US and NC Crops Update

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Some Agricultural Economics Basics

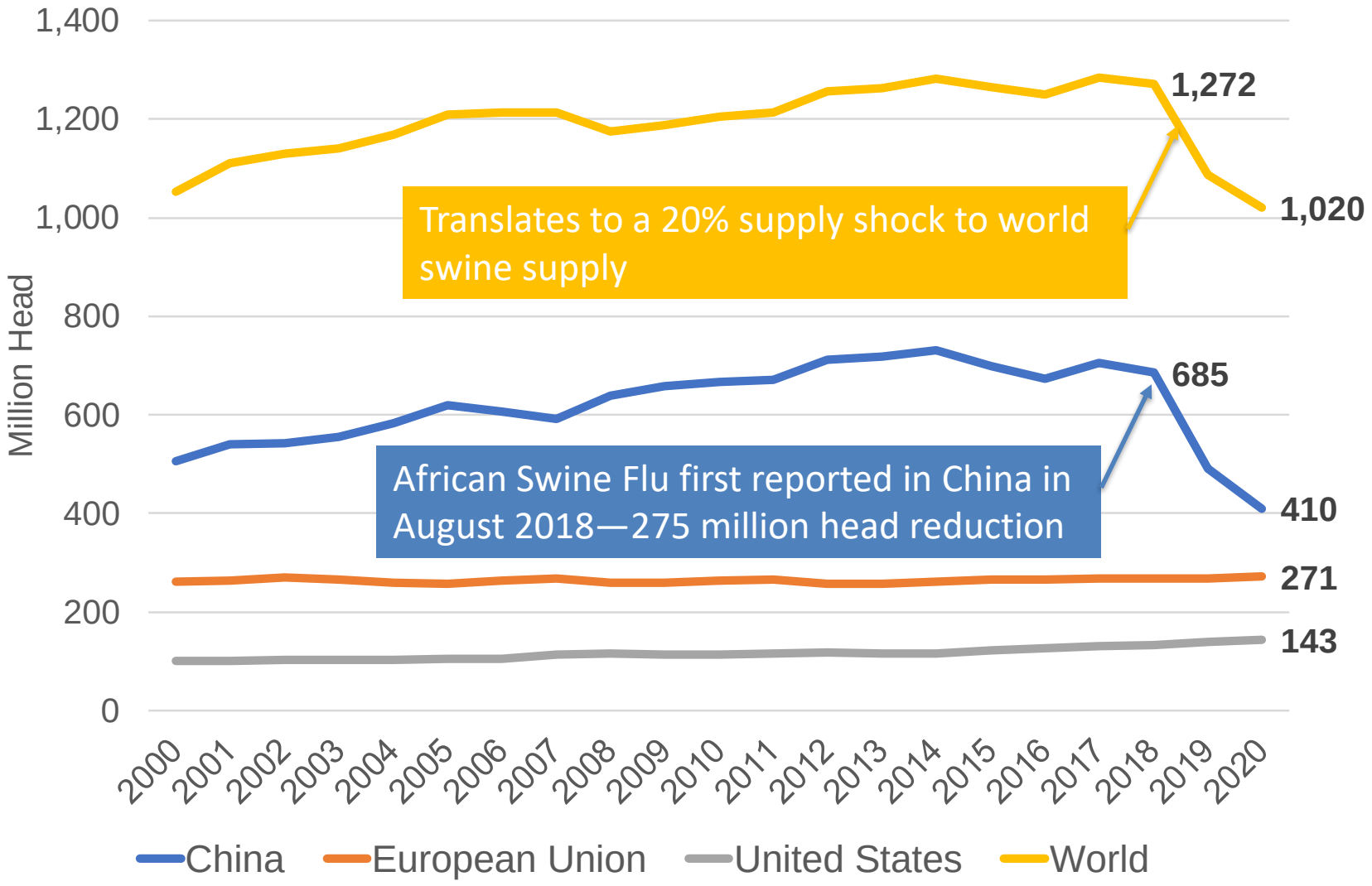
- Agricultural markets involve the supply and demand of agricultural products. In these markets, price allows for the efficient distribution between producers and consumers and signals shortages and surpluses.
- Production risk is fundamental to agricultural production, and two key risks that must be managed are weather and diseases (yield risk). Applies to both crops and animal production.
- The world agricultural economy is globalized so supply shocks can impact markets in many countries and, in particular, North Carolina
  - Two current supply shocks are the **African Swine Flu in China** and **excessive precipitation in the Midwest impacting planting the 2019/20 corn and soybean crops**.
  - Uncertainty and lags in information and reports of shocks. Evaluating the "how and by how much" a supply shock impacts is the tricky part? Particularly, evaluating the impact on North Carolina's agricultural economy. This is part of my task today.
- Agriculture and agribusiness — food, fiber and forestry — is the number one industry in North Carolina. It account for one-sixth of the state's income and employees. Over 17 percent, or over $91.8 billion, of the $538 billion gross state product is contributed by food, fiber and forestry industries. (Walden, ARE-NCSU, May, 2019)

Outline

- **World and US Agricultural Outlook**
  - World and US supply shocks for key agricultural products
  - World demand for key agricultural products
  - US Farm Sector Income Statement
  - Major row crop planted acres in US
  - Late planting of corn and soybeans and level of uncertainty
- **NC Agricultural Outlook and Concerns**
  - Concerns about declining feed grain acres
  - Feed grain deficit accentuated in 2019
  - NC corn, soybean, and wheat basis
  - Vulnerabilities for agriculture experienced during Florence and long-term weather forecasts

World and US Agricultural Outlook

World Swine by Head, 2000-2020

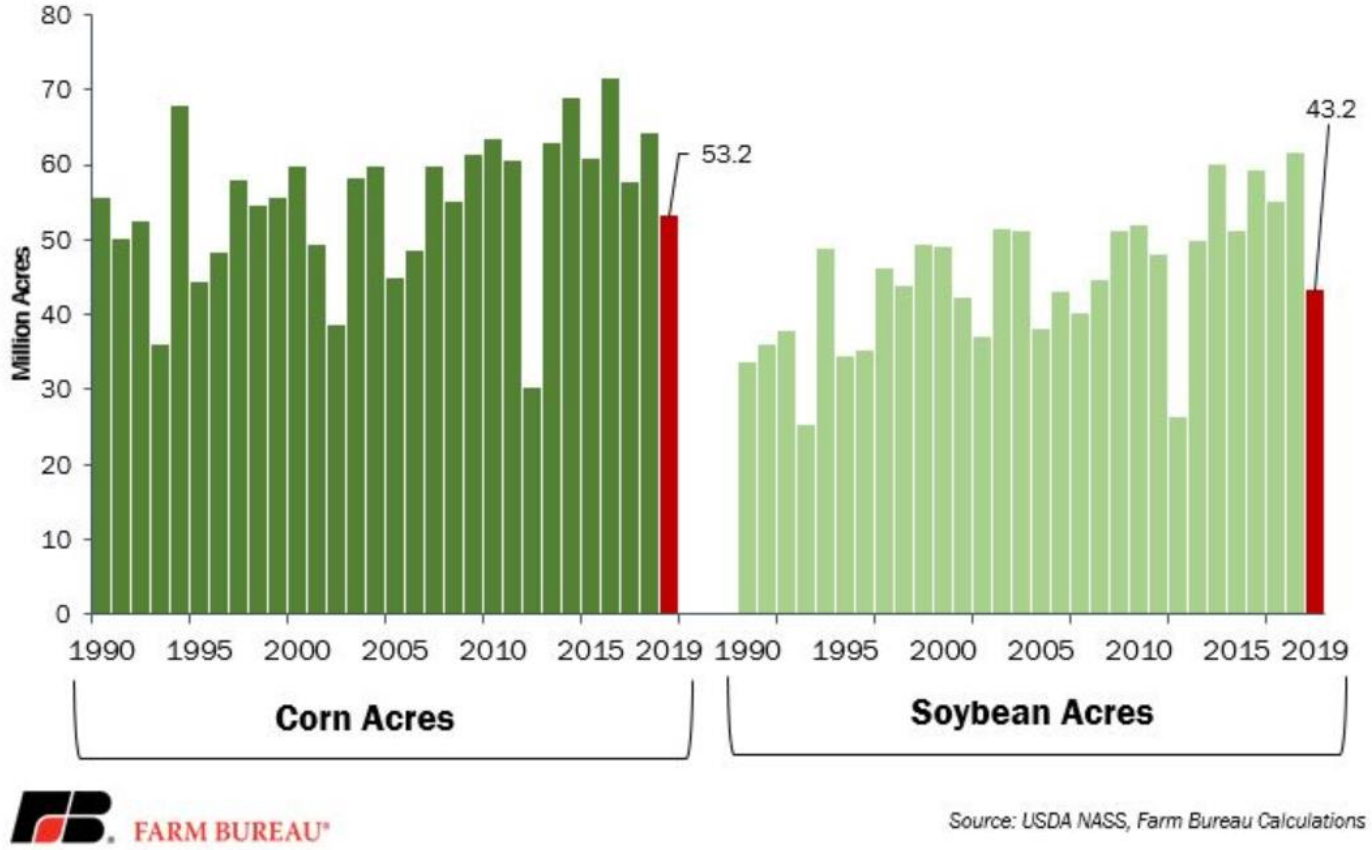


Source: Foreign Agricultural Service, Official USDA Estimates

Figure 1. Corn and Soybean Acres in Good or Excellent Condition

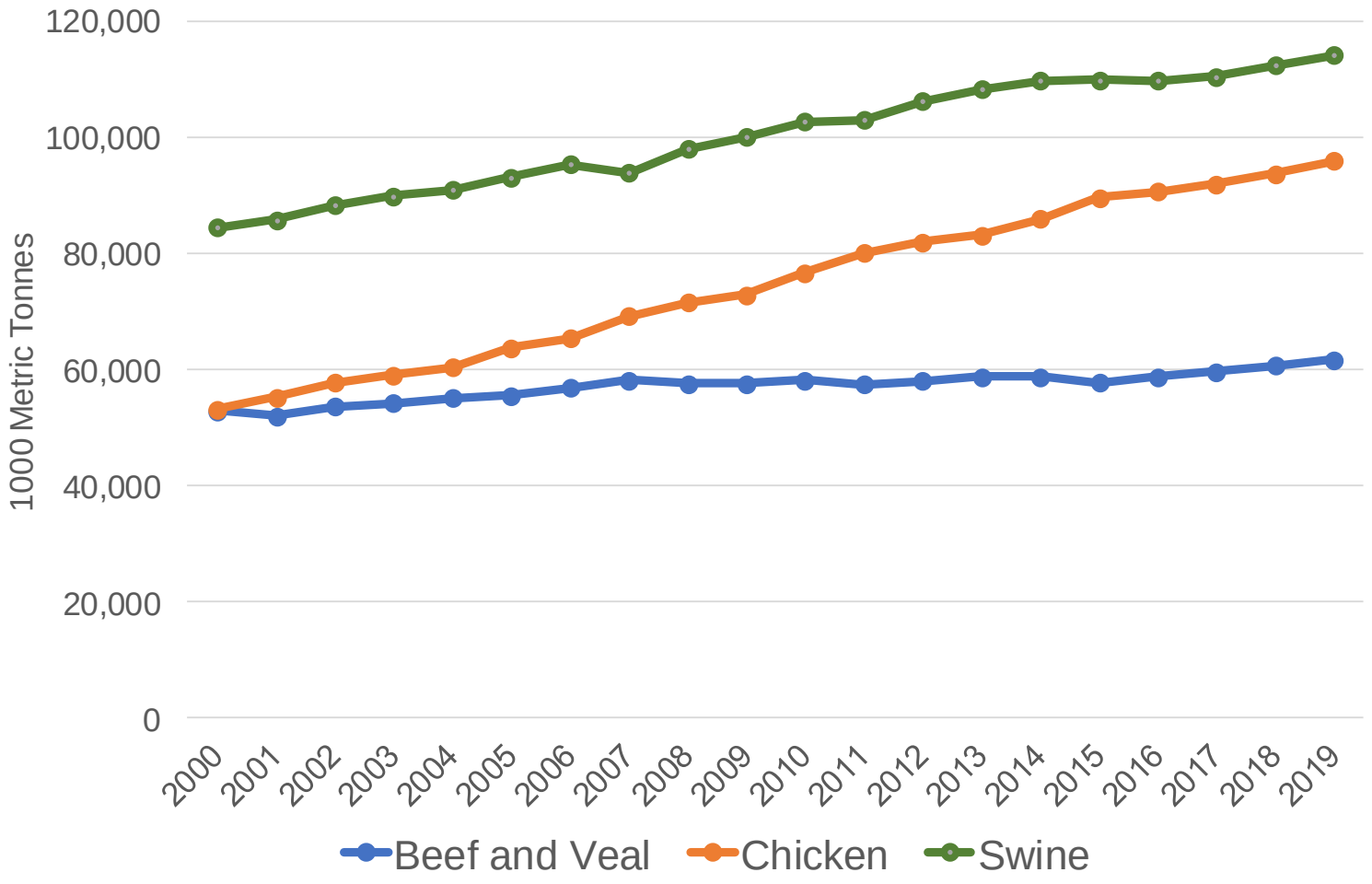
Week 28

July 8 – July 14, 2019



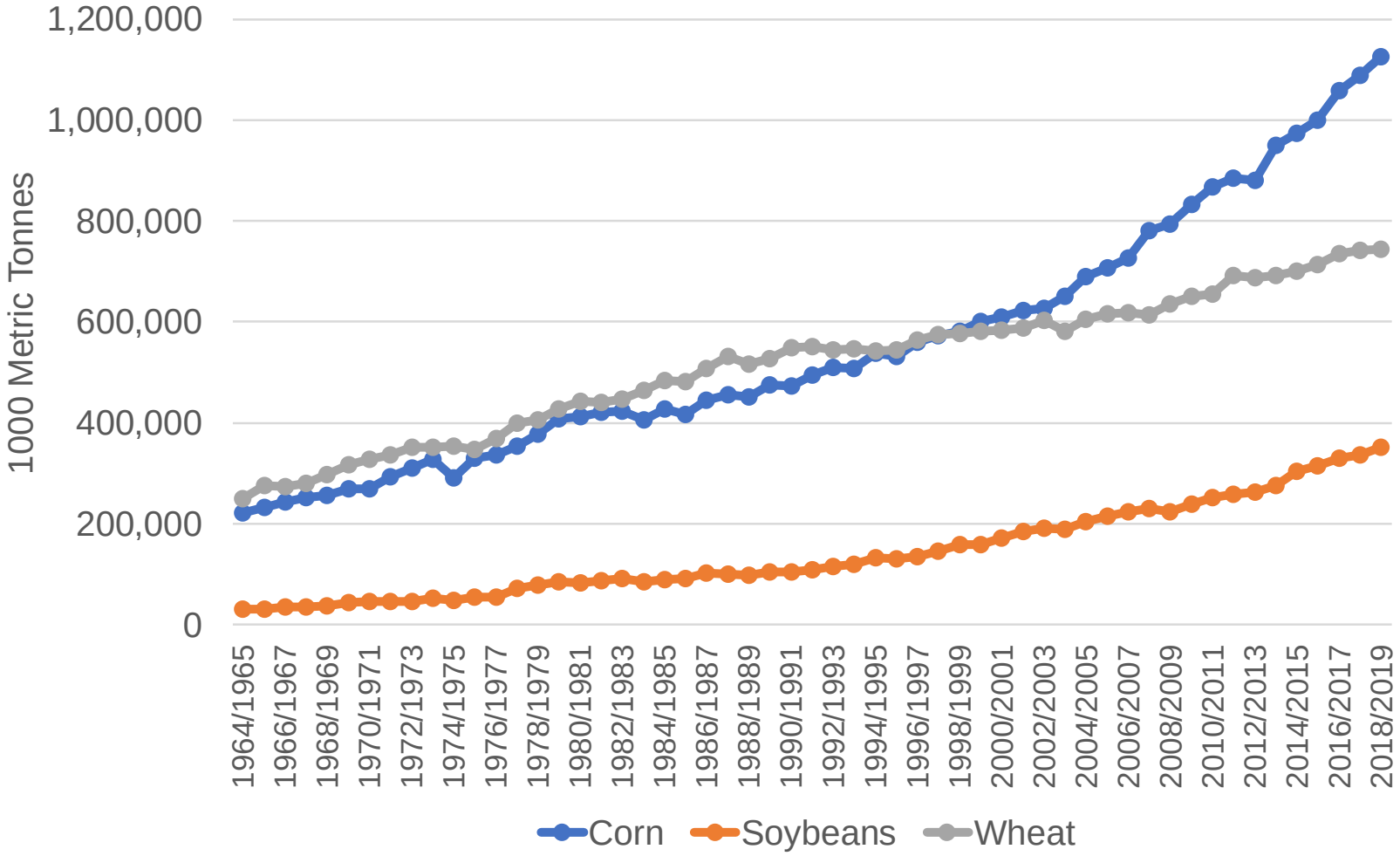
Source: https://www.agweb.com/article/crop-conditions-havent-been-bad-2012

