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

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Introduction

Last month, Ibendahl (2022) provided a prediction of national soybean yields, acres, and total production. This prediction was based on the USDA weekly crop reports which rates the percentage of the soybean crop in each state as either: very poor, poor, fair, good, or excellent. Based on the state crop conditions from 7/31/22 (week 30), Ibendahl estimated a national soybean yield of 50.4 bu/ac and a total national production of 4.413 billion bushels. This current paper updates the earlier forecast with the most recent crop condition report – 8/28/22 (week 34).

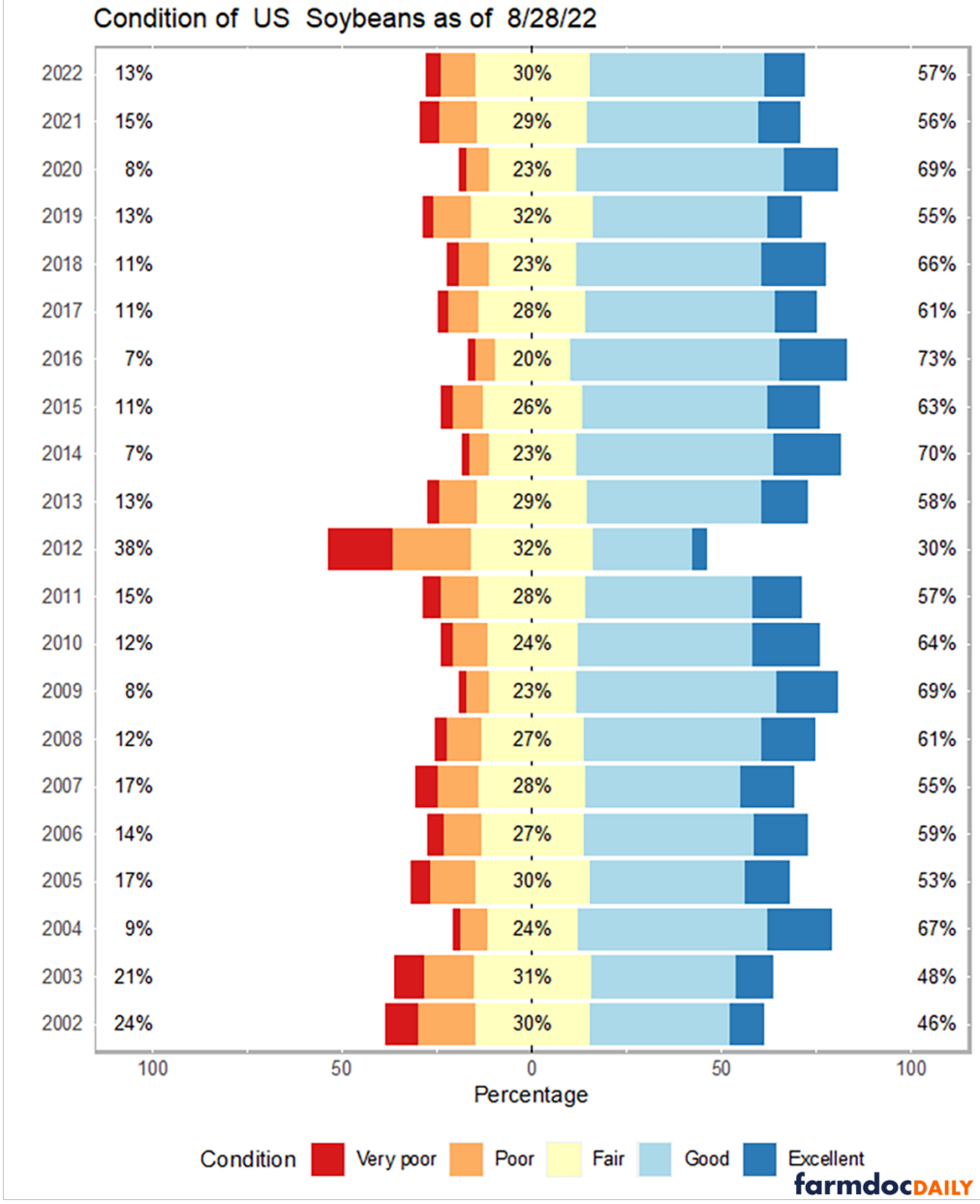
Procedure

The same procedure used in the week 30 estimate is used here. The weekly crop conditions for week 34 are used to calculate an index and then the last 30 years of index values from week 34 are used in a regression model to estimate yields. Each state is estimated individually and then combined into a national estimate. Soybean acres are taken from the August crop production report.

Results

Figure 1 is a Likert graph of the soybean crop conditions for the last 20 years in the U.S. for the last 20 years. This national number is provided by the USDA in addition to the individual state numbers. The Likert graph has the percent of crop acres in the very poor and poor categories listed on the left-hand-side while the number of acres in the good and excellent categories is listed on the right-hand-side. The Likert graph is centered on the fair category which has the percentage listed in the center of the column.

