

Kansas NFI Predictions

GREGG IBENDAHL



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Boom to bust?

	Net Farm Income			
	2020	2021	2022(p)	Est 2023
NFI	\$ 190,966	\$ 355,467	\$ 97,124	\$ (45,888)
% Change		86%	-73%	-147%



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It's a difficult time to make predictions

Quickly changing conditions

- Grain prices
- Expenses
- Crop conditions

Russia/Ukraine conflict

- Russia is a major exporter of fertilizer
- Exports of oil and gas

When did farmers actually market their grain and buy their inputs

My initial prediction back in April was off

- Initially thought NFI might exceed 2001
- Now, a different story



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Weather is a big factor this year

Fairly typical nation-wide corn and soybean production

Kansas corn production will be well below normal

Soybeans below average too but not as bad as corn

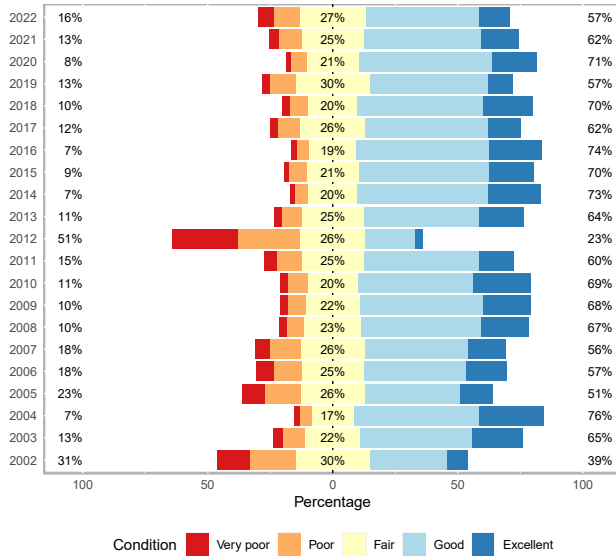
Wheat yields of 39 bu/ac is 15% below the trend line yield of 45.6 bu/ac



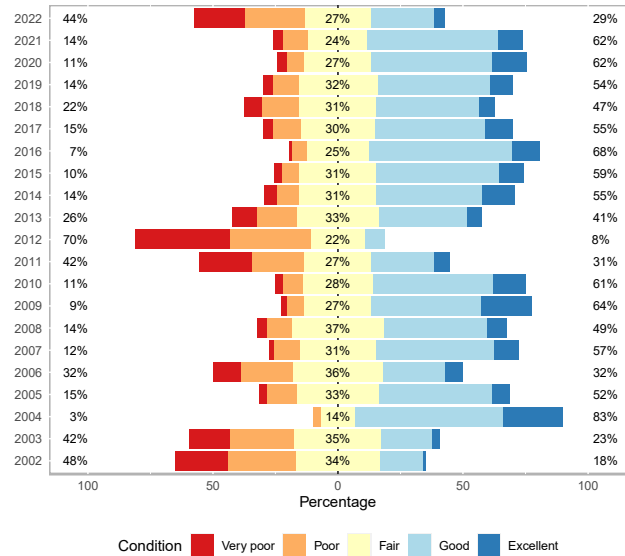
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Condition of US Corn as of 8/14/22



Condition of Kansas Corn as of 8/14/22



Predicted Corn Acres

June crop report had 3M less acres than last year

Kansas though will see a large drop in harvested acres

- 5.4M planted acres
- 5.05M June crop report acres
- Final harvested acres are expected to be 4.7M acres
 - A lot of corn is likely headed to silage

Corn Harvested Acres by State - 8/14/22
1,000 acres

State	Last year	Planted acres	June acres	2022 harvest estimate		
				Lower CI	Predicted	Upper CI
Colorado	1,150	1,480	1,210	1,181	1,212	1,244
Illinois	10,850	10,700	10,450	10,315	10,397	10,479
Indiana	5,270	5,100	4,950	4,870	4,917	4,964
Iowa	12,450	12,700	12,250	12,093	12,176	12,260
Kansas	5,400	5,400	5,050	4,513	4,698	4,883
Kentucky	1,440	1,500	1,390	1,356	1,373	1,390
Michigan	1,990	2,250	1,890	1,801	1,845	1,889
Minnesota	7,840	8,200	7,800	7,649	7,762	7,875
Missouri	3,430	3,600	3,430	3,335	3,398	3,462
Nebraska	9,560	9,700	9,400	9,014	9,161	9,307
North_Carolina	905	890	840	792	817	841
North_Dakota	3,630	3,000	2,750	2,431	2,610	2,790
Ohio	3,340	3,400	3,170	3,073	3,136	3,199
Pennsylvania	990	1,230	885	886	909	932
South_Dakota	5,480	5,900	5,400	5,005	5,189	5,373
Tennessee	960	970	920	890	931	973
Texas	1,850	2,300	1,900	1,744	1,829	1,914
Wisconsin	3,040	4,000	3,000	2,874	2,956	3,039
Total	—	79,575	82,320	76,685	75,317	76,812



