



A Revised Estimate of Corn Production From the 18 Leading Corn States

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August 31, 2022

farmdoc daily (12): 132

Recommended citation format: Ibendahl, G. "A Revised Estimate of Corn Production From the 18 Leading Corn States." *farmdoc daily* (12): 132, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, August 31, 2022.

Permalink: <https://farmdocdaily.illinois.edu/2022/08/a-revised-estimate-of-corn-production-from-the-18-leading-corn-states.html>

Introduction

Five weeks ago, [Ibendahl \(2022\)](#) provided a prediction of national corn yields, acres, and total production. This prediction was based on the USDA weekly crop reports which rates the percentage of the corn crop in each state as either: very poor, poor, fair, good, or excellent. Based on the state crop conditions from 7/24/22 (week 29), Ibendahl estimated a national corn yield of 175.7 bu/ac and a total national production of 14.261 billion bushels. This current paper updates the earlier forecast with the most recent crop condition report – 8/28/22 (week 34).

Update to procedure

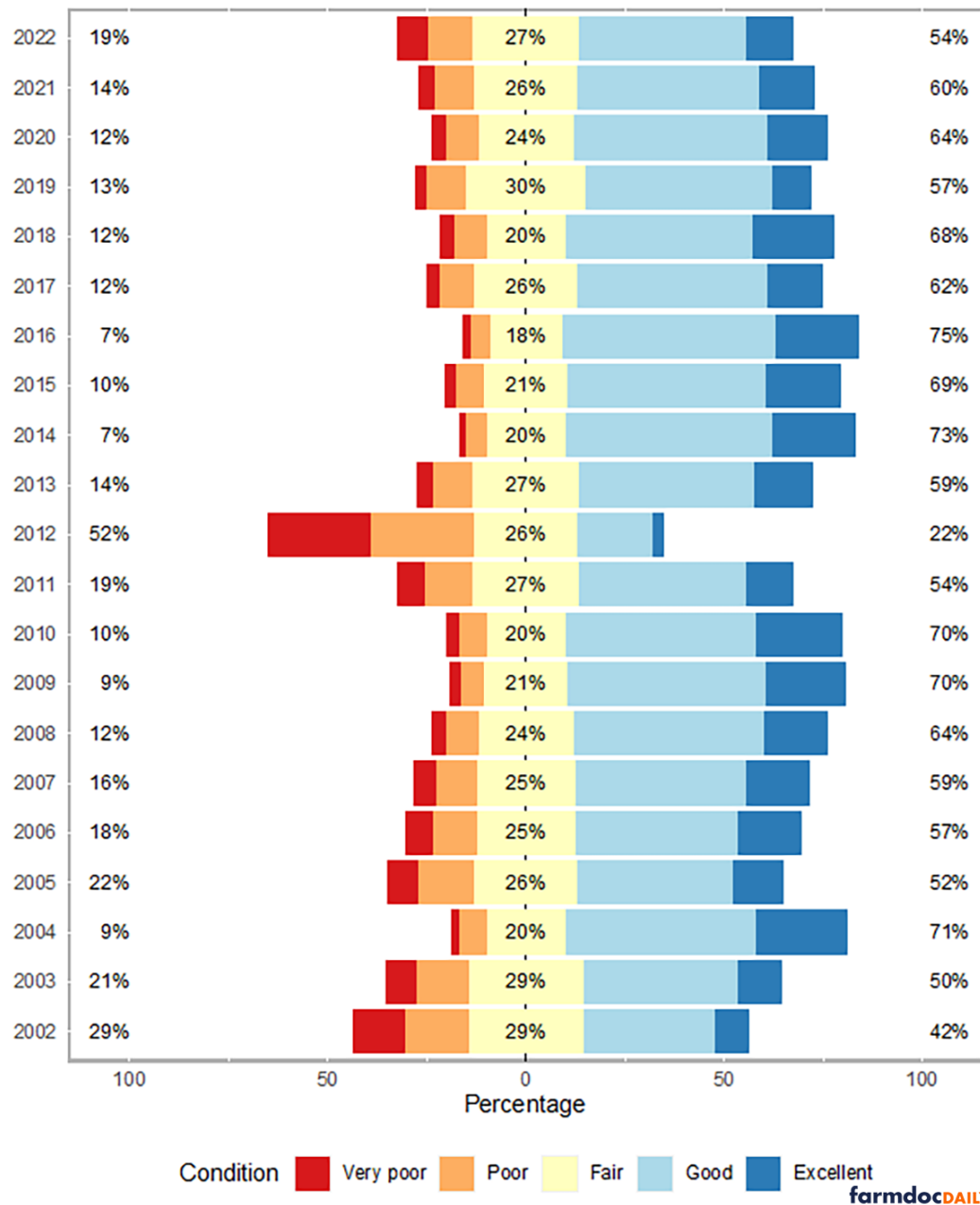
Like the July estimate, both the yield and harvested acres are estimated at the state level for the 18 major corn states. These state estimates are then combined to predict national corn production. Corn yields are based on a regression model using an index of crop condition reports from the same week over the last 30 years. Because the model accuracy improves over time, the model for this week (week 34) should be more accurate than the week 29 estimate. Each state is estimated individually so the model is unique to each state and for each week. Corn acres are also estimated at the state level using the percent of corn acres in the very poor category.

