# Crop Insurance per Acre Coverage:
# Historical Experience and Potential Issues

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A long standing goal of U.S. crop insurance policy has been to increase the share of production it covers. Over time, both the numbers of acres insured and coverage levels have increased, leading to more coverage of production (see Zulauf and Orden and Zulauf and Schnitkey). Moreover, the amount of coverage has increased at a given coverage level due to policy decisions that have resulted in higher insurance yields and prices. As a result of these policy driven coverage enhancements, the same coverage level in 2017 will provide more coverage than in 2000. Collective impact of the policy driven coverage enhancements are examined by calculating the percent of value of production covered by crop insurance. Over time, the percent value of production covered by crop insurance has increased more than coverage level has increased.

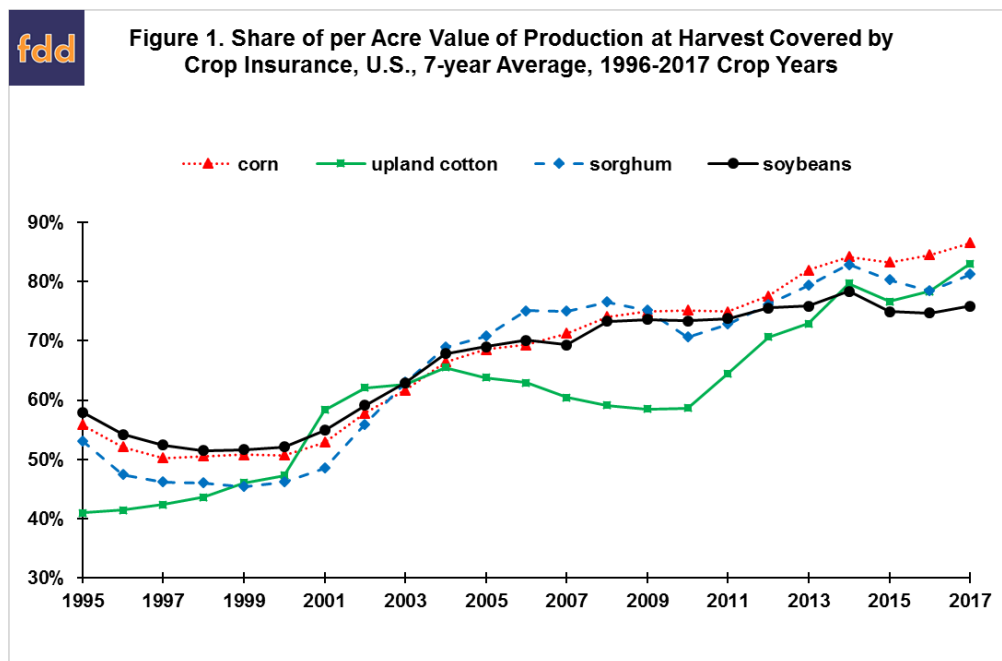**Per Acre Coverage Enhancements** added to crop insurance include

(1)  Increases in transitional yield (t-yield) over time. t-yields are an assigned minimum yield that can be used to replace vary low actual yields when calculating insurance guarantees. Higher t-yields increase guarantees, particularly in high yield risk areas.

(2)  Increased use of HPO (Harvest Price Option). In revenue policies that cover prices and yields, HPO calculates the insurance guarantee with the harvest insurance price if it is higher than the projected insurance price. Guarantees will increase in years in which harvest prices are above projected prices. HPO began with the 1996 crop. See Zulauf, Schnitkey, Coppess and Paulson for further discussion of HPO.

