

Yield loss prediction for corn, sugar beets, and dry edible beans since 7/17

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The purpose of this document is to provide an outlook for soil water depletion and potential yield loss for corn, sugar beets, and dry edible beans in western Nebraska and eastern Wyoming after the collapse of the Gering/Ft. Laramie canal and the loss of surface irrigation water. This document provides weekly yield loss predictions from July 17th to August 13th.

Assumptions used in yield loss prediction model:

1. Crops were fully irrigated and soil was at field capacity before and on July 17th.
2. No irrigation water will be available till Aug. 14th.
3. Rainfall is excluded in the calculations.
4. Corn and sugar beet root depths are at 36 inches.
5. Dry edible bean root depth is at 24 inches.
6. Soil available water is
 - a. 5.4 inches of water per 36-inch soil depth.
 - b. 3.6 inches of water per 24-inch soil depth.
7. Weekly reference evapotranspiration (ET_o) is 2 inches.

Week 1, July 18th to July 23th:

Crop	Weekly Water Use	Soil Moisture Depletion	Yield Loss
Corn	1.6 inches	30%	0%
Sugar Beets	1.0 inches	18%	0%
Dry Edible Beans	0.9 inches	25%	0%

Week 2, July 24th to July 30th:

Crop	Weekly Water Use	Soil Moisture Depletion	Yield Loss
Corn	2.0 inches	66%	30-35%
Sugar Beets	1.2 inches	40%	0%
Dry Edible Beans	1.1 inches	55%	20-30%

Week 3, July 31th to Aug. 6th:

Crop	Weekly Water Use	Soil Moisture Depletion	Yield Loss
Corn	1.8 inches	100%	>90%
Sugar Beets	1.2 inches	62%	20-25%
Dry Edible Beans	1.0 inches	83%	>70%

Week 4, Aug. 7th to Aug. 13th:

Crop	Weekly Water Use	Soil Moisture Depletion	Yield Loss
Corn	0.0 inches	100%	100%
Sugar Beets	1.2 inches	85%	50-60%
Dry Edible Beans	0.6 inches	100%	>90%

This analysis simulates a condition that water is completely cutoff both manually and naturally. The numbers provided are also highly estimated due to lack of such experiments. Condition could vary based on different field conditions, weather parameters, management practices, varieties, etc. Both corn and dry edible beans are developing from vegetative stage to reproductive stage and water usage of the two crops are at or going to be at peak. Although significant water stress could penalize yield significantly, any effective rainfall (>0.1 inch) could also considerably reduce such effect. Therefore, **it is suggested to keep tracking rainfall, crop development (taking canopy cover pictures), and soil moisture profile (if soil moisture sensor is available).**

For any questions in regard to this document, please reach out to the irrigation team at PHREC by email: xin.qiao@unl.edu or phone: 308-632-1240. We also highly recommend you to share your field condition/data with us, as it will greatly help us understand how plants response to such scenario and provide valuable guidance for the future.