I recently wrote about methods that corn farmers could use to cope with drought. This week I will show how high corn yields can be achieved with limited irrigation water supplies when the corn crop is part of a rotational cropping system. News to some, corn grown following wheat and soybeans very often out-yields corn grown following corn or in continuous corn systems. Adding other crops in rotation with corn can also reduce total season water use to boot.

Joel Schneekloth, Colorado State's water resources specialist for Northeastern Colorado, conducted a multi-year irrigated crop rotation trial on a Burlington area center pivot irrigated farm. This trial was completed in 2009. Corn yields in this trial were on average 30 bushels higher following soybeans compared to yields where corn followed corn. In addition, corn yields two growing seasons after a soybean crop resulted in a 10 bushel boost compared to the field area having continuous corn.

Irrigated wheat was also included in this same trial. Rotations where corn was planted the year following winter wheat averaged 15 bushels more than where corn followed corn. Irrigation requirements for wheat are several inches less than for corn. The time for field work for wheat and corn are different and allows for spreading workload.

The field production practices, including fertilizer and irrigation and plant were managed for maximum production. Consequently corn yields in this field averaged over 260 bushels in most locations in 2010. Soybean yields were also excellent while wheat yields were acceptable. Contact Schneekloth for more information on these trials.

Neil Hansen, CSU soil and cropping systems associate professor, has led work on a set of limited irrigation trials in a farmer's field near Iliff. The trials compared different crop rotations and different water reduction strategies against fully irrigated corn. The soils and irrigation water quality limited yields in this field, but all treatments were subject to the same soil and water quality limitations.

In this study irrigated continuous corn production was compared to an irrigated corn and non-irrigated fallow rotation as well as a four-year rotation of irrigated corn, irrigated soybeans, non-irrigated winter wheat and non-irrigated forage triticale. Crop yield and rotation water use were measured and compared between these three production strategies.

Continuous corn averaged 152 bushels per acre and used 24.6 inches of evapotranspiration water. The ET water use was measured from field inputs, irrigation and precipitation and from

the depletion of soil stored moisture. The corn yields from the corn-fallow rotation were 197 bushels or 35 bushels more than the average for continuous corn. However, the average annual production for this rotation was only 98.6 bushels per acre. The average corn-fallow rotation ET was 16.6 inches.

Corn production in the four-year rotation treatment averaged 179.8 bushels, soybeans 30.4 bushels, wheat 43.6 bushels and forage triticale 2.9 tons per acre. The average annual rotation ET was 17.1 inches. This rotation produced grain and forage every year.

Hansen's summary of this study is that corn yields are improved when it follows fallow or other crops in rotation. In addition, if one wants to save water use on land but maintain high corn yields, the same water savings can be achieved by raising some non-irrigated crops in rotation with the corn as compared to that when no crop is raised in fallow between crops.

The rotational crops generate income while fallowing land doesn't, and there are still costs to maintaining weed-free fallow.

At today's corn prices, I don't presume that I'll get anyone to switch to other crops if water and other inputs are not limited. However, if water for irrigation is limited, including other low water use crops in rotation with corn can provide for optimum income and still farm with less water availability.

Please contact me, Bruce Bosley, about this or other cropping systems or natural resource topics by my cell phone: 970-980-4001 or via email: bruce.bosley@colostate.edu.

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