Results

Figure 1 is a Likert graph of the corn crop conditions for the last 20 years in the U.S. (The USDA provides a U.S. number in addition to the individual state numbers). The Likert graph is centered on the fair category to make comparisons among years easier. The number along the left-hand-side of the figure is the total of the very poor and poor categories while the number along the right-hand-side is the total of the good and excellent categories.

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**Figure 1. Historical Corn Crop Conditions for U.S. Corn –
8/28/22 (Week 34)**
Condition of US Corn as of 8/28/22



In the last five weeks, the corn crop has gotten slightly worse. In July, 14% of the corn crop was in the very poor and poor categories. Now, that very bottom group has increased to 19%. Likewise, the percentage of corn in the good and excellent categories has decreased from 61% to 54%.

Even though there is a five-week negative change in the crop condition, that seems to be the historical norm. In most of the last 20 years, the percent of corn in the bottom two categories has increased during the month of August. While 2022 doesn't stick out like 2012, it still is a below normal year for crop conditions. In the last 20 years, only 5 years have had a higher percentage of the corn crop in the very poor and poor categories.

Table 1 shows the estimated yield per harvested acre prediction along with the confidence intervals for each state as of 8/28/22 (week 34.). Because the crop is closer to harvest, the model accuracy has

improved. Despite the national corn crop looking worse, the yield outlook has improved in several states from five weeks ago. However, the biggest corn state, Iowa, has seen their predicted yield decline by 4 bu/ac from five weeks ago.

Table 1. Estimated Yield per Harvested Acre for 18 States as of 8/28/22

Corn Yields per Acre by State - 8/28/22					
Bushels per harvested acre					
State	Last year	2022 prediction			R squared
		Lower CI	Predicted	Upper CI	
Colorado	129.0	121.0	130.9	140.7	-0.03
Illinois	202.0	200.4	204.7	209.0	0.67
Indiana	195.0	178.6	181.9	185.2	0.74
Iowa	205.0	200.0	203.6	207.2	0.64
Kansas	139.0	104.9	112.0	119.1	0.54
Kentucky	192.0	137.7	142.6	147.4	0.89
Michigan	174.0	170.2	172.5	174.7	0.69
Minnesota	178.0	193.3	197.3	201.3	0.51
Missouri	160.0	153.5	156.9	160.4	0.82
Nebraska	194.0	169.9	176.1	182.4	0.52
North_Carolina	149.0	110.4	114.4	118.4	0.80
North_Dakota	105.0	144.1	149.5	154.9	0.36
Ohio	193.0	176.5	179.2	181.9	0.82
Pennsylvania	169.0	149.6	152.4	155.1	0.81
South_Dakota	135.0	147.9	152.1	156.4	0.56
Tennessee	170.0	124.2	132.0	139.8	0.82
Texas	128.0	104.4	111.8	119.3	0.53
Wisconsin	180.0	178.8	182.1	185.4	0.55

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Table 2 shows the estimated harvest acres for each state using the percent of corn in the very poor category as of week 34. The USDA, in their August crop production report, predicted corn acres at the same level as their June report except for a small decline in Minnesota. The model used here mostly reflects that except for a larger decline in Kansas, Colorado, and Nebraska.