World Consumption of Beef and Veal, Chicken, and Swine 2000-2019



Source: Foreign Agricultural Service, Official USDA Estimates

World Consumption of Corn, Soybeans, and Wheat 1964/65-2018/19F



Source: Foreign Agricultural Service, Official USDA Estimates

Soybean and Corn Prices 2000-2020

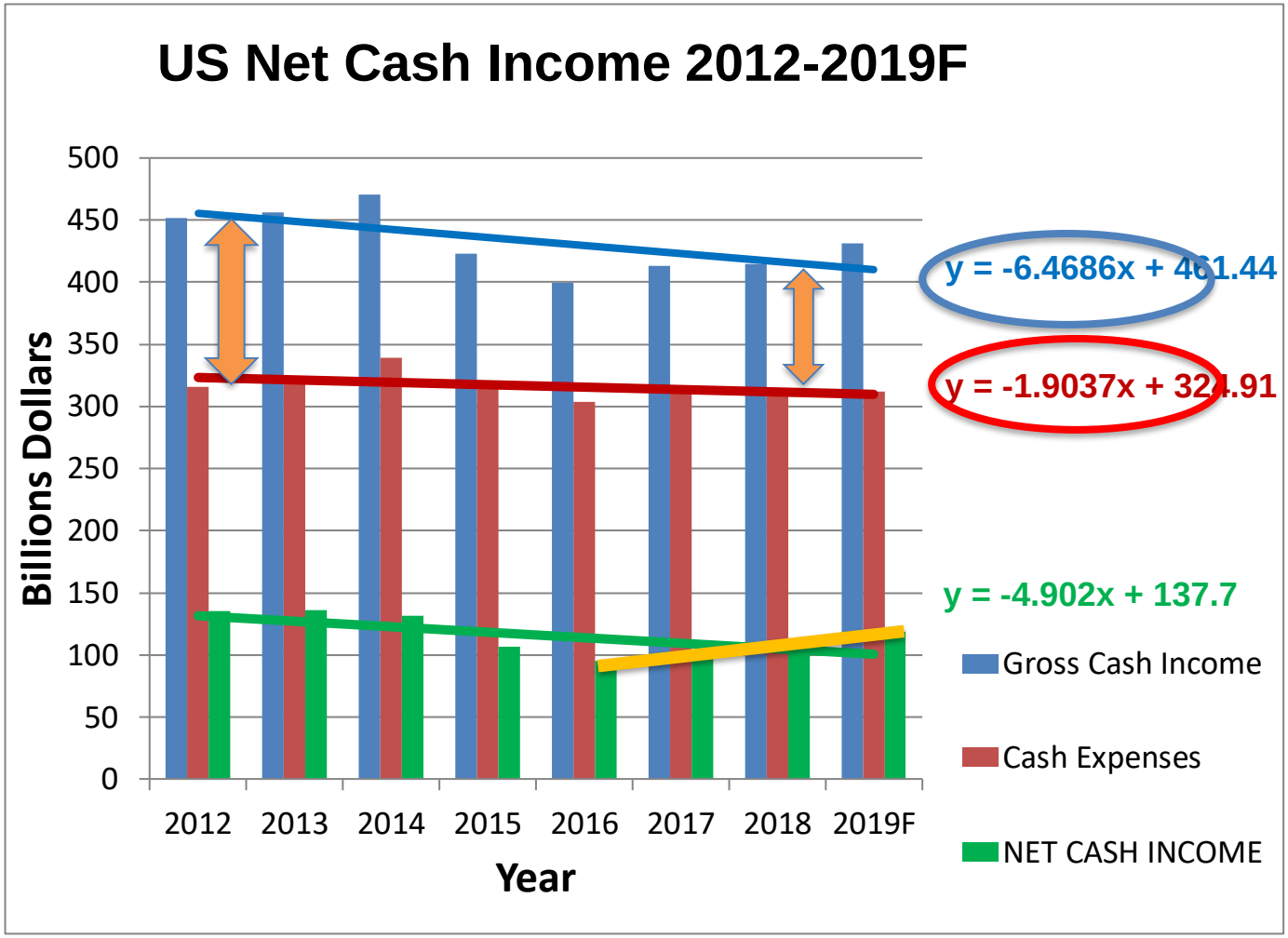
2019F US agricultural economy setting new highs showing signs of turn-around

Income Statement U.S. Farm Sector 2012-2019F

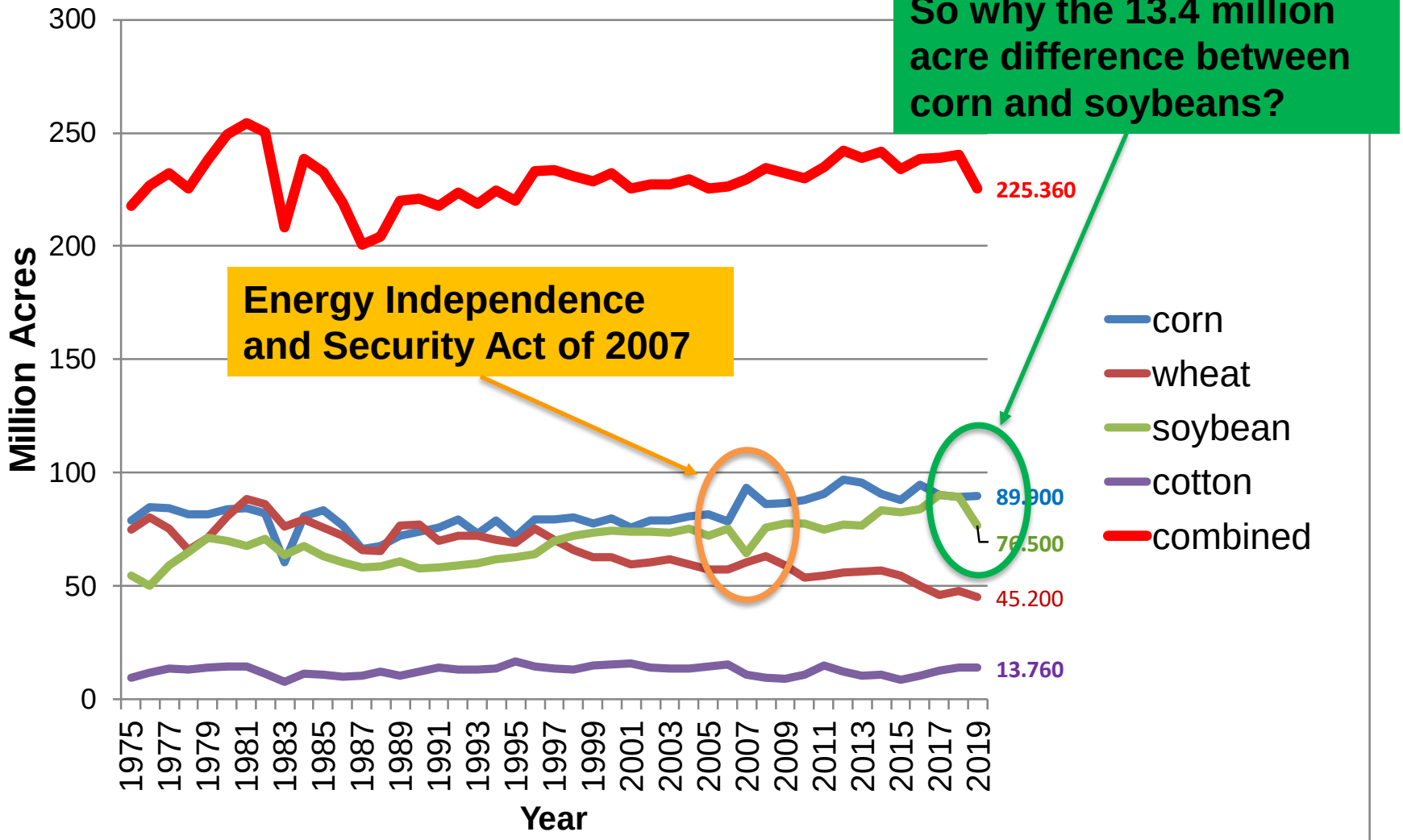
	2012	2013	2014	2015	2016	2017	2018	2019F	2019F v. 2018F	2019F v. 2013
	$ billion									
Cash Receipts	401.4	404.1	424.0	377.4	358.5	370.4	372.0	374.2	0.6%	-7.4%
Crops	231.6	220.9	211.7	187.9	195.8	194.9	195.5	197.4	1.0%	-10.7%
Livestock	169.8	183.1	212.3	189.5	162.7	175.6	176.5	176.8	0.1%	-3.5%
Direct Govt. Pay	10.6	11.0	9.8	10.8	13.0	11.5	13.7	22.4	64.0%	103.7%
Farm-related income	39.3	41.0	36.6	34.4	27.9	31.2	29.1	34.4	18.1%	-16.1%
Gross Cash Income	451.3	456.1	470.3	422.6	399.4	413.2	414.8	431.0	3.9%	-5.5%
Cash Expenses	316.1	320.0	339.0	315.8	303.8	311.9	311.3	312.0	0.2%	-2.5%
NET CASH INCOME	135.3	136.1	131.3	106.8	95.6	101.3	103.5	119.0	15.0%	-12.6%
Selected ratios:	Percent									
Debt-to-equity	12.7	12.9	13.4	14.1	14.7	14.9	15.3	15.5	1.2%	20.5%
Debt-to-asset	11.3	11.4	11.8	12.4	12.8	13.0	13.3	13.4	1.0%	17.8%

Source: http://ers.usda.gov/data-products/farm-income-and-wealth-statistics/data-files-us-and-state-level-farm-income-and-wealth-statistics.aspx

US agriculture experiencing simultaneously decreasing trends in income and expenses with less net cash income



US Major Corn, Soybean, Wheat, and Cotton Acreage 1975-2019F



	Prospective Planting March 2019 [a]	Acreage June 2019 [b]	WASDE Dec 2019 [c]	Difference [c]-[a]
	Million Acres			
Corn				
Planted	92.8	91.7	89.9	**-2.9**
Not Planted at Final Planting Date			30.3	
Prevent Planted	0		11.4	11.4
Late Planted Corn			**18.9**	
Soybeans				
Planted	84.7	80.0	76.5	**-8.2**
Not Planted at Final Planting Date			19.5	
Prevent Planted	0		4.5	4.5
Late Planted Soybean			**15.0**	
Corn & Soybeans				
Planted	177.5	171.74	166.4	**-11.1**
Prevent Planted	0		15.9	**15.9**
			Discrepancy	**-4.8**

Piggott's Potential Feasible Explanation of events and current market situation (could be wrong)

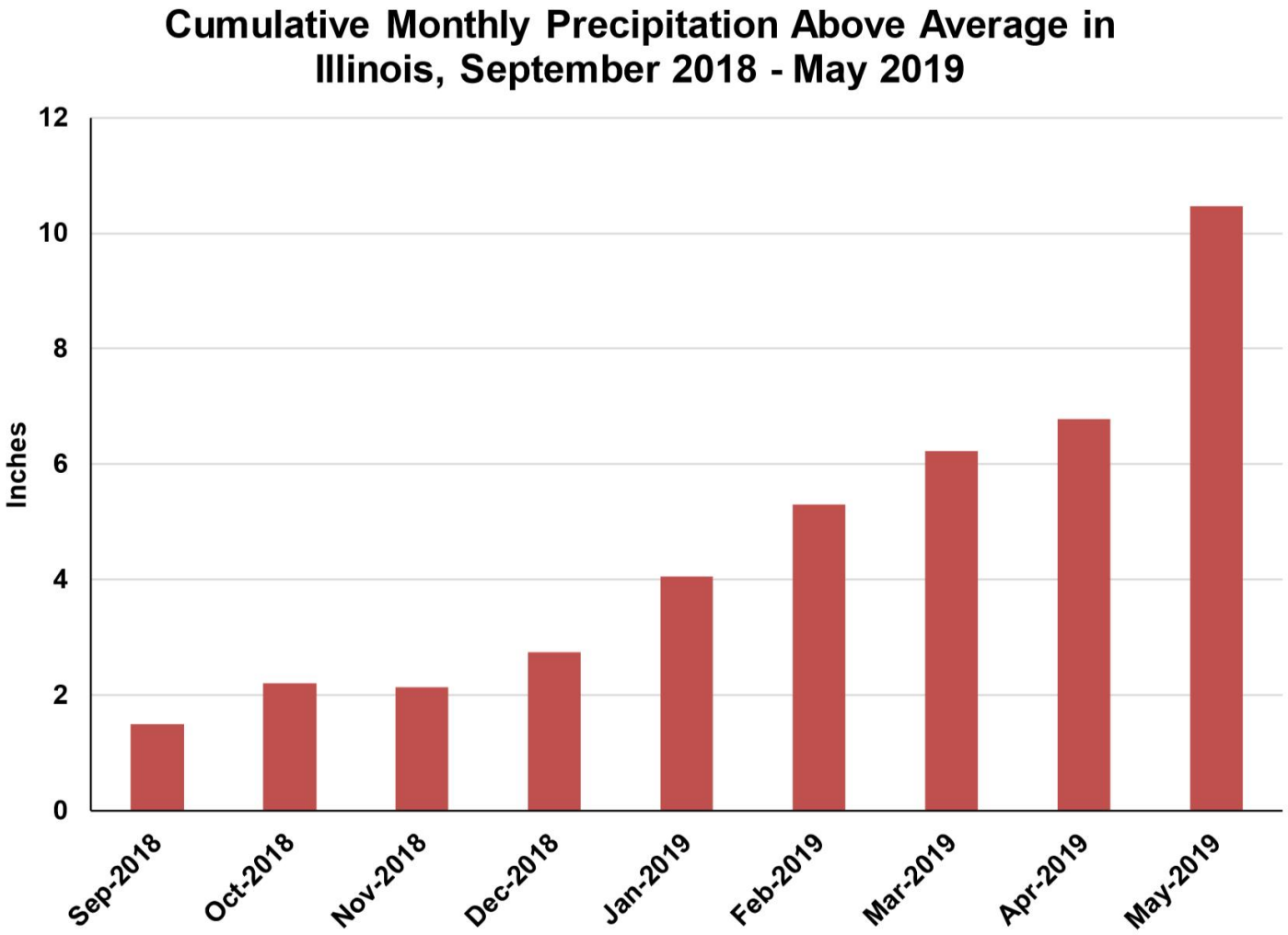
*In many regions consistent cumulative significantly above average rainfall Jan 2019-May2019;

*April 3-5 US and China talk results in S-Nov 2019 declining from $9.40 to $8.27--a $1.13 in a month;

*C-Dec 2019 rallies from $3.72 to $4.52 from May 10-30 ($0.80) based on concerns of late planted acreage;

*By May 10 the (S-Nov 2019/ C-Dec 2019) approached 2.2 (break-even is 2.4) strong signal to plant corn;

*By June 17 the (S-Nov 2019/C-Dec 2019) approached 2.0 even stronger signal to plan corn;



Source: Scott Irwin, “2019: THAT Just Happened”, 2019 Illinois, Farm Economics Summit
https://farmdoc.illinois.edu/ifes

Planting progress and preventative planting in play for corn

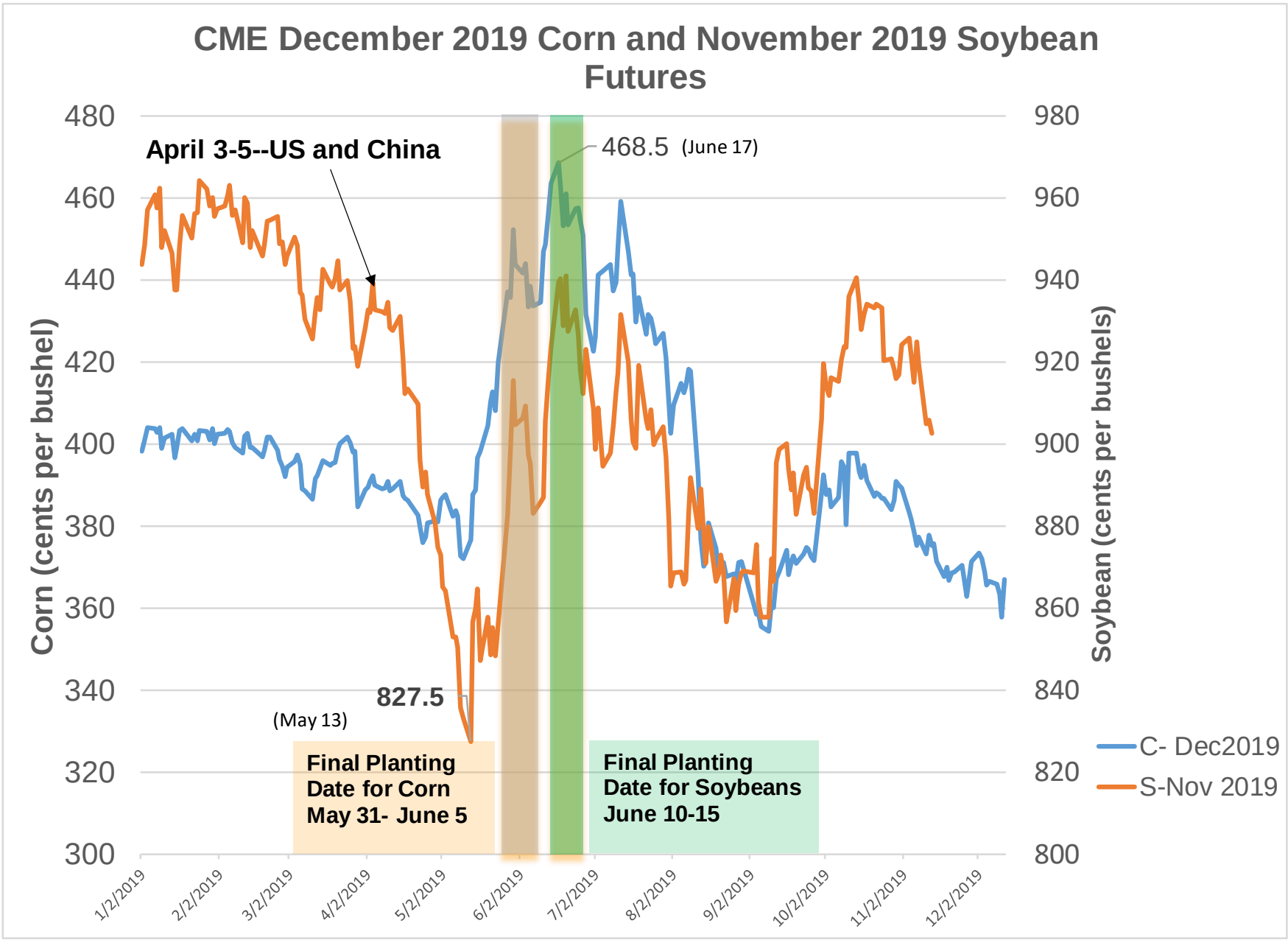
	2019 Corn Acres	Final Planting Date	Corn Planted	2014-18	Corn Planted	Corn Not Planted
	Million Acres	Corn	June 2 (%)	Aver (%)	Million Acres	Million Acres
Iowa	13.6	31-May	80%	100%	10.9	2.7
Illinois	11	5-Jun	45%	100%	5.0	6.1
Nebraska	10	25-May	88%	100%	8.8	1.2
Minnesota	8	31-May	76%	99%	6.1	1.9
Kansas	5.9	25-May, 31-May	79%	97%	4.7	1.2
Indiana	5.5	5-Jun	31%	98%	1.7	3.8
North Carolina	1.0	15-May	99%	98%	1.0	0.0
Subtotal	**55.0**		**69%**		**38.0**	**16.9**
United States	**91.7**		**67%**	**98%**	**61.4**	**30.3**