(3)  Trend-yield adjustment to account for yield growth over time. It began with the 2012 crop.  Use of trend yields will increase guarantees.
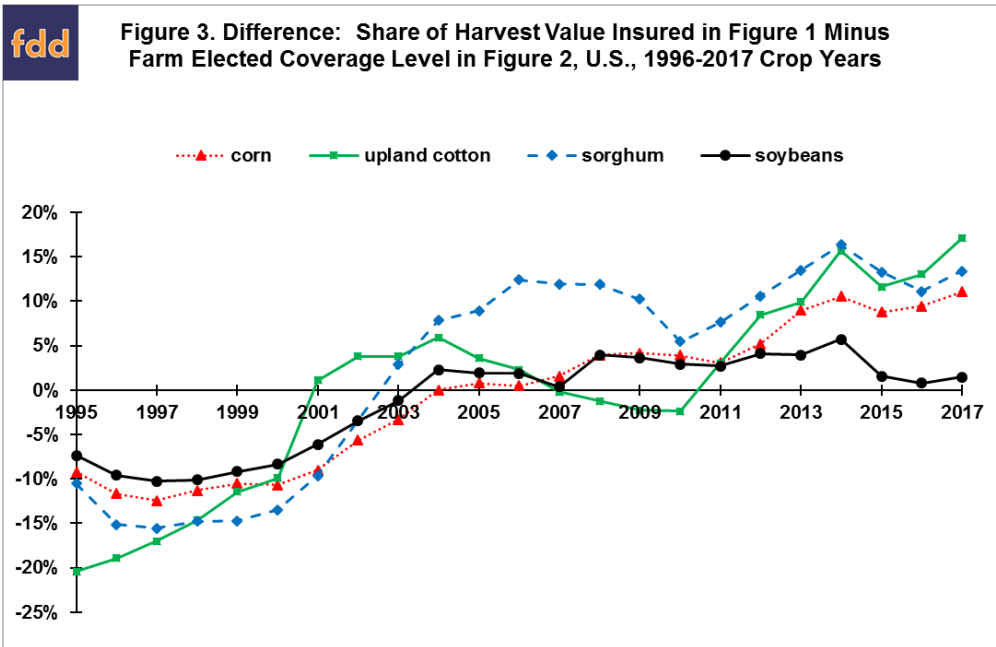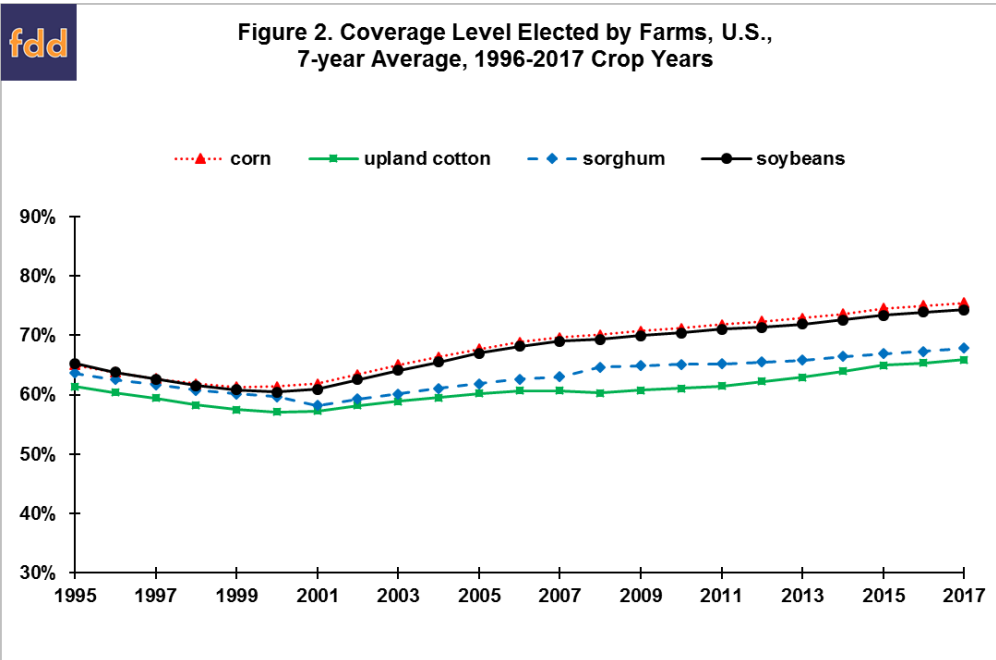
(4) Yield exclusion eliminates a low yield under certain conditions. It began with the 2015 crop. Where used, yield exclusion will increase guarantees. See Schnitkey, Sherrick, and Coppess for further discussion of yield exclusion.

**Procedures:** The following ratio was calculated for a given crop and year: [insured liability per insured acre divided by per acre value of production at harvest]. This ratio is used to measure the actual share of a crop's per acre value of production at harvest that crop insurance covered in a given year for a given crop. The value of production at harvest uses U.S. average yield per planted acre and thus should be thought of as a type of index value when measuring the value of production at harvest for acres that are insured. Because value at harvest varies notably from year-to-year, 7-year averages are computed. Use of a 7-year average, combined with Risk Management Agency (RMA) data starting in 1989, also means that one 7-year period, specifically 1989-1995, predates 3 of the 4 per acre enhancements discussed above. The crops included in the analysis were corn, upland cotton, sorghum, and soybeans. See data note 1 for a discussion of various procedures. See data note 2 for discussion of the data sources.

