



The Relationship between Planting Intentions, Actual Plantings, and Prevented Plantings over 2007-2013

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The USDA's *Prospective Plantings* report of March 31 has stimulated an on-going conversation about the relationship between the magnitude of planting intentions estimates and the magnitude of final planted acreage estimates. In particular, the smaller than expected corn acreage in the March 31 report has prompted considerable discussion about the possibility of the USDA survey undercounting total acreage and this is the reason for the "low" figure for corn. In a [farmdoc daily article last week](#), we examined the data and concluded that there does appear to be some room for planted acreage estimates for principal crops to exceed this year's estimate of planting intentions. Our analysis focused on the sampling variability inherent in "final" estimates of planted acreage.

A related question is whether the historical relationship between planting intentions and final planted acreage provides further clues how planted acreage in 2014 might deviate from planting intentions. The analysis of that relationship is complicated by the annual variation in the amount of acreage that goes unplanted due to adverse weather conditions. Consequently, the analysis in today's post examines the relationship between final planted acreage estimates, March planting intention estimates, and the magnitude of prevented planted acres reported to the USDA's Farm Service Agency for the period 2007 through 2013. This is a relatively short period for such an analysis, but the analysis is limited by the publically available data on prevented plantings. The acreage relationships are examined for corn, soybeans, combined corn and soybeans, and all principal crops.

For each of the acreage categories, calculations are first made for the differences between actual acreage planted and March intentions. These differences are shown in the first column under each crop category in Table 1. For corn, the average difference between actual plantings and March intentions is a relatively small 423.3 thousand acres, about 0.5 percent of the average corn acreage during the seven year period. The average difference is even smaller for soybeans. The difference of 57 thousand acres is less than 0.01 percent of the average planted acreage during the period. For combined corn and soybean acreage, the average difference between actual acreage and March intentions of 480.3 thousand acres is 0.3 percent of

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average total planted acreage. Finally, the average difference between actual acreage and March intentions for all principal crops of 766.6 thousand acres is only 0.02 percent of average planted acreage of those crops.

The small average differences between actual planted acres and March intentions for all crop categories implies that March 1 intentions are an unbiased forecast of actual plantings. That is, the March planting intentions estimates did not systematically over forecast or under forecast actual plantings from 2007 through 2013. However, the differences are quite large in some years in all crop categories. So what explains the differences? For the principal crops category, there are two factors that might explain a very small part of the differences. First, estimates of acreage intentions are not made for all principal crops in March. These omitted crops include planted acreage of proso millet, rye, most potatoes, and harvested acreage of sugarcane. Those crops totaled 4.06 million acres in 2013. To the extent that acreage of these crops in any year differs from the previous year's acreage, the March intentions estimate for principal crops would be in error and account for some of the difference between actual acreage and March intentions for all principal crops. Second, not all crops are designated as principal crops. Acreage of non-principal crops, for example, was estimated at 1.9 million acres in 2013. Variation in the magnitude of the acreage of those crops from intentions could result in minor changes in the acreage of principal crops actually planted. A third factor that could impact the differences between planted acreage and intentions is the double counting of failed acres of one crop, most likely winter wheat, that is subsequently planted to a different crop in the same crop cycle. The magnitude of that double counting is not known, but likely varies from year-to-year.

Table 1. Relationships Among Actual Planted Acres, Planting Intentions, and Prevented Plantings: 2007-2013

Year	Corn			Soybeans			Total			PRINCIPAL CROPS		
	Act - Int	Prevent	Total	Act - Int	Prevent	Total	Act - Int	Prevent	Total	Act - Int	Prevent	Total
 thousand acres.....											
2007	3073	494	3567	-2399	590	-1809	674	1084	1758	-1537	1595	58
2008	-32	864	832	925	591	1516	893	1455	2348	2221	1671	3892
2009	1396	1879	3275	1427	933	2360	2823	2812	5635	2194	4183	6377
2010	-606	2102	1496	-694	1347	653	-1300	3449	2149	-2820	6886	4066
2011	-242	3010	2768	-1563	1448	-115	-1805	4458	2653	-8643	9594	951
2012	1291	262	1553	3296	160	3456	4587	422	5009	3742	1239	4981
2013	-1917	3617	1700	-593	1704	1111	-2510	5321	2811	-523	8318	7795
Average	423.3	1746.9	2170.1	57.0	967.6	1024.6	480.3	2714.4	3194.7	-766.6	4783.7	4017.1

