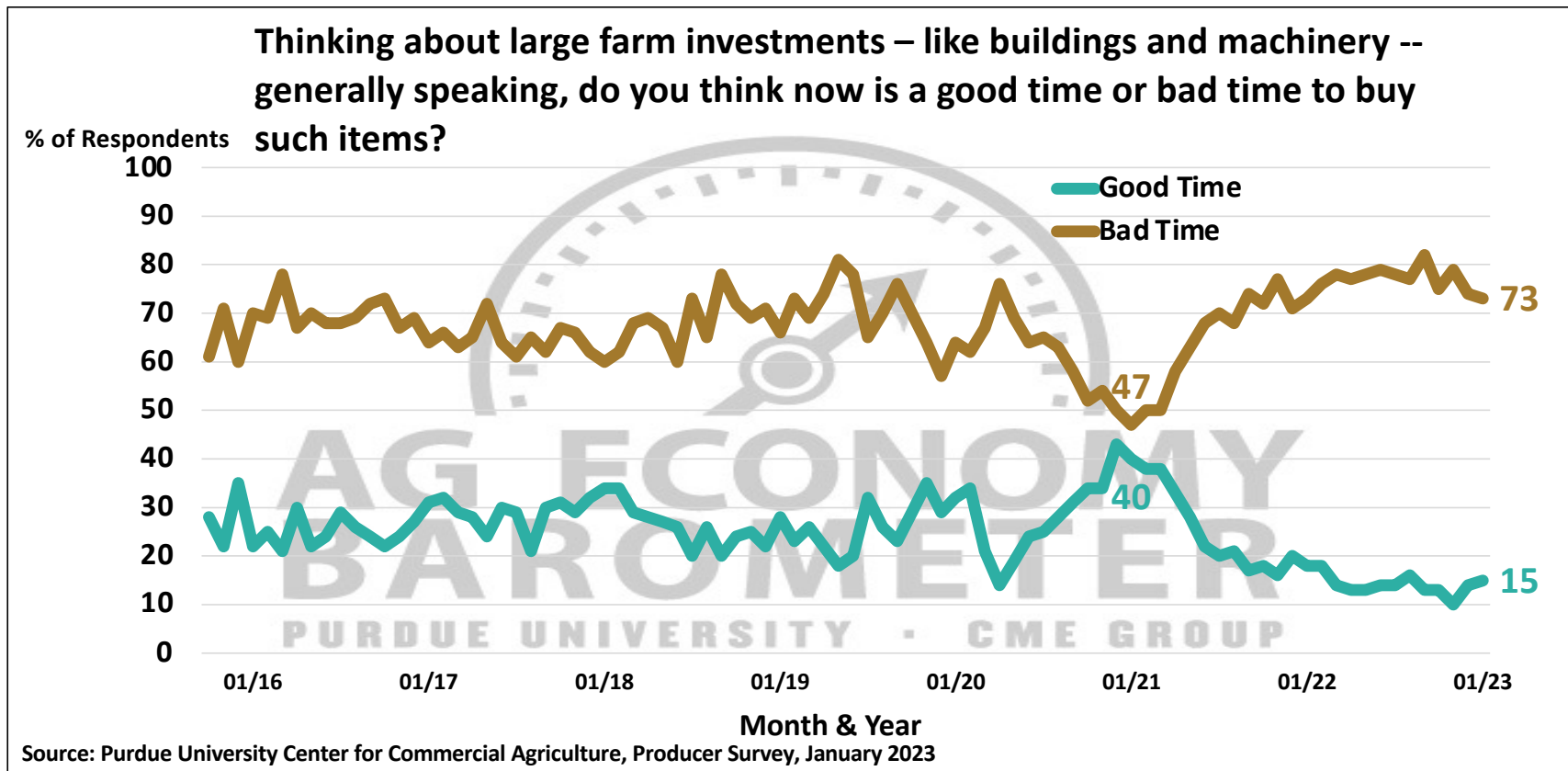
Sentiment Improved in January, But Still Well Below 2 Years Ago



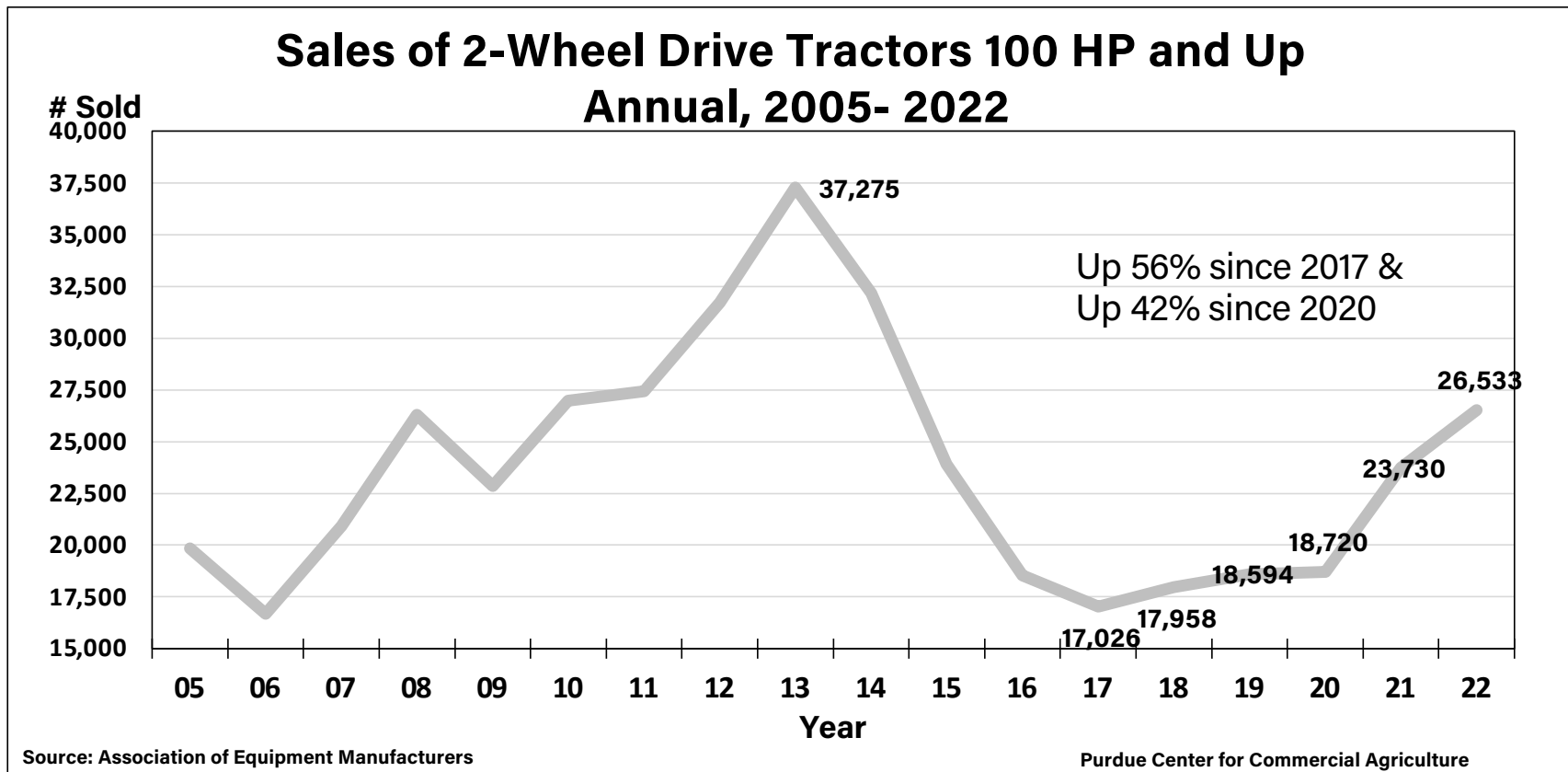
Although the Index Improved in Dec. & Jan., Farmers Continue to Say It's Not a "Good Time" to Invest



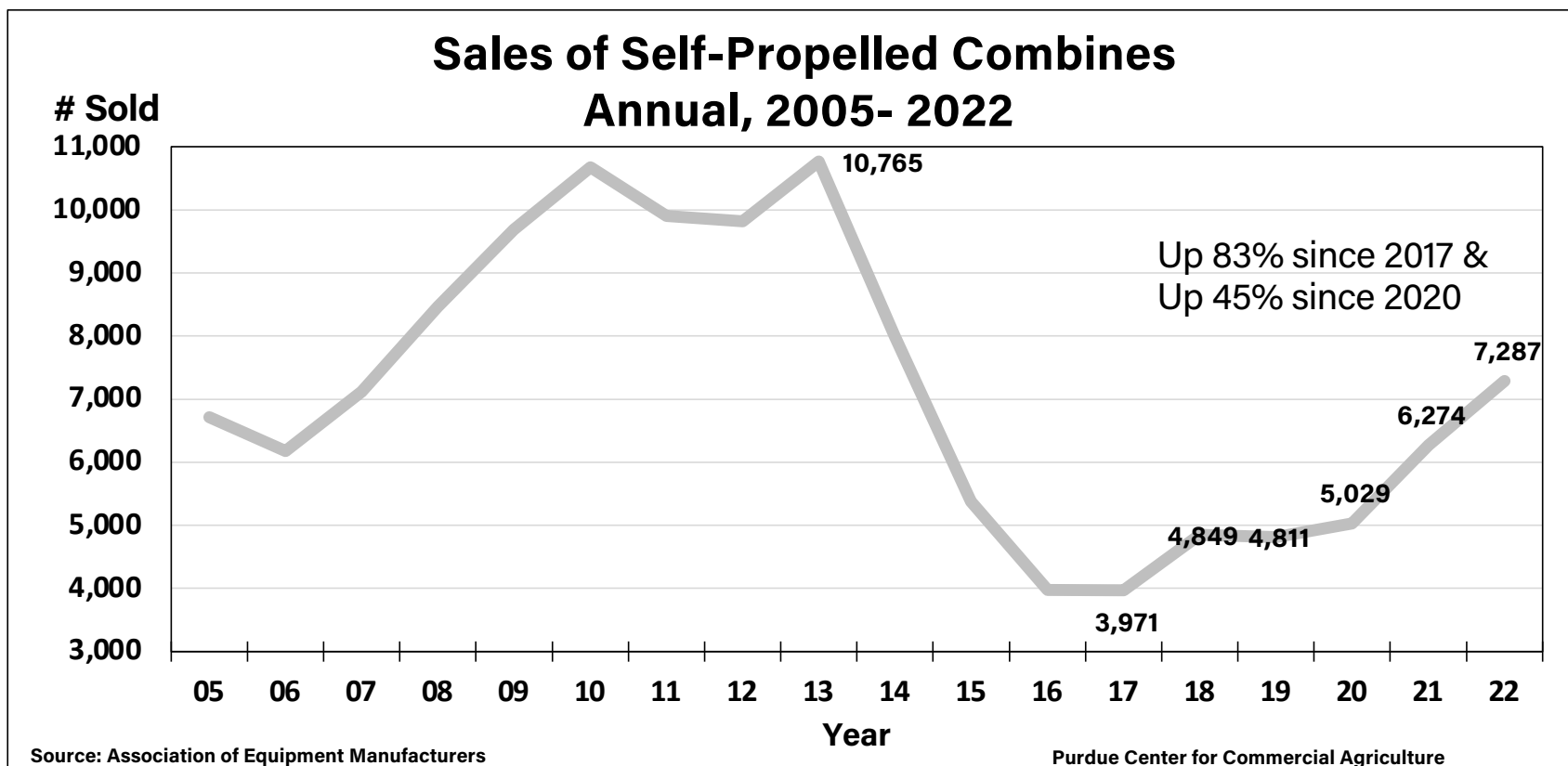
Nearly 3/4's of Respondents Say It's A "Bad Time" to Make Large Investments



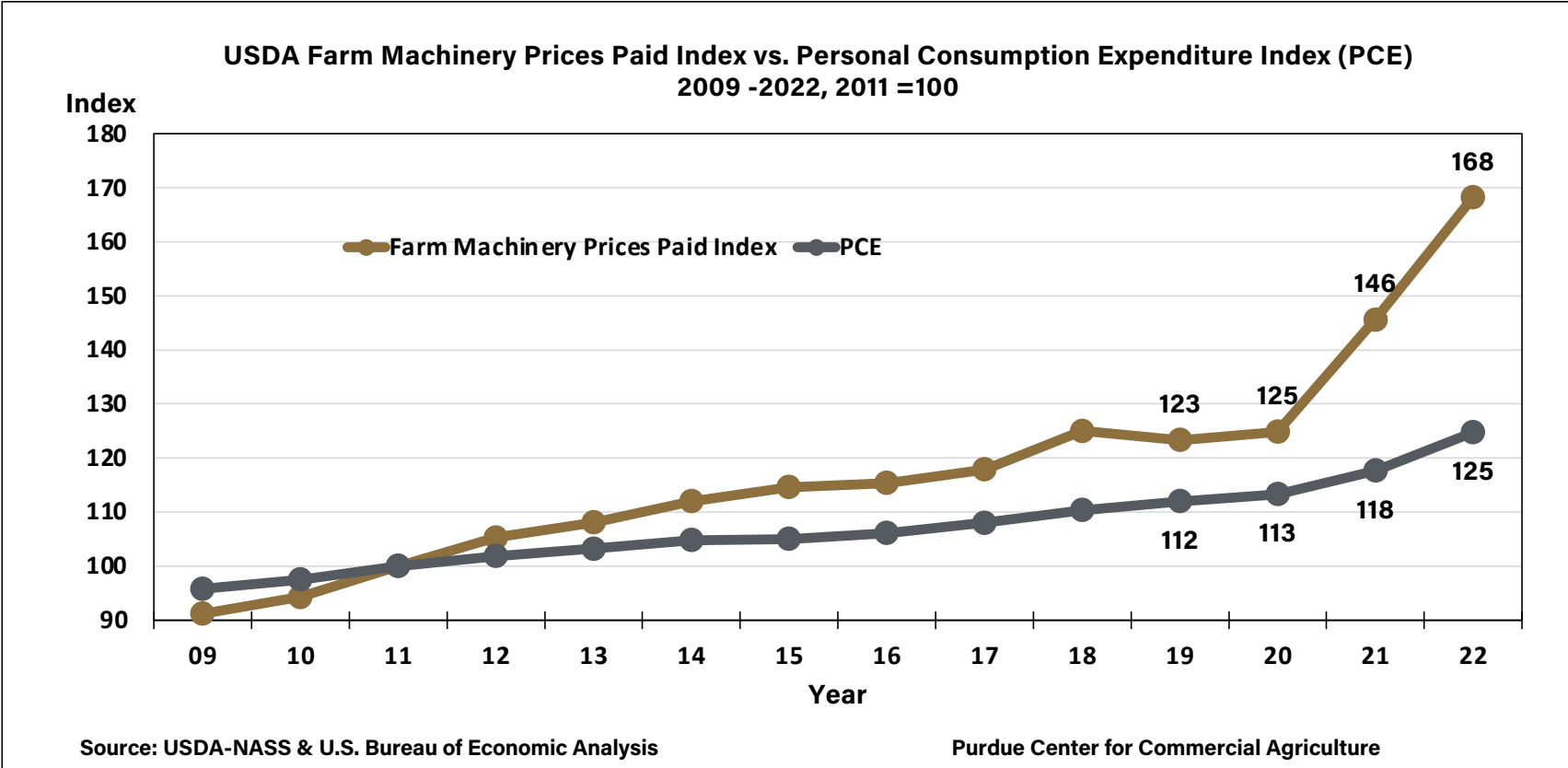
Despite That Sentiment, Tractor Sales Have Rebounded Sharply



As Have Combine Sales...

