



Soybean Yields in Illinois

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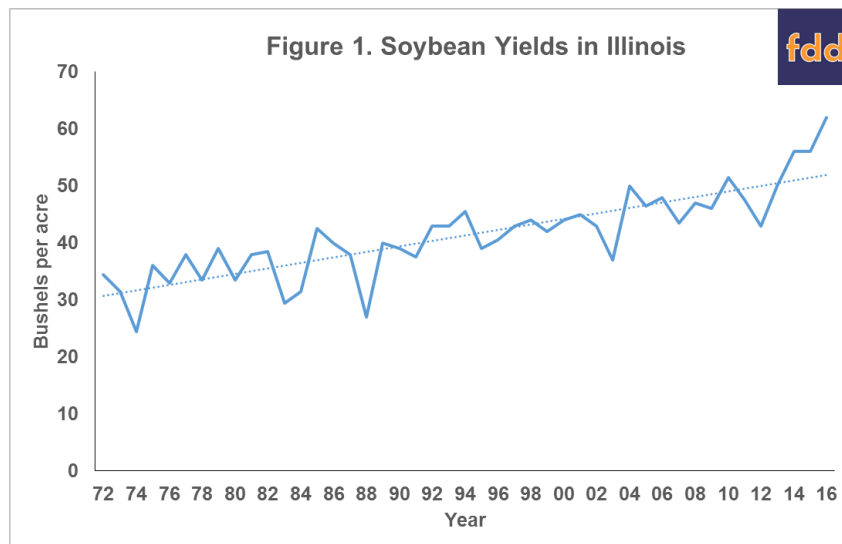
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In recent years, soybean yields in Illinois have been exceptional, leading to questions on whether technologies have caused a "jump" in soybean yields. While the 2016 state yield will be an outlier, it is too early to say that a new regime of soybean yields exists. Relative to corn yields, soybean yields must increase more to have the same relative yields as in the early 1970s.

Comparing Soybean Yields to Trend

State soybean yields for Illinois have been exceptional from 2014 through 2016. In 2014, Illinois' soybean yield was 56 bushels per acre. The 2014 yield was a record high, 4.5 bushels per acre higher than the next highest yield of 51.5 set in 2010. The 2015 state yield again was 56 bushel per acre. In 2016, a new record will be set, with state yield estimated at 62 bushels per acre in the [October Crop Production report](#) produced by the National Agricultural Statistical Service. A 2016 yield of 62 bushels per acre would be 6 bushels per acre higher than the previous highest yield set in 2014 and 2015.



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Comparisons to trend further illustrate how high recent yields have been in Illinois (see Figure 1). Fitting a linear trend through soybean yields results in an increase of .48 bushels per year. The 2014 through 2016 yields are significantly above the trend: 5.1 bushels in 2013, 4.6 bushels per acre in 2015, and 10.1 bushels per acre in 2016. The 2016 yield is a statistical outlier. Only one other yield has been 10 bushels away from the 1972-2016 trend, that being in the 1988 drought year when the actual yield was 11.5 bushels below trend.

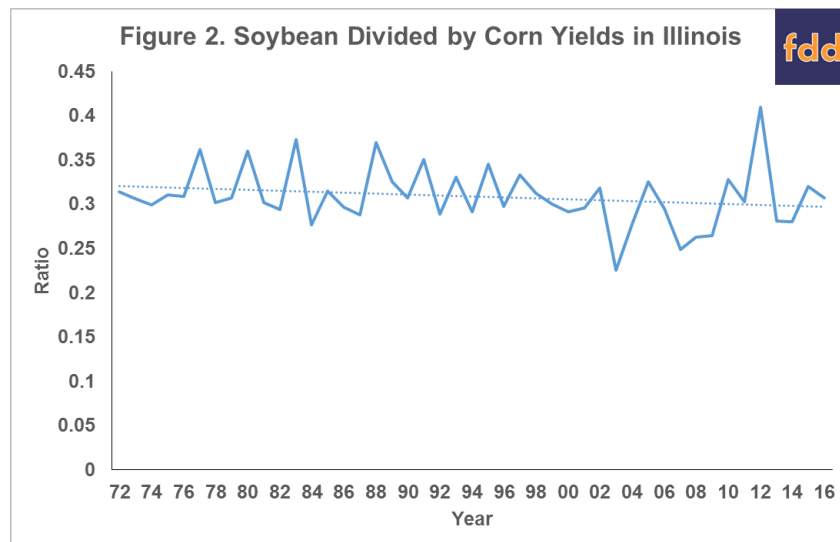
Why are Soybean Yields High?

Recent high soybean yields then lead to the question of what is causing the high yields. Have growing conditions been abnormally good in the past three years, leading to the high yields? Or has technology changed such that a higher yield should be expected in the future? Perhaps genetics have improved, or farmers' use of fungicides and other inputs have been leading to higher yields.

This question – is it good weather or technology changes – is difficult to answer from just observing time series of data. Two contradictory thoughts. Recent yields have been high, and the 2016 yield is a statistical outlier, suggesting technology changes. On the other hand, historical jumps in yields or trends have rarely occurred in the last 50 years. For example, corn yields appeared to be increasing at a faster rate after 1995 than before 1995. Belief in an increasing yield trend decreased after the poorer yields of 2010, 2011, and 2012. The recent high soybean yields in recent years may simply be a signal of exceptional growing conditions.

Soybeans Compared to Corn Trends

While soybeans have had exceptional yielding years recently, soybeans relative to corn yields have not been at historically high levels. Figure 2 shows soybean yields divided by corn yields. Higher levels indicate that soybean yields are higher relative to corn. In 2016, soybeans divided by corn yield is .31, which is not above average.



Over time, soybeans-to-corn yields have been trending downwards. An expected level of soybean-to-corn yields in 1972 was .32. The .31 value in 2016 is below the expectation in 1972. The Illinois state yield for 2016 is projected at 202 bushels per acre. For a .32 soybean-to-corn yield ratio to result in 2016, soybean yield would have to be 64.6 bushels, 2.6 bushels higher than currently projected.

Soybean yields have been declining relative to corn yields because of higher trends for corn. In Illinois, corn yields have been increasing by 1.8 bushels per year compared to .48 bushels per year for soybeans. Over time, the higher increase in corn yields causes lower soybean-to-corn yields

Summary

Soybean yields in Illinois have been exceptional in recent years, with yields being much higher than trend yields. It is too early to say that a permanent change has occurred, and history suggests permanent changes occur rarely.

Reference

USDA, National Agricultural Statistics Service. *Crop Production* (October 2016). Released October 12, 2016. <http://usda.mannlib.cornell.edu/usda/nass/CropProd//2010s/2016/CropProd-10-12-2016.pdf>