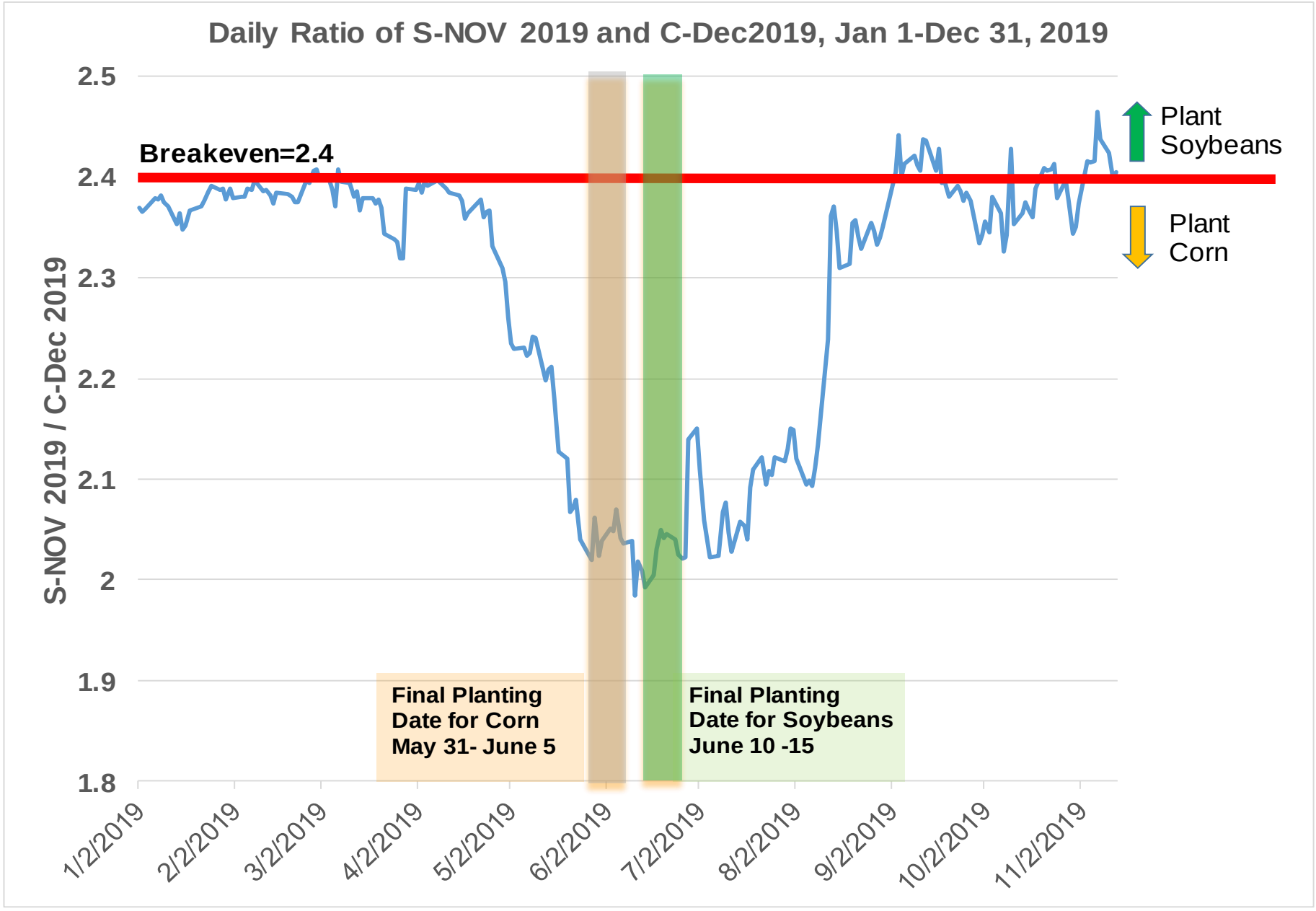
US Corn Planted By June 2	61.4	million acres
US Corn Unplanted by June 2	**30.3**	**million acres**
Total	91.7	million acres

Planting progress and preventative planting in play for soybeans

	2019 Soybeans Acres	Final Planting Date	Soybean Planted	2014-18	Soybeans Planted	Soybeans Not Planted
	Million Acres	Soybeans	June 16 (%)	Aver (%)	Million Acres	Million Acres
Illinois	10.5	10-Jun	70%	95%	7.4	3.2
Iowa	9.4	15-Jun	89%	98%	8.4	1.0
Minnesota	7.3	10-Jun	94%	98%	6.9	0.4
North Dakota	6.5	10-Jun	96%	99%	6.2	0.3
Indiana	5.7	20-Jun	64%	94%	3.6	2.1
Kansas	4.9	15-30 June	83%	96%	4.1	0.8
North Carolina	1.5	30-Jun	100%	100%	1.5	0.0
Subtotal	**45.8**		**83%**		**38.0**	**7.8**
United States	**84.6**		**77%**	**93%**	**78.7**	**19.5**

US Soybeans Planted by June 15	65.1 million acres
US Soybeans Unplanted by June 15	**19.5 million acres**
Total	84.6 million acres


CME December 2019 Corn and November 2019 Soybean Futures
Corn (cents per bushel)
Soybean (cents per bushels)
480
460
440
420
400
380
360
340
320
300
980
960
940
920
900
880
860
840
820
800
April 3-5--US and China
468.5 (June 17)
827.5
(May 13)
Final Planting Date for Corn May 31- June 5
Final Planting Date for Soybeans June 10-15
1/2/2019
2/2/2019
3/2/2019
4/2/2019
5/2/2019
6/2/2019
7/2/2019
8/2/2019
9/2/2019
10/2/2019
11/2/2019
12/2/2019
C- Dec2019
S-Nov 2019


Daily Ratio of S-NOV 2019 and C-Dec2019, Jan 1-Dec 31, 2019
S-NOV 2019 / C-Dec 2019
2.5
2.4
2.3
2.2
2.1
2
1.9
1.8
Breakeven=2.4
Plant Soybeans
Plant Corn
Final Planting Date for Corn May 31- June 5
Final Planting Date for Soybeans June 10 -15
1/2/2019
2/2/2019
3/2/2019
4/2/2019
5/2/2019
6/2/2019
7/2/2019
8/2/2019
9/2/2019
10/2/2019
11/2/2019

June 6 Planting (In June)

APH yield	220	bu per acre
Projected Price	$4.00	2019 level
RP coverage level	85%	
Prevent plant factor	0.55	(.55 or .60)
Yield below APH on June	25.0	bu per acre
Yield decline per day	3.5	bu per acre

Prevent Plant		
Prevent plant payment	$411	per acre
Prevent plant costs	$45	per acre
Net Return	$366	per acre

Plant corn		
Yield	195	bu acre
Cash price	4.30	$ per acre
Harvest price	4.55	$ per acre
Crop revenue	$839	$ per acre
RP insurance payment	$0	$ per acre
- corn costs	$470	$ per acre
+ 2019 MFP payment	45	$ per acre
Net return planting corn	$414	$ per acre

Net Return Plant Corn Minus Net Return		
Prevent Plant	**$48**	$ per acre

June 6 Planting (In December)

APH yield	220	bu per acre
Projected Price	$4.00	2019 level
RP coverage level	85%	
Prevent plant factor	0.55	(.55 or .60)
Yield below APH on June	20.0	bu per acre
Yield decline per day	3.5	bu per acre

Prevent Plant		
Prevent plant payment, 15% top off, $15 MFP	$488	per acre
Prevent plant costs	$45	per acre
Net Return	$443	per acre

Plant corn		
Yield	200	bu acre
Cash price	3.90	$ per acre
Harvest price	3.90	$ per acre
Crop revenue	$780	$ per acre
RP insurance payment	$0	$ per acre
- corn costs	$510	$ per acre
+ 2019 MFP payment	75	$ per acre
Net return planting corn	$345	$ per acre

Net Return Plant Corn Minus Net Return		
Prevent Plant	**-$98**	$ per acre

farmdoc

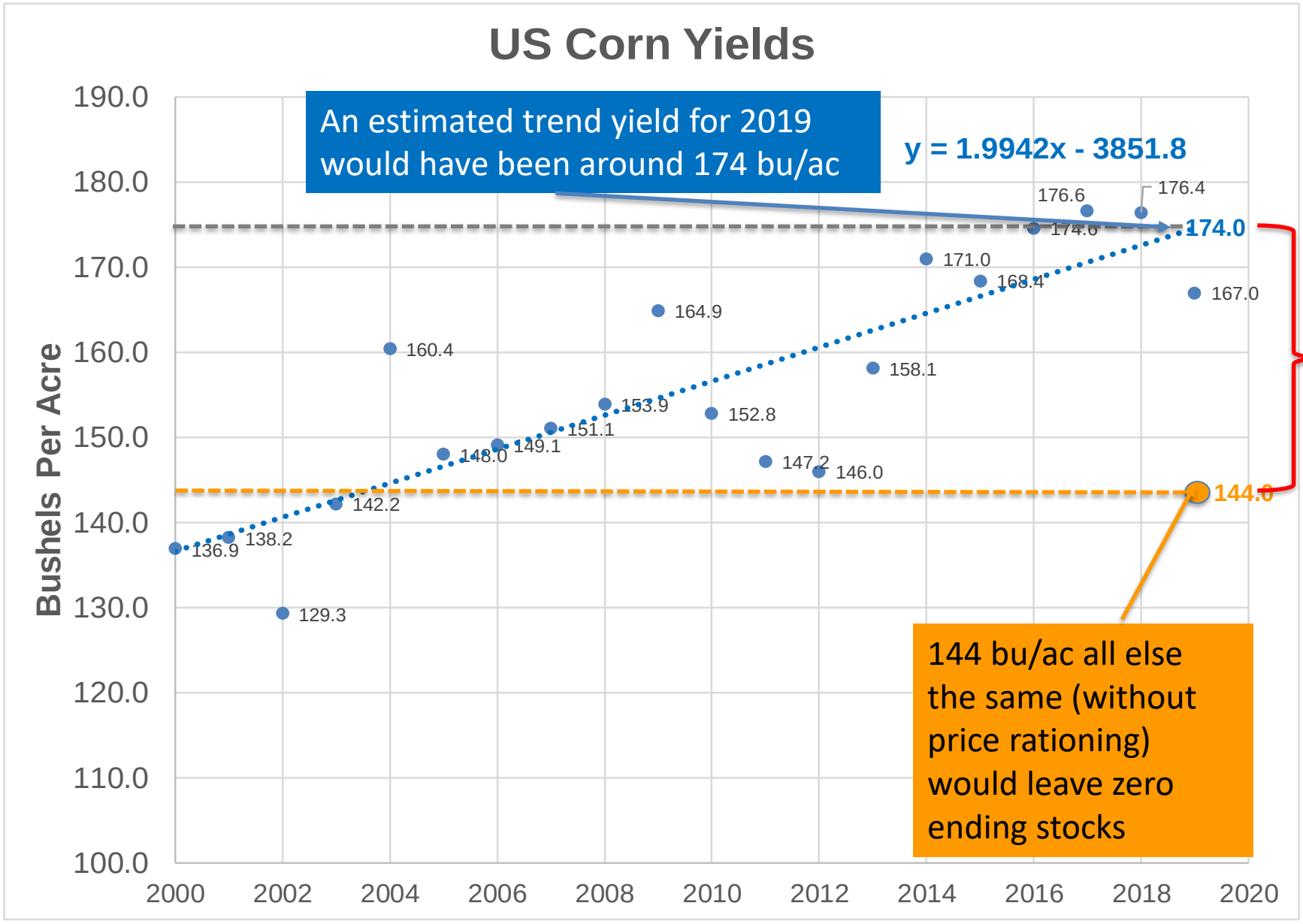
ILLINOIS

Source: Gary Schnitkey and Dale Lattz, “What Did We Learn from Delayed Planting: Farm Management Implications”, 2019 Illinois, Farm Economics Summit
https://farmdoc.illinois.edu/ifes

How uncertainty on yields of late planted corn impact US ending stocks and yields?

Late Planted Corn Acres	Harvested Late Acres	Yield on Late Acres	Production	What if Yield Declines	Decline In Production	US Ending Stocks	US Yield on All Acres
Mill. Acres	Mill. Acres	bu/ac	Mill. Bu	%	Mill. Bu	Mill. Bu	bu/ac
18.9	17.2	167.0	2,866	0%	0%	1,910	167.0
18.9	17.2	150.3	2,579	10%	287	1,623	163.5
18.9	17.2	120.2	2,064	20%	802	1,108	157.2
18.9	17.2	84.2	1,444	30%	1,422	488	149.6
18.9	17.2	**55.6**	953	34%	1,913	-3	**143.6**

Note: Current (WADE Dec 2019) projected ending stocks is 1,910. 79% of the acres planted before final planting date are assumed to yield the current projected 167 bu/ac. The analysis only considers the yield uncertainy on the remaing 11% (or 17.2 mil. ac) late planted acres and what that means for US ending stocks and US yields on all harvested acres.

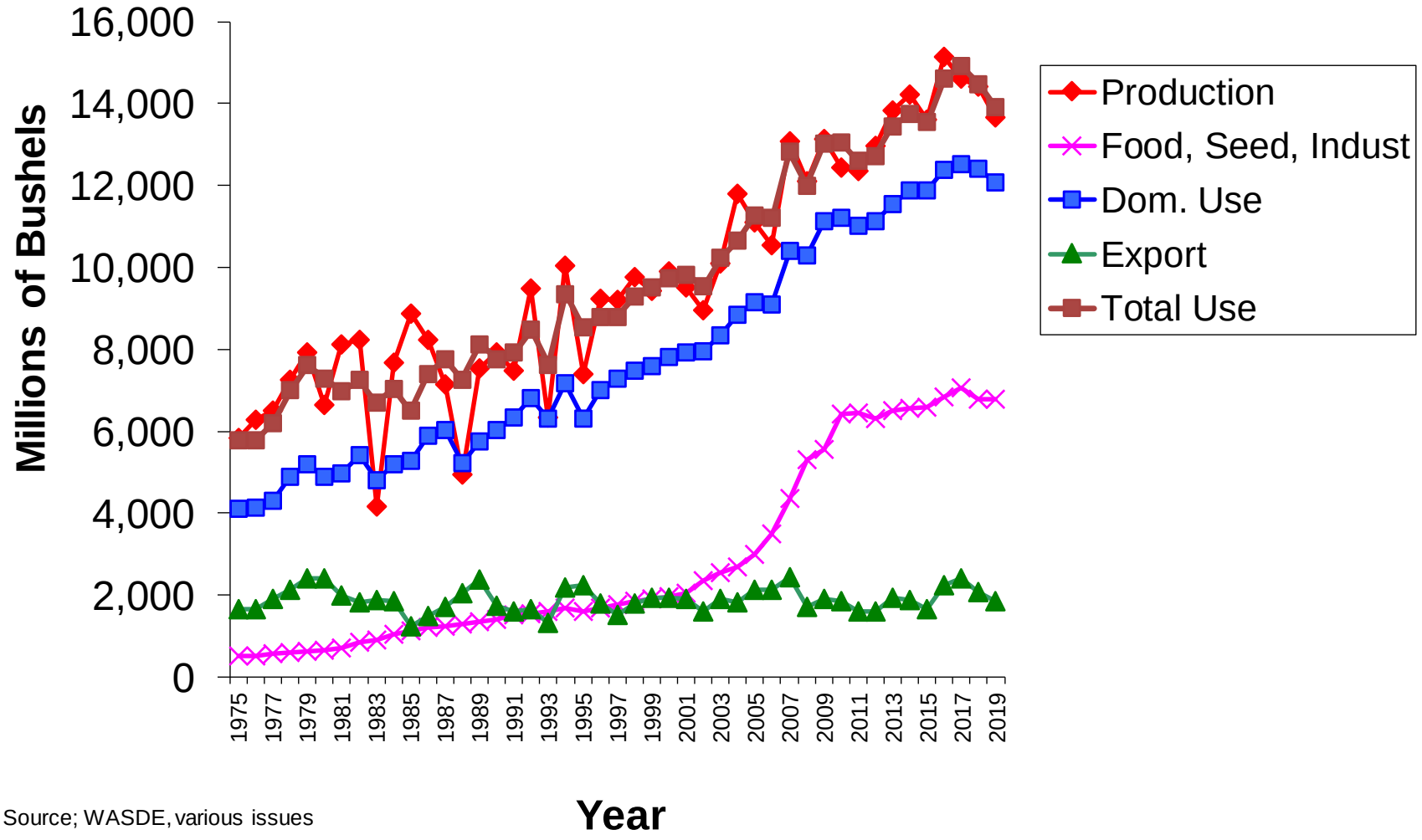

US Corn Yields
An estimated trend yield for 2019 would have been around 174 bu/ac
y = 1.9942x - 3851.8
Bushels Per Acre
190.0
180.0
170.0
160.0
150.0
140.0
130.0
120.0
110.0
100.0
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
136.9
138.2
129.3
142.2
148.0
149.1
151.1
153.9
164.9
160.4
152.8
147.2
146.0
158.1
171.0
168.4
176.6
174.0
176.4
167.0
174.0
144.0
-17.2%
144 bu/ac all else the same (without price rationing) would leave zero ending stocks

USDA SUPPLY/DEMAND BALANCE SHEET FOR CORN

	2017/18	2018/19	2019/20	%Δ
		Million Acres		
Acres Planted	90.2	89.1	89.9	0.9%
Acres Harvested	82.7	81.7	81.8	0.1%
Bu./Harvested Acre	176.6	176.4	167.0	-5.3%
		Million Bushels		
Beginning Stocks	2,293	2,140	2,114	-1.2%
Production	14,604	14,420	13,661	-5.3%
Total Supply	16,939	16,588	15,825	-4.6%
Use:				
Feed and Residual	5,304	5,618	5,275	-6.1%
Ethanol for fuel	5,605	5,376	5,375	0.0%
Exports	2,438	2,065	1,850	-10.4%
Total Use (Demand)	14,798	14,474	13,915	-3.9%
Ending Stocks	2,140	2,114	1,910	-9.6%
Ending Stocks, % of Use	14.5	14.6	13.7	-6.0%
U.S. Season Avg. Farm Price, $/ Bu.	$3.36	$3.61	$3.85	6.6%