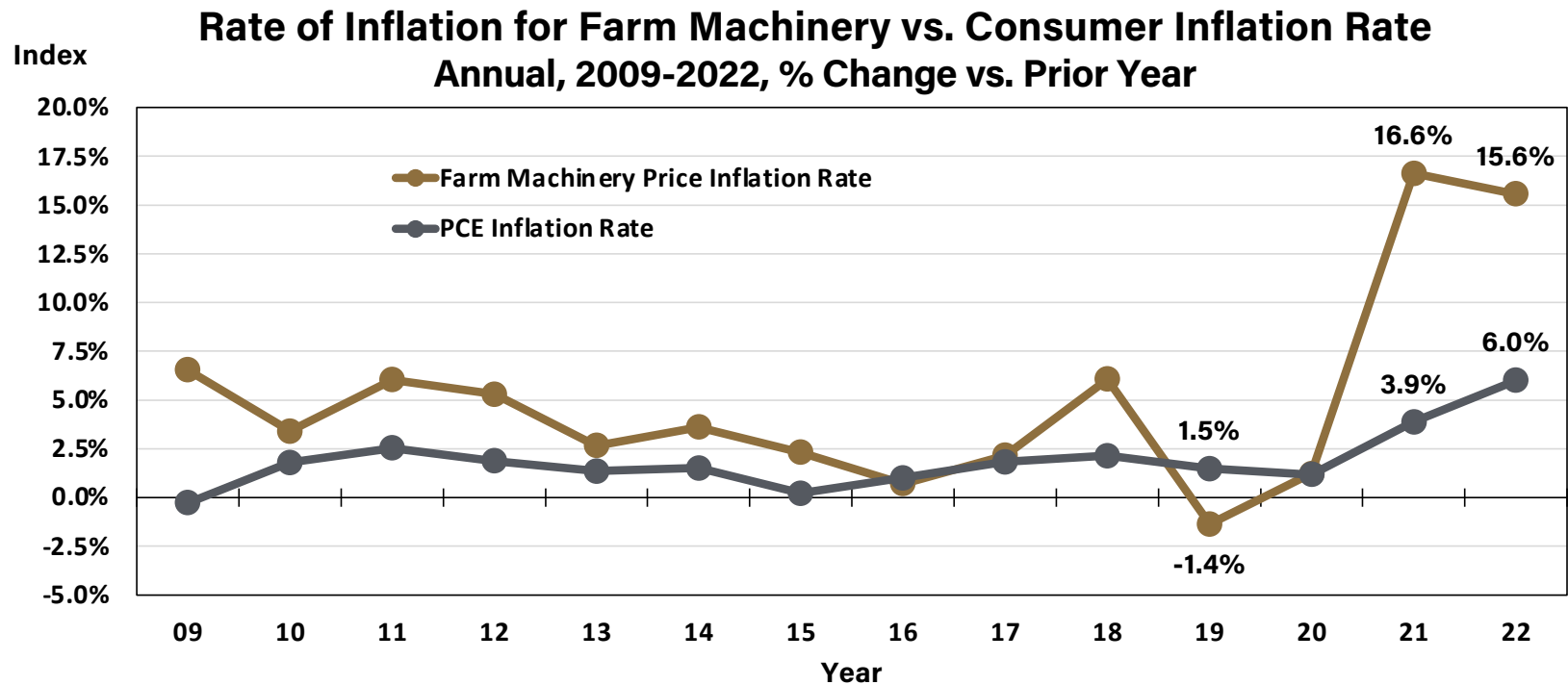


Farm Machinery Prices Have Increased More Rapidly Than Consumer Prices



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Farm Machinery Prices Have Gone Up More Rapidly Than Prices for Consumer Goods



Source: USDA-ERS & U.S. Bureau of Economic Analysis

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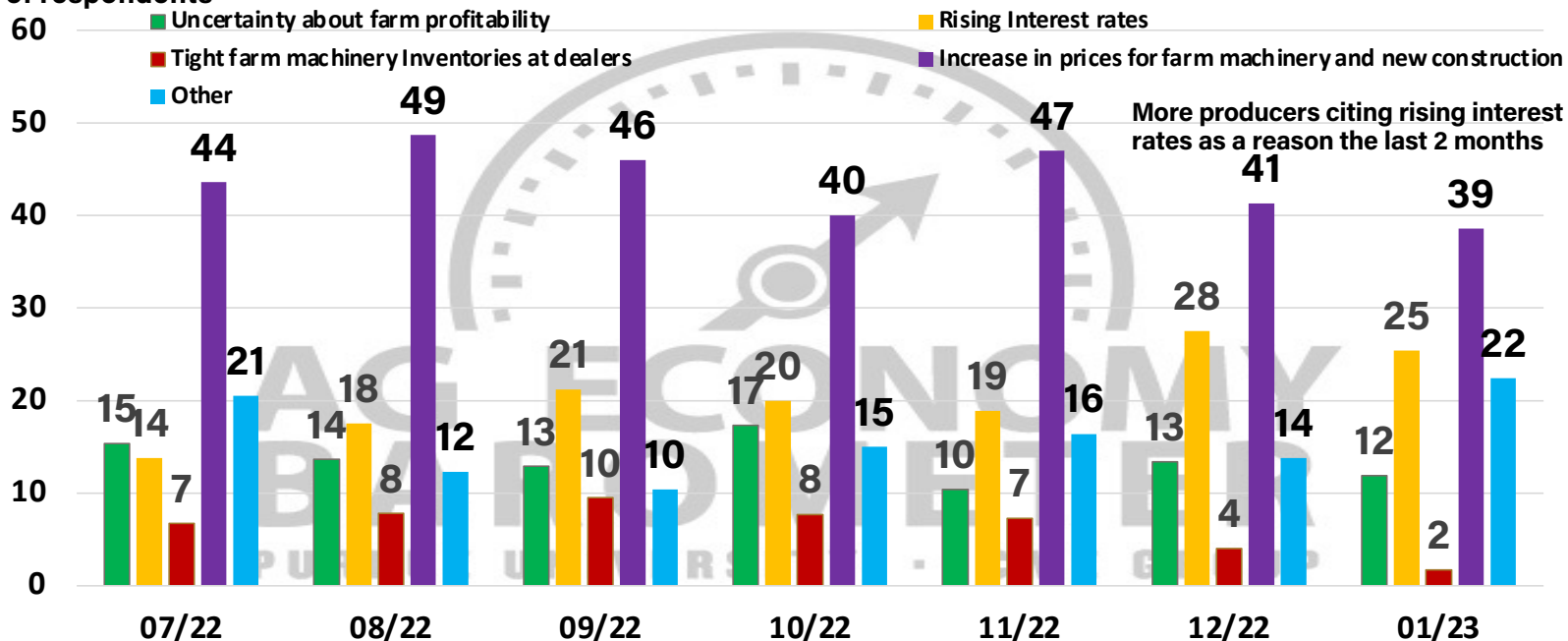
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Machinery Prices &, Recently, Rising Interest Rates Are Key

Primary Reason Now Is a Bad Time to Make Large Investments

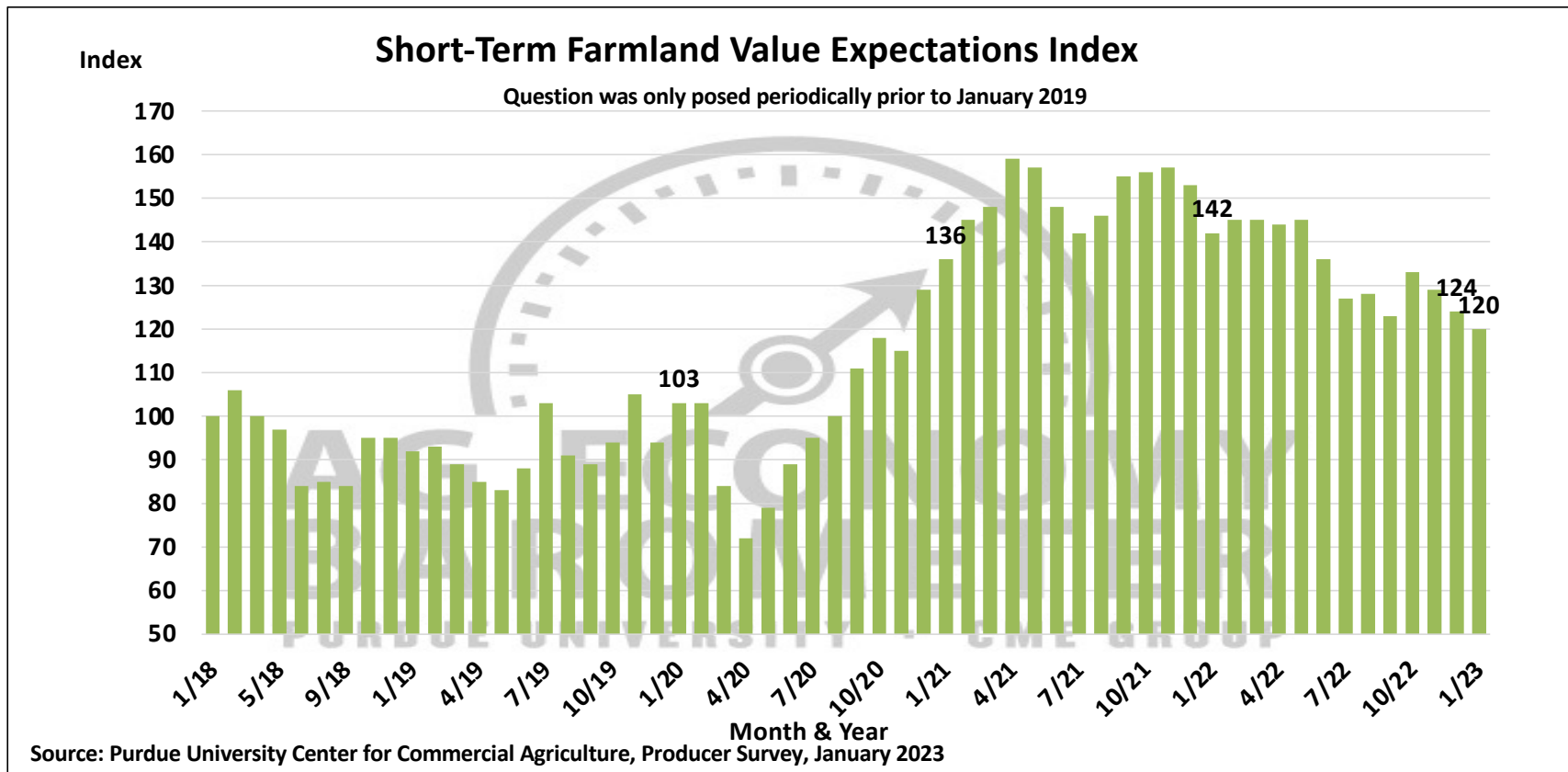
Question was only posed to those who said now is a bad time to make large investments

