



Using Preliminary FSA Data to Project Final Planted Acreage for Corn and Soybeans

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Each year the USDA's National Agricultural Statistics Service (NASS) provides estimates of planted acreage of corn and soybeans in the U.S. These estimates provide important fundamental information about potential crop size and have important implications for the price of corn and soybeans. As a result, market participants spend considerable effort in forming expectations about the magnitude of these acreage estimates. Since 2011, the USDA's Farm Service Agency (FSA) has also issued monthly reports of planted acreage to the public beginning in August based on farmer reports received and summarized to date. The usefulness of the FSA planted acreage data has been the subject of considerable debate. The purpose of this article is to estimate the relationship between the preliminary and final FSA planted acreage and to use this relationship to predict final NASS planted acreage for corn and soybeans in 2020. This article updates the analysis of FSA planted acreage found in this earlier *farmdoc daily* article ([January 27, 2016](#)).

Analysis

FSA policy requires that producers participating in several Federal commodity programs submit an annual report regarding all cropland use on their farms, including planted acreage and prevented plant acreage. (See the *farmdoc daily* article from [August 20, 2020](#) for analysis of FSA prevented plant acreage data). The deadline for reporting acreage each year is July 15th for most crops. In consideration of the COVID-19 pandemic, the FSA waived the late fee for 30 days this summer, which raises the possibility that the normal pattern of reporting to FSA will not hold in 2020. The FSA issues monthly reports of planted acreage to the public beginning in August based on farmer reports received and summarized to date. The final report is released in January and, in theory, that data represent a complete census of planted acreage enrolled in the farm programs administered by the FSA.

While FSA acreage data represent a census of planted acreage enrolled in farm programs, the FSA acreage data do not function as official USDA planted acreage estimates. This makes sense because not all farms are enrolled in the farm programs administered by the FSA. The official planted acreage estimates are the responsibility of NASS, a different agency in the USDA. The progression of official NASS planted acreage estimates for the year begins with the *Prospective Plantings* report released on