Source: USDA, WASDE Dec, 2019

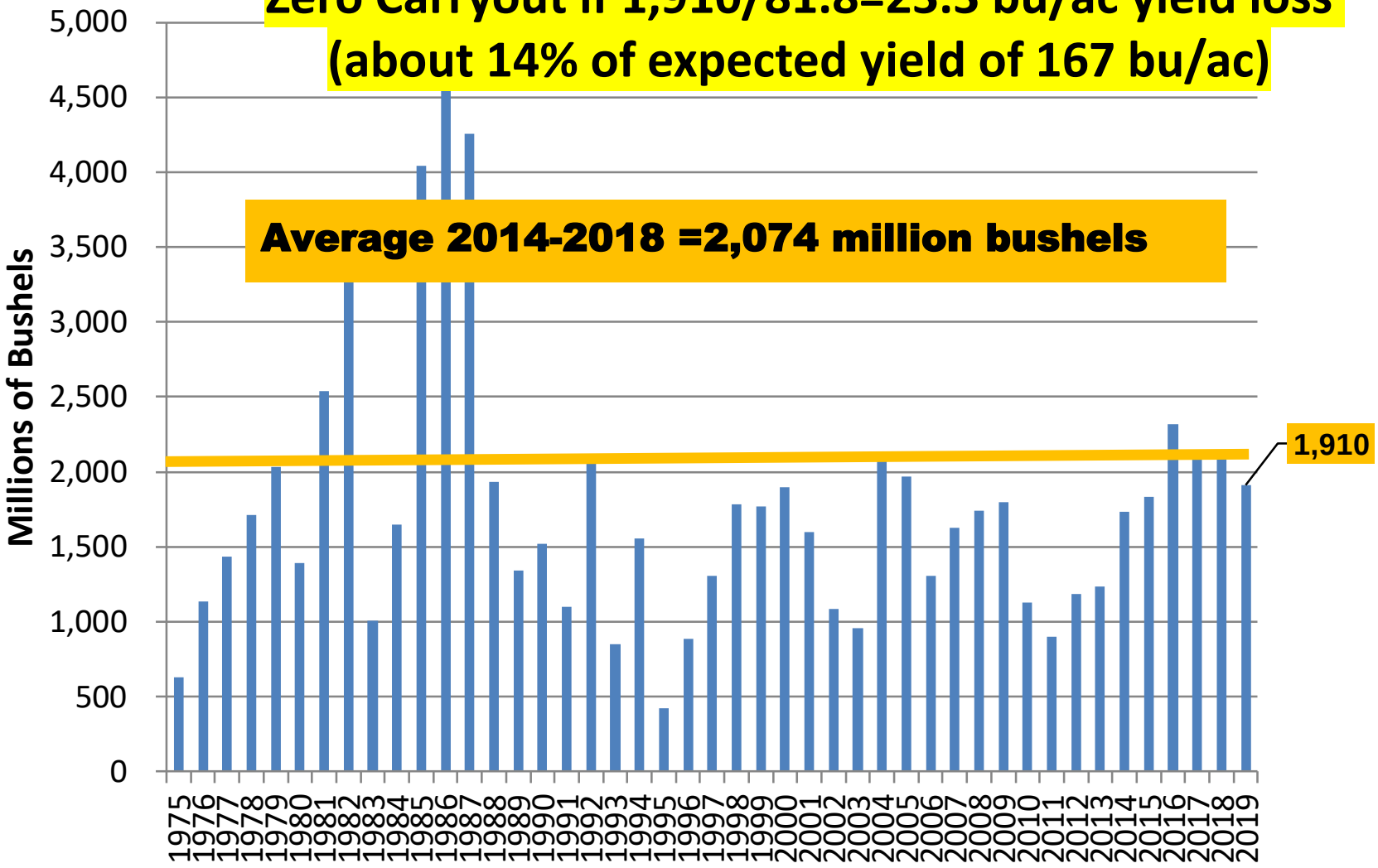
U.S. Corn Supply and Disappearance 1975/76-2019/20F



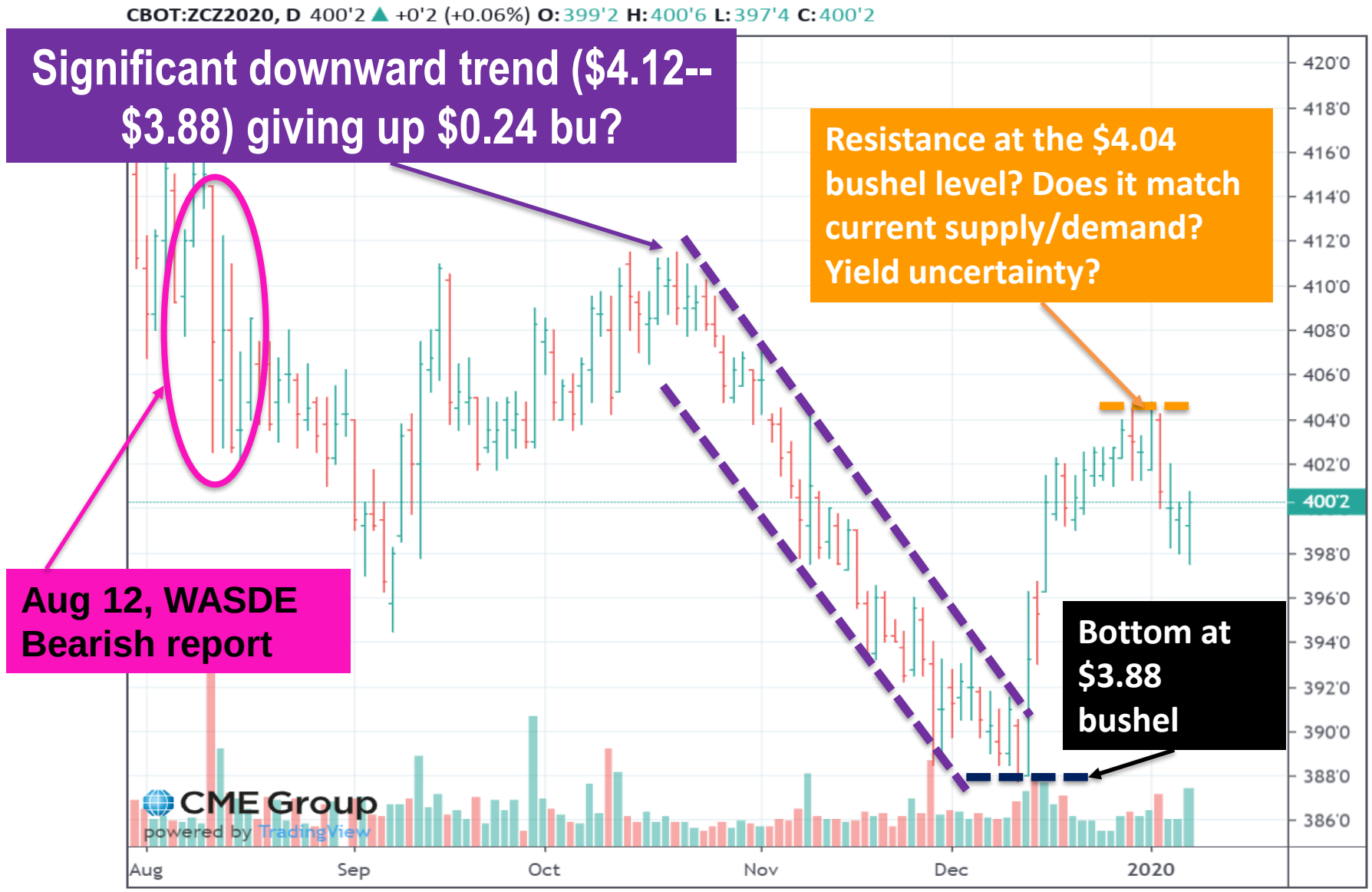
Source; WASDE, various issues

US Corn Ending Stocks 1975/76-2019/20F

Zero Carryout if 1,910/81.8=23.3 bu/ac yield loss (about 14% of expected yield of 167 bu/ac)



Corn Dec 2020

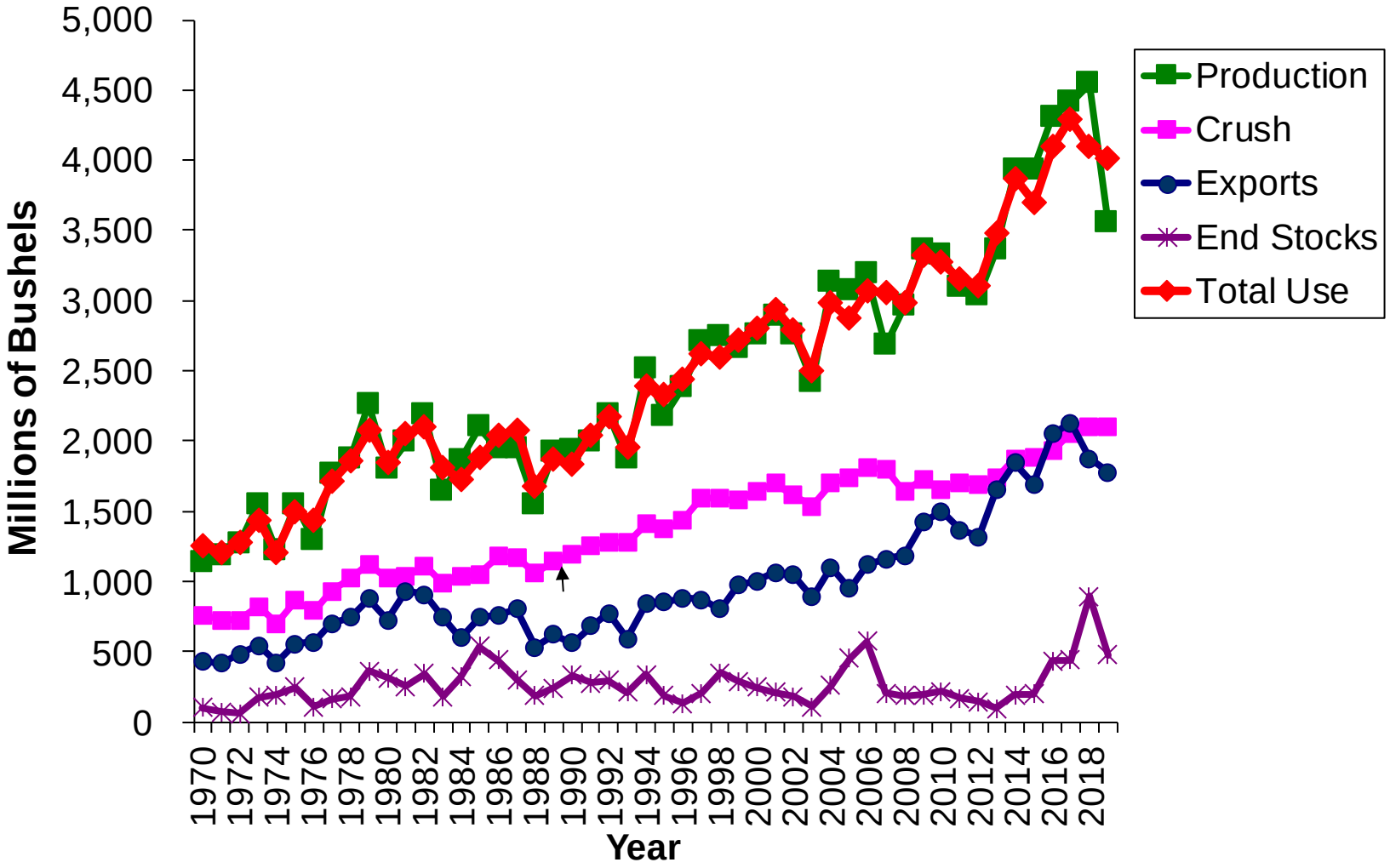


USDA SUPPLY/DEMAND BALANCE SHEET FOR SOYBEANS

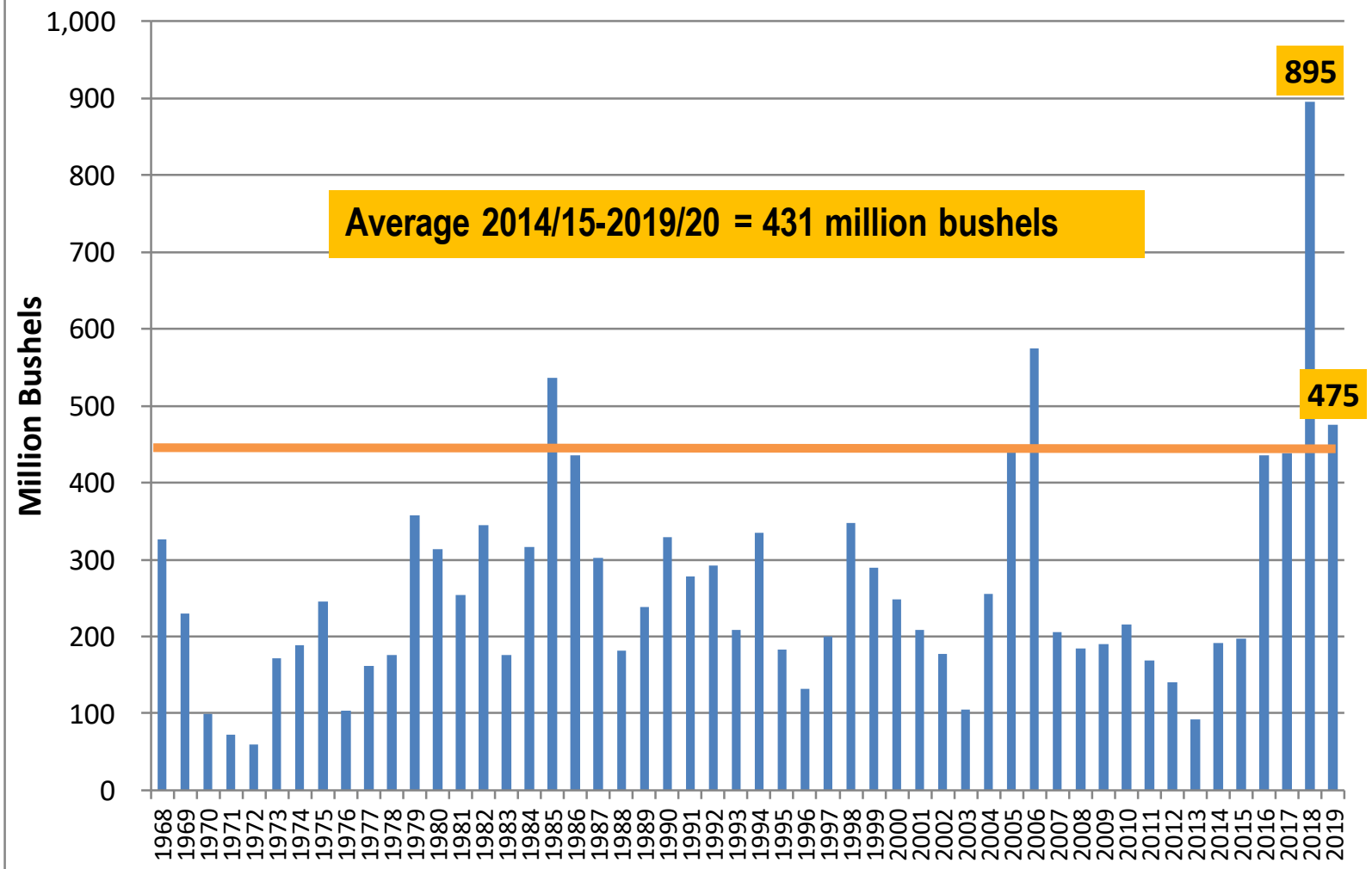
	2017/18	2018/19	2019/20 Proj	%Δ
		Millions of Acres		
Acres Planted	90.2	89.2	76.5	-14.2%
Acres Harvested	89.5	87.6	75.6	-13.7%
Bu./Harvested Acre	49.3	50.6	46.9	-7.3%
		Millions of Bushels		
Beginning Stocks	302	438	913	108.4%
Production	4,112	4,428	3,550	-19.8%
Total Supply	**4,735**	**4,880**	**4,483**	-8.1%
Use:				
Crushing	2,055	2,092	2,105	0.6%
Exports	2,134	1,748	1,775	1.5%
Seed & Residuals	109	128	128	0.0%
Total Use (Demand)	**4,297**	**3,967**	**4,008**	1.0%
Ending Stocks	438	913	475	-48.0%
Ending Stocks, % of Use	10.2%	23.0%	11.9%	-48.5%
U.S. Season Average Farm Price, $/ Bu.	$9.33	$8.48	$8.85	4.4%

Source: WASDE, USDA, Dec 2019

US Soybean Supply and Disappearance 1970/71-2018/19F



US Soybeans Ending Stocks 1968/69-2019/20F

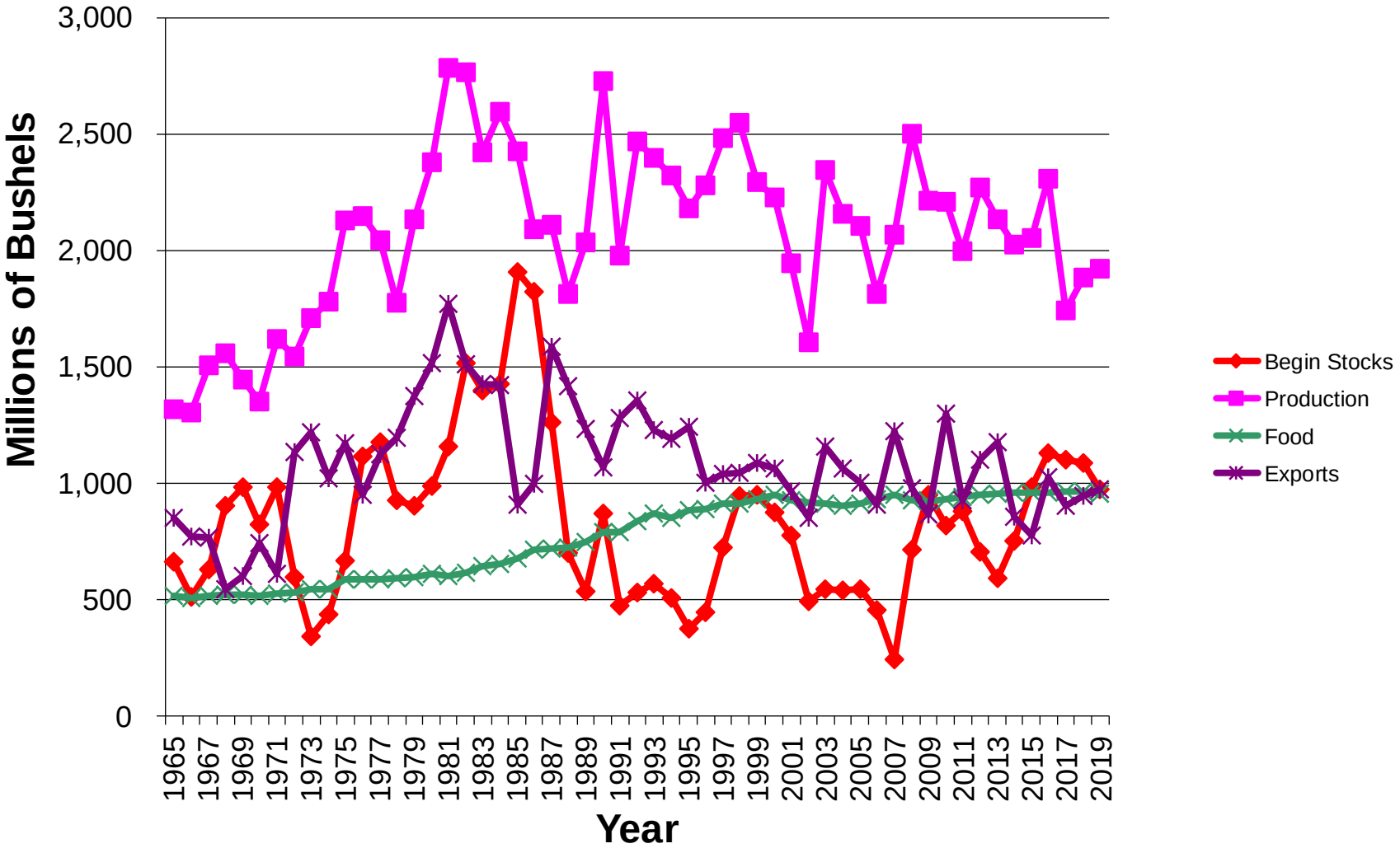


USDA SUPPLY/DEMAND BALANCE SHEET FOR WHEAT

	2017/18	2018/19	2019/20 Proj	%Δ
Acres Planted	46.1	47.8	45.2	-5.4%
Acres Harvested	37.6	39.6	37.2	-6.1%
Bu./Harvested Acre	46.4	47.6	51.7	8.6%
	Million Bushels			
Beginning Stocks	1,181	1,099	1,080	-1.7%
Production	1,741	1,885	1,920	1.9%
Imports	158	135	105	-22.2%
Total Supply	**3,080**	**3,119**	**3,105**	-0.4%
Use:				
Food	964	955	955	0.0%
Seed	63	59	61	3.4%
Feed & Residual	47	90	140	55.6%
Domestic, Total	1,075	1,103	1,156	4.8%
Exports	906	936	975	4.2%
Total Use (Demand)	**1,981**	**2,039**	**2,131**	4.5%
Ending Stocks	1,099	1,080	974	-9.8%
Ending Stocks, % of Use	55.5	53.0	45.7	-13.7%
U.S. Season Aver. Farm Price, $/ Bu.	$4.72	$5.16	$4.55	-11.8%