% of respondents

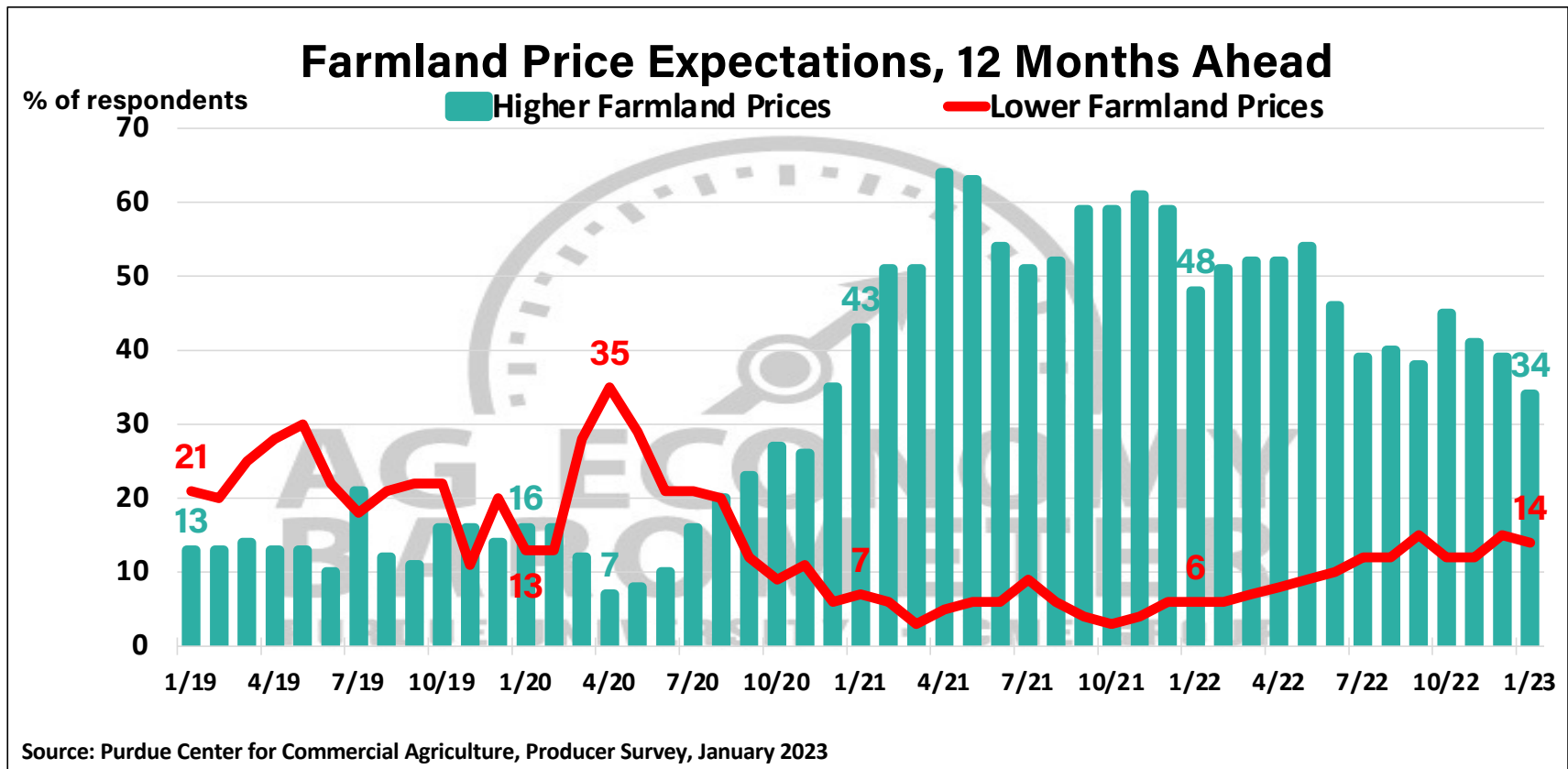


Source: Purdue Center for Commercial Agriculture, Producer Survey, January 2023

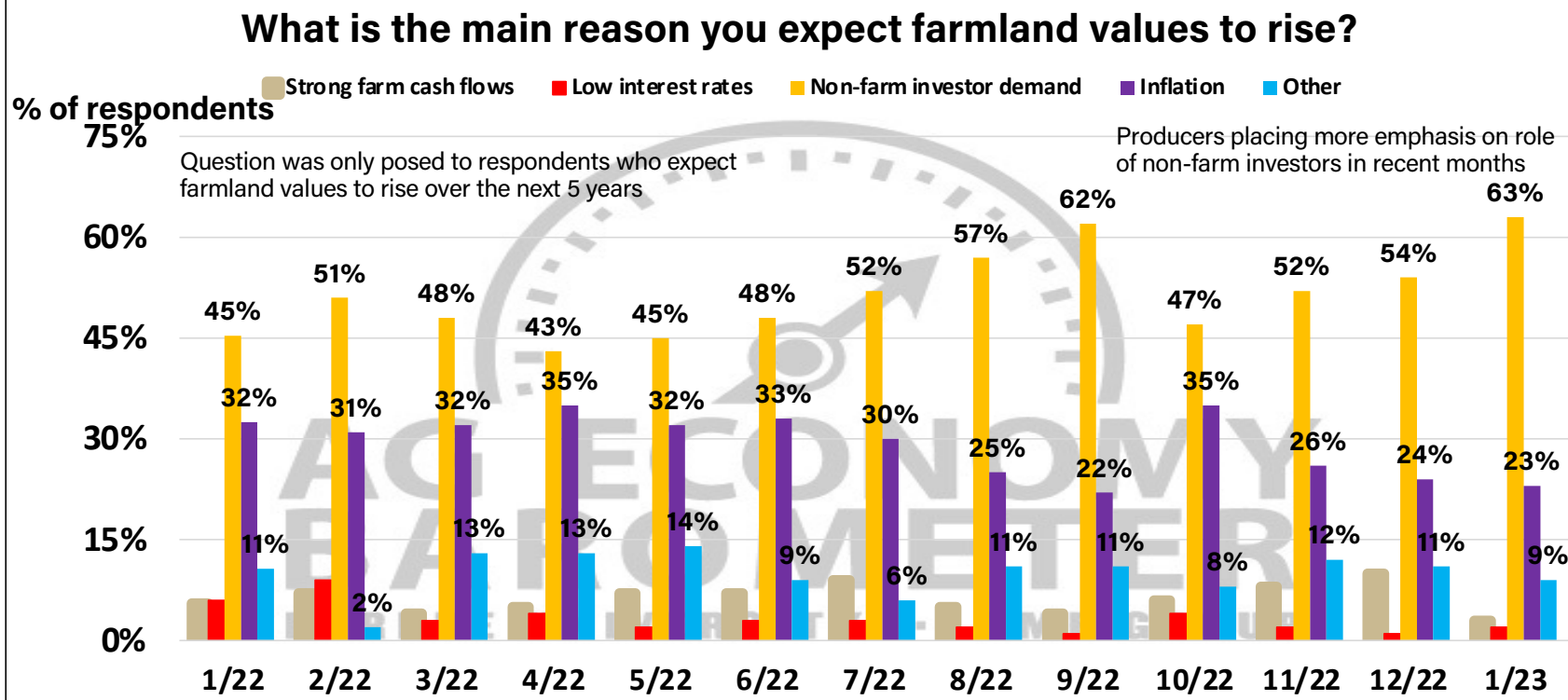
Producers Still Optimistic About Farmland Values...But



But There Are Some Signs That Sentiment Could Be Shifting



Key Reasons Why Farmers Expect Farmland Values to Rise Over Next 5 Years

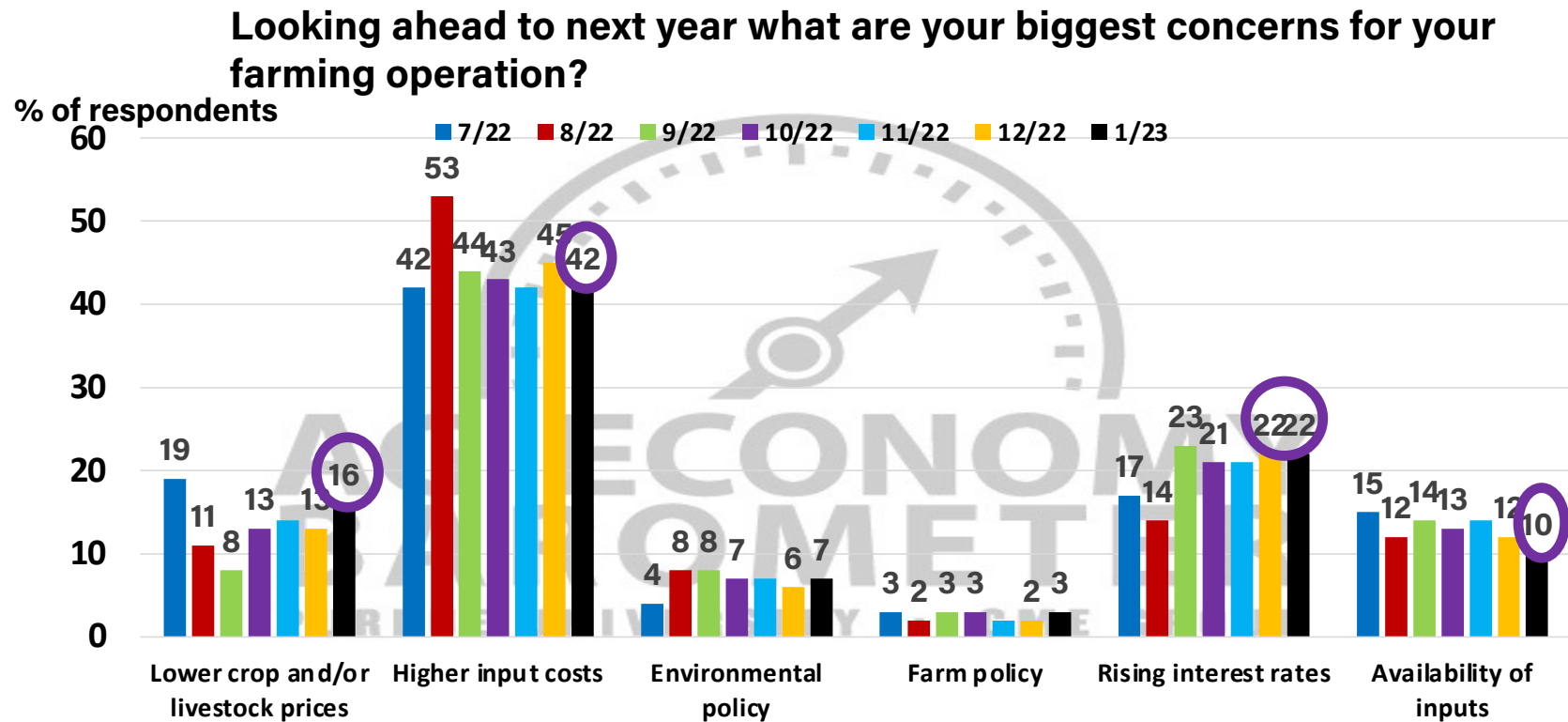


Source: Purdue Center for Commercial Agriculture, Producer Survey, January 2023



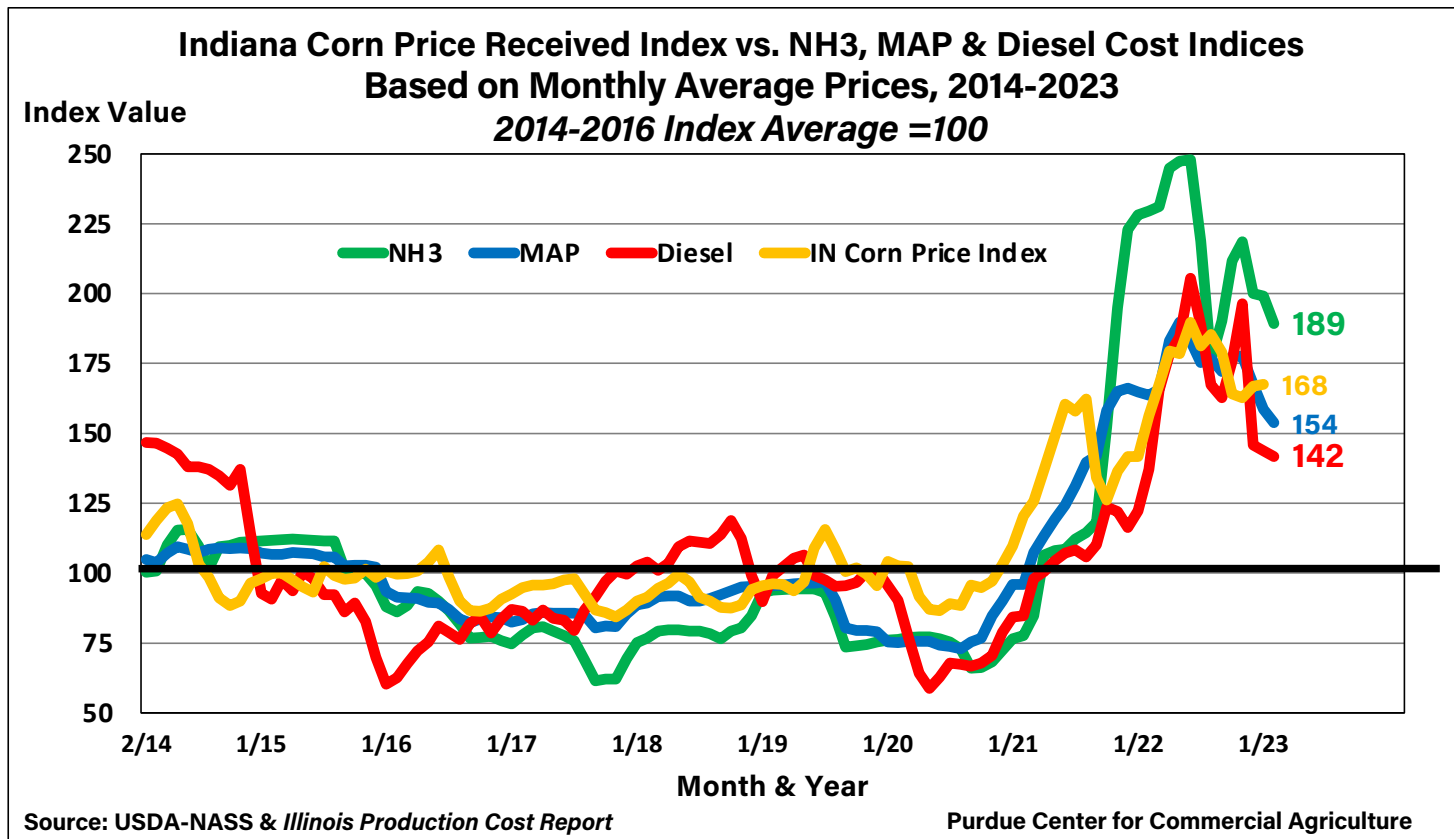
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What Are Producers' Biggest Concerns for 2023?



Source: Purdue Center for Commercial Agriculture, Producer Survey, January 2023




Although Input Prices Have Started to Decline, Farmers Are Concerned About a Possible Cost-Price Squeeze



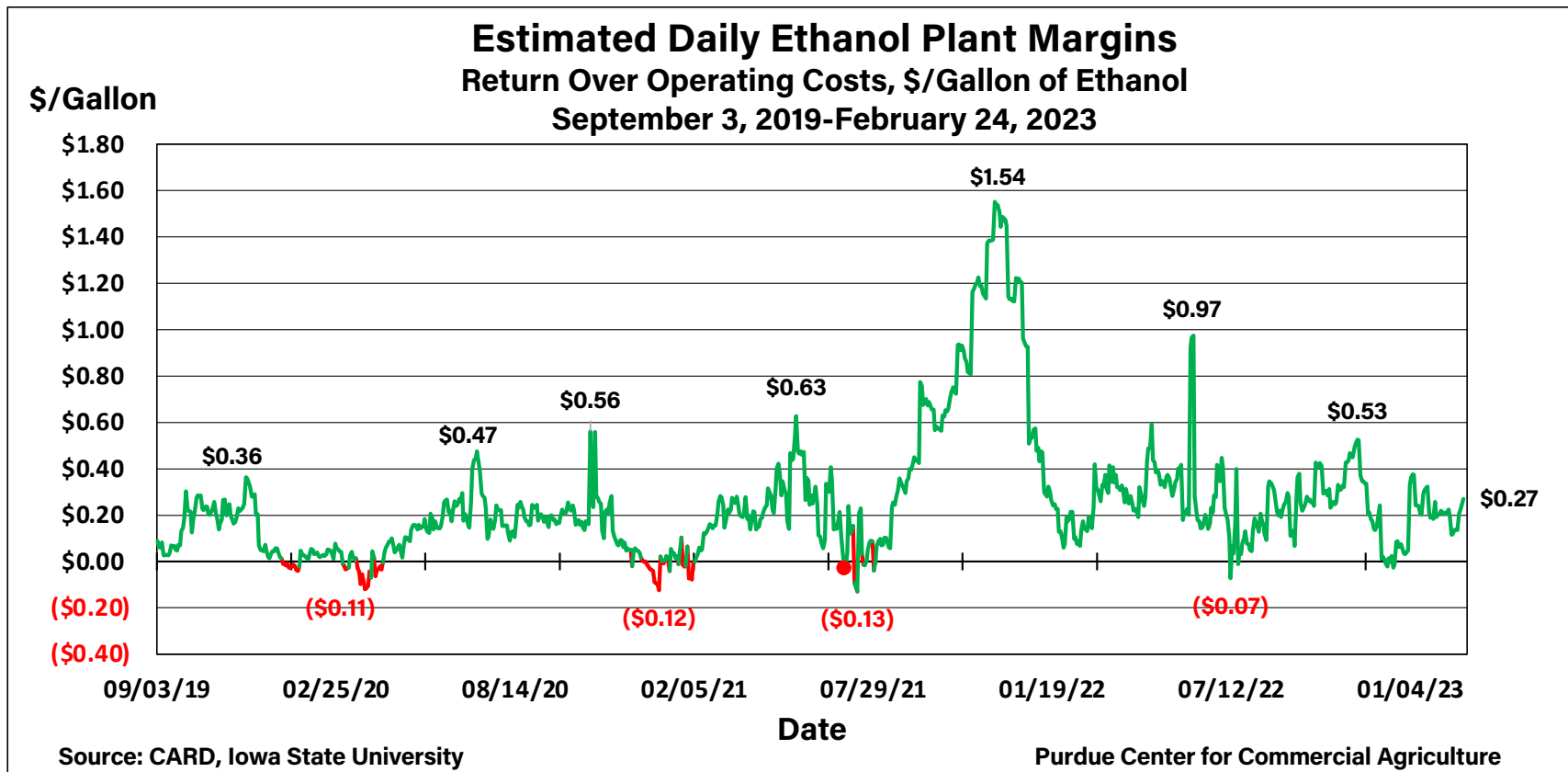
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USDA's February Update Reduced Ethanol Usage: Result...Pushed Ending Stocks Up