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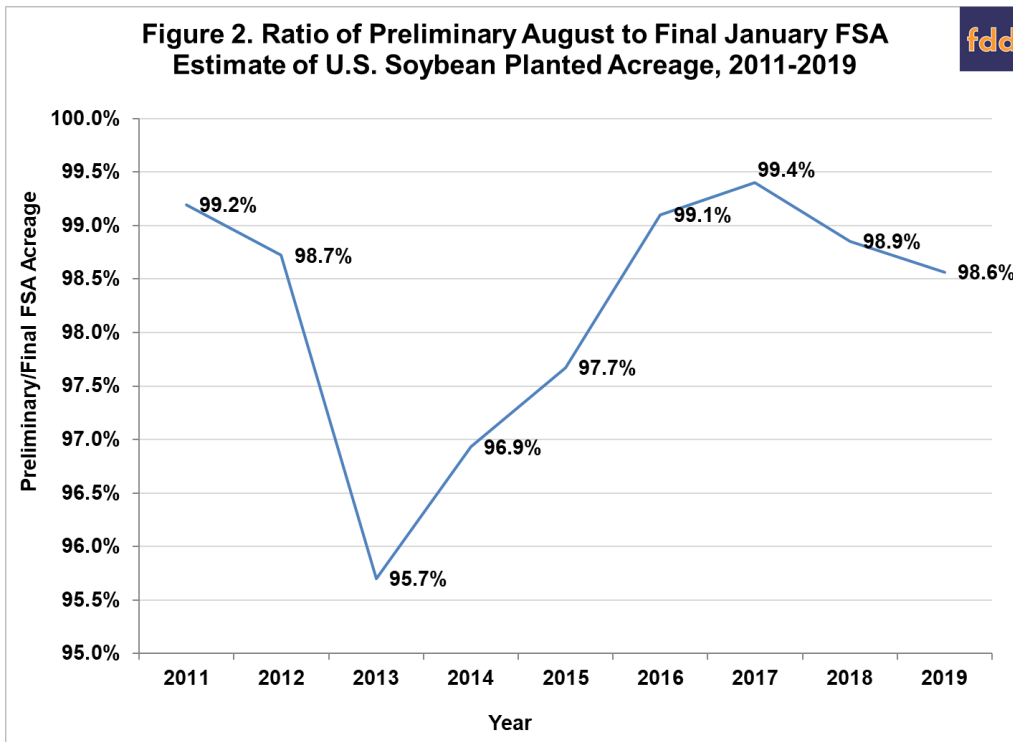
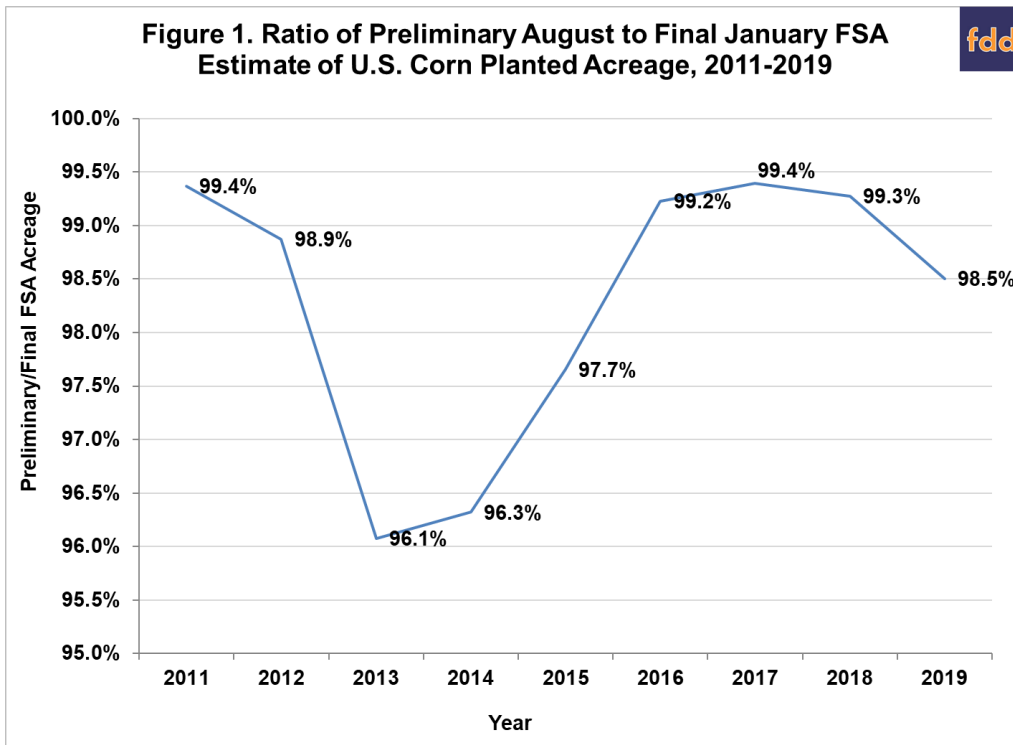
the last business day of March, is followed by the *Acreage* report released on the last business day of June, and finally the *Crop Production Annual Summary* report released in January after harvest. FSA data on planted acreage released in October are sometimes used by NASS to adjust their survey-based planted acreage estimates. It should be emphasized that the administrative FSA data are used by NASS to supplement survey data and there are likely statistical limits on the magnitude of changes in estimates made in October. Conversations with NASS statisticians indicate the changes are typically no more than one standard error from the previous estimate.

We begin our analysis by reviewing the relationship between the preliminary and final planted acreage estimates for corn and soybeans from 2011 through 2019. The time period is selected based on the availability of FSA data at the [FSA website](#). As shown in Table 1, all but a very small slice of planted acreage for corn and soybeans is generally reported to the FSA by August. For example, over 2011-2019 the average ratio of preliminary to final FSA planted acreage for corn and soybeans is 98.3 and 98.2 percent, respectively. The average ratios both move above 99 percent in September and reporting is virtually complete by October.

Crop/Month	2011-2019			2016-2019		
	Average	Low	High	Average	Low	High
Panel A: Corn						
August	98.3%	96.1%	99.4%	99.1%	98.5%	99.4%
September	99.4%	98.1%	99.9%	99.8%	99.6%	99.9%
October	99.7%	98.5%	99.9%	99.9%	99.8%	99.9%
November	99.8%	99.2%	100.0%	99.9%	99.9%	100.0%
December	99.9%	99.7%	100.0%	100.0%	99.9%	100.0%
Panel B: Soybeans						
August	98.2%	95.7%	99.4%	99.0%	98.6%	99.4%
September	99.5%	98.8%	99.9%	99.7%	99.3%	99.9%
October	99.7%	99.1%	100.0%	99.8%	99.5%	100.0%
November	99.9%	99.6%	100.0%	99.9%	99.6%	100.0%
December	99.9%	99.8%	100.0%	99.9%	99.8%	100.0%

Notes: FSA denotes the Farm Service Agency of the USDA.