Source: USDA, WASDE Dec 2019

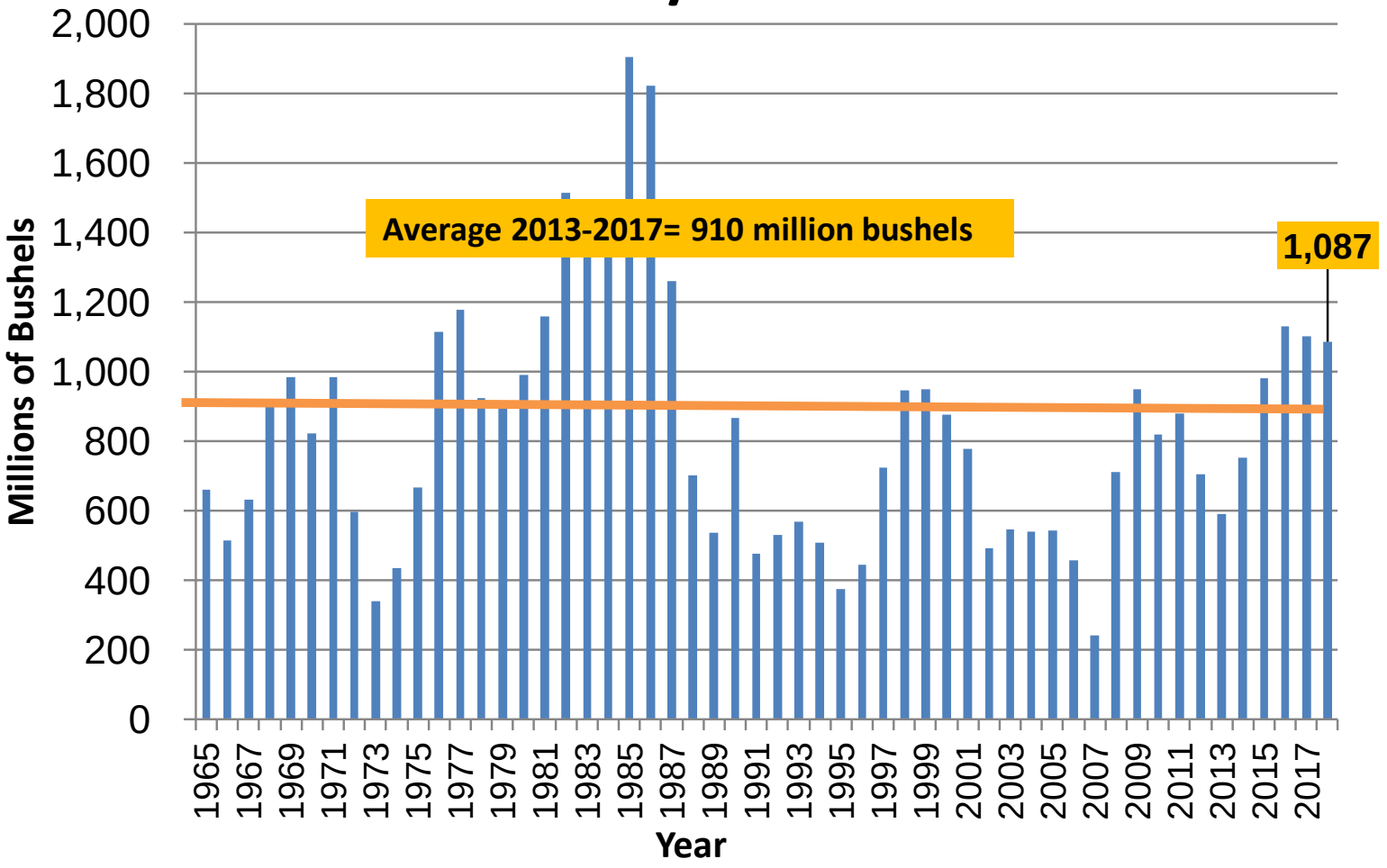
Wheat Supply and Disappearance 1965/66-2018/19



W-July 2020


CBOT:ZWN2020, D 559'0 ▲ +2'6 (+
C:559'0
WHEAT FUTURES (JUL 2020), D, C
Vol (20)
Market has rallied
$5.70/bu-$5.10/bu
= $0.60/bu
580'0
570'0
559'0
550'0
540'0
530'0
520'0
510'0
500'0
490'0
CME Group
powered by TradingView
Oct
Nov
Dec
2020
21

US Wheat Ending Stocks 1965/66-2018/19



NC Crop Outlook and Concerns

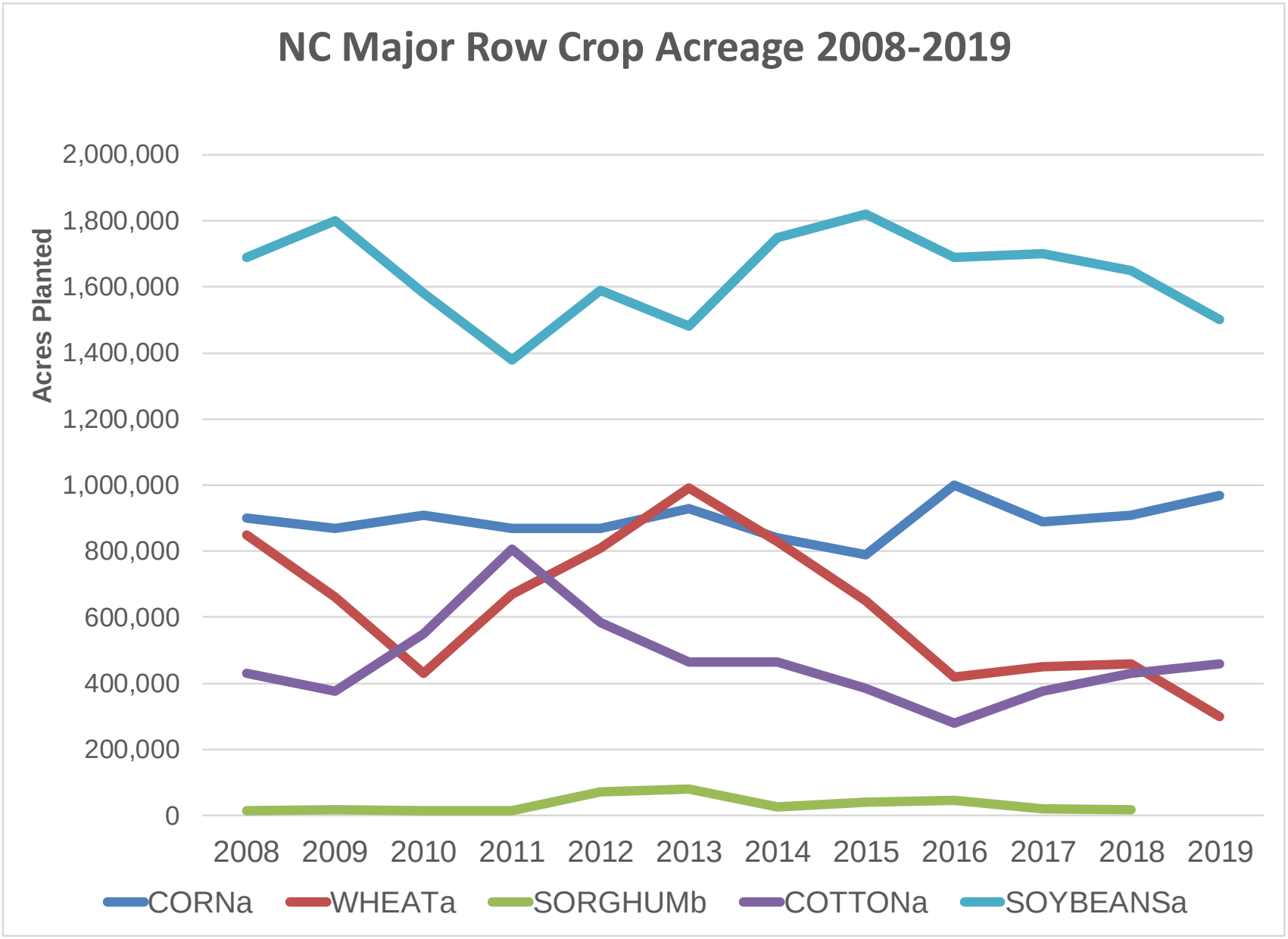
NC Major Row Crop Acreage: 2008-2019

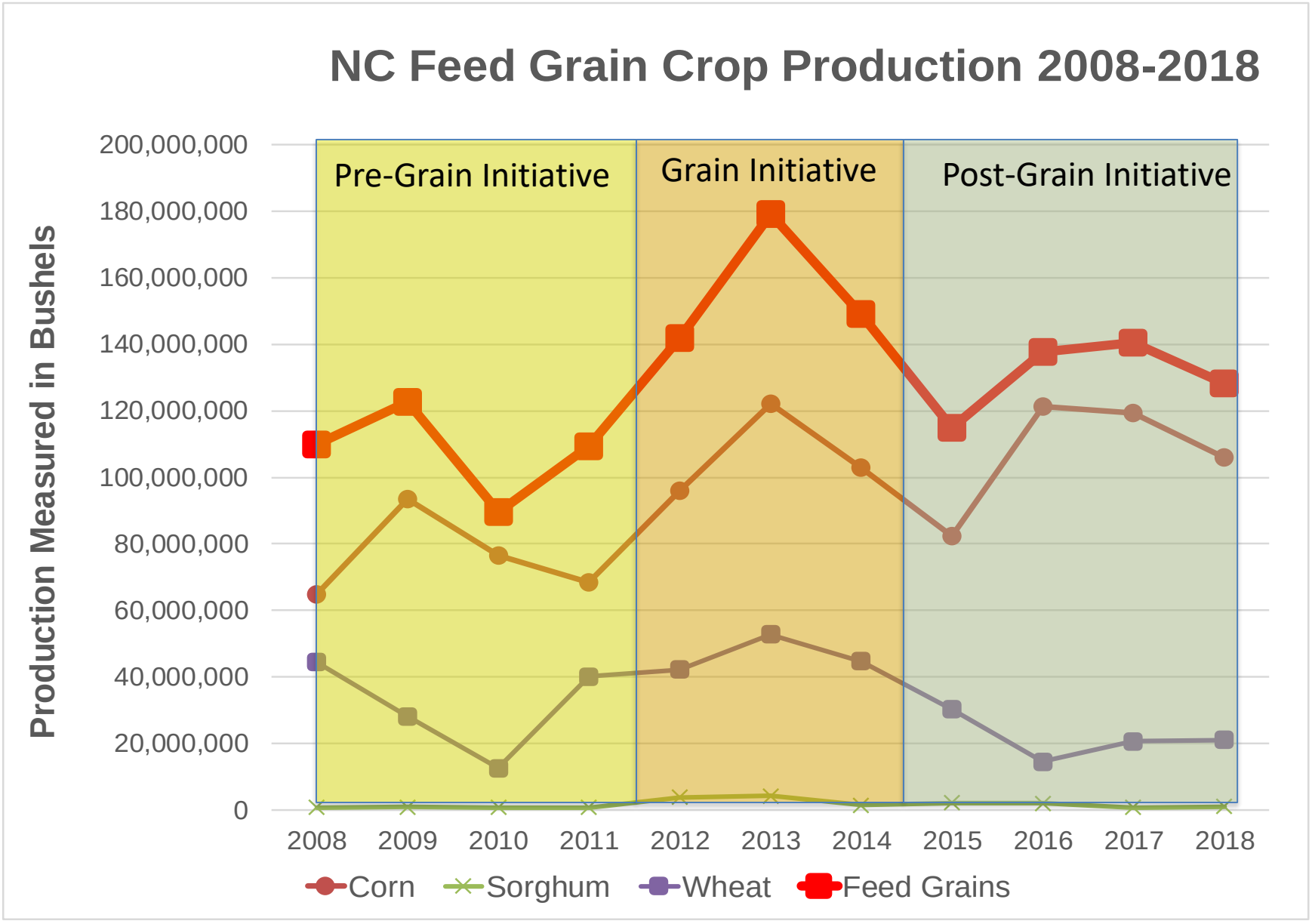
- Past 12 years reveals, over the pre- and post-feed grain initiative, a decline in total acres of 16.9%, with a decline in feed grain acres of 28.1%.
- Corn acres have increased 7.8%
- Wheat acreage has declined by 64.7% but this masks a significant run-up between 2010 and 2013 when acres doubled but then declined

NC Acres Planted 2008-2019

Crop	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2008 vs 2019
CORN[a]	900,000	870,000	910,000	870,000	870,000	930,000	840,000	790,000	**1,000,000**	890,000	910,000	970,000	7.8%
WHEAT[a]	850,000	660,000	430,000	670,000	810,000	**990,000**	830,000	650,000	420,000	450,000	460,000	300,000	-64.7%
SORGHUM[b]	16,000	16,159	13,262	14,936	70,366	**79,187**	26,640	39,516	45,000	20,000	18,000	--	--
COTTON[a]	430,000	375,000	550,000	**805,000**	585,000	465,000	465,000	385,000	280,000	375,000	430,000	460,000	7.0%
SOYBEANS[a]	1,690,000	1,800,000	1,580,000	1,380,000	1,590,000	1,480,000	1,750,000	**1,820,000**	1,690,000	1,700,000	1,650,000	1,500,000	-11.2%
Total	3,886,000	3,721,159	3,483,262	3,739,936	3,925,366	**3,944,187**	3,911,640	3,684,516	3,435,000	3,435,000	3,468,000	3,230,00	-16.9%
Feed Grains	1,766,000	1,546,159	1,353,262	1,554,936	1,750,366	**1,999,187**	1,696,640	1,479,516	1,465,000	1,360,000	1,388,000	1,270,00	-28.1%
% Feed Grains	45.4%	41.6%	38.9%	41.6%	44.6%	**50.7%**	43.4%	40.2%	42.6%	39.6%	40.0%	39.3%	-13.5%

Pre-Feed Grain Initiative | During Feed Grain Initiative


NC Major Row Crop Acreage 2008-2019
Acres Planted
2,000,000
1,800,000
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
CORNa
WHEATa
SORGHUMb
COTTONa
SOYBEANSa


NC Feed Grain Crop Production 2008-2018
Production Measured in Bushels
200,000,000
180,000,000
160,000,000
140,000,000
120,000,000
100,000,000
80,000,000
60,000,000
40,000,000
20,000,000
0
Pre-Grain Initiative
Grain Initiative
Post-Grain Initiative
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Corn
Sorghum
Wheat
Feed Grains

