



2024

# CROP INSURANCE

## INTRODUCTION

Crop insurance benefits crop producers by providing them with management of risk to crop failure and price reductions. This allows for incremental increases in investment to improve crop performance without the risk of total crop failure leading to large financial losses. In fact, the level of coverage (based on revenue or yield) is based on historical county yield data used to determine transitional yield (T-yield) or the farmer's actual production history (APH). Therefore, as producers adopt technologies to increase crop performance, their level of coverage increases. In part, this serves as a positive feedback that drives the advancement of technology and increases yields.

Despite the benefits of crop insurance for agricultural producers and the advancement of yield-increasing technologies, it does, however, result in unintended consequences with respect to resource conservation. This is particularly true with respect to water conservation in irrigated crop production where increasing yields

*Authors: Dale Manning (CSU), Richard Rockel (Kansas Water Office), Joel Schneekloth (CSU), Art Stoecker (OSU), Jason Warren (OSU), and Sam Zipper (KGS/KU)*

*Crop Insurance*

can drive increasing water use for crop production, or at least disincentivize the adoption of water conserving practices if these practices lead to lower average yields.

## LIMITED IRRIGATION

Historically, irrigated crop insurance policies required that adequate water be used to produce the APH. As such, water use was tied to APH and a reduction in irrigation water applied below a threshold could be deemed as out of compliance, leading to loss of coverage for that crop. This creates a strong disincentive to reduce irrigation. As a result, policies have been developed to allow for reduced irrigation applications (limited irrigation). This has helped producers comply with water conservation programs such as those recently implemented in Kansas.

Prior to 2017, limited irrigation crop insurance was only available within very few select areas. In 2017, the United States Department of Agriculture–Risk Management Agency (USDA–RMA) expanded coverage in Kansas to 28 counties for soybeans (Figure 1) and 47 counties for corn (Figure 2) This limited irrigation coverage facilitated the adoption of recently enacted water conservation policies. The limited irrigation insurance policies allow for reduced water applications and use of a [Limited Irrigation calculator](#) to calculate the resulting reduction in coverable yield. This allows a producer to use their historical APH, projected water quantity available for the coming year, and the limited irrigation calculator to calculate what levels of yield coverage is available to them for the water quantity available. With the development of multi-year water conservation plans in Kansas, producers within water conservation plans may have enough quantity of water some years to maintain full irrigation coverage, with the option to go into a Limited Irrigation policy if there is a water short year. Each year under a Limited Irrigation policy creates a Limited Irrigation APH track, which is separate from the historical Irrigated APH track, so that producers preserve their Irrigated APH level.

This change in policy is critical for the adoption of water withdrawal goals set by Local Enhanced Management Areas (LEMA). Specifically, it provides farmers the option to continue to grow corn and soybeans with reduced water use and reduced expected yields. This expands the flexibility that producers have when complying with conservation goals without penalizing the lower yield with the loss of insurance coverage or a reduction in APH. Relatively few producers have elected to

participate in the limited irrigation insurance program since it became available, largely because they were able to adapt their management practices to achieve comparable yields under lower irrigation application depths. Regardless, the creation of the limited irrigation option was nonetheless essential to the creation of LEMAs since addressed a potential concern of producers and provided flexibility to facilitate achievement of LEMA conservation goals.

