Kansas Wheat Yield Outlook for 2023 - Week #16 (4/23/23)

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Introduction

On April 27, 2023, Ibendahl estimated the wheat yield for Kansas using the drought monitor index values (https://agmanager.info/production-economics/production-publications/kansas-wheat-yield-estimates-2023). This estimate, using a county by county approach resulted in a projected yield of 34.5 bu/ac. In this publication, Ibendahl again estimates yields but by using the state crop conditions provided by NASS. As shown below, the crop condition index results is a predicted yield of **36 bu**/**ac**. This publication and the prior one are meant to be complementary as one uses the soil moisture level and the other the reported crop conditions. The two publications are in agreement for predicting a very poor year for wheat yields.

The USDA collects weekly crop conditions throughout the growing season. The crop is rated as either: very poor, poor, fair, good, or excellent. These crop condition reports can be used in a model to help forecast yields. This procedure to estimate yields is detailed in Ibendahl's AgManager report "Kansas Wheat Yield Outlook for 2022 - Week 47" (https://www.agmanager.info/production-economics/production-publications/kansas-wheat-yield-outlook-2022-week-47).

As of week 16 (week ending 4/23/23) in Kansas, for the winter wheat crop, 62% was rated either very poor or poor, 24% was fair, 14% was either good or excellent. This crop condition report is one of the worst in the last 20 years. See Figure 2.

Estimate of Crop Condition

The crop conditions are used to construct a CCI score:

CCIndex = (% acreage Excellent) * 1 + (% acreage Good) * 0.75 + (% acreage Fair) * 0.50 + (% acreage Poor) * 0.25 + (% acreage Very poor) * 0

The index ranges from [0, 100]. An index value of 100 corresponds to 100 percent of the surveyed crop being reported in excellent condition, and a value of 0 indicates 100

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percent of the crop is in very poor condition. A value of 50 indicates the average crop condition for the state is in fair condition.

The CCI indexes are calculated for the last 30 years. These CCI indexes are then used in a regression analysis to estimate the wheat yield per acre where the yield is a function of the CCI index. To account for the yield trend, the actual model is an estimation of the deviation from the yield trend as a function of the CCI index. (Figure 1 show the historical wheat yields and the 30-year trend line). Figure 3 plots the deviation from the state average wheat yield tend line on the left axis and the CCI index on the bottom axis. The dark gray band represents the standard error. The standard error of the regression is the average distance that the observed values fall from the regression line.

Results

The model accuracy will improve as harvest gets closer. The model currently has an R-squared of 0.32. The estimated yield equation is

Yield deviation from trend = 0.338 * CCI_score - 18.92

That is, an improvement of 1% in the CCI score can increase the average state yield by 0.34 bushels per acres. The effect of the CCI score will become more pronounced as the season progresses. While the model gets better across time, the low R-squared value is the result of large variations in the final wheat yield for a given CCI score. It's still early yet so a lot can happen before a wheat crop is harvested. The large variability can easily be seen in Figure 3.

The 2023 wheat crop, as of week #16, had a CCI score of 30.5. This translates into a 8.6 negative deviation from trend line yield. The trend line yield is 44.8 bu/ac so the wheat yield estimate for 4/23/23 is **36.2 bu/ac**. The CCI score calculated here is the lowest in 30 years. However, the low R-squared value for the model means much could change before harvest. When accounting for uncertainty, the most likely range of wheat yields is from 31.1 bu/ac to 41.4 bu/ac.

Implications

Producers should look at these results as only a guide. Now that crop reports come in weekly, this model will be update regularly and the reliability will improve as harvest gets closer. However, given the agreement between this model and the previous model, achieving a normal state yield this year is highly unlikely.





Figure 1. Historical State Wheat Yields from Kansas





Condition of Kansas Wheat as of WEEK #16

Figure 2. Historical Crop Conditions for Wheat in Kansas - 4/23/23





Figure 3. Expected Yield (Trend Deviation) for Various CCI Index Values - 4/23/23