Figure 1. Historical Soybean Crop Conditions for the U.S. – 8/28/22 (Week 34)



As Figure 1 illustrates, the national soybean crop conditions have remained steady for the last month. Currently, 13% of the soybeans are in the very poor and poor categories. At the end of July, there was 11% of the crop in these two categories. Nationally, the 2022 soybean condition looks almost identical to last year. In the last 20 years, 10 years have had the same or greater percentage of the crop in the bottom two categories compared to this year.

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.). This estimation is based on 30 years of observations from week #34. The R-square values have improved since the end of July but those are still lower than the corn prediction model. Soybeans are a more difficult crop to estimate for yields.

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

Soybean Yields per Acre by State - 8/28/22

Bushels per harvested acre

		2022 prediction			
State	Last year	Lower CI	Predicted	Upper CI	R squared
Arkansas	51.0	51.9	52.7	53.5	0.68
Illinois	64.0	59.6	61.0	62.3	0.36
Indiana	59.5	55.1	56.1	57.0	0.60
Iowa	62.0	56.0	57.1	58.2	0.61
Kansas	39.5	30.8	33.1	35.4	0.67
Kentucky	56.0	47.6	49.0	50.5	0.69
Louisiana	52.0	51.8	53.1	54.4	0.45
Michigan	51.0	47.7	49.1	50.4	0.34
Minnesota	47.0	48.9	50.2	51.5	0.44
Mississippi	54.0	52.8	54.1	55.5	0.42
Missouri	49.0	47.1	48.3	49.4	0.61
Nebraska	63.0	55.3	56.8	58.3	0.57
North_Carolina	40.0	37.4	38.2	39.1	0.61
North_Dakota	25.5	33.5	35.2	36.8	0.18
Ohio	56.5	53.5	54.5	55.5	0.54
South_Dakota	40.0	42.3	43.8	45.3	0.33
Tennessee	50.0	42.6	43.9	45.3	0.77
Wisconsin	55.0	49.2	51.0	52.7	0.55

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Table 2 shows the harvested acres from last year, the planted soybean acres this year, and the USDA August soybean estimate of acres. The USDA lowered estimated harvested acres slightly in two states from the June estimate. With this new estimate, soybean harvested acres are expected to increase 1.03% from last year.

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

Soybean Harvested Acres by State - 8/28/22

1,000 acres

	State	Last year	Planted acres	Aug 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	5,650
	Ohio	4,880	4,950	4,930
	South_Dakota	5,390	5,400	5,350
	Tennessee	1,520	1,800	1,770
	Wisconsin	2,070	2,250	2,220
Total	—	82,630	84,200	83,480

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Table 3 shows the estimated soybean production by state and is the result of multiplying the August acre estimate by the expected yields. Because yields in some of the major soybean growing areas are estimated to be lower, total production is expected to be 0.68% lower even though acres are expected to be higher. Total production when scaled to a national level is expected to be 4.405 billion bushels with a range from 4.290 billion bushels to 4.52 billion bushels.

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

Total Soybean Production by State - 8/28/22

1,000,000 bushels

State	Last year	2022 prediction		
		Lower CI	Predicted	Upper CI
Arkansas	154	165	167	170
Illinois	673	662	677	692
Indiana	336	321	327	332
Iowa	622	572	584	595
Kansas	190	153	164	175
Kentucky	103	97	100	103
Louisiana	55	59	60	61
Michigan	109	106	109	112
Minnesota	356	363	373	383
Mississippi	118	120	123	126
Missouri	277	276	282	289
Nebraska	351	307	315	324
North_Carolina	66	67	68	70
North_Dakota	182	189	199	208
Ohio	276	264	269	274
South_Dakota	216	226	234	242
Tennessee	76	75	78	80
Wisconsin	114	109	113	117
Total —	4,271	4,131	4,242	4,353

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Table 4 lists these estimated national numbers. Table 4 also shows the calculated yield per acre. Last year, the national yield per acre was 51.4 bushels per acre. This year, the national yield per acre is expected to be nearly a full bushel lower at 50.5 bushels per acre with a range from 49.2 to 51.8 bushels per acre. The expected yield per acre has only changed by 0.1 bu/ac from the July estimate (50.4 bu/ac).

The USDA August Crop Production Report is estimating a national yield of 51.9 which is at the top end of the confidence interval shown in this paper.

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

		Aug Acres
Acres (1,000 ac)	Expected	87,211
Yield/ac	Low	49.2
	Expected	50.5
	High	51.8
Production (1,000,000 bu)	Low	4,290
	Expected	4,405
	High	4,520

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References

Ibendahl, G. "An Estimate of Soybean Production From the 18 Leading Soybean States." *farmdoc daily* (12):115, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, August 4, 2022.

USDA, National Agricultural Statistics Service. *Crop Production* (August 2022). https://downloads.usda.library.cornell.edu/usda-esmis/files/tm70mv177/n5840309g/2n49v849f/crop0822.pdf