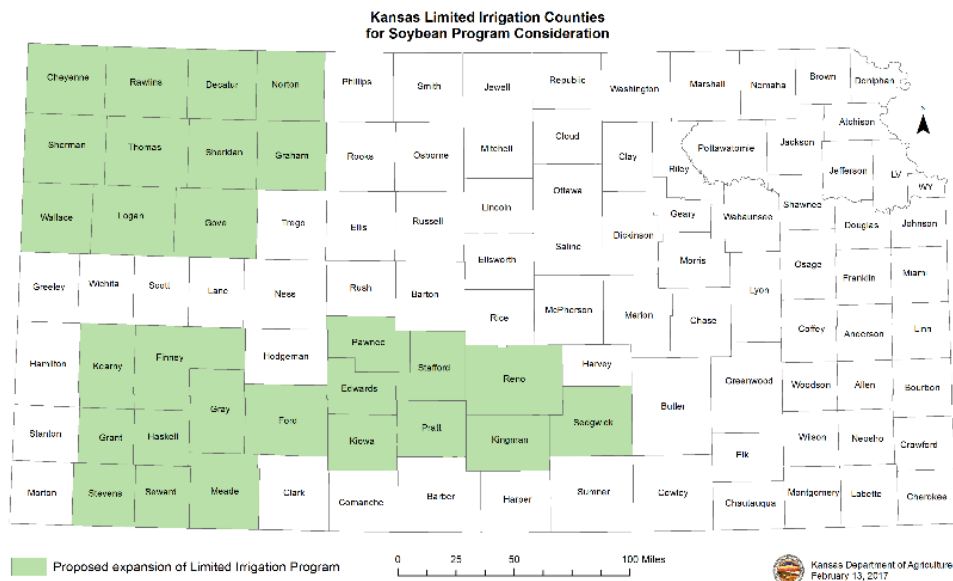


Figure 1. Proposed Limited Irrigation Soybean Counties

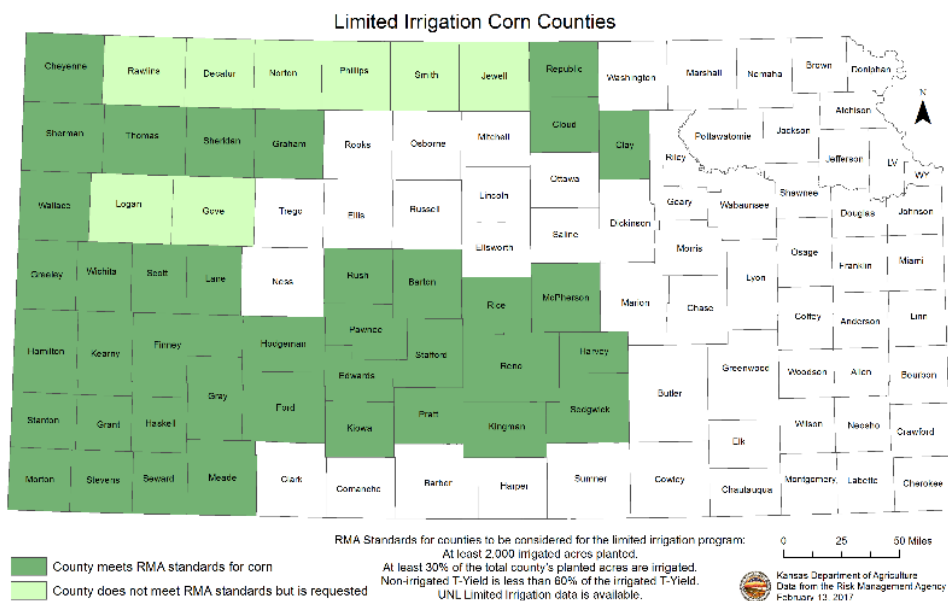


Figure 1. Proposed Limited Irrigation Corn Counties

## **CROP SELECTION**

Crop insurance can have a significant impact on the adoption of crops such as grain sorghum, which requires less irrigation, in place of corn. Empirical evidence suggests that producers respond to crop insurance by altering the crops and acreage planted. For example, Deryugina and Konar (2017) find that producers use more water when purchasing crop insurance, and this is driven by an increase in acres planted in cotton. Claassen et al. (2017) also find that crop insurance increases the number of acres in production while altering crop mixes and rotations. If producers shift to more water intensive crops, this can exacerbate depletion of groundwater resources. Crop insurance may also allow producers to continue to grow these crops despite well capacity depletion below thresholds needed for viable production.

A recent comparison of the cost of crop insurance for corn compared to grain sorghum provides an informative example. This comparison was conducted after an economic analysis suggested that in the panhandle of Oklahoma, production of grain sorghum was economically advantageous when irrigation capacities fell below 4.2 GPM/acre (CR-2173). However, irrigated grain sorghum acres have continued to decline as corn acres increased (CR-2174) despite the fact that well capacities have declined to below this threshold in some areas of the panhandle.

Discussions with growers suggest that the recent advance of the sugar cane aphid (a devastating new pest in the 2015 and 2016 crop years that feeds on sorghum) contributes to a reduction in the willingness of farmers to produce grain sorghum. Yet, the key missing economic driver in the comparison of corn to sorghum was the cost of crop insurance premiums. An analysis of premium costs confirms this. In fact, irrigated grain sorghum premiums are 3.5 to 5.6 times higher than premiums paid by farmers producing corn based on data generated for Texas County, OK using the RMA Crop Insurance Decision Tool. Additional analysis is needed to understand the geographic extent of this discrepancy and the causes. This preliminary information suggests that serious assessment of crop insurance policy costs must be included in evaluations of the profitability of all crops, especially those under consideration to reduce water demand in the Ogallala Region.

Improved field trial data can help facilitate the adoption of less water-intensive crops by providing data that can be used to design crop insurance programs. For example, producers growing irrigated crops in the Kansas portion of the High Plains Aquifer have expressed interest in alternative crops such as barley and camelina.

However, due to the absence of high-quality field trial data that can be used to develop yield curves and provide guidance to producers on management practices, these emerging crops require a written agreement to obtain insurance coverage, which is a relatively burdensome process. Improved research and extension data on lower water-use crops can facilitate their integration into crop crop insurance coverage options.

## **INTEGRATING MULTI-YEAR RISK**

Water conservation practices are often motivated by long-term goals, such as a desire to sustain water resources for future generations (Lauer et al., 2018). However, the crop insurance system is designed to protect agricultural producers from risks such as drought or excess moisture within a given year. As a result, the crop insurance system does not account for the existential and economic risks caused by groundwater depletion, such as transitions from irrigated to dryland production when well yields decline (Deines et al., 2020). The mismatch between these long-term goals and within-year practices drives much of the tension between potential water conservation approaches and crop insurance. Ultimately, this suggests that water conservation practices must be compatible with the current crop insurance program, but also be developed through alternative state and federal programs that are designed to incentivize water conservation.

## **REFERENCES**

Claassen, R., Langpap, C. and Wu, J., 2017. Impacts of federal crop insurance on land use and environmental quality. *American Journal of Agricultural Economics*, 99(3), pp.592–613.

Deines, J. M., Schipanski, M. E., Golden, B., Zipper, S. C., Nozari, S., Rottler, C., Guerrero, B., and Sharda, V. (2020). Transitions from irrigated to dryland agriculture in the Ogallala Aquifer: Land use suitability and regional economic impacts. *Agricultural Water Management*, 233, 106061.

Deryugina, T. and Konar, M., 2017. Impacts of crop insurance on water withdrawals for irrigation. *Advances in Water Resources*, 110, pp.437–444.

Lauer, S., Sanderson, M. R., Manning, D. T., Suter, J. F., Hrozencik, R. A., Guerrero, B., & Golden, B. (2018). Values and groundwater management in the Ogallala Aquifer region. *Journal of Soil and Water Conservation*, 73(5), 593–600.