Cover crops, soil conservation, and prevented planting acres

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As agricultural producers around the world are acutely aware, climate, cropland quality, and profits are inextricably intertwined. In the REACCH area, precipitation amounts are expected to increase by 5 to 15% in the next 40 to 70 years, and wet springs are expected to become more common (Figure 1). The timing of spring precipitation increases will have an impact on spring plantings.

In the Palouse region, which comprises a large subsection of the REACCH study area, excess springtime moisture can lead to crop insurance claims for prevented planting. Prevented planting coverage insures producers against instances in which they are unable to put seeds in the ground for an insurable reason. Under such a circumstance, prevented planting provisions generally pay out 60% of the total insured amount. Producers are then restricted from harvesting a crop from the land for which they took an indemnity until November 1 or later without a reduction in benefits (e.g., a producer would receive only 30% of the prevented planting coverage). The parcel can be left fallow or planted to a cover crop, but the cover crop cannot be harvested without incurring the penalty.

IMPACT

Predicted increases in spring precipitation and resulting impacts on spring plantings due to excess springtime moisture can lead to crop insurance claims for prevented planting, often with negative financial implications to the farmer. Fallow ground is more susceptible to erosion. When erosion increases, future yields and profits drop. The proper use of cover crops conserves soils on erodible land, improves soil structure, and tends to slow or reverse some of the impacts of modern intensive farming practices.

No year is more illustrative of the effects of excessive spring precipitation than 2011, when an unusually wet spring triggered prevented planting claims on more than 122,000 acres in the REACCH area. After the final planting date, most producers decided to summer fallow the parcels on which they took prevented planting, which led to increases in soil erosion on these parcels.

The Palouse is characterized by rolling loess hills (Figure 2). The topsoil in the Palouse is deeper than any other in the world. This soil, originally deposited by wind, is highly erodible. Under normal weather conditions, cropland in the Palouse erodes at a comparatively high rate (Figure 3). Under conditions of increased spring precipitation, these rates could increase. Without roots in the ground to help retain soil, already severe sheet and rill erosion on the Palouse's hilly terrain turns into more severe gully erosion.

Heavy erosion is unsustainable for long-term productivity. As valuable topsoil erodes away, yield and profits drop. The Palouse is a special case in that it has so much topsoil that it is much more resilient to erosion than other less fortunate locales. But this does not mean that producers in the area are not concerned with erosion.

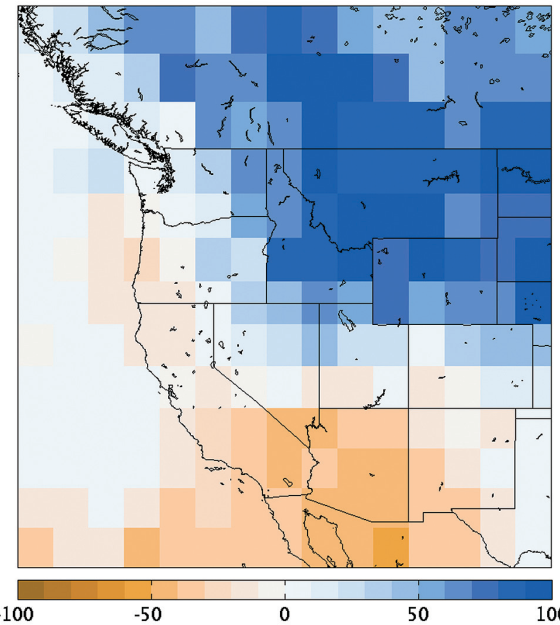

Figure 1. *Projected percentage change in the frequency of wet springs (March through May) for 2031 through 2060 as compared to contemporary climate (averaged from 28 climate models run under experiment RCP 8.5). Wet springs are defined as being among the wettest 20% of springs. The models hint at more frequent wet springs in a changing climate. No change would correspond to a value of 0. Blue indicates an increase in frequency of wet springs; orange/brown indicate a decrease.*

The proper use of cover crops has been repeatedly shown to conserve soil on erodible land, to improve soil structure, and to generally slow or reverse some of the impacts of modern intensive farming practices. The Natural Resources Conservation Service estimates that, accounting just for sheet and rill erosion, as opposed to more destructive gully erosion, cover crops planted on otherwise fallow ground will retain 4 to 5 tons of soil per acre.

Based on the high rate of prevented planting claims in the Palouse region during the high rainfall year in 2011, it was hypothesized that prevented planting claims may be correlated with springtime rainfall. Using claims information provided by the U.S. Department of Agriculture (USDA) Risk Management Agency and annual precipitation data from the National Oceanic and Atmospheric Administration, a statistical model linking rainfall to prevented planting claims was developed for the Palouse region. The results from the analysis are consistent with the expectation that higher springtime precipitation leads to more frequent prevented planting claims. The analysis shows a correlation between prevented planting acreage and annual precipitation. Creating a true predictive model would require accounting for other influences such as springtime temperatures, seasonal precipitation, prices, and other policy variables.

Nonetheless, the expected increase in precipitation over the next several decades could lead to increases in prevented planting claims and erosion rates similar to 2011. During that year, erosion rates were estimated to be as much as 50 tons per acre on some fields. According to the USDA, each ton of soil eroded in the Pacific farm production region has a negative economic impact of $0.53. Combating soil erosion from weather events will help ensure long-term productivity and profitability. One way to do this would be to plant cover crops on prevented planting acreage, which would reduce erosion and increase soil quality on land that lies fallow.

Figure 2. *The Palouse region. Photo courtesy of Stone-Buhr Flour Company.*

Figure 3. *Winter erosion after winter wheat harvest, direct seed versus conventional tillage. Photo by Bill Jepsen.*