NC feed grain deficit around 265 mil. bu (or 53%), but higher in 2018 and 2019

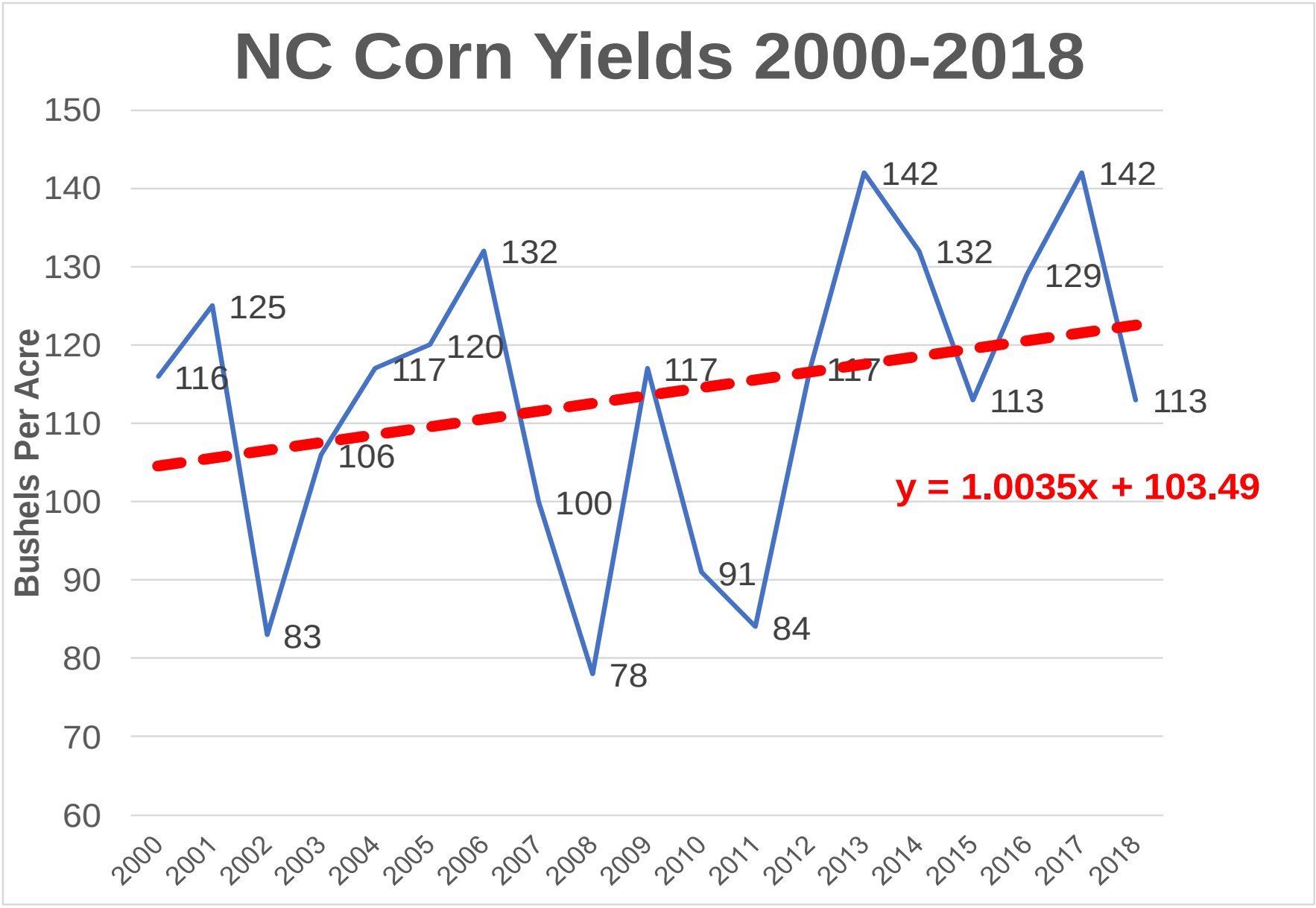
Feed Grain/Livestock	Acres (5 yr. aver. 2013-17)	Yield	Lbs per Bushel	Production (5yr average 2013-17)	Production 2018	Production 2019
		Bushel/Acre		*Million Bushels*		
Corn	890,000	131.6	56	109.6	93.8	100.1
Wheat (80% fed)	668,000	52.8	60	34.2	21.1	12.6
Sorghum	22,271	55.0	56	1.5	0.5	--
Total				**145.3**	**115.4**	**112.7**
	GCAU FACTOR	**2017 Annual Head**	**2017 GCAU**	**Feed Demand in Bushels**		
Hogs	0.2285	9,000,000	**2,056,500**	171.6		
Broilers	0.0020	125,953,846	**251,908**	21.0		
Layers	0.0217	15,143,000	**328,603**	27.4		
Turkeys	0.0155	10,307,692	**159,769**	13.3		
Cattle	0.0000	830,000	**917,533**	76.6		
Total			**3,714,313**	**310.0**	**310.0**	**310.0**
Feed Grain Deficit				**164.7**	**194.6**	**197.3**
				53%	**63%**	**64%**

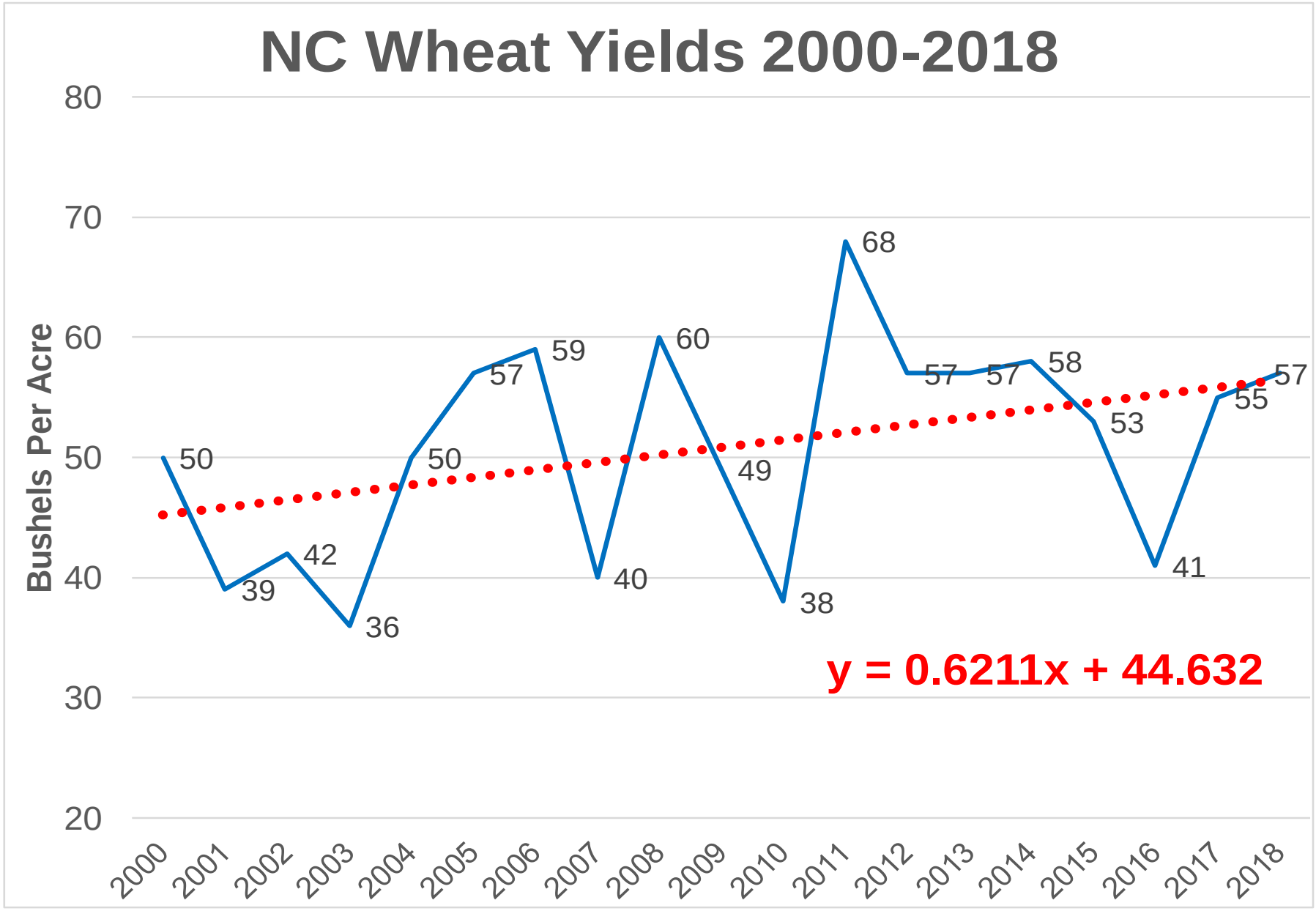
Note: 1 GCAU=2.12 Me ... nsumed by an average milk cow); 1 bushel is 56 pounds

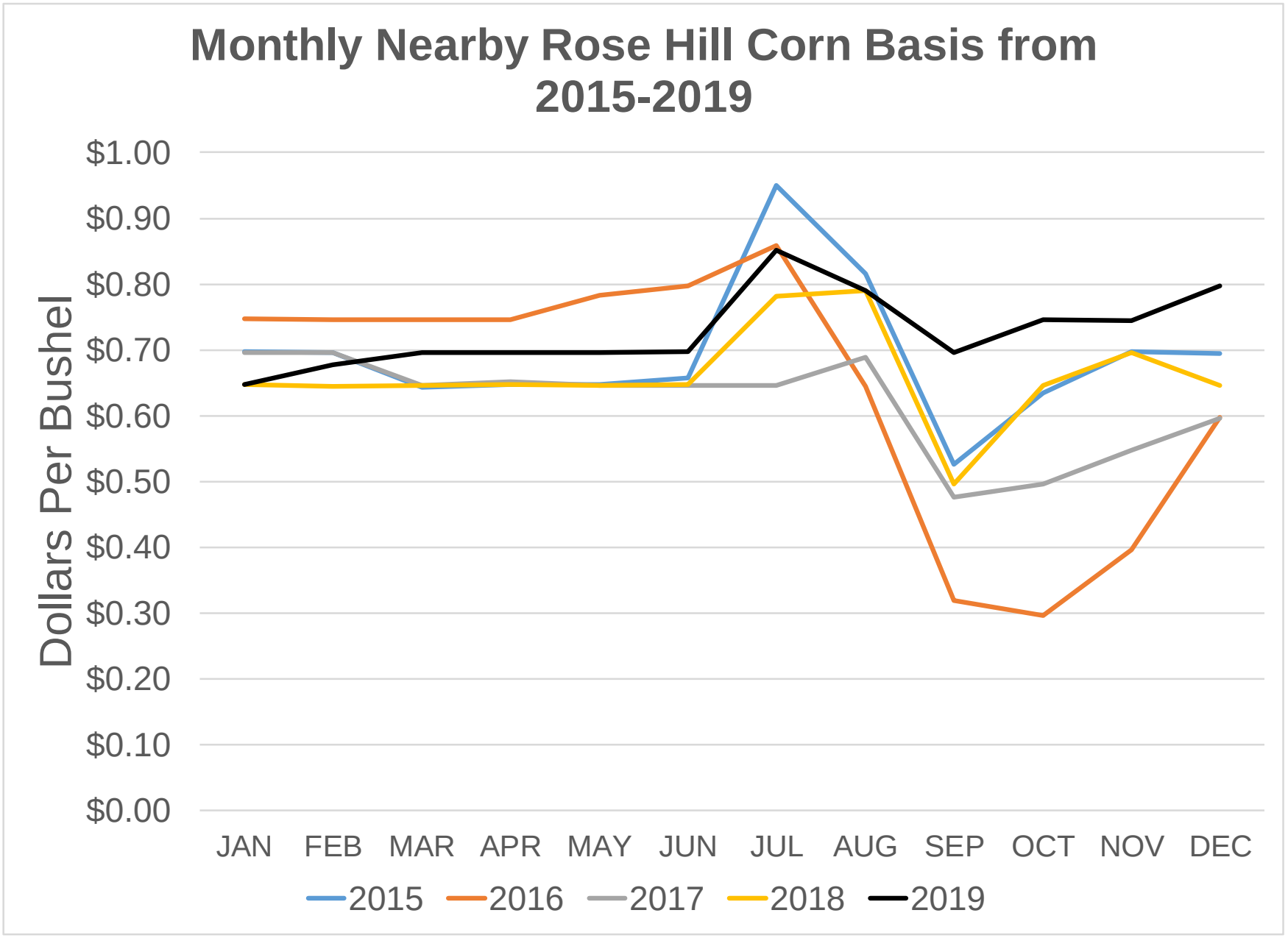
This will be revised upward with expansion of broiler industry

Average Profitability of NC Row Crops Around Pre-Planting 2019: Rented Land

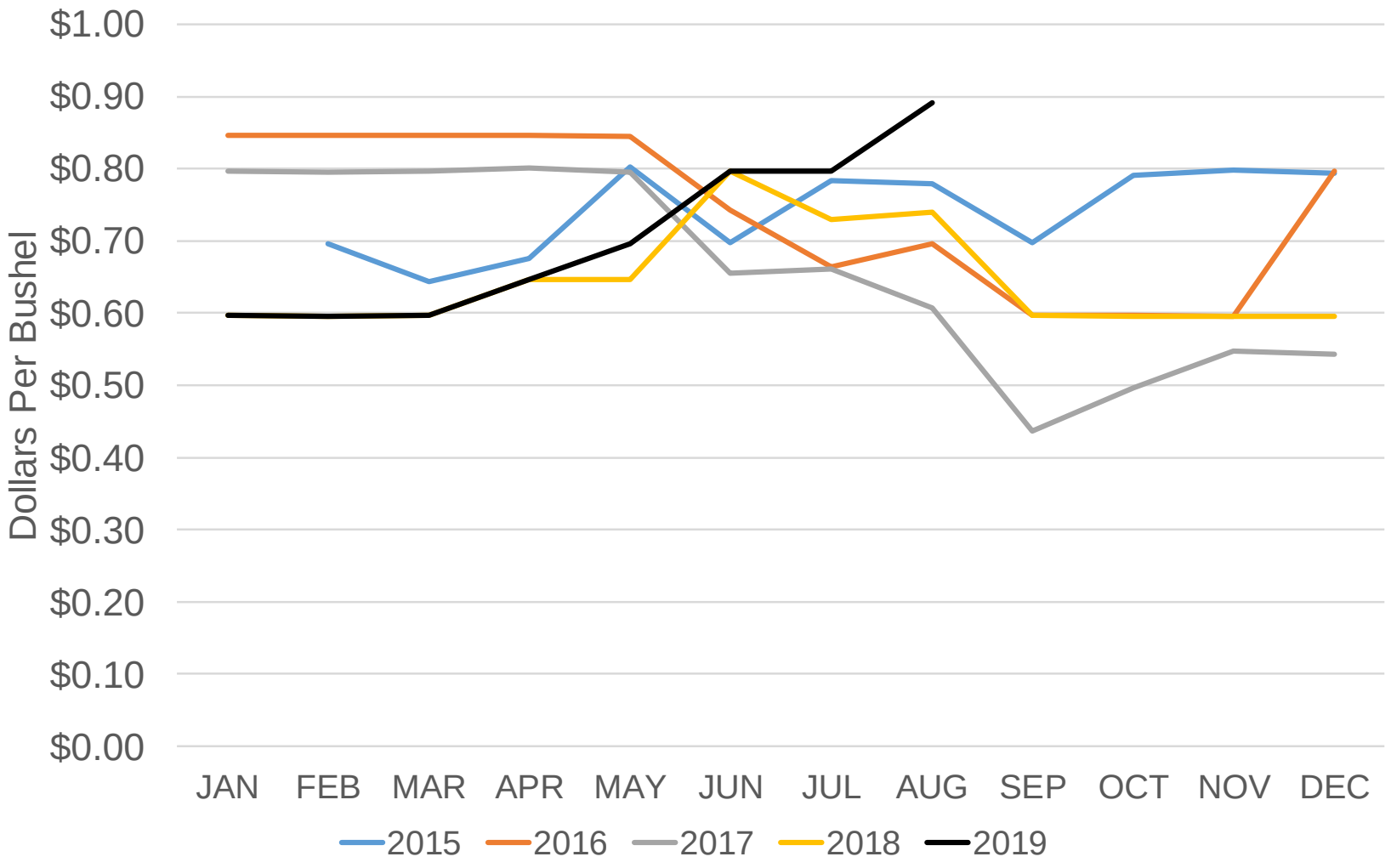
Budget Comparison 2019 Crop Year of Crop Choices Given Current Market Conditions and Expected Yields					
Enter Average Land Rent Value Here	110				
	Corn	Soybean	Wheat	Sorghum	Cotton
Yield (bu/acre)[1]	127	36	53	55	
Yield (lbs./acre)--Cotton	--	--	--	--	837
Yield (lbs./acre)--Cotton Seed	--	--	--	--	1,398
Price (New Crop Futures Price from CME & NYBOT 4/23/2019)	$3.82	$9.09	$4.43	$3.63	$0.77
Cotton Seed	--	--	--	--	$0.08
Current New Crop Basis	$0.70	($0.14)	$0.00	$0.67	($0.02)
EXPECTED NET PRICE (New Crop Futures + Basis)[2]	$4.52	$8.95	$4.43	$4.29	$0.75
Gross Revenue	$572.23	$325.78	$233.90	$236.17	$739.75
VARIABLE EXPENSES[1]					
Total Variable Costs	$540.00	$362.13	$308.68	$374.69	$759.24
Return above Variable Costs	$32.24	-$36.35	-$74.78	-$138.52	-$19.49
FIXED EXPENSES					
Total Fixed Costs	$65.70	$82.63	$33.31	$80.66	$113.16
Total Cost	$605.70	$444.76	$341.99	$455.35	$872.40
NET RETURNS TO FARMER AND RISK:	**($33.46)**	**($118.98)**	**($108.09)**	**($219.18)**	**($132.65)**
Break Even Yield	134	50	77	106	1163
Break Even Price	$4.78	$12.22	$6.48	$8.28	$0.91
Break Even Yield % of 5 yr. aver.	105.8%	136.5%	146.2%	202.0%	138.9%


NC Corn Yields 2000-2018
Bushels Per Acre
150
140
130
120
110
100
90
80
70
60
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
116
125
83
106
117
120
132
100
78
117
91
84
117
142
132
113
129
142
113
y = 1.0035x + 103.49

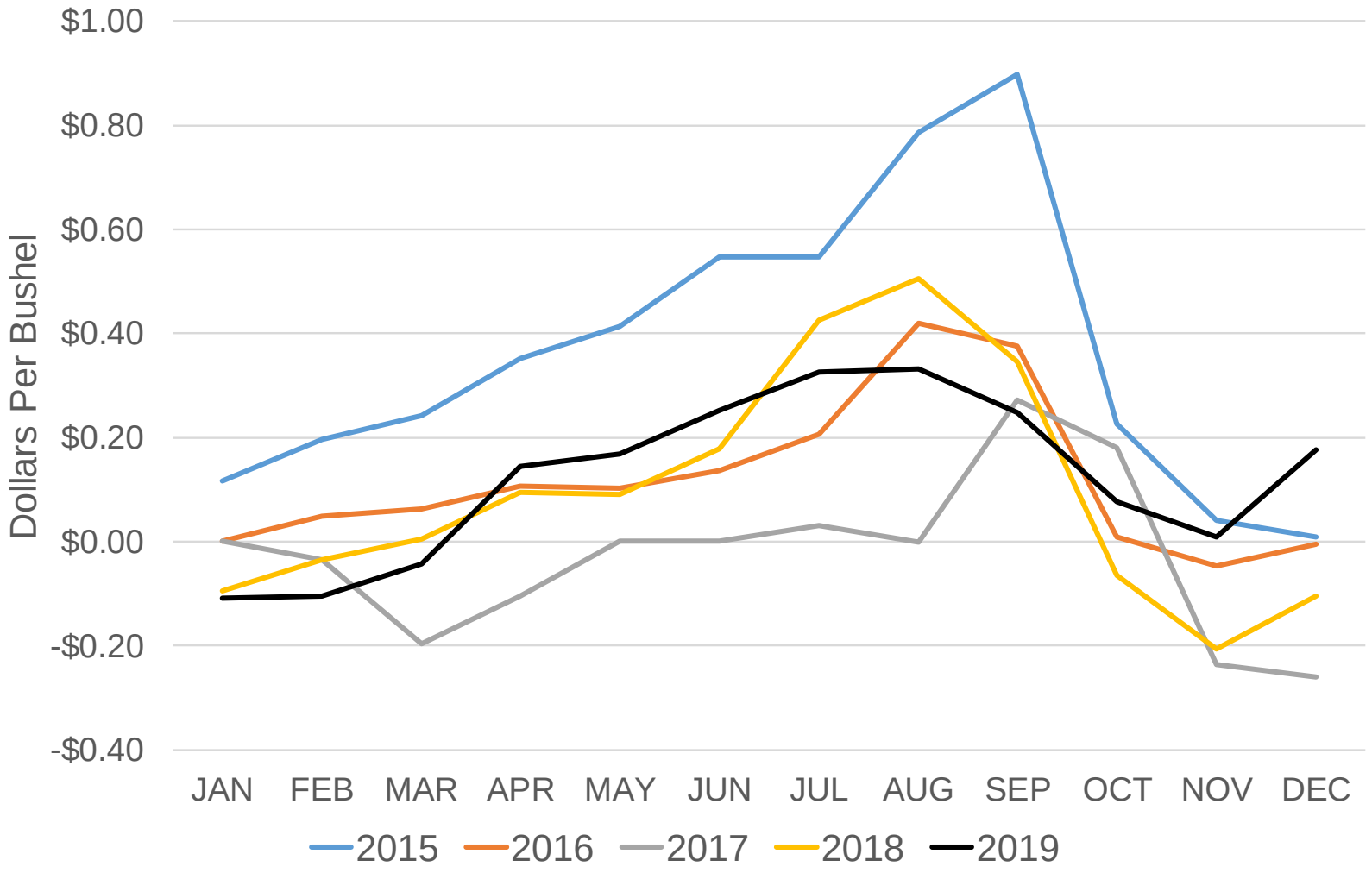

NC Wheat Yields 2000-2018
Bushels Per Acre
80
70
60
50
40
30
20
50
39
42
36
50
57
59
40
60
49
38
68
57
57
58
53
41
55
57
y = 0.6211x + 44.632
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018