A fourth factor that could explain more of the variation between March planting intentions and actual plantings in all of the crop categories considered here is sampling error. As explained in our article last week ([April 4](#)), sampling errors represent the variability between estimates that would result if many different samples were surveyed at the same time. For acreage estimates, those sampling errors are thought to be between 1.0 and 3.0 percent. Errors of that magnitude could explain at least a portion of some of the large differences between March planting intentions and final acreage estimates since both are subject to sampling error.

Another obvious potential explanation for large differences between March planting intentions and actual plantings is the magnitude of prevented planting. Without sampling error, one might expect that large negative differences between actual acreage and March intentions (acreage less than intended) would be explained by large acreage of prevented plantings. That is, if the March planting intentions estimate accounted for all the acreage of principal crops and survey respondents reported intentions to plant all of their acreage, the sum of prevented acreage plus the difference between actual plantings and intentions would be near zero for the category of all principal crops. Said another way, actual plantings plus prevented

plantings would be expected to equal March intentions for all principal crops. As indicated in Table 1, that was not the case for the period 2007 through 2013. Actual plantings plus prevented acreage exceeded March intentions every year, by as little as 58 thousand acres and as much as 7.8 million acres. The average difference was just over four million acres. For corn, soybeans, and combined corn and soybean acreage, the total of actual planted acreage plus prevented plantings exceeded March intentions in every instance except for soybeans in 2007 and 2011.

The question then becomes, why do March planting intentions for principal crops understate the total of actual plantings plus prevented plantings? Perhaps some respondents to the USDA March Agricultural Survey anticipate some prevented acreage at the time of the survey so that planting intentions do not account for all acres operated. While there is no way to know, it seems likely that such instances would not account for much of the difference. Perhaps there is some "inflation" in the estimate of the sum of planted acreage plus prevented acreage. (As mentioned in the post of April 4, the inflation would be akin to the apparently inflated total of planted plus set-aside acres when acreage reduction programs were in place). If that were the case, the differences between planted plus prevented acreage and intentions would be expected to be larger in years of large prevented acres. That relationship, however, is not consistent for the period 2007 through 2013. Finally, March survey respondents may just be conservative in their estimates of planted acreage and/or March survey results may be subject to larger sampling error than subsequent estimates. Subsequent acreage estimates supplement results from the Agricultural Survey with results from an area frame sample. Those subsequent estimates, then, may reflect smaller sampling errors than the March estimates.

Implications for 2014

Our analysis indicates that the prospective plantings of corn, soybeans, and all principal crops are unbiased estimates of final planted acreage. However, there is considerable variation in the relationships from year-to-year and prospective plantings substantially under-estimates the sum of final planted acreage and prevented plantings for the same categories. The inconsistent relationships in planting intentions, actual plantings, and prevented plantings only adds to the difficulty of anticipating actual planted acreage of principal crops in 2014 based on March intentions. Even in view of this uncertainty, recent history strongly suggests that 2014 March intentions for planting of principal crops understates the total of planted acreage plus prevented acreage. We argued last week that a conservative estimate of the understatement is in the range of 2-4 million acres and our analysis today suggests it is still a reasonable benchmark. However, we cannot say with any degree of certainty whether these additional acres will show up in planted acres or prevented plantings.

References

Good, D., and S. Irwin. "[Are There Acres Missing from the USDA's Prospective Plantings Report?](#)" *farmdoc daily* (4):61, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, April 4, 2014.