USDA's February 2023 Corn Balance Sheet

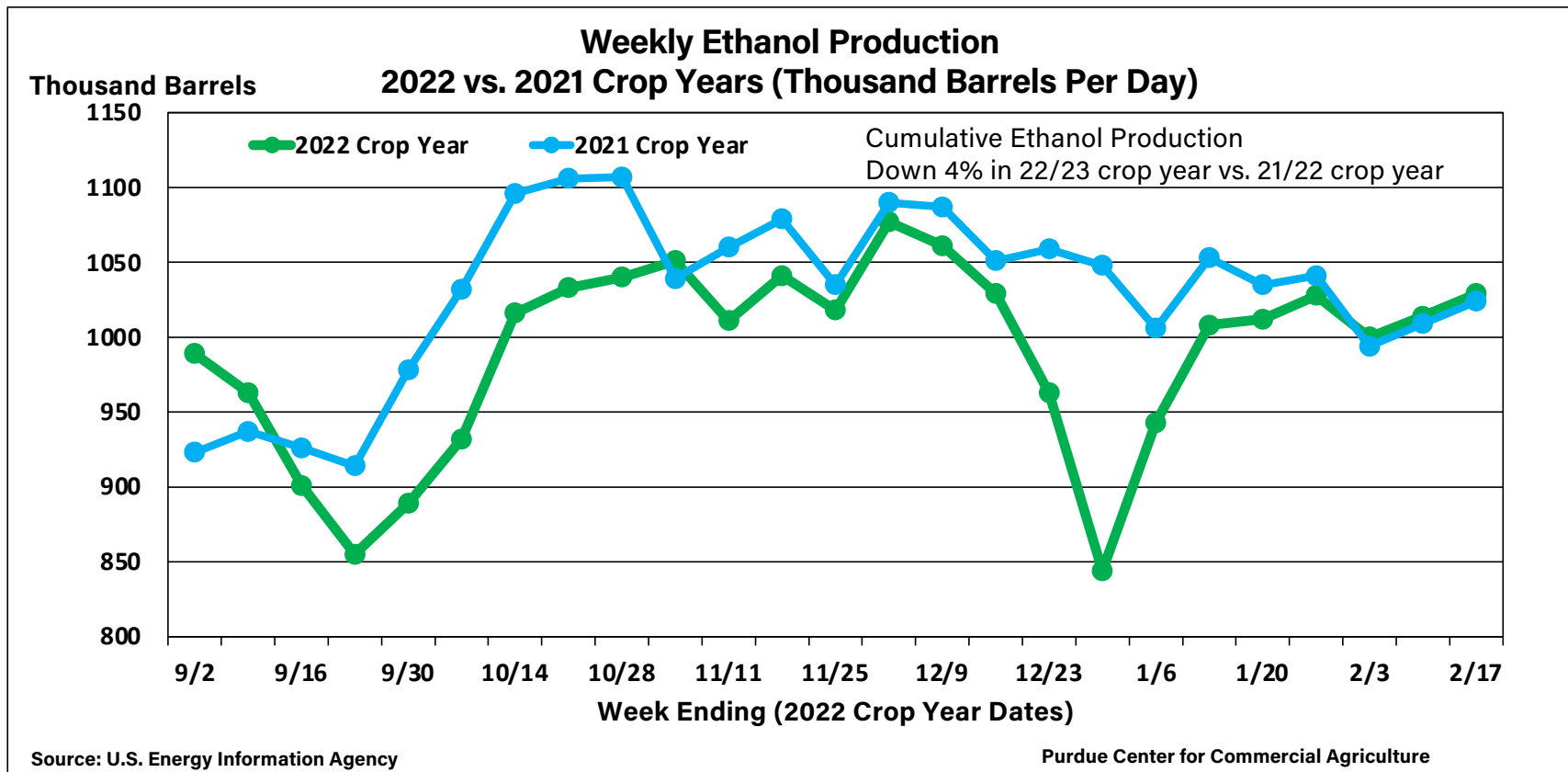
	20/21	21/22	Jan. Proj. 22/23	Feb. Proj. 22/23
		<i>Million Acres</i>		
Area Planted	90.7	93.3	88.6	88.6
Area Harvested	82.3	85.3	79.2	79.2
		<i>Bushels</i>		
Yield per Harvested Acre	171.4	176.7	173.3	173.3
		<i>Million Bushels</i>		
Beginning Stocks	1,919	1,235	1,377	1,377
Production	14,111	15,074	13,730	13,730
Imports	24	24	50	50
Supply, Total	16,055	16,333	15,157	15,157
Feed and Residual	5,607	5,718	5,275	5,275
Food, Seed & Industrial 2/	6,467	6,766	6,715	6,690 
Ethanol & by-products 3/	5,028	5,326	5,275	5,250 
Domestic, Total	12,074	12,484	11,990	11,965
Exports	2,747	2,471	1,925	1,925
Use, Total	14,821	14,956	13,915	13,890
Ending Stocks	1,235	1,377	1,242	1,267 
Avg. Farm Price (\$/bu) 4/	4.53	6.00	6.70	6.70

Ethanol Margins Have Tightened...But Are Still Positive



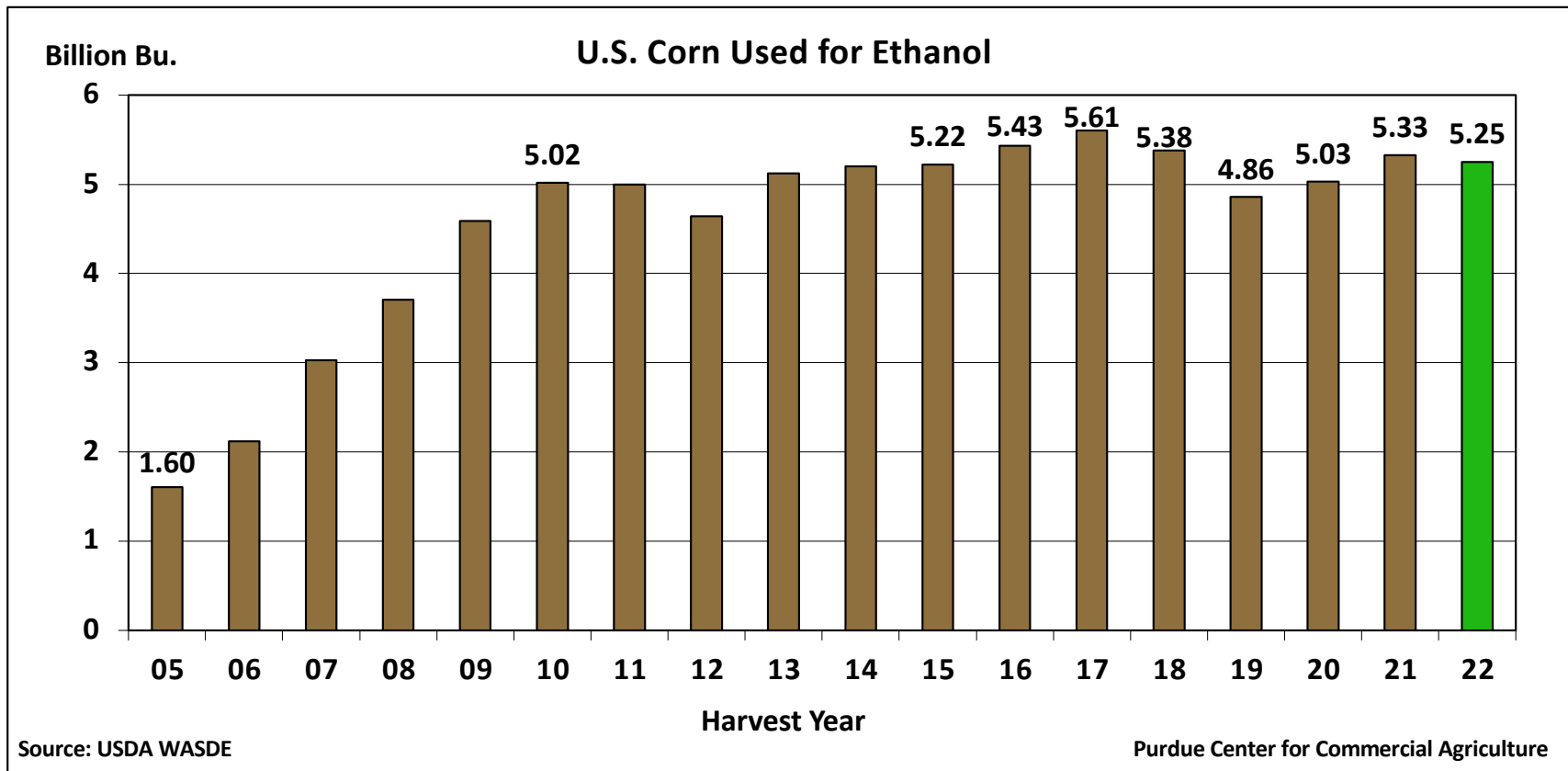
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Weekly Ethanol Production Below Year Ago Levels, But Rebounded Recently

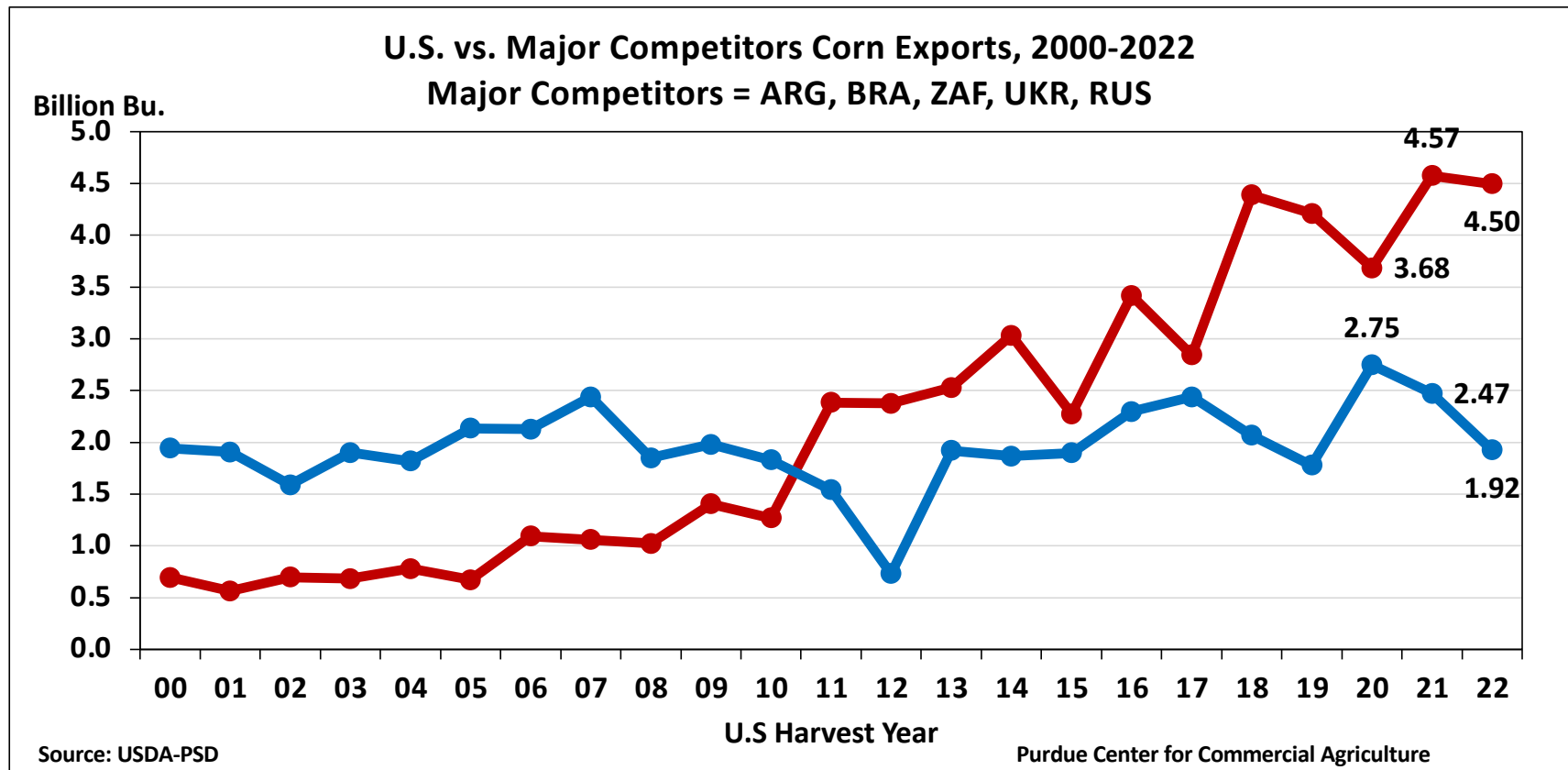


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Soft Margins & Gasoline Usage Led USDA to Reduce Corn Used for Ethanol Estimate

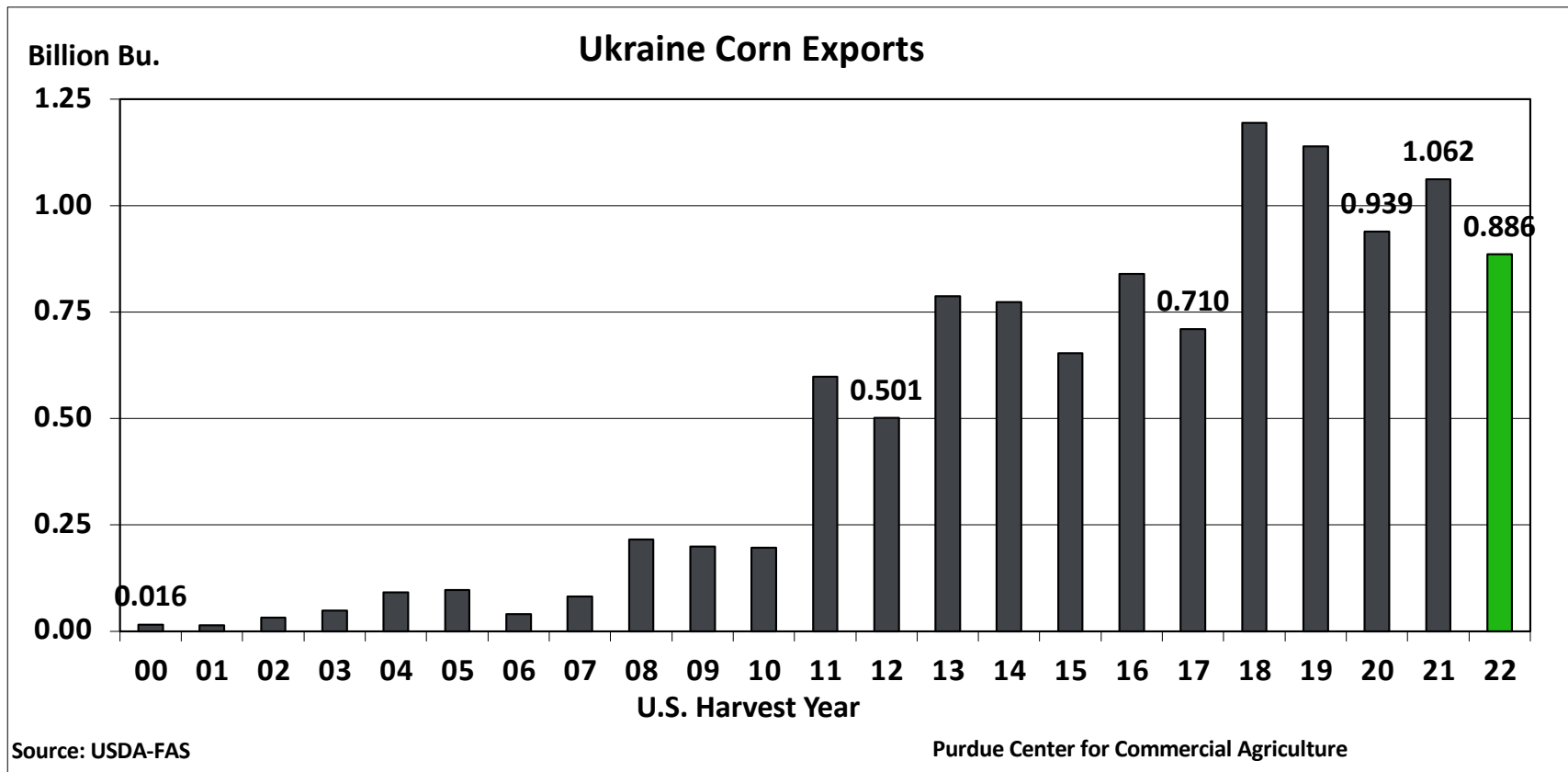


Weak U.S. Corn Exports While S. American Exports Projected to Increase Substantially