Predicted Corn Yields

Many states will have average or above average yields

- Illinois, Iowa, Michigan, Minnesota

Kansas though will see a large drop in corn yields

- 139 bu/ac state average last year
- 113 bu/ac this year (19% lower)
- Range from 107 to 120 bu/ac



Corn Yields per Acre by State - 8/14/22

Bushels per harvested acre

State	Last year	2022 prediction			R squared
		Lower CI	Predicted	Upper CI	
Colorado	129.0	124.0	130.8	137.6	-0.02
Illinois	202.0	201.1	205.5	209.9	0.67
Indiana	195.0	176.9	180.4	183.9	0.72
Iowa	205.0	198.8	202.5	206.3	0.60
Kansas	139.0	106.6	113.3	120.0	0.54
Kentucky	192.0	141.0	146.6	152.3	0.82
Michigan	174.0	169.3	172.1	174.9	0.53
Minnesota	178.0	191.6	195.5	199.4	0.52
Missouri	160.0	147.6	151.5	155.3	0.80
Nebraska	194.0	174.7	179.4	184.2	0.58
North_Carolina	149.0	111.5	115.0	118.6	0.83
North_Dakota	105.0	142.4	147.6	152.7	0.33
Ohio	193.0	176.2	179.4	182.7	0.73
Pennsylvania	169.0	150.8	154.0	157.2	0.74
South_Dakota	135.0	147.9	152.1	156.4	0.56
Tennessee	170.0	132.5	139.0	145.5	0.82
Texas	128.0	110.0	116.0	121.9	0.55
Wisconsin	180.0	178.8	182.3	185.9	0.51

Predicted Corn Production

U.S. corn production is expected to be 6% below last year

Kansas – 29% drop in corn production

- Range from 36% to 22% lower

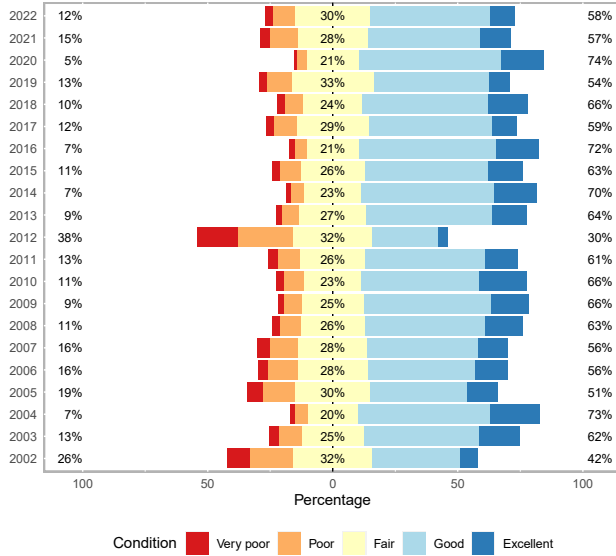


Total Corn Production by State - 8/14/22

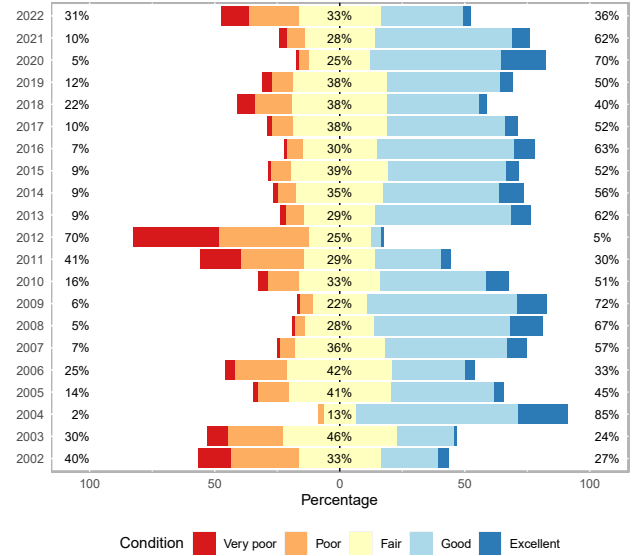
1,000,000 bushels

State	Last year	2022 prediction		
		Lower CI	Predicted	Upper CI
Colorado	148	146	159	171
Illinois	2,192	2,074	2,137	2,200
Indiana	1,028	861	887	913
Iowa	2,552	2,404	2,466	2,529
Kansas	751	481	532	586
Kentucky	276	191	201	212
Michigan	346	305	318	330
Minnesota	1,396	1,465	1,517	1,570
Missouri	549	492	515	538
Nebraska	1,855	1,575	1,644	1,714
North_Carolina	135	88	94	100
North_Dakota	381	346	385	426
Ohio	645	541	563	584
Pennsylvania	167	134	140	147
South_Dakota	740	740	789	840
Tennessee	163	118	129	142
Texas	237	192	212	233
Wisconsin	547	514	539	565
Total	—	14,107	12,668	13,227