There is some variation in the relationship between preliminary and final prevented plant acreage that is obscured by the averages over 2011-2019 in Table 1. As examples, Figures 1 and 2 present the yearly ratios for corn and soybeans in August, respectively. Two things stand out. First, there was a sharp drop in reporting during 2013 and 2014, possibly due to the transition to new rules under the 2014 farm bill. Second, there is overall an upward trend in reporting for August over time. Consequently, we also present statistics for the ratio of preliminary and final planted acreage in Table 1 only for the last four years, 2016-2019. This increases the average ratio for corn and soybeans in August to 99.1 and 99.0 percent, respectively.



The next step of the analysis is to examine the relationship between final FSA and NASS estimates of planted acreage. Tables 2 and 3 for corn and soybeans, respectively, show that the relationships are quite consistent. For corn, the final FSA estimate of planted acreage averages 96.7 percent of final NASS planted acreage over 2011-2019 and the range is less than 2 percent. For soybeans, the final FSA estimate of planted acreage averages 98.4 percent of final NASS planted acreage over 2011-2019 and the range is only 0.5 percent. Finally, the average percentages change only slightly if the lowest observation (2014) is excluded. The consistency of the relationships make sense because enrollment in FSA farm programs varies relatively little from year-to-year.

Table 2. U.S. Planted Acres of Corn Estimated by NASS and Reported to FSA, 2007-2019

Year	NASS (thousand acres)	FSA (thousand acres)	Difference (thousand acres)	FSA/NASS (%)
2011	91,921	88,864	3,057	96.7
2012	97,155	94,070	3,085	96.8
2013	95,365	92,399	2,966	96.9
2014	90,597	86,505	4,092	95.5
2015	87,999	85,143	2,856	96.8
2016	94,004	91,066	2,938	96.9
2017	90,167	87,361	2,806	96.9
2018	89,129	86,398	2,731	96.9
2019	89,700	87,176	2,524	97.2
Full Sample:				
Average			3,006	96.7
Low			2,524	95.5
High			4,092	97.2
w/out 2014:				
Average			2,870	96.9
Low			2,524	96.7
High			3,085	97.2

Note: NASS planted acreage is the January estimate released in the year after planting.

Table 3. U.S. Planted Acres of Soybeans Estimated by NASS and Reported to FSA, 2007-2019

Year	NASS (thousand acres)	FSA (thousand acres)	Difference (thousand acres)	FSA/NASS (%)
2011	74,976	73,773	1,203	98.4
2012	77,198	75,879	1,319	98.3
2013	76,533	75,299	1,234	98.4
2014	83,701	81,757	1,944	97.7
2015	82,650	81,370	1,280	98.5
2016	83,433	82,106	1,327	98.4
2017	90,142	88,752	1,390	98.5
2018	89,196	87,965	1,231	98.6
2019	76,100	75,084	1,016	98.7
Full Sample:				
Average			1,327	98.4
Low			1,016	97.7
High			1,944	98.7
w/out 2014:				
Average			1,250	98.5
Low			1,016	98.3
High			1,390	98.7

Note: NASS planted acreage is the January estimate released in the year after planting.

We now have the necessary information to project final NASS planted acreage for corn and soybeans in 2020 based on the planted acreage in the August 2020 report issued by the FSA. The computations are as follows:

	FSA August Planted Acreage	Assumed Ratio Preliminary/Final	Estimated Final FSA Planted Acreage	Assumed Ratio FSA/NASS	Estimated Final NASS Planted Acreage	NASS June Planted Acreage
Corn	81,121,755	99.1%	81,858,350	96.9%	84,495,888	92,006,000
Soybeans	75,906,283	99.0%	76,689,775	98.5%	77,889,456	83,825,000
Total	157,028,038		158,548,124		162,385,344	175,831,000