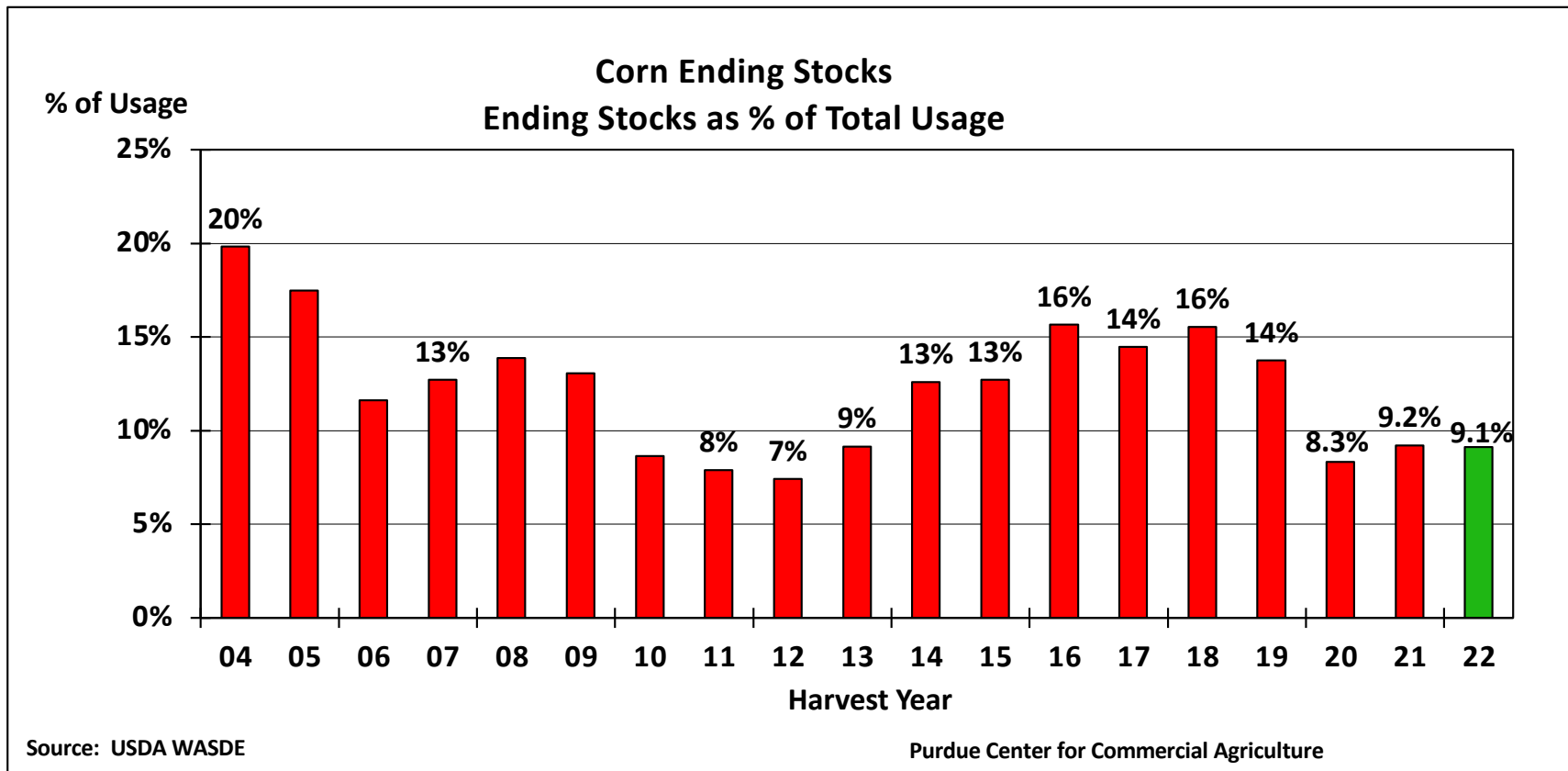
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Corn Exports from Ukraine Remain a Wild Card in the Corn Outlook



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Ending Stocks Still Tight By Historical Standards, But Could Increase Significantly in '23



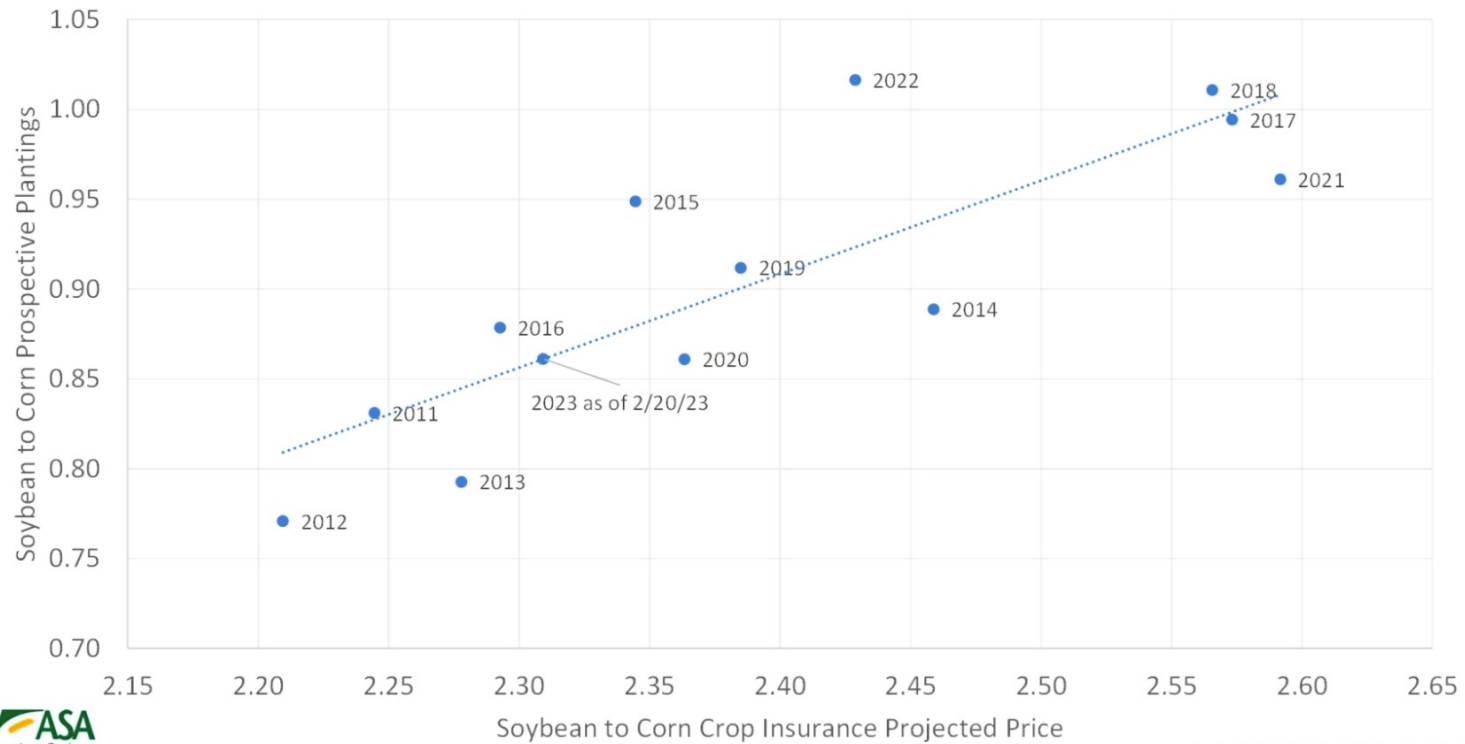
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USDA Projecting Increase in U.S. Corn Planted Acreage & Rebound in Corn Yield

	2021/22	2022/23	2023/24	Change yr/yr
Area planted (mil acres)	93.3	88.6	91	2.4
Area harvested (mil acres)	85.3	79.2	83.1	3.9
Yield (bu/acre)	176.7	173.3	181.5	8.2
		<u>Million bushels</u>		
Beginning stocks	1,235	1,377	1,267	(110)
Production	15,074	13,730	15,085	1,355
Imports	24	50	25	(25)
Total supply	16,333	15,157	16,377	1,220
Domestic use (total)	12,484	11,965	12,290	325
-Feed and residual	5,718	5,275	5,600	325
-Food, seed, and industrial	6,766	6,690	6,690	-
--Ethanol and byproducts	5,326	5,250	5,250	-
Exports	2,471	1,925	2,200	275
Ending stocks	1,377	1,267	1,887	620
Stocks-to-use (percent)	9.2	9.1	13.0	3.9
Average farm price (\$/bushel)	6.00	6.70	5.60	(1.10)

USDA Basing Corn Acreage Increase on Soybean/Corn Price Ratio

Soybean and Corn Planting Intentions and Projected Prices







Source: USDA NASS and ASA calculations



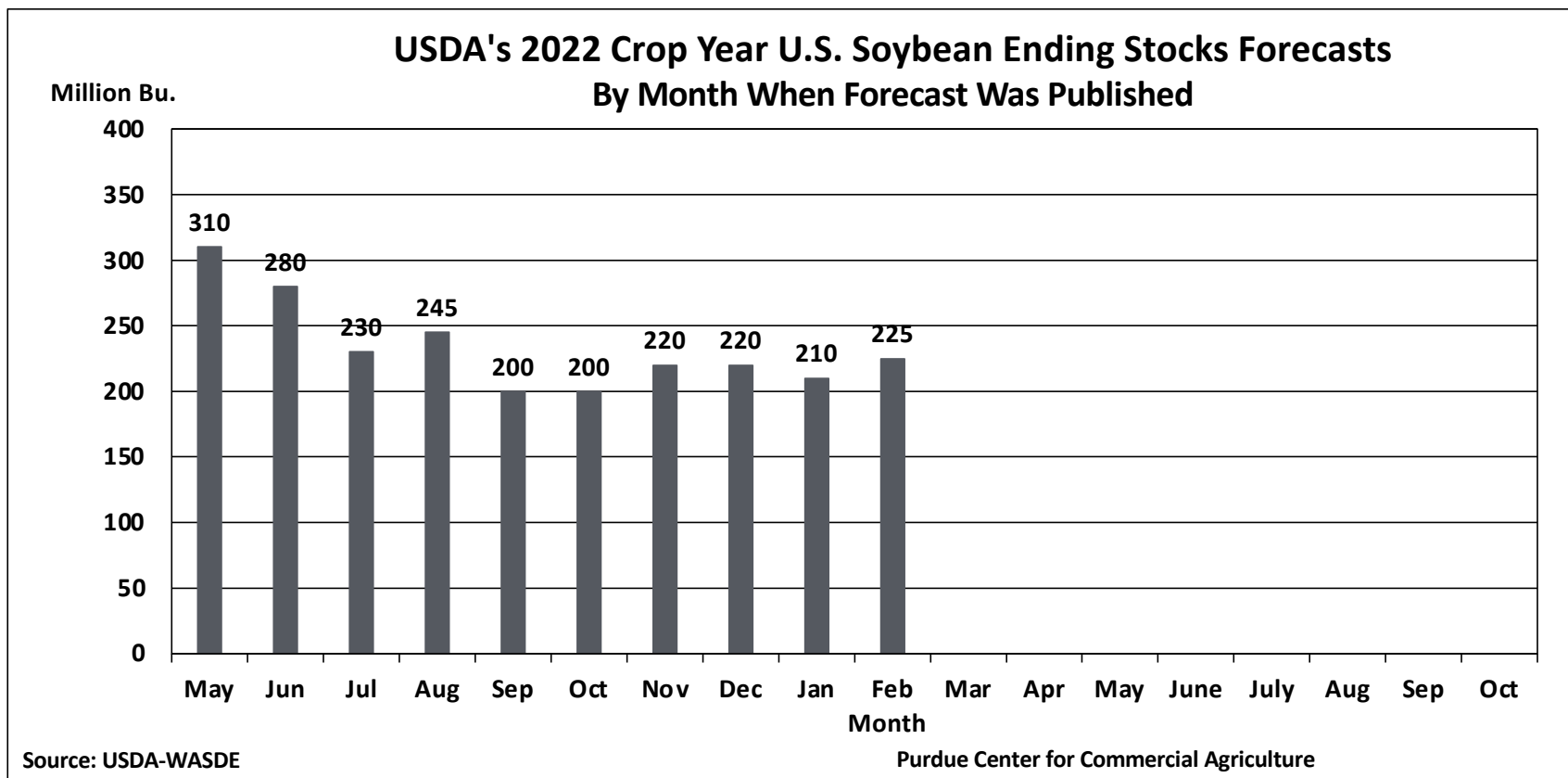
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USDA's February Update Reduced Soybean Crush & Raised Ending Stocks

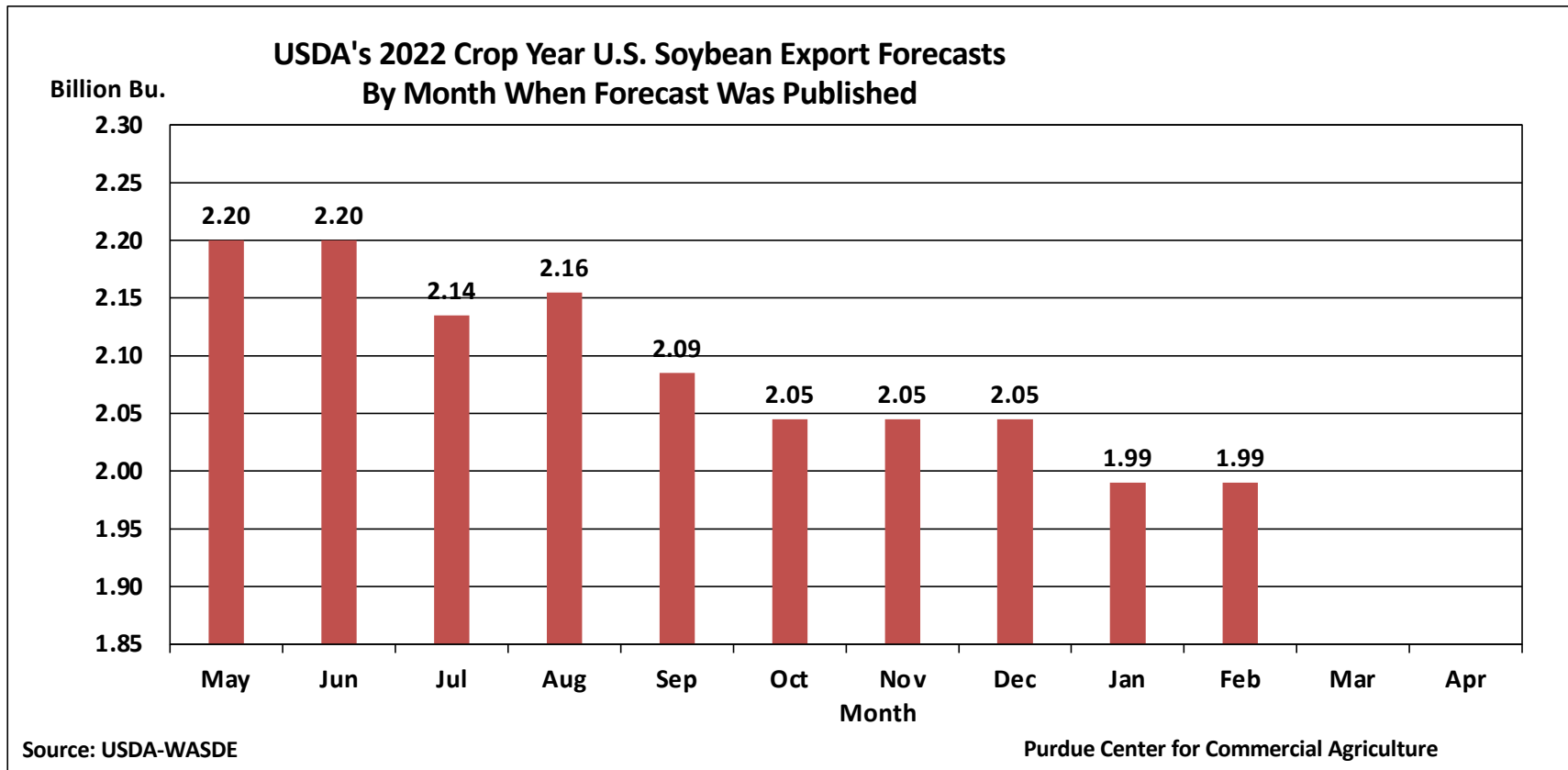
USDA's February 2023 Soybean Balance Sheet