Condition of US Soybeans as of 8/14/22



Condition of Kansas Soybeans as of 8/14/22



Predicted Soybean Acres

June crop report had 1M more acres than last year

Kansas soybean acres are higher too

- 5M planted acres
- 4.95M June crop report acres

The model to predict soybean acres based on the percent of the crop in the very poor category doesn't predict very well

- Likely other uses (silage) for very poor corn

Soybean Harvested Acres by State - 8/14/22
1,000 acres

State	Last year	Planted acres	June acres
Arkansas	3,010	3,200	3,170
Illinois	10,510	11,200	11,100
Indiana	5,640	5,850	5,830
Iowa	10,030	10,300	10,220
Kansas	4,800	5,000	4,950
Kentucky	1,840	2,050	2,040
Louisiana	1,060	1,150	1,130
Michigan	2,140	2,250	2,230
Minnesota	7,580	7,500	7,430
Mississippi	2,180	2,300	2,270
Missouri	5,650	5,900	5,850
Nebraska	5,570	5,600	5,550
North_Carolina	1,640	1,800	1,790
North_Dakota	7,120	5,700	5,850
Ohio	4,880	4,950	4,930
South_Dakota	5,390	5,400	5,450
Tennessee	1,520	1,800	1,770
Wisconsin	2,070	2,250	2,220
Total	—	82,630	83,780



Predicted Soybean Yields

National yields will be slightly less than last year (about 1 bu/ac lower)

Soybeans are a more difficult crop to predict

- Lower R-squared values compared to corn
- Seed size and pod fill difficult to gauge

Kansas soybean yields are expected to be lower but not to the extent of corn

- 11% lower at 35.2 bu/ac
- Range 32.6 to 37.8 bu/ac

Soybean Yields per Acre by State - 8/14/22
Bushels per harvested acre

State	Last year	2022 prediction			R squared
		Lower CI	Predicted	Upper CI	
Arkansas	51.0	53.2	54.4	55.6	0.56
Illinois	64.0	59.4	60.9	62.4	0.25
Indiana	59.5	54.9	56.0	57.1	0.47
Iowa	62.0	55.5	57.0	58.6	0.28
Kansas	39.5	32.6	35.2	37.8	0.46
Kentucky	56.0	46.1	48.3	50.6	0.45
Louisiana	52.0	53.7	55.0	56.3	0.45
Michigan	51.0	46.8	48.3	49.9	0.07
Minnesota	47.0	48.2	49.6	51.1	0.28
Mississippi	54.0	52.3	53.6	54.8	0.53
Missouri	49.0	45.8	46.9	48.0	0.57
Nebraska	63.0	56.8	58.0	59.2	0.60
North_Carolina	40.0	35.8	36.7	37.6	0.62
North_Dakota	25.5	33.1	34.7	36.4	0.09
Ohio	56.5	53.5	54.6	55.7	0.44
South_Dakota	40.0	42.1	43.8	45.4	0.25
Tennessee	50.0	40.8	42.6	44.4	0.69
Wisconsin	55.0	47.4	49.9	52.3	0.07



Predicted Soybean Production

U.S. soybean production is expected to be near last year's number

- More acres but lower yield

Kansas – 8% drop in soybean production

- Range from 15% to 2% lower

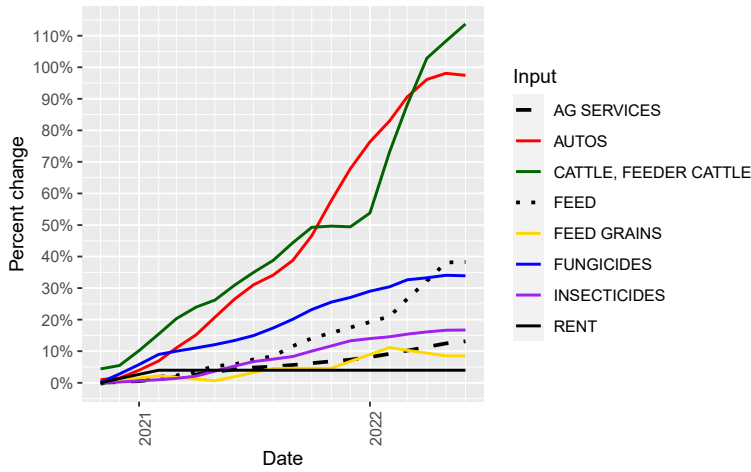
Total Soybean Production by State - 8/14/22
1,000,000 bushels