Table 2. Estimated Harvested Acres for 18 States as of 8/28/22

Corn Harvested Acres by State - 8/28/22							
1,000 acres							
State	Last year	Planted acres	Aug acres	2022 harvest estimate			
				Lower CI	Predicted	Upper CI	
Colorado	1,150	1,480	1,210	1,004	1,065	1,125	
Illinois	10,850	10,700	10,450	10,309	10,388	10,468	
Indiana	5,270	5,100	4,950	4,870	4,918	4,967	
Iowa	12,450	12,700	12,250	12,084	12,170	12,256	
Kansas	5,400	5,400	5,050	4,506	4,695	4,883	
Kentucky	1,440	1,500	1,390	1,359	1,380	1,401	
Michigan	1,990	2,250	1,890	1,797	1,843	1,890	
Minnesota	7,840	8,200	7,700	7,526	7,652	7,778	
Missouri	3,430	3,600	3,430	3,345	3,405	3,464	
Nebraska	9,560	9,700	9,400	8,882	9,084	9,285	
North_Carolina	905	890	840	795	819	844	
North_Dakota	3,630	3,000	2,750	2,438	2,628	2,817	
Ohio	3,340	3,400	3,170	3,073	3,134	3,195	
Pennsylvania	990	1,230	885	883	908	933	
South_Dakota	5,480	5,900	5,400	4,982	5,179	5,375	
Tennessee	960	970	920	891	960	1,028	
Texas	1,850	2,300	1,900	1,630	1,764	1,897	
Wisconsin	3,040	4,000	3,000	2,879	2,962	3,045	
Total	—	79,575	82,320	76,585	73,253	74,952	76,651

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The predicted harvested acres for the 18 major corn states is estimated to be 74.962 million acres. This is a decline of 0.9% from five weeks ago and a decline of 5.8% from last year.

Table 3 shows the estimated corn production by state and is produced by multiplying Table 1 and Table 2 together. The current estimate is for 13.161 billion corn bushels from the 18 biggest corn states with a range of 12.562 billion to 13.777 billion corn bushels. Corn production of 13.161 billion bushels from these 18 states would represent a 6.7% decline in corn production from last year. However, this August estimate is only 1.1% below the July estimate.

Table 3. Estimated Corn Production for 18 States as of 8/28/22

Total Corn Production by State - 8/28/22					
1,000,000 bushels					
State	Last year	2022 prediction			
		Lower CI	Predicted	Upper CI	
Colorado	148	121	139	158	
Illinois	2,192	2,066	2,127	2,188	
Indiana	1,028	870	895	920	
Iowa	2,552	2,417	2,478	2,540	
Kansas	751	473	526	582	
Kentucky	276	187	197	207	
Michigan	346	306	318	330	
Minnesota	1,396	1,455	1,510	1,566	
Missouri	549	513	534	556	
Nebraska	1,855	1,509	1,600	1,694	
North_Carolina	135	88	94	100	
North_Dakota	381	351	393	436	
Ohio	645	542	562	581	
Pennsylvania	167	132	138	145	
South_Dakota	740	737	788	840	
Tennessee	163	111	127	144	
Texas	237	170	197	226	
Wisconsin	547	515	539	565	
Total	—	14,107	12,562	13,161	13,777

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Table 4 projects the 18 leading corn states acres and production into a national total for acres and production. To get the national totals, the acres and corn production from the 18 major corn states are compared to the harvested acres and production from those same 18 states last year. These percentage changes are then used to adjust the national harvested acres and production from last year. These national projections thus assume that the same changes in the 18 major corn states apply to the other corn states.