	20/21	21/22	Jan. Proj. 22/23	Feb. Proj. 22/23
		<i>Million Acres</i>		
Area Planted	83.4	87.2	87.5	87.5
Area Harvested	82.6	86.3	86.3	86.3
		<i>Bushels</i>		
Yield per Harvested Acre	51.0	51.7	49.5	49.5
		<i>Million Bushels</i>		
Beginning Stocks	525	257	274	274
Production	4,216	4,465	4,276	4,276
Imports	20	16	15	15
Supply, Total	4,761	4,738	4,566	4,566
Crushings	2,141	2,204	2,245	2,230 
Exports	2,266	2,158	1,990	1,990
Seed	101	102	102	102
Residual	-4	1	18	18
Use, Total	4,504	4,464	4,355	4,340 
Ending Stocks	257	274	210	225 
Avg. Farm Price (\$/bu) 2/	10.80	13.30	14.20	14.30 

Reduction in Soybean Crush Estimate Pushed Ending Stocks Estimate Up

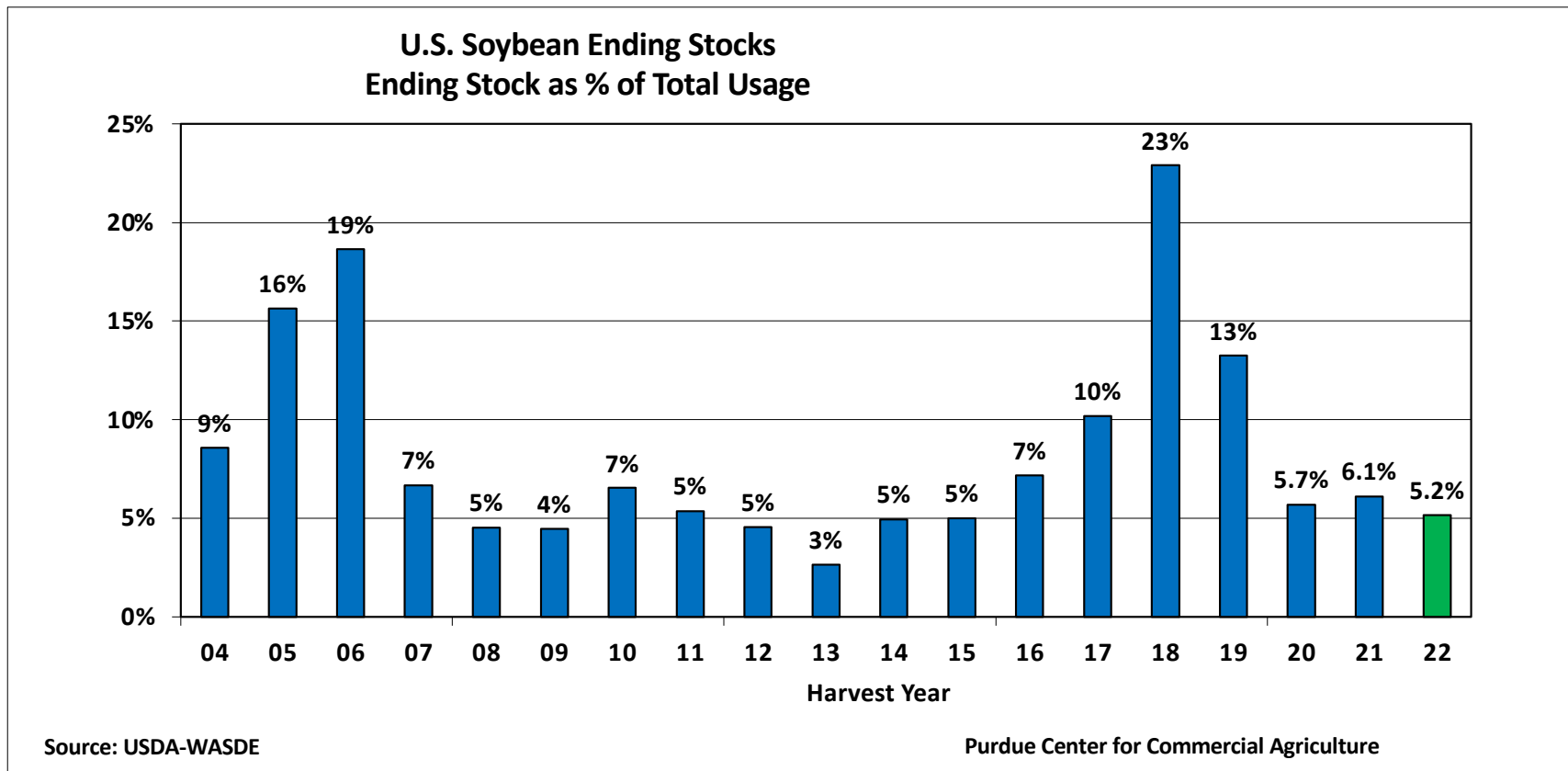


No Change in USDA's Export Forecast...But S. American Competition Looms Large



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Still a Tight Carryover Level for '22 Crop, But Stocks Could Increase for '23 Crop






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USDA Projecting No Change in Soybean Acreage, But A Yield Rebound in '23

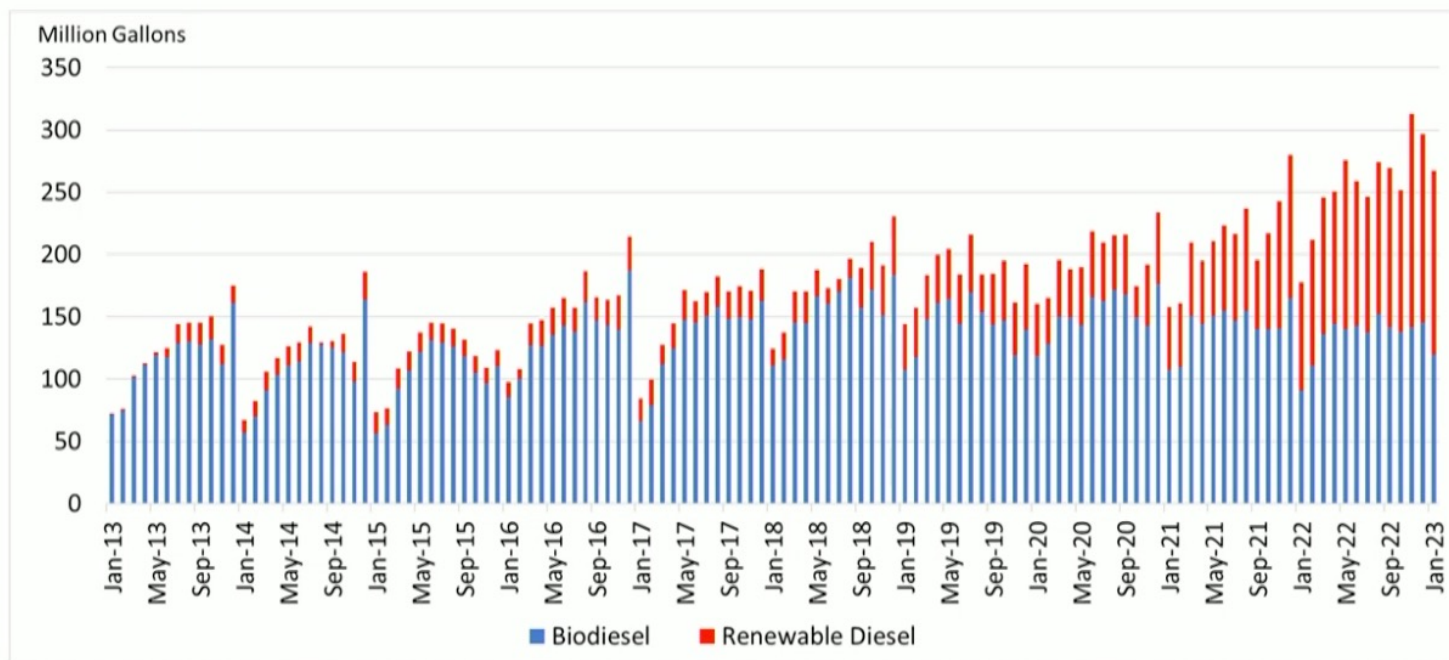
	2021/22	2022/23	2023/24	Change yr/yr
Area planted (mil acres)	87.2	87.5	87.5	0
Area harvested (mil acres)	86.3	86.3	86.7	0.4
Yield (bu/acre)	51.7	49.5	52	2.5
		<u>Million bushels</u>		
Beginning stocks	257	274	225	(49)
Production	4,465	4,276	4,510	234
Imports	16	15	15	-
Total supply	4,738	4,566	4,750	184
Crush	2,204	2,230	2,310	80
Exports	2,158	1,990	2,025	35
Total use	4,464	4,340	4,461	121
Ending stocks	274	225	290	65
Stocks-to-use (percent)	6.1	5.2	6.5	1.3
Average farm price (\$/bushel)	13.30	14.30	12.90	(1.40)

Guide to Bio-Based Fuels

RENEWABLE DIESEL	BIODIESEL	SUSTAINABLE AVIATION FUEL
<p>Renewable fuel that is chemically the same as petroleum diesel.</p>	<p>Renewable, biodegradable fuel that must be blended with petroleum diesel.</p>	<p>The common term for non-petroleum jet fuel.</p>
<p>RENEWABLE DIESEL 100% FUEL</p>	<p>BIODIESEL ← BETWEEN 2% AND 20% PETROLEUM DIESEL ← BETWEEN 98% AND 80%</p>	<p>SAF ← BETWEEN 10% AND 50% JET FUEL ← BETWEEN 90% AND 50%</p>
<p>Can be used in existing petroleum pipelines, storage tanks and diesel engines.</p>		
<p>MADE FROM:</p> <ul style="list-style-type: none">▶ vegetable oils▶ animal fats▶ recycled restaurant grease	<p>MADE FROM:</p> <ul style="list-style-type: none">▶ vegetable oils▶ animal fats▶ recycled restaurant grease	<p>MADE FROM:</p> <ul style="list-style-type: none">▶ wood residue▶ animal fats▶ algae▶ cooking/vegetable oil▶ sugars/alcohol▶ ethanol▶ greases
		