State	Last year	2022 prediction			
		Lower CI	Predicted	Upper CI	
Arkansas	154	169	172	176	
Illinois	673	660	676	693	
Indiana	336	320	326	333	
Iowa	622	567	583	599	
Kansas	190	162	174	187	
Kentucky	103	94	99	103	
Louisiana	55	61	62	64	
Michigan	109	104	108	111	
Minnesota	356	358	369	379	
Mississippi	118	119	122	124	
Missouri	277	268	274	281	
Nebraska	351	316	322	329	
North_Carolina	66	64	66	67	
North_Dakota	182	193	203	213	
Ohio	276	264	269	274	
South_Dakota	216	230	239	248	
Tennessee	76	72	75	79	
Wisconsin	114	105	111	116	
Total	—	4,271	4,124	4,250	4,377



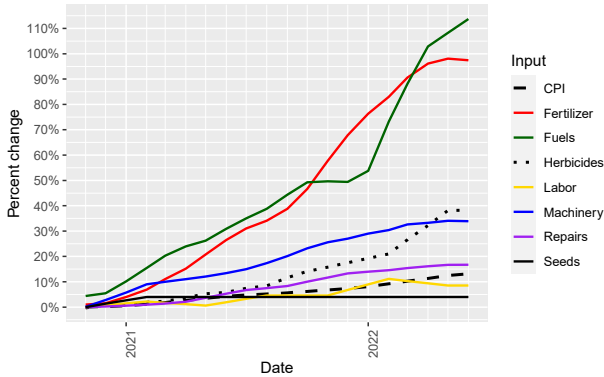
What about expenses?

USDA Price Indexes Relative to 2020-11-01

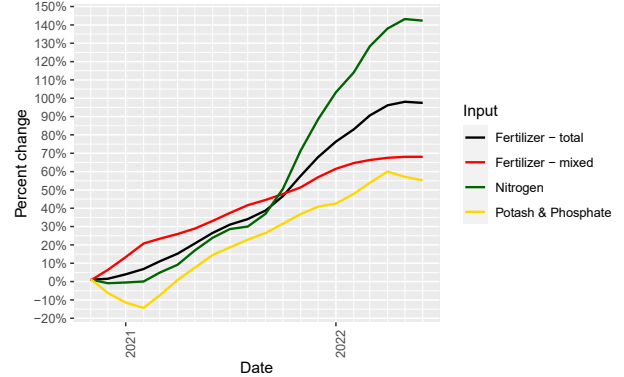


USDA expense indexes (cont.)

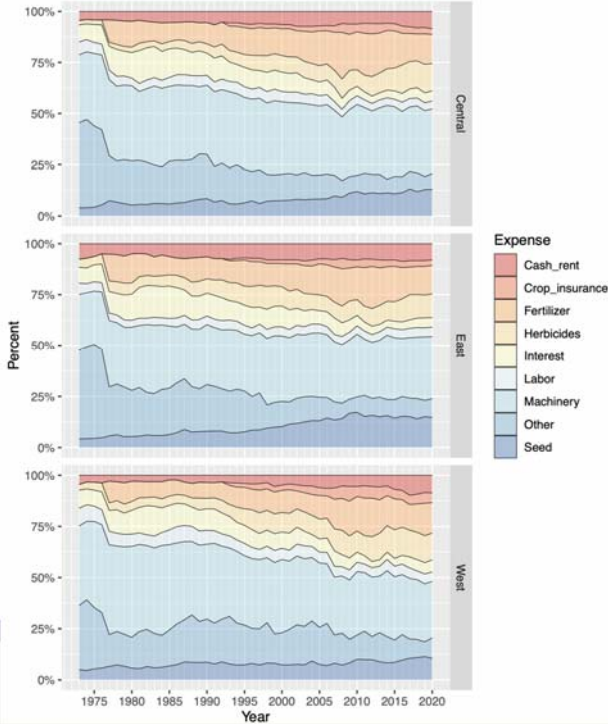
USDA Price Indexes Relative to 2020-11-01