Monthly Nearby Rose Hill Corn Basis from 2015-2019
Dollars Per Bushel
$1.00
$0.90
$0.80
$0.70
$0.60
$0.50
$0.40
$0.30
$0.20
$0.10
$0.00
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
2015
2016
2017
2018
2019

Nearby Monthly Rose Hill Wheat Basis 2015-2019



Monthly Nearby Fayetteville Soybean Basis from 2015-2019

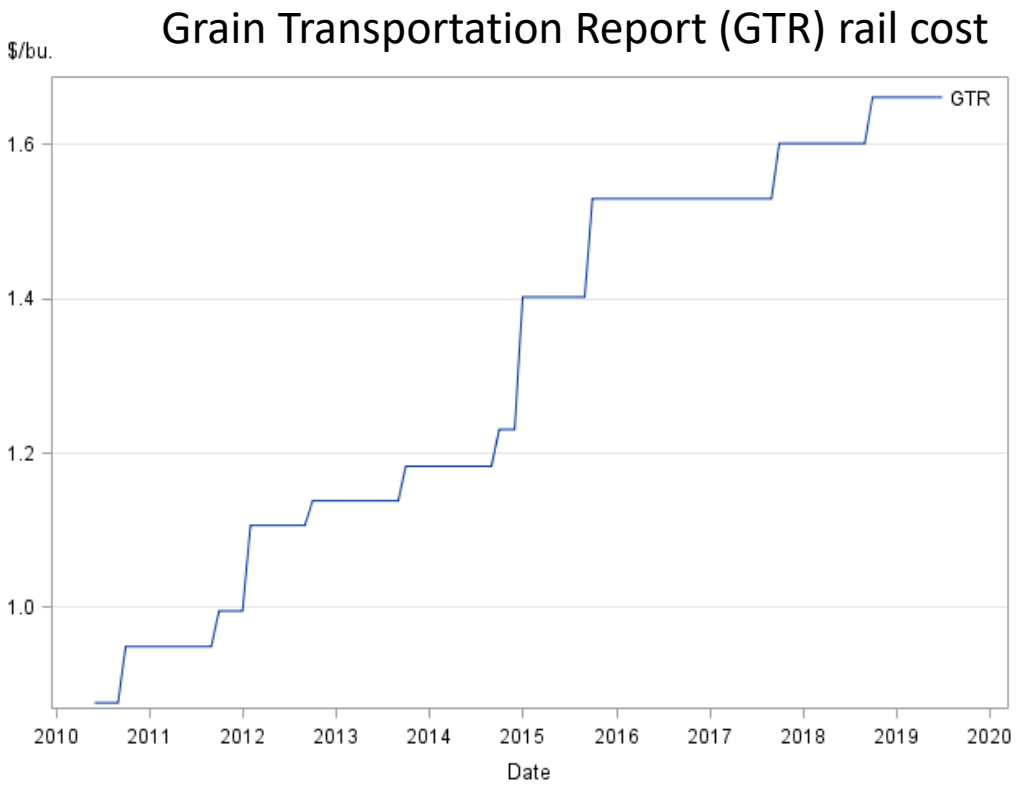


Maximum willingness to pay for feedgrain (corn, wheat) in NC = price elsewhere + transportation costs to NC

All modes

Rail Transportation Cost

- Publicly available data from USDA-AMS
- Originating Toledo, OH terminating Raleigh, NC
- Issues
  - Short series: 2010-2019
  - May not be representative of actual rail cost



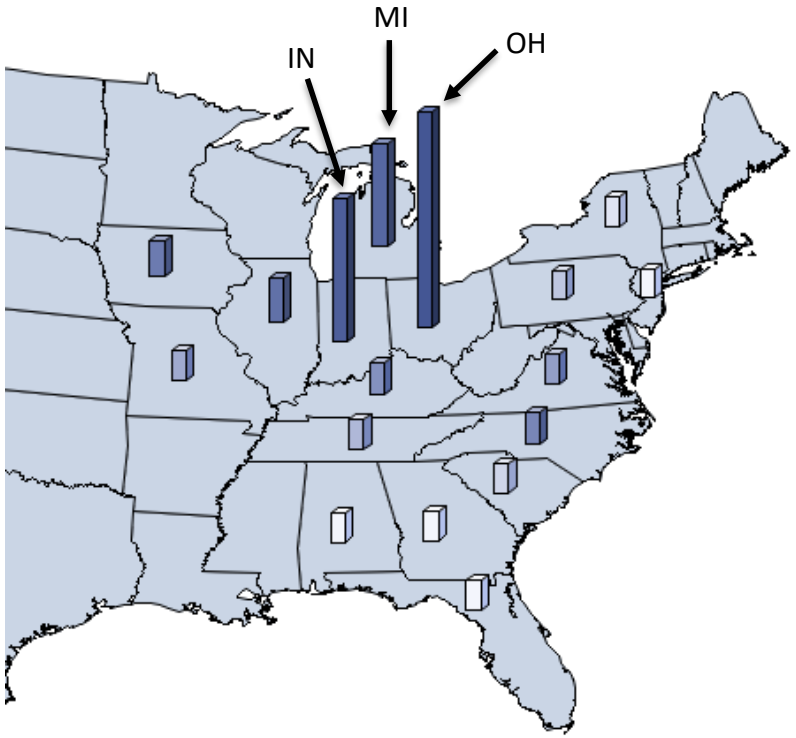
Source: Heidi Schweizer, ARE-NCSU

SURFACE TRANSPORTATION BOARD WAYBILL SAMPLE

- Carload Waybill
  - Shipping Document prepared by Rail Carrier
- Includes
  - Origin
  - Destination
  - Revenue
  - What is being shipped
  - …… plus about 200 more variables

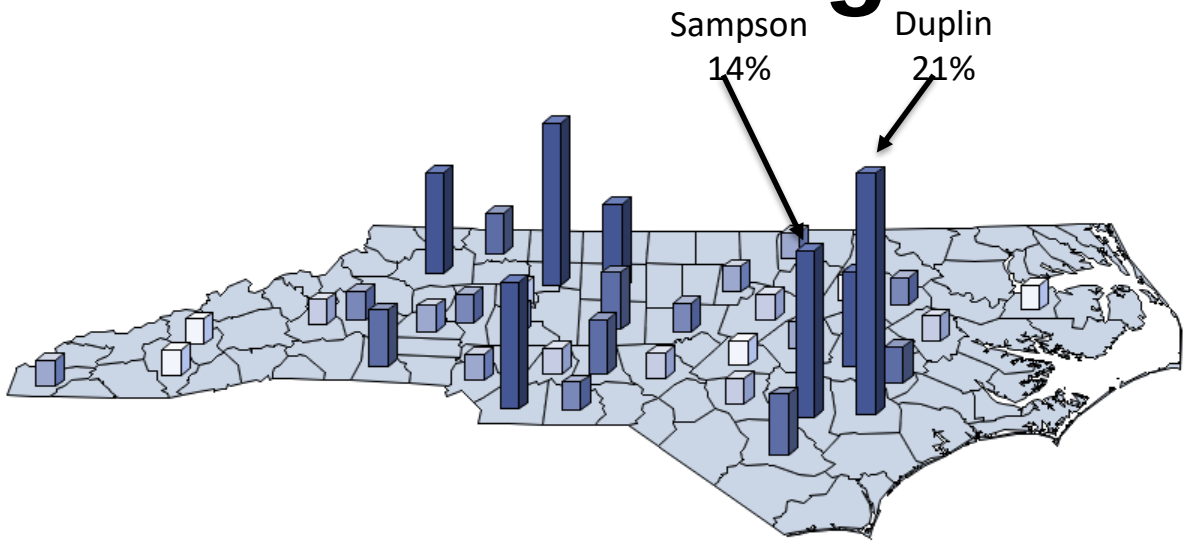
Origin of Rail Shipments of Corn Terminating in NC

	% of Bushels	
Ohio	46	92%
Indiana	28	
Michigan	18	
Rest	< 5	



Source: Robert Thompson, ARE-NCSU

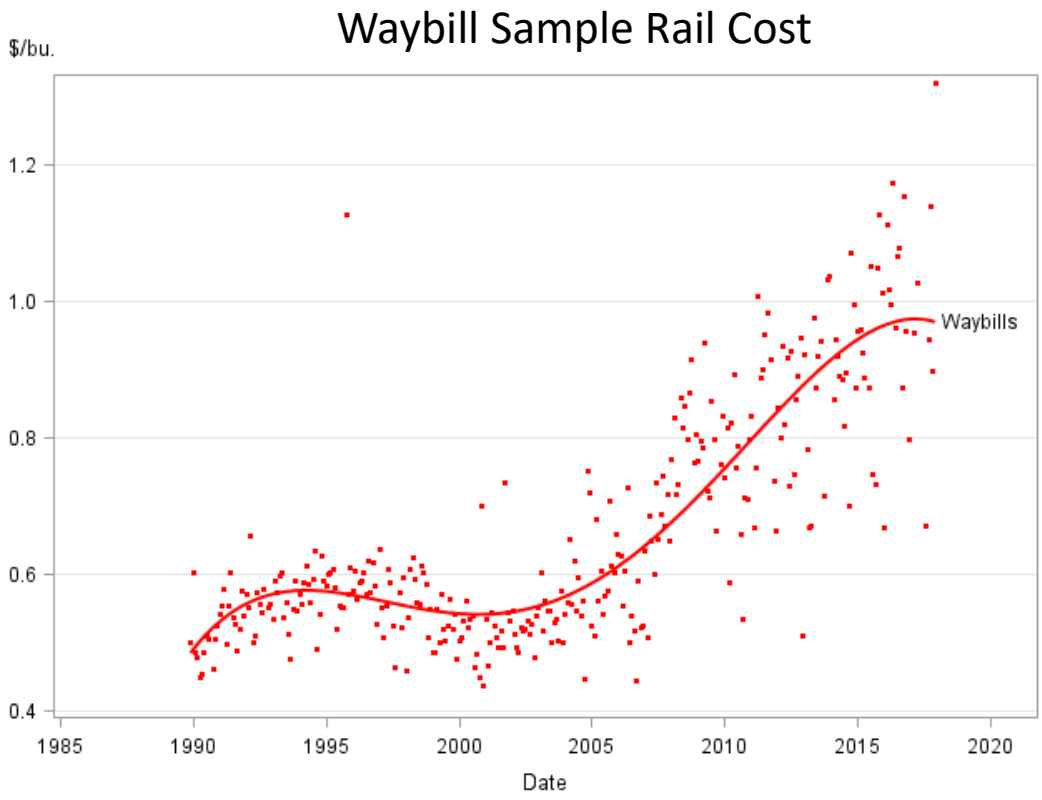
Destination of Rail Shipments of Corn Terminating in NC



Source: Robert Thompson, ARE-NCSU

Rail Transportation Cost

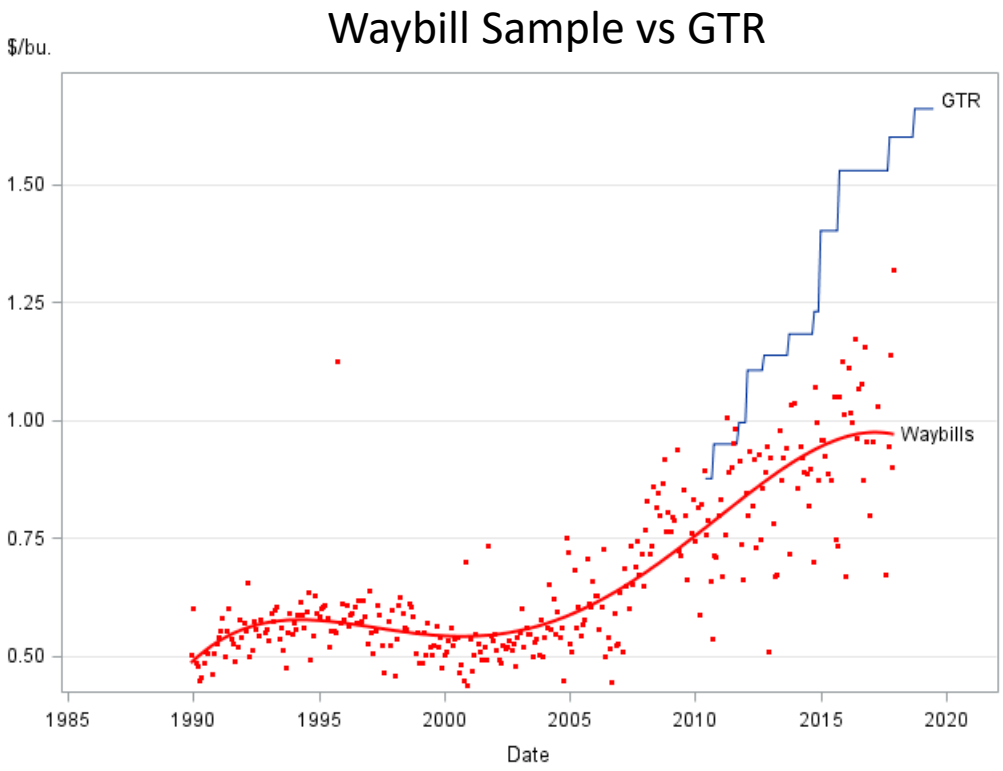
- Monthly Average Cost per Bushel
- All “unmasked” Waybill Revenues
  - Originating in Ohio
  - Terminating in NC
  - Shipping Corn



Source: Robert Thompson, ARE-NCSU

Rail Transportation Cost

- GTR much higher than waybill samples
- Waybill Samples are ACTUAL transactions
- GTR are posted rates

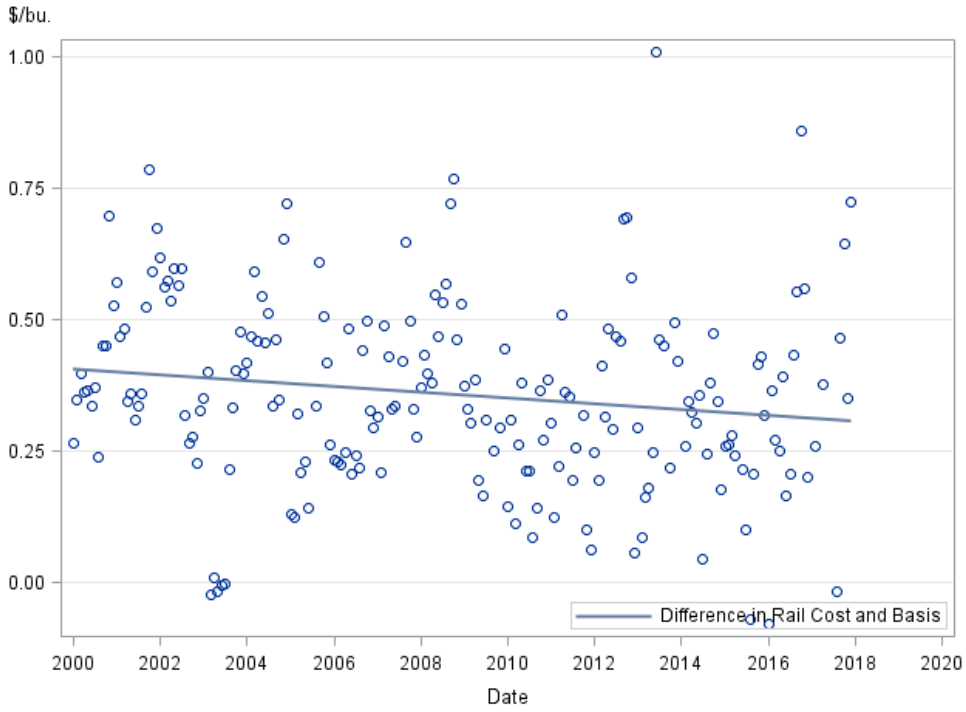


Source: Robert Thompson, ARE-NCSU

Corn Prices and Rail Transportation Cost

- Should be exactly equal
  - At least in theory…
- Rail Cost ≈ $0.30-$0.40 more than Rose Hill Basis on average
- BUT very stable over time