Growth Market for Soybeans Is Renewable Diesel

Renewable Diesel Production is Expanding



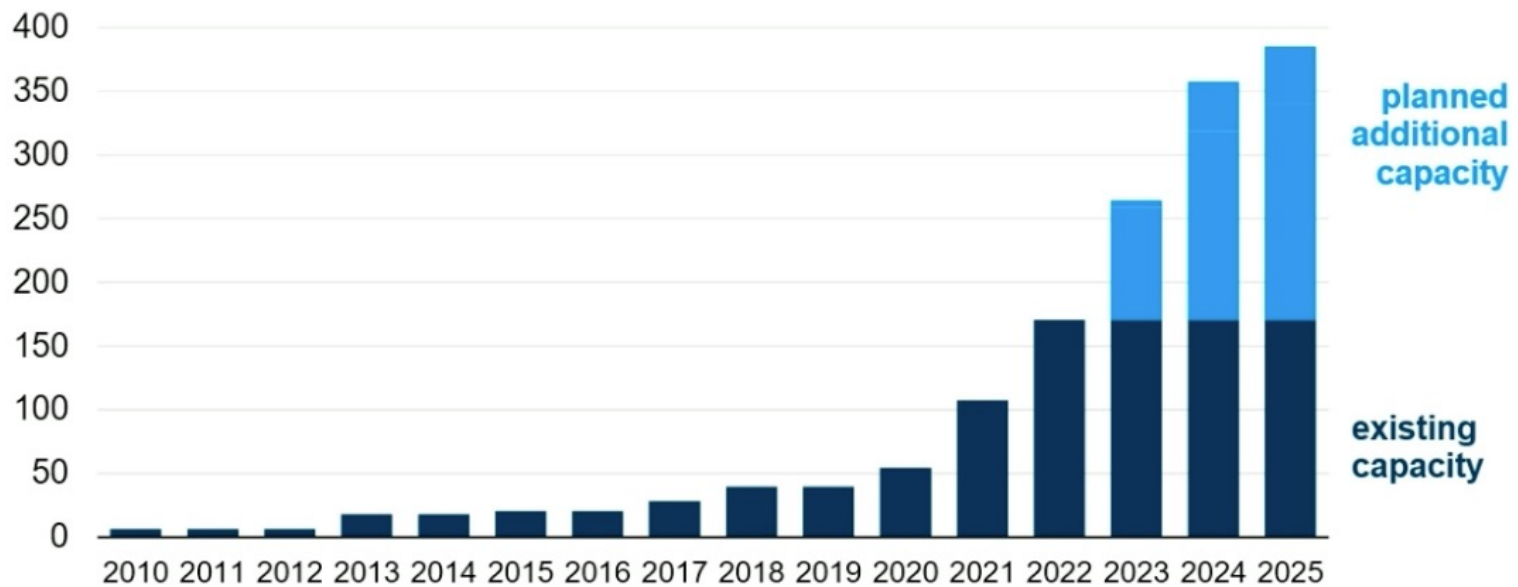
Source: EPA



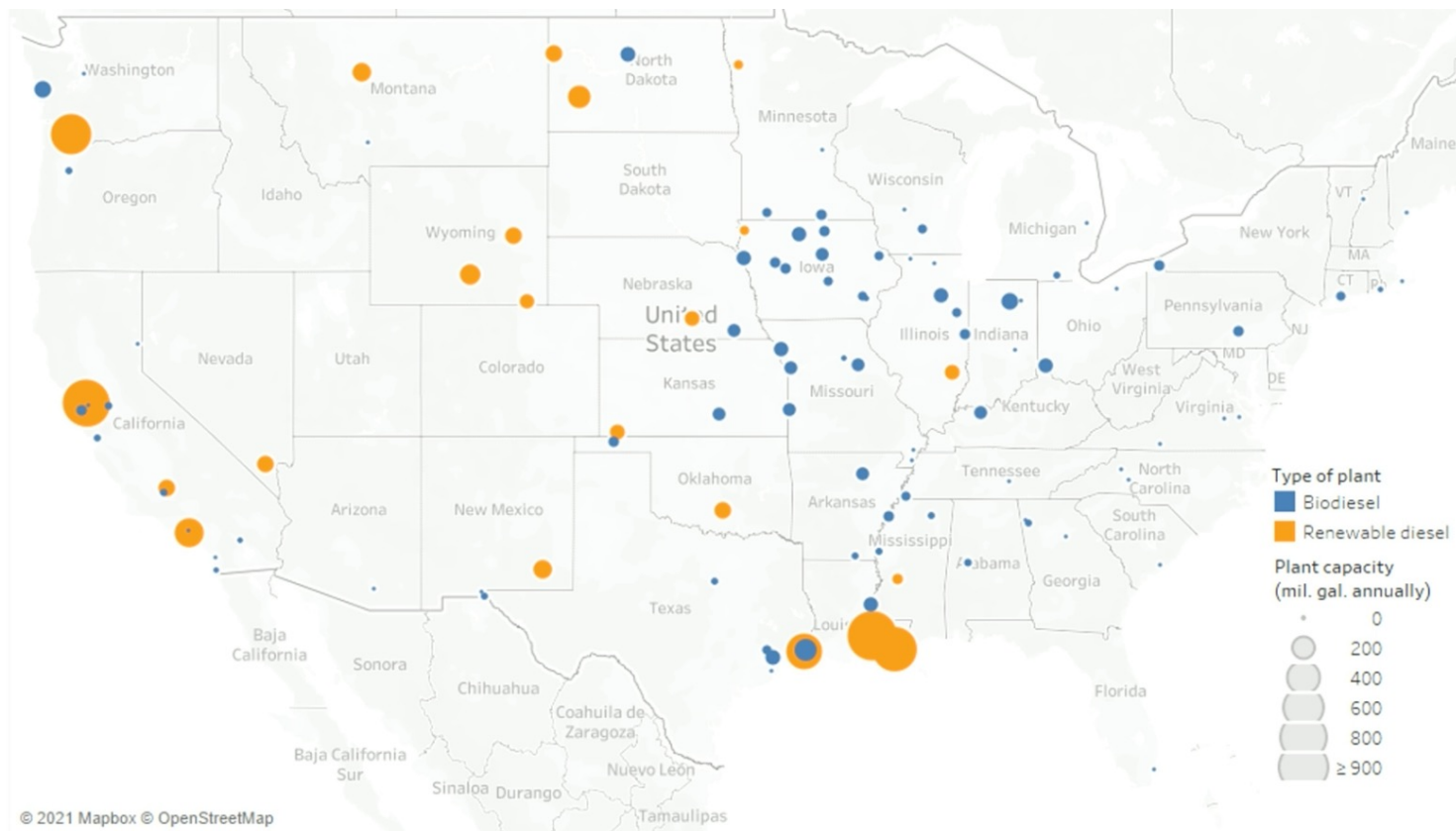
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Lots of Additional Capacity Announcements...How Many Will Be Built?

Annual existing and expected U.S. renewable diesel production capacity (2010–2025)
thousand barrels per day

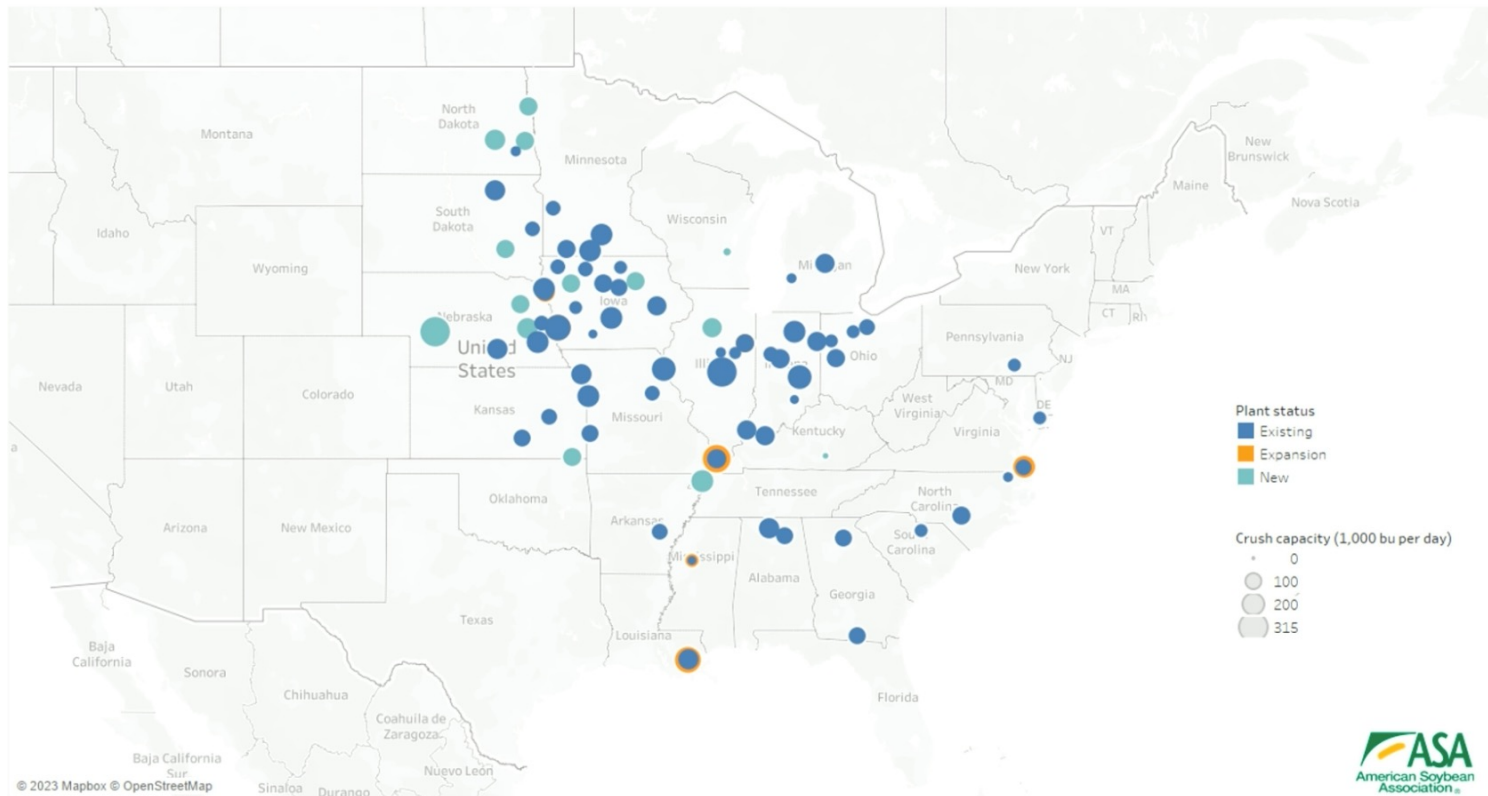


Biodiesel & Renewable Diesel Plants...Includes Announced Plants



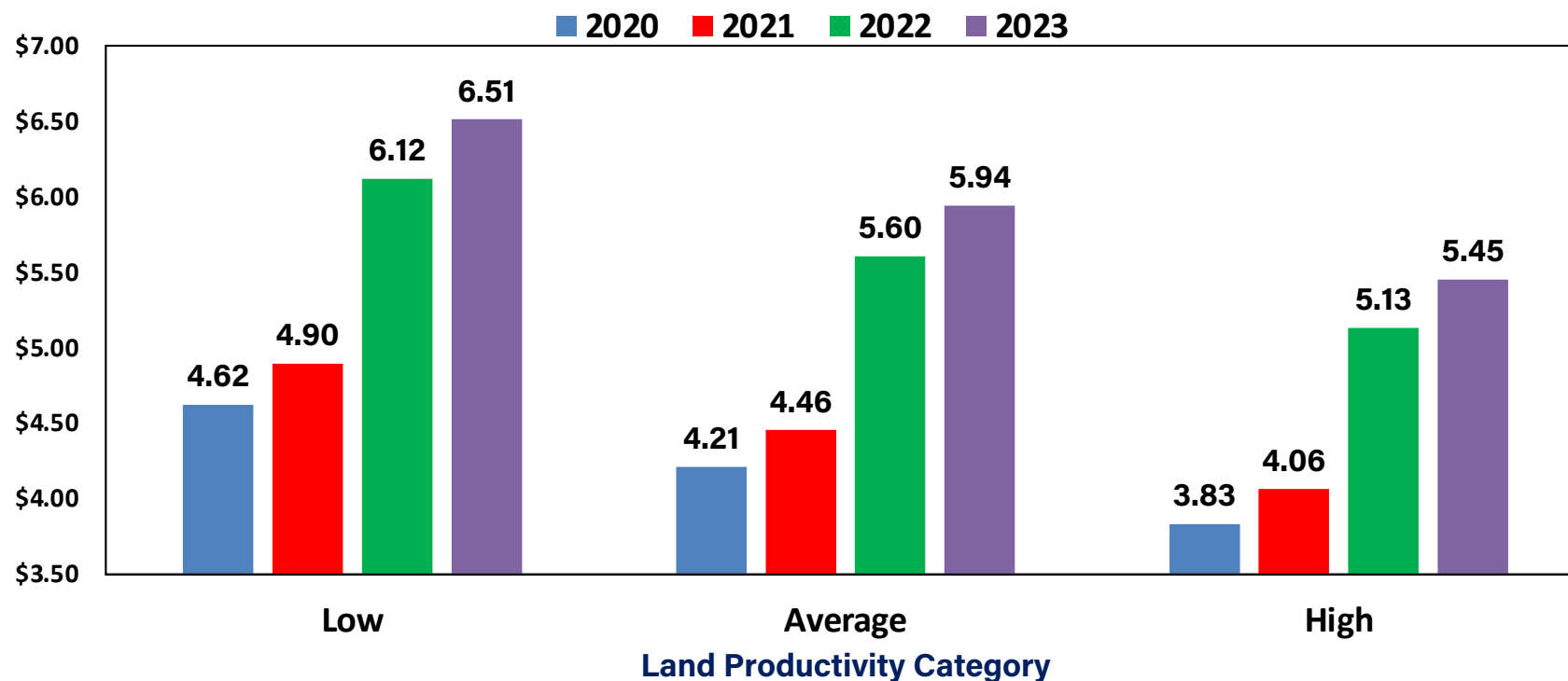
Soybean Crush Plants...Includes Existing Plants, Plant Expansions & New Plants

U.S. Soybean Crush Plants



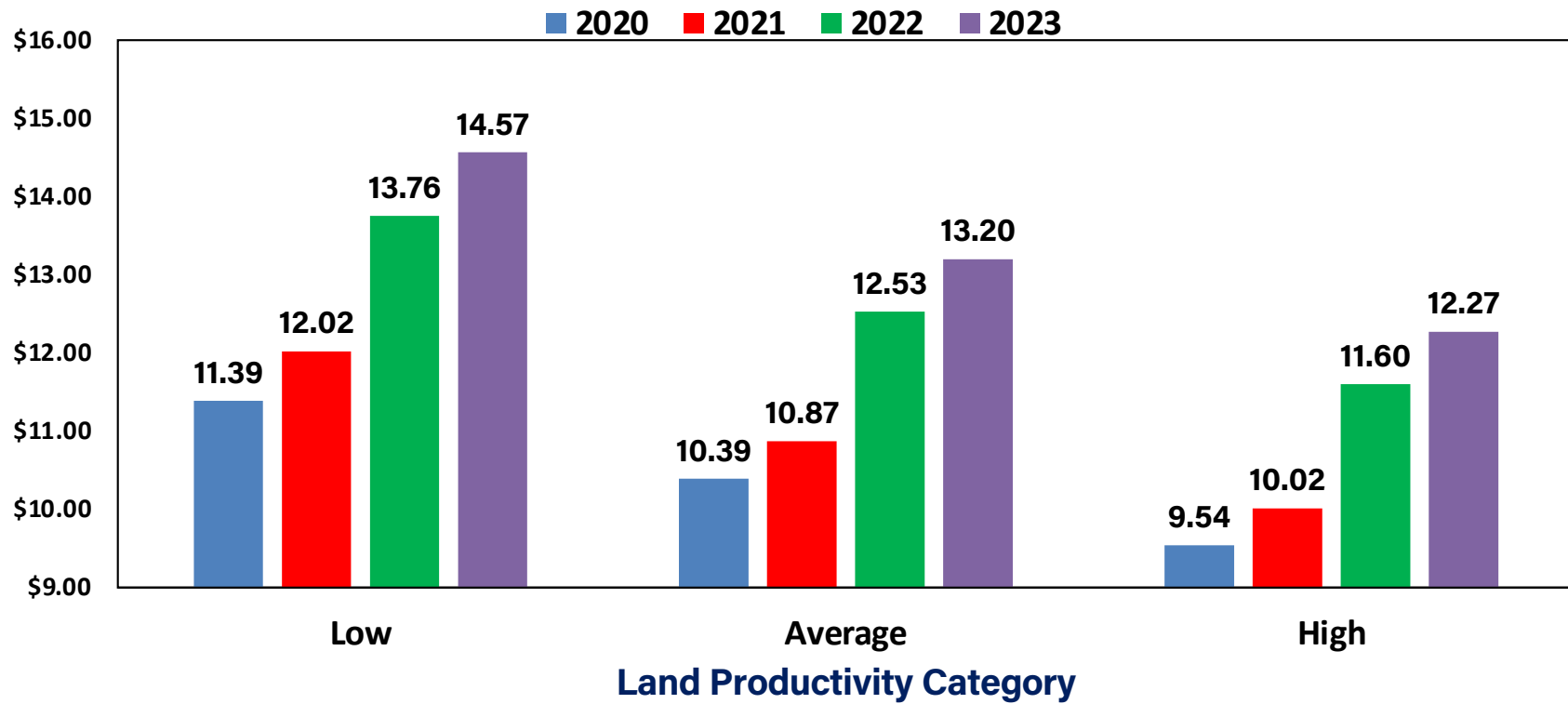
Breakeven for Average Productivity Up 33% Since 2021