**Findings:** For all 4 crops, the 7-year average share of harvest value that has been covered by crop insurance has increased substantially over the last quarter century (see Figure 1). Across the 4 crops, it averaged 82% over the 2011-2017 period vs. 52% over the 1989-1995 period. The coverage level that farms elected also increased, but by far less (see Figure 2). It averaged 71% over 2011-2017 across the 4 crops vs. 64% over 1989-1995. Taking a different perspective, over 2011-2017 U.S. farms on average elected an insurance coverage level that averaged 71% across the 4 crops; however, the actual coverage of harvest value provided by crop insurance during this period averaged 82% across the 4 crops. In contrast, over 1989-1995, U.S. farms elected an average coverage level of 64% but actual coverage by insurance across the 4 crops averaged only 52%. Thus, on average across the 4 crops, the share of harvest value that crop insurance actually covered went from being notably less than the elected coverage level over 1989-1995 to notably larger over 2011-2017 (see Figure 3). This change in relationship can be associated with the per acre coverage enhancements. The increase in actual harvest value covered by insurance relative to the increase in elected coverage level was particularly large for corn, sorghum, and upland cotton, as it equaled or exceeded 20 percentage points. Taken together the figures also reveal that these trends have persisted throughout the last quarter century irrespective of whether multi-year price trends were increasing or decreasing.



Figure 1. Share of per Acre Value of Production at Harvest Covered by Crop Insurance, U.S., 7-year Average, 1996-2017 Crop Years

Figure 2. Coverage Level Elected by Farms, U.S., 7-year Average, 1996-2017 Crop Years



Figure 3. Difference: Share of Harvest Value Insured in Figure 1 Minus Farm Elected Coverage Level in Figure 2, U.S., 1996-2017 Crop Years

**Summary Observations**

- As with any study, findings of this study need verification via further analysis. This is especially important when using both RMA and National Agricultural Statistical Service data, as in this study. See Zulauf, Schnitkey, Paulson, and Coppess for an illustration of this concern.

- Given this caveat, this study finds that the per acre value of production at harvest covered by crop insurance has increased substantially over the last quarter century. It also has increased faster and now equals or exceeds the average coverage level elected by farms.

- Policy driven per acre coverage enhancement features added to crop insurance over time explains much of the increase in per acre coverage not due to farms electing higher coverage levels. It would be useful for research to partition out which of these features explain the findings of this study.

- Assuming verification, the findings of this study imply

(1)  that the coverage level elected by farms does not fully reflect crop insurance's coverage of a crop's per acre value at harvest and in particular its increase over time, and

(2)  that the per acre coverage enhancement features have likely benefited crops differentially, with this study suggesting soybeans has benefited less than the other 3 crops.

- Again assuming verification, these 2 implications prompt the following policy questions:

(1)  Given farm elected coverage level may not fully reflect per acre coverage, what should be the highest coverage level to receive a public subsidy? Is it 85% or a lower coverage level?

(2)  Has the rapid increase in crop insurance's per acre coverage of farm harvest revenue encouraged the growth of larger crop farms?

**Data Notes:**

(1)  (a)  Corn, upland cotton, sorghum, and soybeans were selected for analysis because they are large acreage crops with continuous crop insurance contracts since at least 1989. Unlike rice and wheat, these crops also have a single dominant type, which simplifies calculations.

(b)  Value of production per acre was calculated using U.S. yield per planted acre and harvest insurance price. Average yield was thus assumed to be the same for insured and non-insured acres. Use of harvest insurance price avoids the complication that the basis between the futures price used to determine the insurance harvest price and cash price can vary from year to year.

(c)  Upland cotton and soybean yield per planted acre equals U.S. production divided by U.S. acres planted to the crop. For corn and sorghum, production is divided by planted acres minus acres harvested for silage. The latter calculation assumes all non-harvested corn and sorghum acres were intended for grain production.

(d)  Crop insurance liability for a given crop and crop year was adjusted for the Harvest Price Option when HPO was triggered. Specifically, the insured liability reported by the Risk Management Agency (RMA) for insurance contracts with HPO was multiplied by the ratio of harvest insurance price to projected insurance price, if harvest price was higher. This HPO adjusted liability was added to RMA reported liability for insurance contracts without HPO, then divided by insured acres to calculate insured liability per insured acre. HPO dates to the Crop Revenue Coverage (CRC) contract, offered initially for 1996 crops. Other insurance contracts with HPO are Revenue Assurance (RA), Revenue Protection (RP), Group Risk Insurance Protection – Harvest Revenue Option (GRIP-HRO) and Area Revenue Product (ARP).

(2)  U.S. yields were calculated using data from *Quick Stats*, U.S. Department of Agriculture (USDA), National Agricultural Statistics Service. Insured liability and insured acres were from the *Summary of Business*, USDA, RMA (Risk Management Agency). Insurance prices were from a data set compiled by Art Barnaby of Kansas State University and RMA's *Price Discovery* program. When using the latter, prices were for the large producing states of Illinois for corn and soybeans, Texas for cotton, and Kansas for sorghum.

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