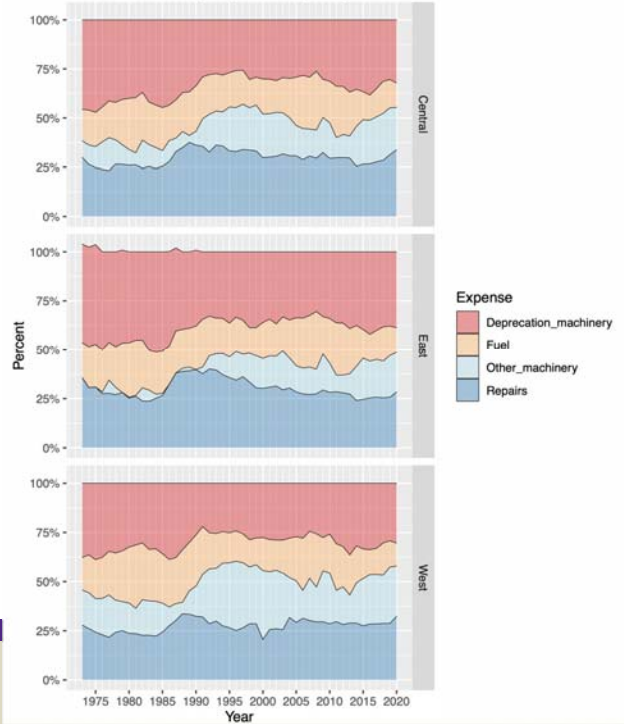
USDA Fertilizer Indexes Relative to 2020-11-01



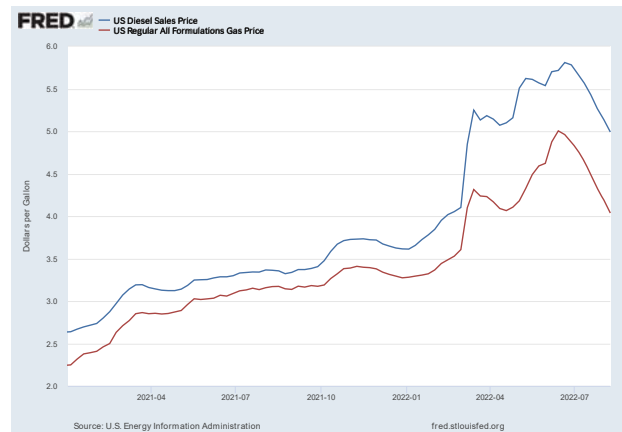
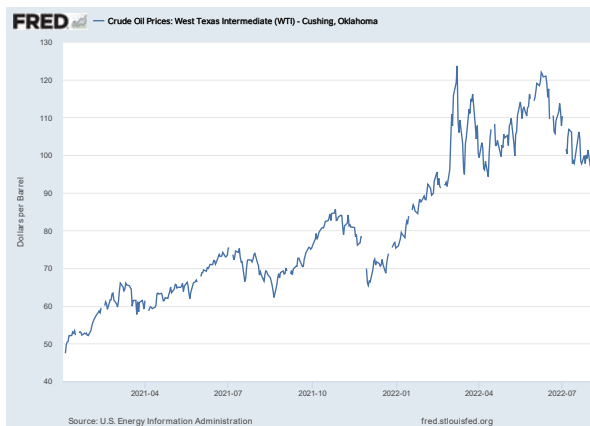
Percent Crop Expenses by Region



Percent Machinery Expenses by Region



Gas and Diesel and Oil



Refinery capacity and utilization

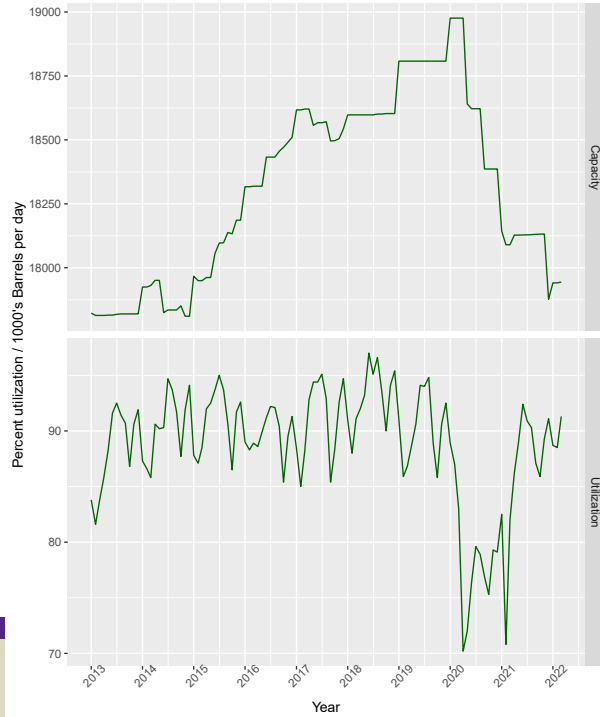
U.S. has the capability to produce nearly all the oil we need

