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US SOYBEAN YIELD TRENDS—IRRIGATED AND NONIRRIGATED

An article in farmdocdaily authored by Irwin, Hubbs, and Good and titled “[U.S. Soybean Yield Trends for Irrigated and Non-Irrigated Production](#)” provides the status of current yield trends in U.S. soybean production. The following points from this article are noteworthy.

- Irrigated soybean acreage has increased from near zero in 1960 to about 7% of total U.S. harvested acreage in 2016. Production from irrigated acres accounted for between 8% and 9% of total U.S. soybean production in 2016. Irrigated acreage has ranged between 6% and 7% of the harvested acreage since 2000.
- Irrigated acreage has now risen to about 5.5 million harvested acres in the U.S. (*See caveat below*).
- The majority of U.S. irrigated soybean acreage is in Arkansas and Nebraska, which had 2.96 and 2.79 million irrigated soybean acres in 2017, respectively. These irrigated acres were 84.5% and 49.2% of the total soybean acres in each respective state.
- Yield from irrigated acres has increased at a slightly faster pace than yield from nonirrigated acres.
- A quadratic trend fits the pattern of yield increases from irrigated acres better than a linear trend; thus, irrigated yields are increasing at an increasing rate. A linear trend fits the pattern of nonirrigated yield increases, which indicates that nonirrigated yield increases have been steady over time.
- The rate of increase in irrigated yields in recent years (1 bu/acre/year over the last decade) is greater than the rate of increase in nonirrigated yields (0.6 bu/acre/year over the last decade).
- The quadratic trend in U.S. irrigated soybean yields is likely a contributing factor to the apparent quadratic trend in overall U.S. soybean yields in recent years.

Caveat. According to NASS, the number of irrigated acres in Arkansas, Nebraska, and Kansas totaled 5.384 million acres in 2016, and about 6.12 million acres in 2017. Since Mississippi has an estimated 1.25 million acres of irrigated soybean, and the southeastern U.S. has some irrigated soybean acres, the irrigated soybean acres in the U.S. is likely nearer 7.6 million acres, which is about 8.5% of the 2017 U.S. soybean acreage.

Take Home Message

NASS reported U.S. soybean yield data separated for irrigated and nonirrigated production for Arkansas, Kansas, and Nebraska for the 2014-2016 period. In those years, irrigation increased yields above nonirrigated yields in these

respective states by 13.3, 21.2, and 12.3 bu/acre (2014); 16.2, 22.8, and 14.8 bu/acre (2015); and 16.6, 13.6, and 12.4 bu/acre (2016). In 2017, irrigation increased yields in Arkansas and Nebraska by 12.1 and 14.4 bu/acre, respectively.

[Experience from ~25 years of research](#) with nonirrigated and irrigated soybean in Mississippi was that properly timed irrigation applied to soybean produced/should produce yields that were/should be >20 bu/acre more than nonirrigated yields in any given year. The above yield records compiled by NASS often do not reflect this.

Irrigated soybean acreage in the U.S. is less than 9% of the total soybean acreage and likely will remain so for the foreseeable future (may even decline with current/future pressures on water supplies). Therefore, the majority of future increases in U.S. soybean yields will have to come from increases in yields from nonirrigated acres, even if increases from irrigated acres continue a quadratic trend.

This, then, results in an important conclusion. Future research efforts in the U.S. should be mainly directed toward 1) exploring and developing technology to increase soybean yields from nonirrigated soybean acres since these acres are and will continue to be the vast majority used for U.S. soybean production, and 2) developing and promoting guidelines that will result in larger yield increases from irrigation than those currently being realized.

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