Notice that there are two stages in the computations. The first is to estimate final FSA planted acreage by dividing the reported August FSA figure by the assumed ratio of preliminary to final FSA acreage. In this case, we use the 2015-2019 averages for this ratio. The second step is estimate the final NASS planted acreage by dividing the estimated final FSA planted acreage by the assumed ratio of final FSA to NASS planted acreage. We use the averages over 2011-2019 after excluding 2014 to estimate these ratios. Given these assumptions, we estimate final NASS planted acreage for corn and soybeans to be 84.5 and 77.9 million acres, respectively. These estimates are 7.5 and 6.0 million less than the NASS June Acreage estimates for corn and soybeans, which seems very unrealistic. As noted earlier, the July

15th reporting deadline was effectively waived for 30 days this year due to the COVID-19 pandemic. The most likely explanation is therefore delayed reporting compared to the historic pattern, which implies that the historical average ratio of preliminary to final FSA estimates assumed in the calculation was too high.

As an alternative, we redo the computations but assume the lowest FSA reporting ratio for corn and soybeans that occurred over 2011-2019, which was 96.1 and 95.7 percent, respectively. The alternative computations are as follows:

	FSA August Planted Acreage	Assumed Ratio Preliminary/Final	Estimated Final FSA Planted Acreage	Assumed Ratio FSA/NASS	Estimated Final NASS Planted Acreage	NASS June Planted Acreage
Corn	81,121,755	96.1%	84,436,636	96.9%	87,157,249	92,006,000
Soybeans	75,906,283	95.7%	79,317,830	98.5%	80,558,623	83,825,000
Total	157,028,038		163,754,466		167,715,871	175,831,000

If the true reporting level for August 2020 is as assumed above, we estimate final NASS planted acreage for corn and soybeans to be 87.1 and 80.6 million acres, respectively. These estimates are 4.8 and 3.3 million less than the NASS June *Acreage* estimates for corn and soybeans, which still seems unrealistic.

It seems probable from the analysis that FSA reported of corn and soybean planted acreage in August 2020 was the smallest on record. We estimate the magnitude of the reporting outlier below by forcing our estimated final NASS planted acreages to equal the NASS June planted acreage and solve for the ratio of preliminary to final FSA estimates, as follows:

	FSA August Planted Acreage	Assumed Ratio Preliminary/Final	Estimated Final FSA Planted Acreage	Assumed Ratio FSA/NASS	Estimated Final NASS Planted Acreage	NASS June Planted Acreage
Corn	81,121,755	91.0%	89,134,034	96.9%	92,006,000	92,006,000
Soybeans	75,906,283	92.0%	82,533,898	98.5%	83,825,000	83,825,000
Total	157,028,038		171,667,931		175,831,000	175,831,000

The computations shows that it takes an extremely low ratio of preliminary to final FSA acreage to reconcile the reported FSA August data with the NASS June planted acreage. In particular, the assumed ratio of preliminary to final NASS acreage has to fall to 91 and 92 percent for corn and soybeans, respectively. This is possible given the COVID-related delays in reporting and processing FSA data, but it would truly be a very large outlier compared to historical reporting patterns.

Implications

Since 2011, the USDA's Farm Service Agency (FSA) has issued monthly reports starting in August of planted acreage based on farmer reports received and summarized to date. This data is widely following in the market for clues about possible future revisions to the official USDA planted acreage estimates for corn and soybeans. We show that all but a very small slice of planted acreage for corn and soybeans is generally reported to the FSA by August. For example, over 2011-2019 the average ratio of preliminary to final FSA planted acreage for corn and soybeans is 98.3 and 98.2 percent, respectively. We also show that the relationship between final FSA and NASS planted acreage is quite stable for the two crops. Using these relationships, we project final NASS planted acreage for corn and soybeans in 2020 based on the FSA estimates released earlier this month, which were 81.1 and 79.6 million acres, respectively. Even if one assumes the lowest level of August reporting since 2011, it is difficult to reconcile the August FSA estimates with the NASS June *Acreage* estimates of 92.0 and 83.8 million acres. Either reporting to FSA was substantially lower than any time in the past due to COVID-related delays or the NASS June estimates are too high. We suspect that it is some of both.

References

Good, D. and S. Irwin. "Using FSA Acreage Data to Project NASS January Planted Acreage Estimates for Corn and Soybeans." *farmdoc daily* (6):17, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, January 27, 2016.

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