Refinery system is a bottleneck

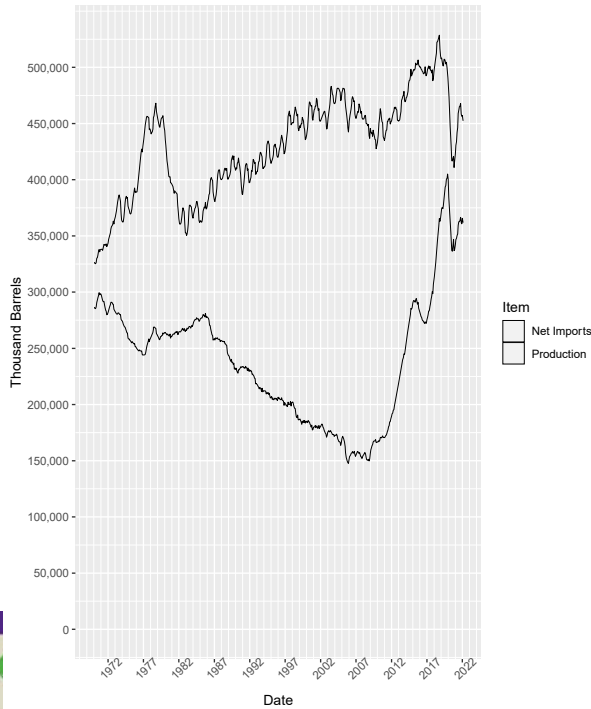
- Last new refinery built back in the 1970s
- Baling wire and duct tape



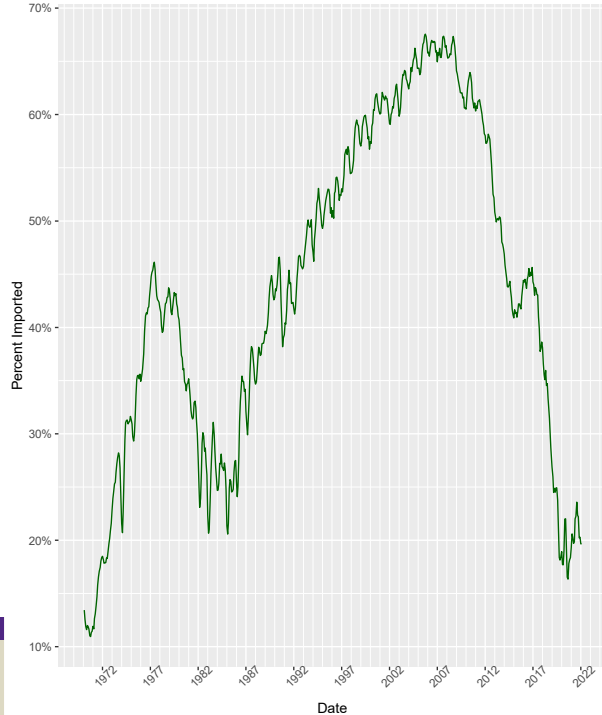
Refinery Capacity and Utilization



U.S. Oil Use by Production and Net Imports

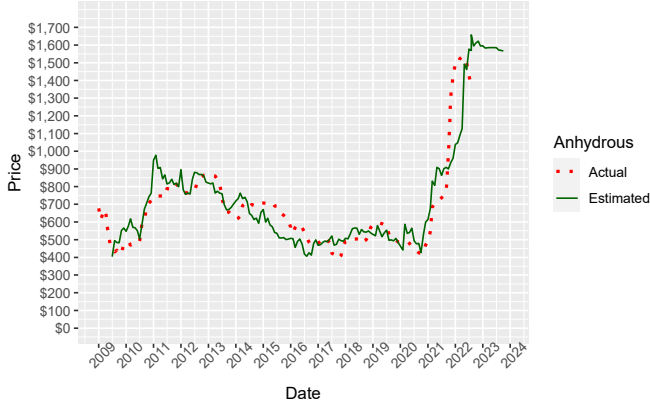


Percent of U.S. Oil - Imported



Fertilizer

Anhydrous Price – Actual vs Predicted

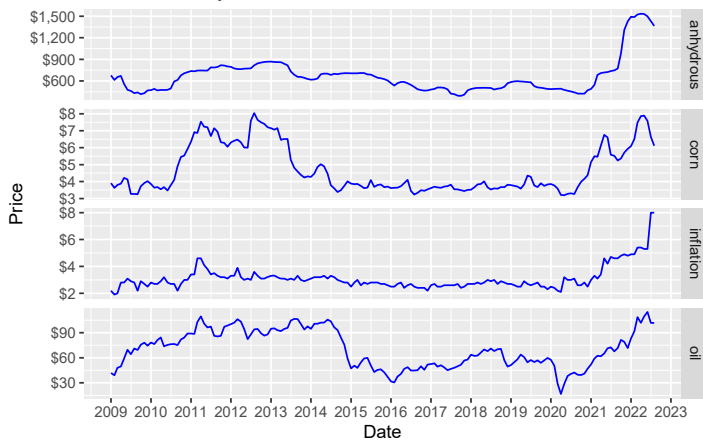


Anhydrous Price – Actual vs Predicted



What make a good fertilizer model?