Breakeven Prices for Rotation Corn in Indiana



Breakeven for Average Productivity Up 21% Since 2021

Breakeven Prices for Rotation Soybeans in Indiana



COMPARING 2ND YEAR SOYBEANS TO ROTATION CORN IN THE EASTERN CORN BELT

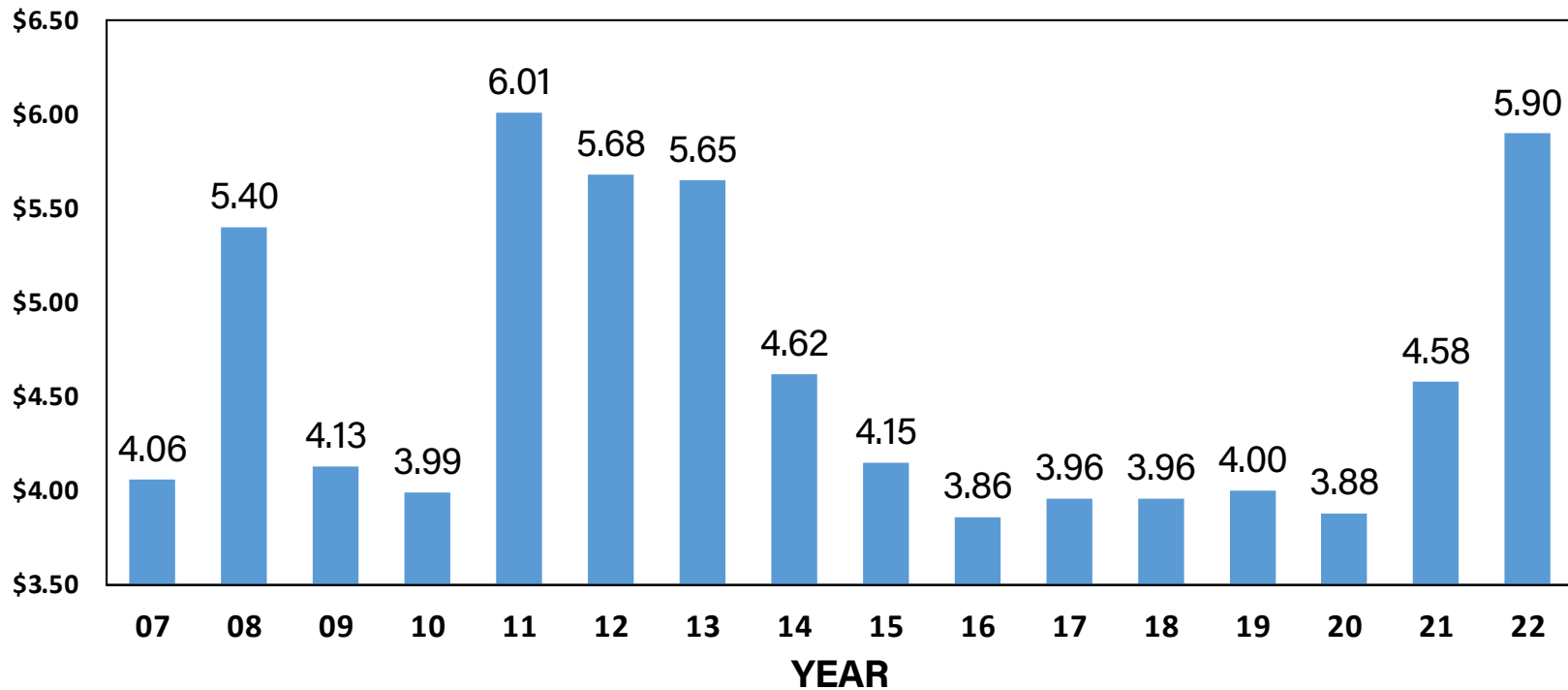
Corn Prices Required to Produce Per Acre Returns Equivalent to Soybeans

Soybean Price	Low Productivity (C=152; SB=46)	Avg. Productivity (C=184; SB=56)	High Productivity (C=216; SB=66)
\$12.50	\$5.89	\$5.73	\$5.52
\$13.00	\$6.04	\$5.88	\$5.68
\$13.50	\$6.19	\$6.03	\$5.83
\$14.00	\$6.34	\$6.18	\$5.98
\$14.50	\$6.49	\$6.34	\$6.13
\$15.00	\$6.64	\$6.49	\$6.29

2023's Price Guarantee Won't Be Available Until March 1st ... But Average Up Through 2/23/23 = \$5.95

Projected (February) Crop Insurance Prices for Corn (\$ per bushel)

Source: USDA-RMA

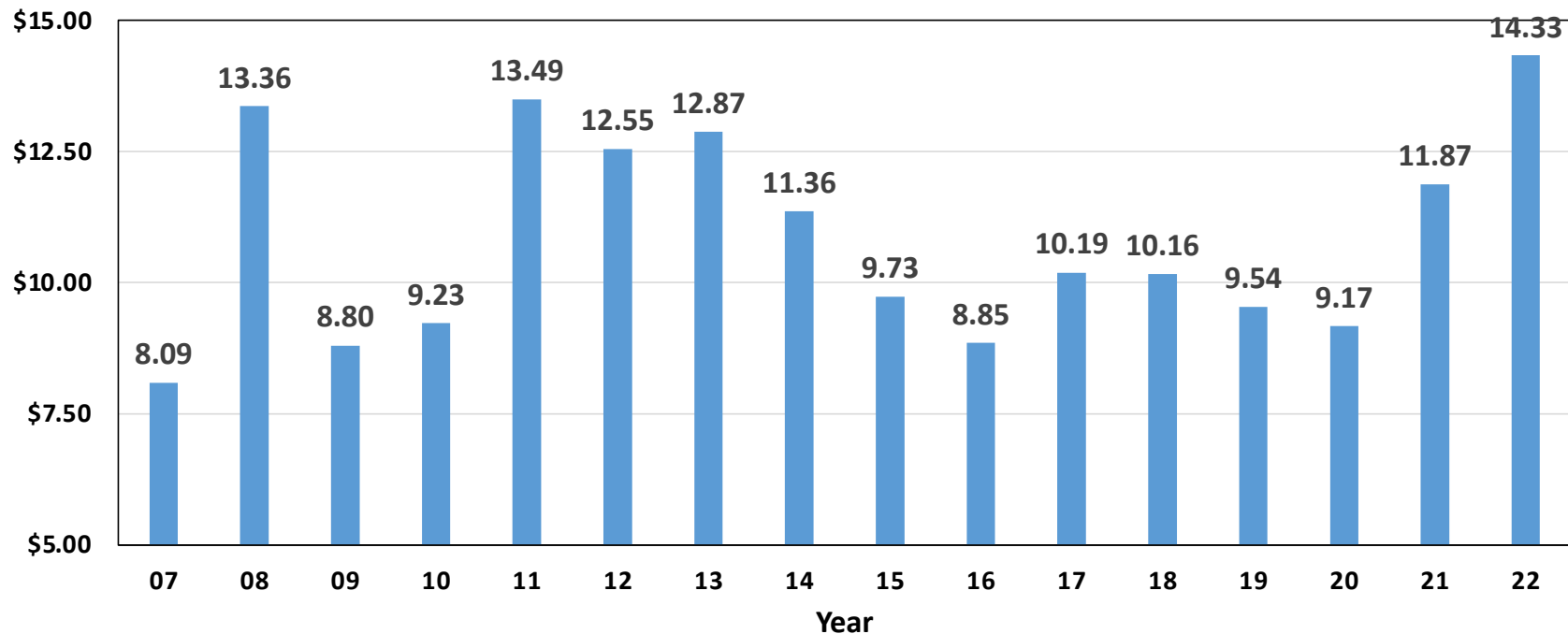


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2023's Price Guarantee Won't Be Available Until March 1st ... But Average Up Through 2/23/23 = \$13.78

Projected (February) Crop Insurance Prices for Soybeans (\$ per bushel)

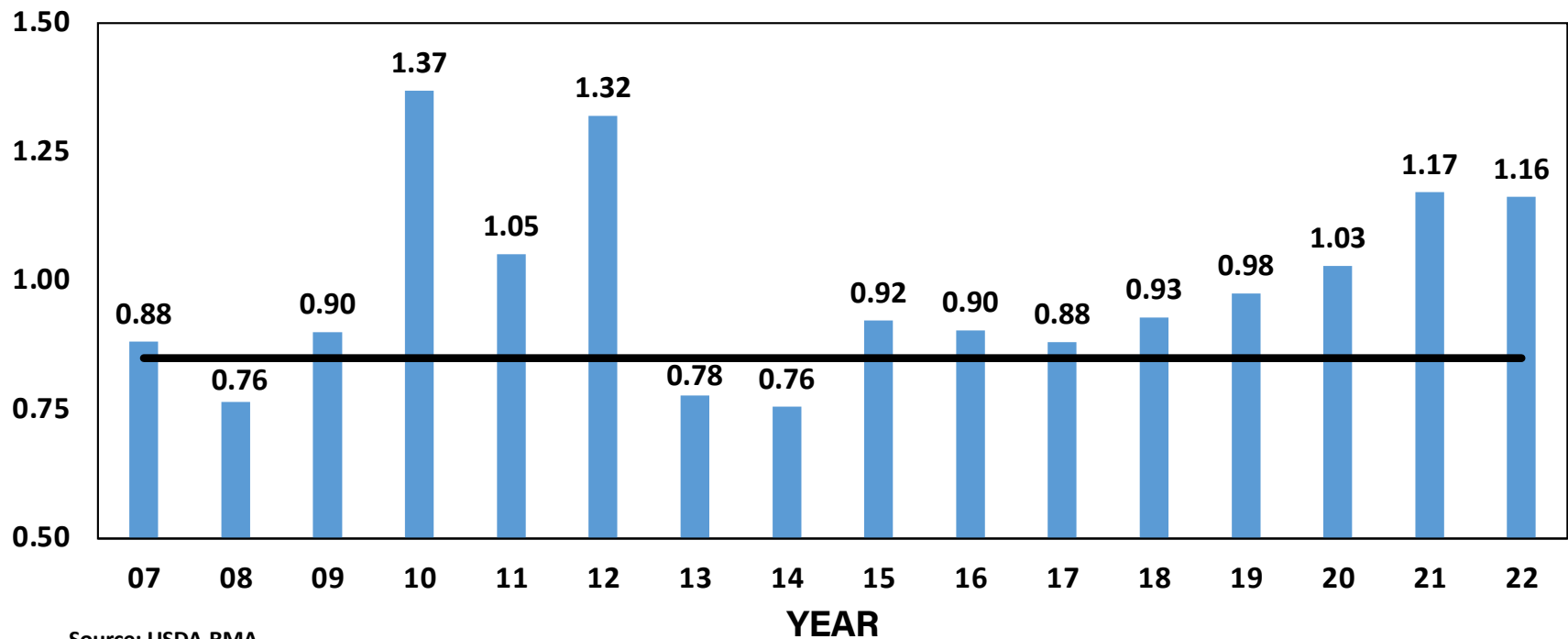
Source: USDA-RMA



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Ratio of Harvest to February Crop Insurance Price Fell Below 0.85 in Just 3 of Last 16 Years

RATIO OF HARVEST TO FEBRUARY CROP INSURANCE PRICES FOR CORN , 2007-2022

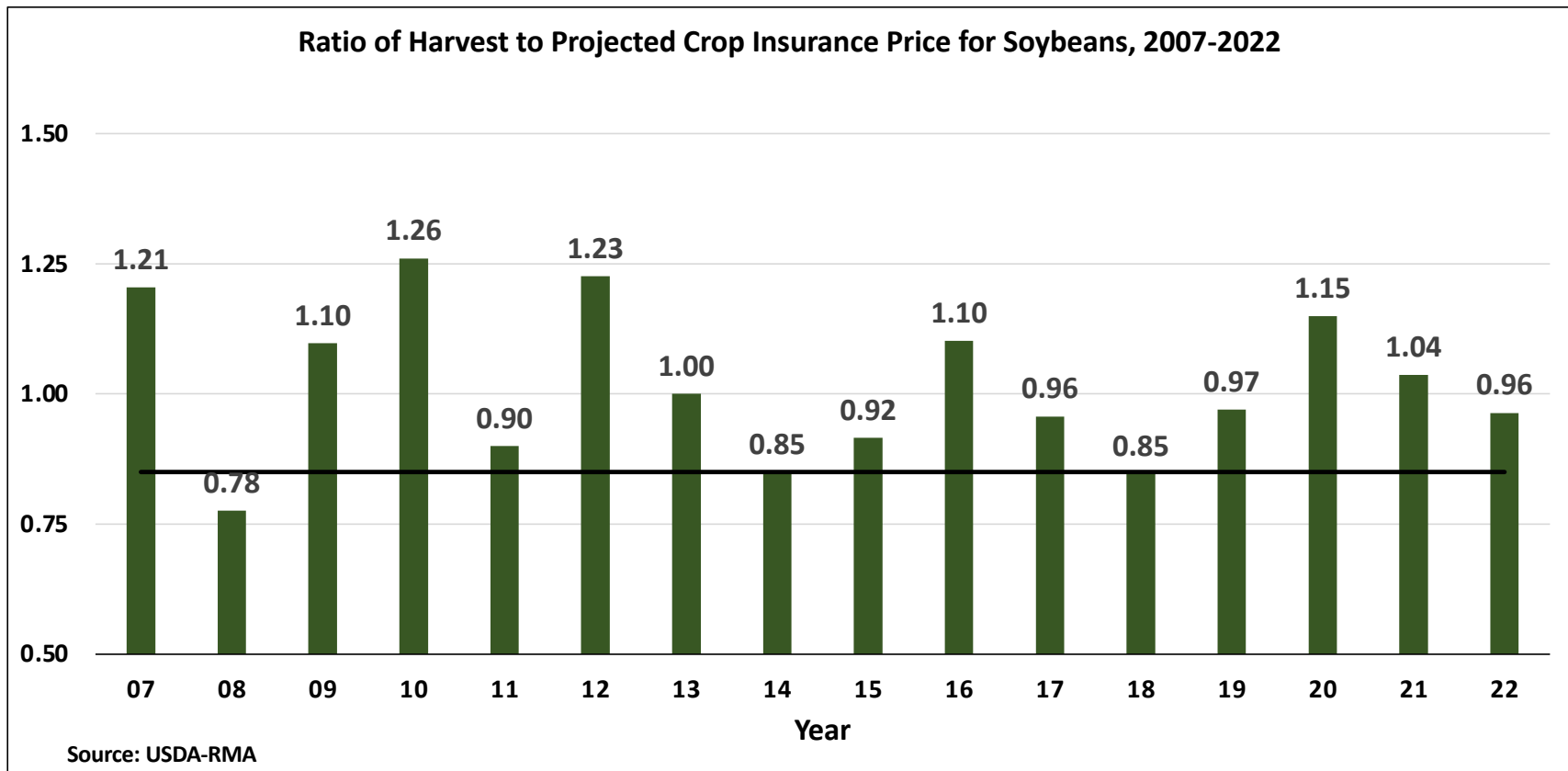


Source: USDA-RMA



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Ratio of Harvest to February Crop Insurance Price Fell Below 0.85 in Just 1 of Last 16 Years



Comparison of Crop Insurance Bundles for Corn ... Should You Increase Your Coverage Level?

Assumptions (White County, Indiana): 1) \$5.95 projected price; volatility = 0.19 2) Farm and county trend yield = 190 3) Projected Price > Harvest Price	Estimated Premium Enterprise Units	Farm-Level Revenue Guarantee	Additional County Revenue Guarantee
RP: 75%	\$8.16	\$848	\$0
$\$7.32/\$56.00 = 13\% + \$7.32$			+ \$56.00
RP: 80%	\$15.48	\$904	\$0
$\$14.49/\$57.00 = 25\% + \$22.65$			+ \$57.00
RP: 85%	\$29.97	\$961	\$0

Comparison of Crop Insurance Bundles for Corn ... Should You Increase Your Coverage Level?

Assumptions (White County, Indiana): 1) \$5.95 projected price; volatility = 0.19 2) Farm and county trend yield = 190 3) Projected Price > Harvest Price	Estimated Premium Enterprise Units	Farm-Level Revenue Guarantee	Additional County Revenue Guarantee
RP: 75%	\$8.16	\$848	\$0
$\$7.32/\$56.00 = 13\% + \$7.32$			+ \$56.00
RP: 80%	\$15.48	\$904	\$0
$\$14.49/\$57.00 = 25\% + \$22.65$			+ \$57.00
RP: 85%	\$29.97	\$961	\$0
RP: 85%, SCO, and ECO: 90%	\$43.15	\$961	+\$56
RP: 85%, SCO, and ECO: 95%	\$63.59	\$961	+\$113

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