

Central Great Plains Yield Calculator

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Central Great Plains Yield Calculator

In order to use this calculator, please enter the Available Starting Soil Water (water with lower limit subtracted on) into the yellow cell.
 Next click on the blue cell and select a crop from the drop-down list.
 Next click on the blue cell and select a location from the drop-down list.

Yield Estimates will appear in the red cells

Step 1	Step 2	Step 3	Step 4	Average Growing Season Precipitation (in)	Assumed Growing Season
Enter Available Starting Soil Water (in)	Select a Crop	Select a Location	Enter % of Average Precipitation (0%-200%)	8.05	Apr 02-Jul 15
5.00	Pea				
	Yield (lbs/a)	Yield (bu/a)		Precipitation Used in Yield Calculation	
	2213	---		8.05	

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The yields shown in the Yield Calculator are estimates based on relationships derived from experimental data acquired at the Central Great Plains Research Station, Akron, CO. Actual yields produced will vary from those predicted due to timing of precipitation, fertility levels, hail, frost, and insect, disease, and weed pressures. The USDA-ARS does not guarantee that yields predicted by the formulas in the Yield Calculator will be obtained by a producer, and crop selection based on the results of the Yield Calculator is done at the sole risk of the user.

The Central Great Plains Yield Calculator is a simple Excel spreadsheet that calculates crop yield based on user-selected values for Available Starting Soil Water at planting and expected Growing Season Precipitation. Those two values are added together to form the estimate of growing season crop water use which is then used in a production function to calculate yield.

The production functions were all determined at Akron, CO, with some data coming from the long-term dryland Alternative Crop Rotation study, and other data coming from gradient irrigation studies. These studies showed that both seed and forage yields were linearly related to seasonal crop water use. The calculator assumes that water is the controlling factor for yield, and that other factors (such as date of planting, fertility, weed control, insect control, timing of precipitation, and harvest efficiency) are optimal. The calculator also assumes that there are no significant weather influences such as hail, frosts, or excessive wind.

Production functions are available in the Yield Calculator for 16 crops and average weather data are included for 15 locations:

Crop Type	Crop	State	Location	
Grains	Corn	Colorado	Akron	
	Proso Millet		Briggsdale	
	Winter Wheat		Fort Morgan	
Seed Legumes	Chickpea		Julesburg	
	Dry Bean		La Junta	
	Lentil		Lamar	
	Pea		Limon	
	Soybean		Stratton	
			Wray	
Oilseeds	Canola		Kansas	Colby
	Crambe			Garden City
	Sunflower			Tribune
Forages	Corn Silage		Nebraska	McCook
	Forage Kenaf			North Platte
	Forage Pea			Sidney
	Forage Triticale			
	Foxtail Millet			

To use the Yield Calculator, the user first enters a value for the Available Starting Soil Water at planting. This value can be obtained by taking a soil sample, determining the volumetric water content by drying, and then subtracting off the lower limit of water availability (i.e., the % water that is not available to the plant). An alternative method is to use a probe with a small ball on the end (sometimes referred to as a Monsanto probe or a Paul Brown probe). The probe is pushed into the soil as far as possible and the depth to which it is pushed is considered to be at field capacity. The user then multiplies this depth times the available water holding capacity for the type of soil that he has (a table of these values is provided on the Yield Calculator spreadsheet).

Next the user selects a crop and a location from the two drop-down lists. The final step is for the user to enter a percentage of average precipitation that will fall during the growing season. The Yield Calculator then shows the assumed beginning and ending growing season dates, the average growing season precipitation, the growing season precipitation used to determine yield, and the calculated crop yield.

Even though all of the production functions used in the Yield Calculator were derived at Akron, CO, they should be fairly applicable to all of the locations available to the user through the drop-down list. The slopes of the linear production functions used are fairly stable across locations, with small shifts occurring in the intercepts as locations move north or south of Akron.

While the Yield Calculator was developed primarily for estimating dryland crop yields, it can be used cautiously to estimate irrigated yields. The user would add the estimated irrigation amount to the Available Starting Soil Water at planting. However, the user should be aware that estimated yields under high water availability conditions may be underestimated, as yield potential for many crops under irrigation would be increased by higher seeding rates, higher fertilizer rates, and longer-season hybrids.

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