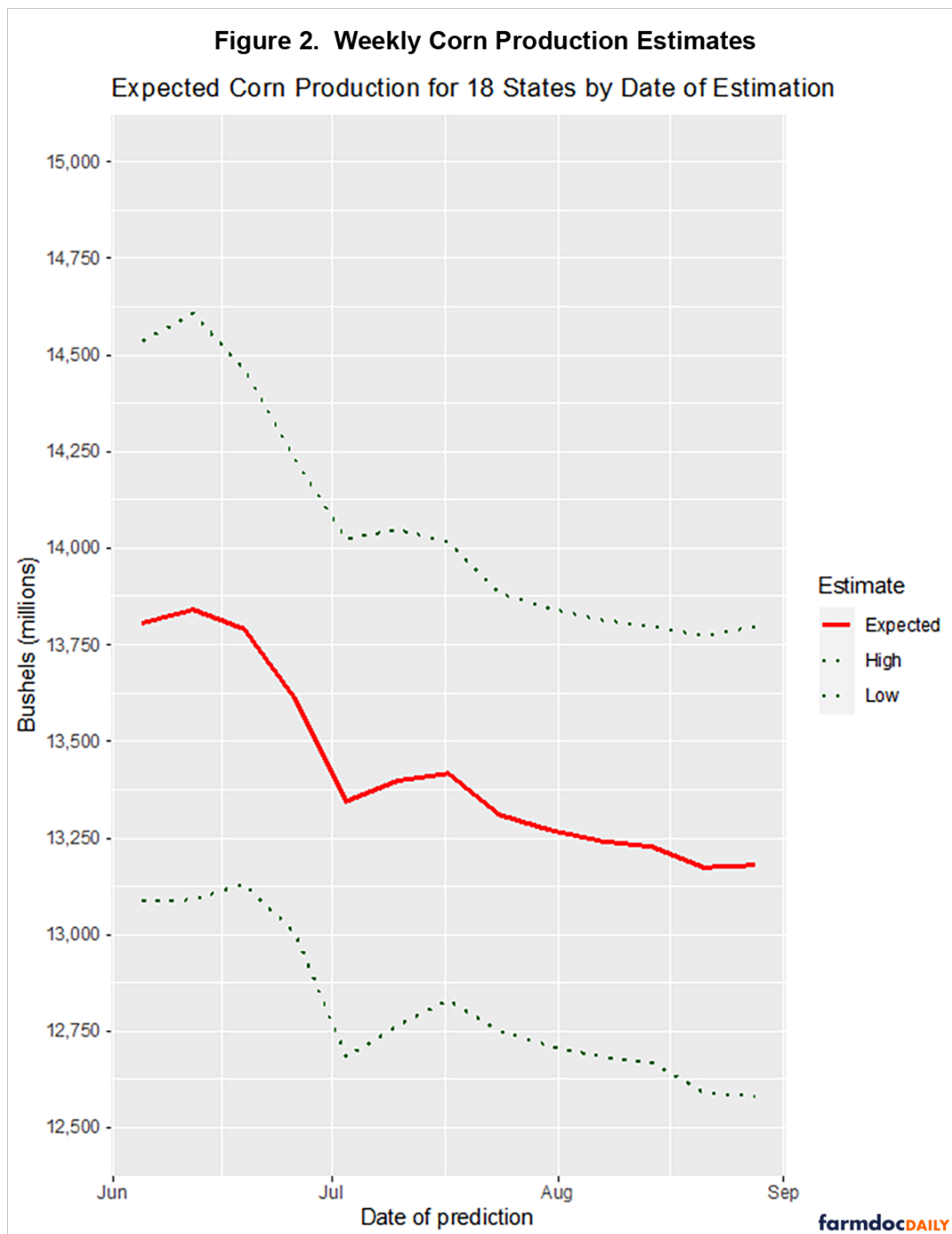
Table 4. National Projections for Corn Acres, Yields, and Total Production

		Model (est acre)	Actual Aug acres
Acres (1,000 ac)	Low	78,604	
	Expected	80,427	81,840
	High	82,250	
Yield/ac	Low	171.2	
	Expected	175.3	175.3
	High	179.5	
Production (1,000,000 bu)	Low	13,460	
	Expected	14,101	14,349
	High	14,761	

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Because the yield per acre from the individual states can't be summed together, the shown yield per acre is calculated from the total production divided by the total harvested acres. As the table indicates, total production is expected to be 14.101 billion bushels with a range from 13.460 to 14.761 billion bushels. Harvest acres are expected to be 80.427 million acres with a range from 78.604 to 82.250 million acres. These numbers are all calculated using estimated harvested acres as a function of the June acres. The last column in Table 4 has the actual August corn acre numbers from the USDA. This number (81.840 million acres) assumes harvested acres equal the August estimated acres.

Figure 2 shows how the model prediction has changed during the growing season. Estimates have been trending downward most of the year reflecting the worsening crop conditions in the U.S.



Other points

The USDA in their August 12 Crop Production report predicted an average yield of 175.4 bu/ac. The model developed here predicts an average yield of 175.3 bu/ac. It probably shouldn't be surprising that the USDA estimate is so close to this paper's estimate given the model is based on USDA crop reports. What might be a little surprising is that the predicted yield has not dropped very much during the last half of August.

References

Ibendahl, G. "An Estimate of Corn Production From the 18 Leading Corn States." *farmdoc daily* (12):111, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, July 27, 2022.

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