Historical Anhydrous, Corn, Inflation, and Oil Prices



$$\begin{aligned}
 \text{Anhydrous ammonia } (\$/\text{ton}) = & \\
 & - 165 \\
 & + 33.5 * \text{corn } (\$/\text{bu}) \\
 & + 2.38 * \text{oil_6 mo lag } (\$/\text{barrel}) \\
 & + 159 * \text{inflation expectations_2 mo} \\
 & \text{lead}
 \end{aligned}$$

Based on \$95 oil, 8% inflation, and current corn prices – Anhydrous is unlikely to go below \$1200



	2020	2021	2022(p)	Est 2023
Income				
Beef	\$ 57,021	\$ 72,372	\$ 83,228	\$ 91,551
Dairy-livestock	152	45	48	50
Dairy-milk	-	-	-	-
Sheep	164	198	198	198
Swine	2,139	2,851	3,421	3,421
Poultry and eggs	227	241	241	241
Other livestock	864	518	523	523
Custom feeding	8,640	11,481	12,284	12,284
Ad hoc pmt - Livestock	12,874	3,443	-	-
minus Feed purchased	26,397	30,338	37,923	41,715
Livestock VFP	\$ 55,684	\$ 60,811	\$ 62,020	\$ 66,553
Com	233,332	359,103	284,622	310,624
Grain sorghum	50,125	70,658	63,883	58,491
Soybeans	221,696	259,624	248,470	280,675
Sunflowers	2,419	979	-	-
Wheat	76,169	149,149	169,091	166,575
Hay and forage	12,540	18,578	20,435	22,479
Other crop	-	-	-	-
Govt payment (farm bill only)	32,420	19,384	-	-
Ad hoc pmt - Crops	49,292	43,826	-	-
Crop ins proceeds	23,038	16,279	114,493	29,237
Machine work	16,963	15,933	17,092	17,946
Other income and hedging	37,527	31,302	32,867	33,525
Crop VFP	\$ 755,522	\$ 985,205	\$ 949,955	\$ 919,553
TOTAL VFP	\$ 811,205	\$ 1,046,016	\$ 1,011,975	\$ 986,106
Expenses				
Hired Labor	26,278	28,251	30,891	33,980
Machinery Repairs	56,046	63,311	72,488	78,287
Irrigation Repairs	2,271	2,312	2,543	2,925
Building Repairs	3,609	4,038	4,240	4,664
Seed/Other Crop Expenses	80,923	83,100	108,398	122,685
Crop Insurance	20,350	28,775	33,620	36,982
Fertilizer-Lime	90,825	107,127	200,558	239,274
Machine Hire	25,854	29,243	37,553	41,309
Organization Fees, Publications	5,598	6,039	6,310	6,941
Vet-Med-Drugs	4,133	4,086	4,413	4,855
Misc Crop Expense	4,423	6,359	6,894	7,584
Misc Livestock Expense	2,251	2,325	2,558	2,686
Dairy Expense	-	-	-	-
Gas-Fuel-Oil	22,761	29,863	59,477	71,372
Irrigation Energy	4,892	5,607	6,728	8,747
Real Estate Taxes	12,194	12,402	12,650	13,282
Personal Property Taxes	2,513	2,548	2,666	2,799
General Farm Insurance	14,211	15,178	15,909	17,500
Utilities	6,555	7,535	8,262	9,088
Cash Farm Rent	51,467	55,856	58,649	64,514
Herbicide-Insecticide	77,048	88,068	117,621	129,383
Conservation	2,191	2,617	2,891	3,036
Auto Expense	796	860	1,526	1,679
Other expenses	(79)	33	33	33
Total Operating Expenses	\$ 517,111	\$ 585,537	\$ 796,880	\$ 903,604
Interest paid	29,356	34,376	26,336	28,432
Depreciation - machinery	65,612	72,283	83,126	91,438
Depreciation - buildings	8,160	8,353	8,520	8,520
Total Farm Expenses	\$ 620,239	\$ 690,549	\$ 914,852	\$ 1,031,994
Net Farm Income	\$ 190,966	\$ 355,467	\$ 97,124	\$ (45,888)