Difference in Basis and Rail cost

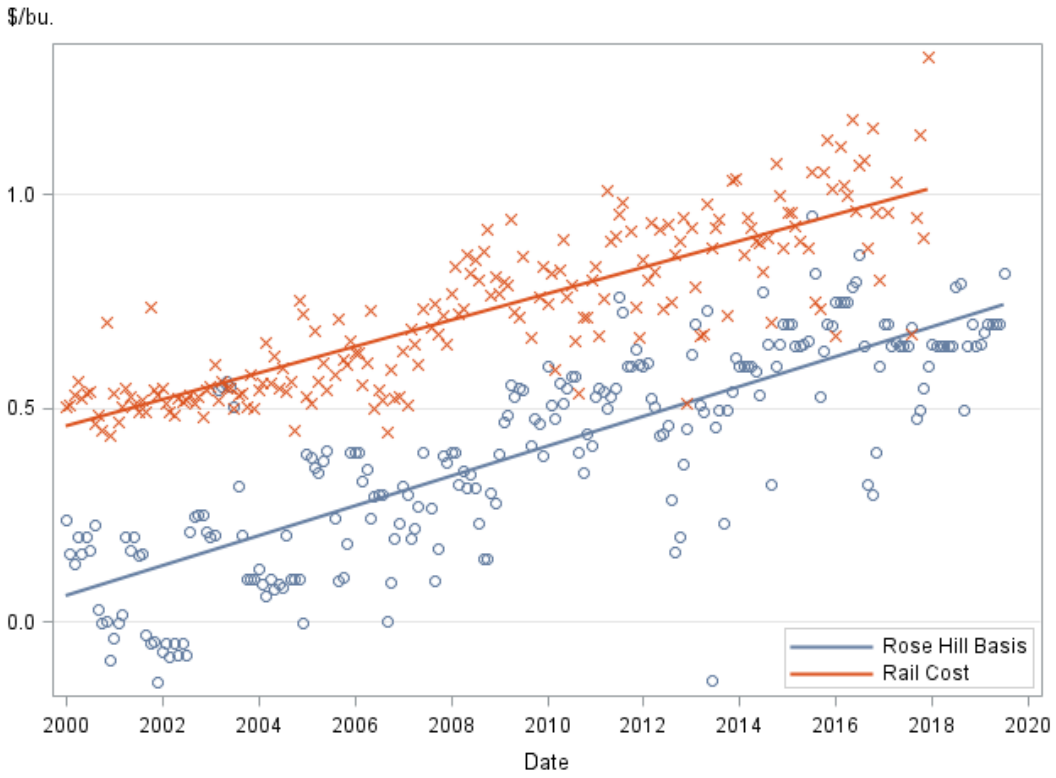


Source: Robert Thompson, ARE-NCSU

Corn Prices and Rail Transportation Cost

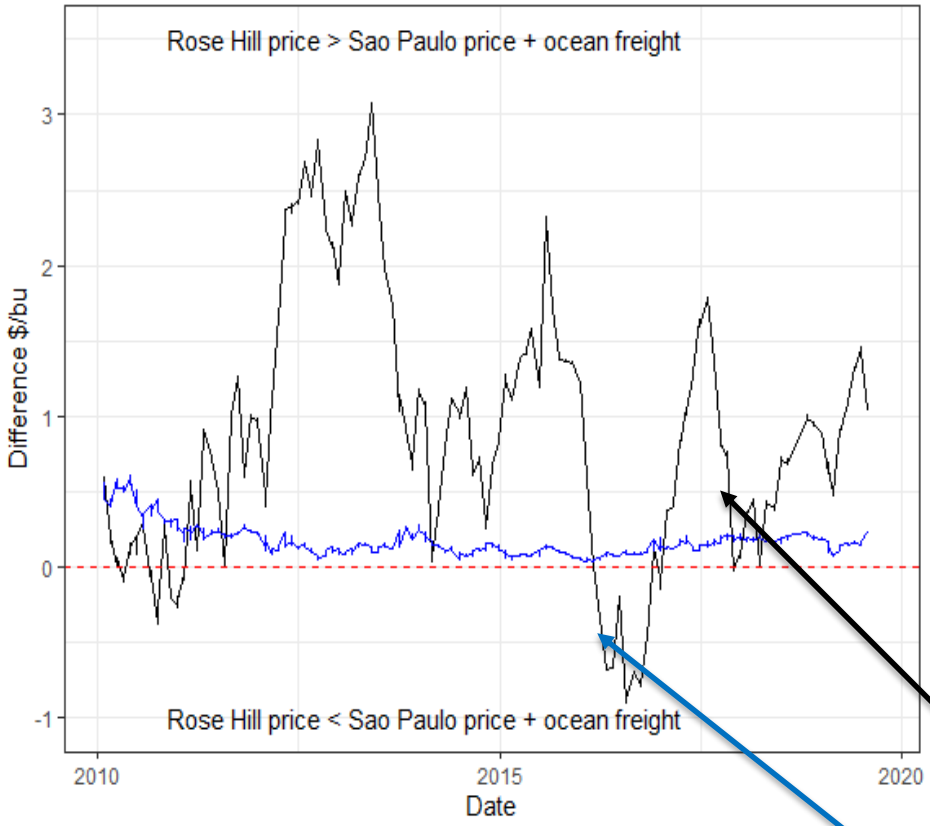
- MAIN takeaway: Stable over time ⇒ Basis increases with Rail costs

Basis and Rail cost



Source: Robert Thompson, ARE-NCSU

Comparing cost of procurement from Brazil



- Difference is volatile
  - Ocean freight rates are volatile but relatively small - most variance comes from the price spread
- Difference may reflect
  - Loading and unloading costs
  - Interior transportation costs
  - Exchange rate risk
  - Quality differentials
  - Bunker fuel, port fees, and insurance (not included in time charters)

Data source: Bloomberg terminal
Assumptions: 1.8M bushels per vessel, 30 days transit time

Source: Heidi Schweizer, ARE-NCSU

Rose Hill price – (Sao Paulo price + ocean freight to Wilmington, NC) [Average=$0.90 per bushel]

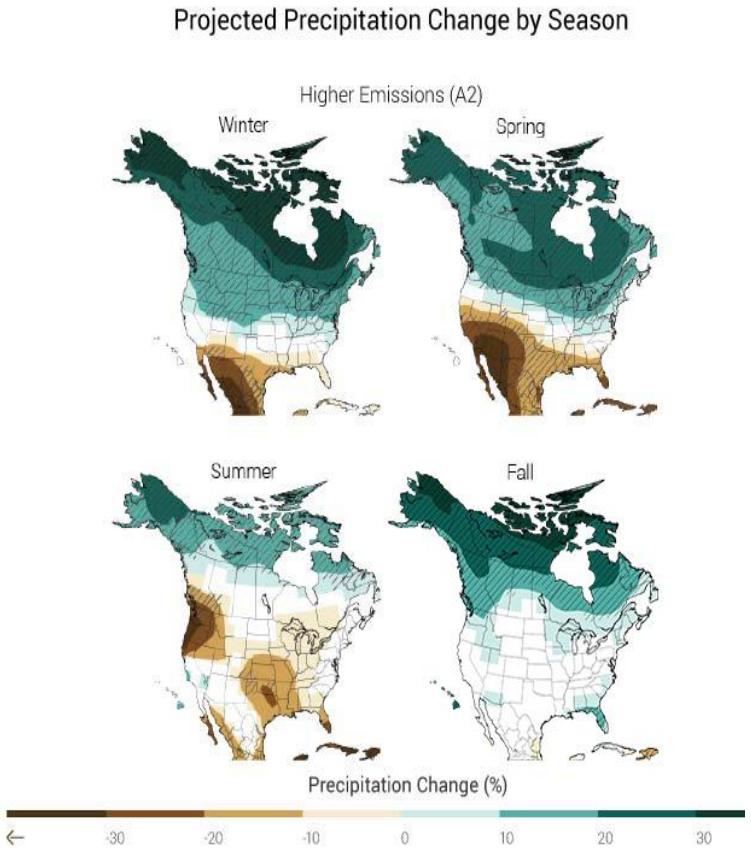
Ocean Freight from Sao Paulo to Wilmington, NC

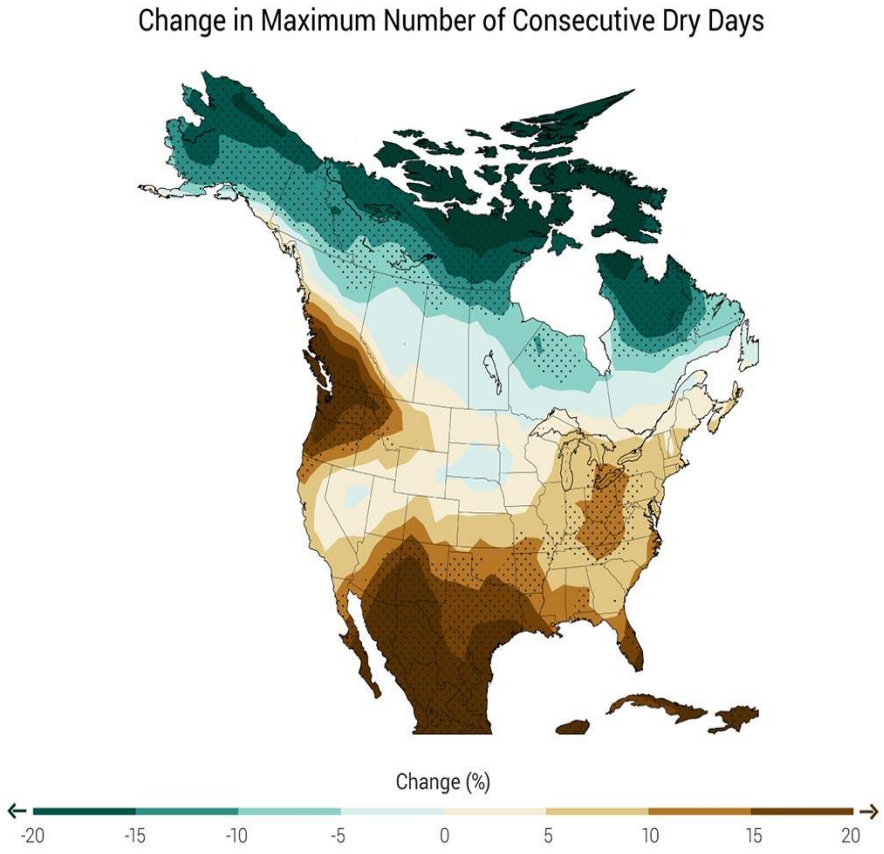
Vulnerabilities for NC Agriculture Experienced from Extreme and Changing Weather

- **NC is vulnerable to severe weather during hurricane season which can lead to extensive crop damage and extreme flooding. Agriculture is particularly vulnerable in two ways:**
  1. **Row crop production occurs during hurricane season making for additional production risk. Corn and soybean crop losses and impacts planted wheat acres can accentuate the feed grain deficit.**
  2. **Animal agriculture is threatened; animals drown, interruptions of feed and veterinary supply deliveries, and negative impact on marketings**

- **Also longer-term weather forecasts of more annual precipitation but also longer dry periods calls for innovation and adaptations to build resilience to maintain vitality of NC agriculture**

Climate Change Projections

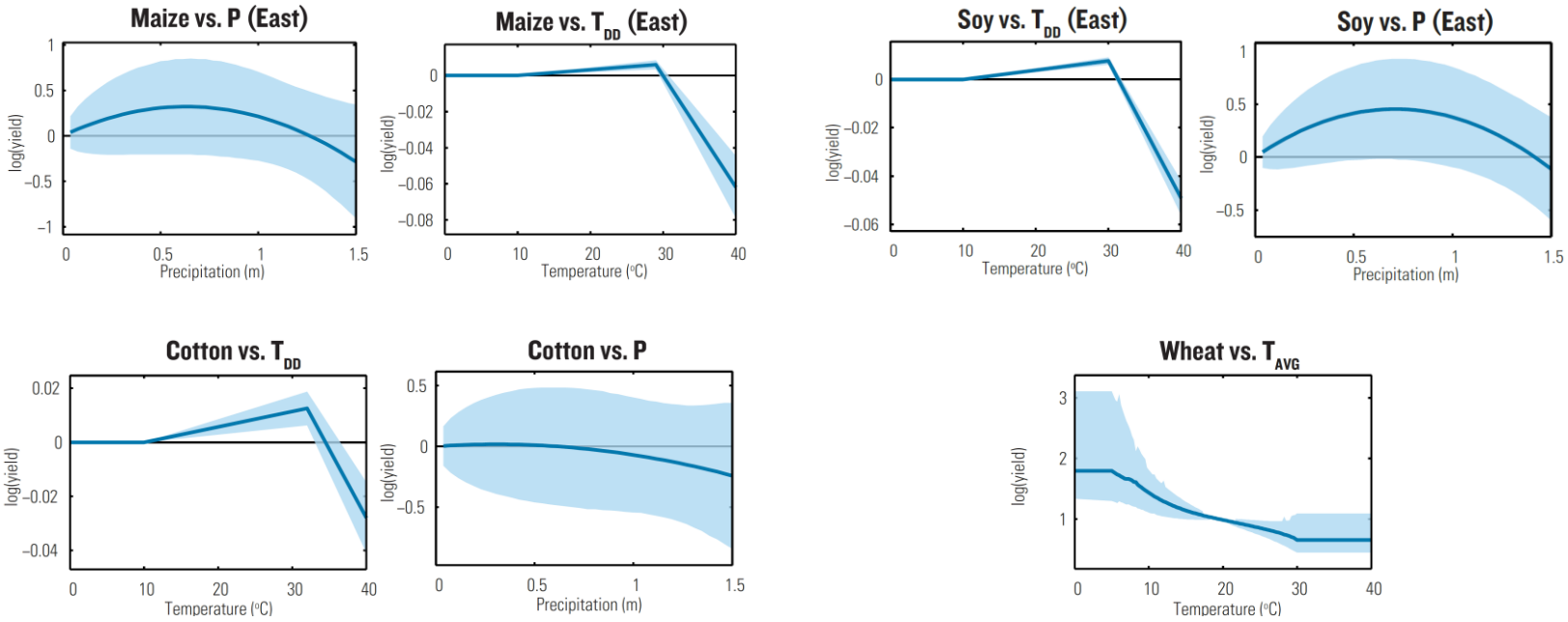




Source: National Climate Assessment with data from NOAA NCDC / CICS-NC

Source: Eric Edwards, ARE-NCSU—State Extension Conference 2019

Crops: Big-4 / Climate Relationship



Source: Hsiang, S., Kopp, R., Jina, A., Rising, J., Delgado, M., Mohan, S., Rasmussen, D.J., Muir-Wood, R., Wilson, P., Oppenheimer, M. and Larsen, K., 2017. Estimating economic damage from climate change in the United States. *Science*, *356*(6345), pp.1362-1369.

Source: Eric Edwards, ARE-NCSU—State Extension Conference 2019

Innovation and adaptations from extreme and changing weather to build resilience

- For resilience to extreme weather events such as hurricanes and droughts:
  - for animal agriculture the possibility of strategic input supplies pre-positioned? Where? How much? Investment and/or co-ordination in logistical infrastructure which facilitates continuity of critical input deliveries (feed and veterinary supplies) and orderly marketing of outputs
  - for row crop production the possibility of developing
    - shorter season varieties that reduce the exposure to hurricanes
    - varieties that are more drought tolerant
- For resilience to longer-term weather forecasts in NC of more annual precipitation but also longer dry periods:
  - Modify how we manage water resources. Possibility of harvesting and collecting more water during excessive rain events and investing in irrigation for longer dry periods.
- NCSU land grant missions of research and extension have a critical role:
  - Plant Science Initiative at NCSU promises the innovation and research
  - Support and partnerships from NC commodity organizations is vital

Final thoughts….

- World demand for key agricultural products is *strong* as a result of rising incomes and populations
- US Farm Sector Income Statement
  - 2019 continues to show turn around in US agricultural economy
- Consecutive record US corn and soybean crops in recent years have resulted in significantly larger ending stocks
  - Lower prices but less price volatility
  - Implications for marketing opportunities and risk management
- Adverse weather in Midwest in 2019 impacted plantings of corn and soybeans
  - Appears potential unintended consequences of MFP impacted preventive planting economic incentives spilling over from ongoing tariff wars and led to significant number of corn acres being planted late that otherwise would have been preventive planted
  - Significant uncertainty about yields on late-planted corn acres could mean less production than currently estimated? How much?

Final thoughts…..

- Declining feed grain acreage is a concern for the vitality of the NC livestock industry. NC feed grain deficit has recently accentuated to around 64%, meaning around 200 million bushels must be imported. This is on the rise with expansion of poultry business.

- Feed grain farmers will respond with additional acres with price incentives which will require improved basis and use of more sophisticated marketing contracts that help with lending to support planting

- Innovation and adaptations to extreme and changing weather to build resilience is an important longer-term priority for NC agriculture—NCSU has important role

https://agecon.ces.ncsu.edu/

NC STATE EXTENSION

Home | Reports

Historical North Carolina Corn, Soybean, and Wheat Price and Basis Data

The North Carolina State University corn, soybean, and wheat price and basis database contains local price and basis time series data over the period beginning in 2000 until the current year. For each series, average monthly observations are presented constructed from daily observations. For example, the reported average monthly price and basis data for any month of a given year (e.g. January) at a particular location, represents the average of all of the daily observations of price and basis for the particular month at the given location. The daily price data were obtained from a Weekly Grain Summary Federal-State Market New Service (RA_GR115). The futures prices used to calculate basis are the daily settlement prices from the Chicago Board of Trade.

How to Use the Information

These historical data can help to put current price and basis levels into perspective. Access the data by clicking the "reports" tab in the main menu.

Sellers can use these data to see how current price and basis levels compare to those in previous years and to detect seasonal trends in price and basis levels. Because basis levels tend to be more predictable than general price levels, historical basis data are especially informative. Knowing the historical basis and its typical patterns throughout a marketing year and in different locations can help farmers determine when and where to sell their crops, and, in particular, it can help them to evaluate **cash bids**.

When current basis is relatively strong, it implies that current local demand is high relative to supply. Likewise, when current basis is weak, it implies local demand is low compared to supply. The terms weak and strong, when used to describe basis levels, are relative terms: a weak basis is one that is below typical historical levels, and a strong basis is one that is above typical historical levels. Historical basis data can serve as a measuring stick in that one only needs to compare the current basis to historical levels to decide if the current basis is stronger or weaker than usual at any time. This comparison is especially useful in evaluating **cash bids**.

Historical basis can be used to evaluate **forward price contract** offers. A stronger-than-expected basis in conjunction with an acceptable price level may signal an opportunity to eliminate price and basis risk by agreeing to a **forward price contract**. Basis can be used to decide whether it is beneficial to **hedge**. A weaker-than-expected basis, in conjunction with an acceptable price level, may signal an opportunity to eliminate price risk by hedging and retaining only basis risk. Basis can be used to decide whether it is beneficial to **store** for a deferred sale. Typically, basis is weakest at harvest, but a seller benefits when basis is strong. A basis that improves considerably after harvest, combined with an attractive spread between the nearby (harvest) futures and distant futures may signal an opportunity to benefit from storage.

A historical basis that has behaved predictably can give producers additional confidence when making storage decisions. Additional details about how to utilize historical basis information can be found at the following publication "A Guide to Price-Risk Management in Grain Marketing".

Who might benefit from these historical data

Both sellers (farmers) and buyers (integrators, feedmills, and elevators) can all benefit from the historical data in this database. All parties can benefit from understanding historical price and basis levels as well as seasonal trends to put the current price and basis situation into context. In particular, the charts of the previous four years provide an informative illustration of the current situation compared to the most recent years enabling more informed decision making to occur.

Financial support of this project has been provided through a grant by the Corn Growers Association of North Carolina and by the N.C. Cooperative Extension.

corn growers Association of North Carolina

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Questions