Grain prices are above historical norms but below earlier this spring

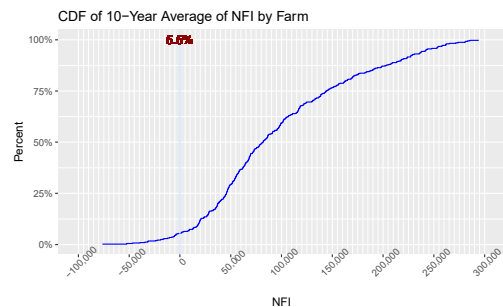
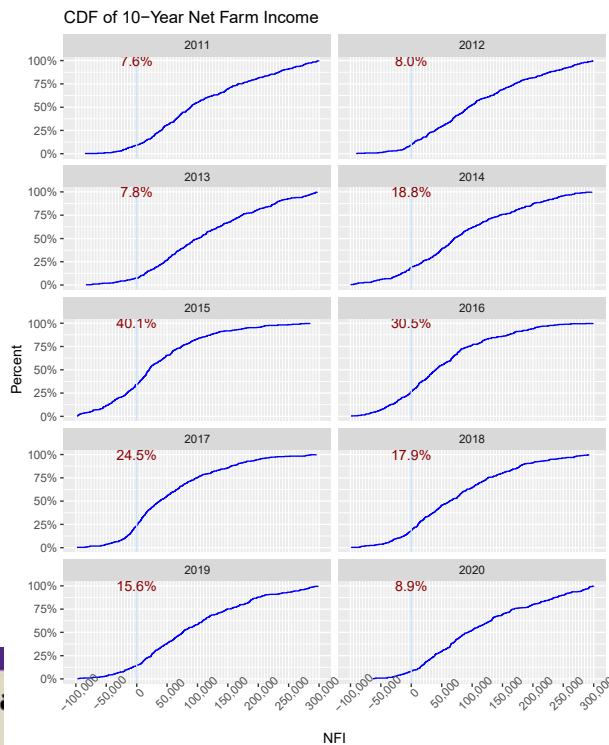
Poor yields offsetting higher grain prices

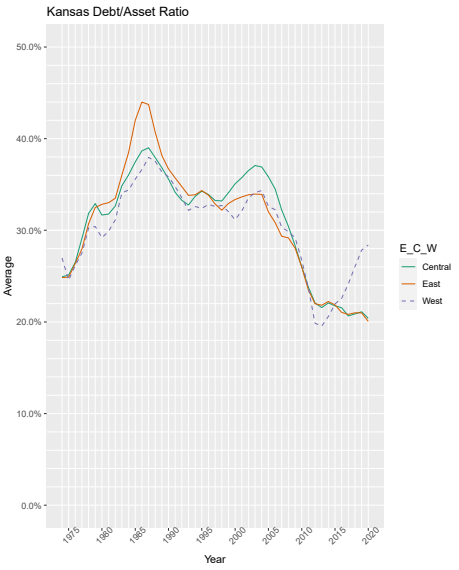
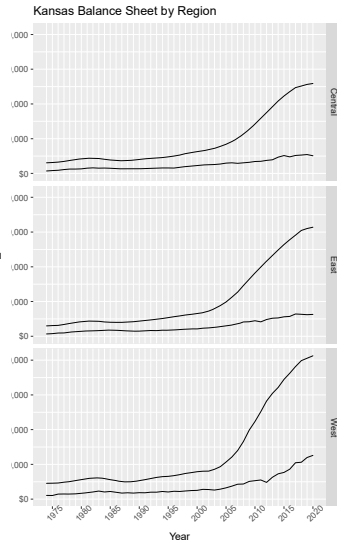
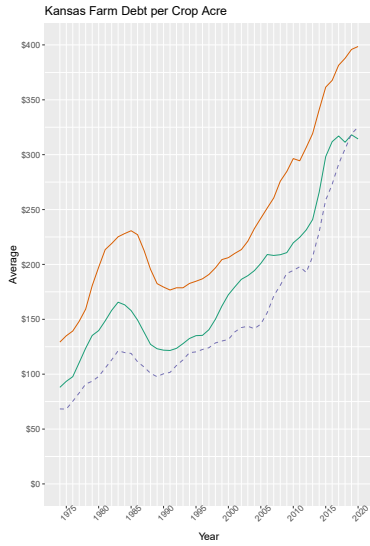
Farmers likely to feel the majority of input increases in 2022

While 2022 is likely to be profitable for many grain farms (crop insurance is likely to be a big factor), 2023 looks to be a difficult year

	Net Farm Income			
	2020	2021	2022(p)	Est 2023
NFI	\$ 190,966	\$ 355,467	\$ 97,124	\$ (45,888)
% Change		86%	-73%	-147%

How are farms doing?





Is the 1980's Farm Crisis coming back?



Thank you!

Gregg Ibendahl

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