

# ROSHOLT FARM

## Reduced Irrigation Study



Pope County, Minnesota

### Status

#### Installation

2016

#### Data collection

2016 – 2018

### Contact

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### Partners

Collaborative effort between multiple government agencies, agricultural businesses and organizations, and the University of Minnesota

*List of partners on the reverse.*

## GOAL

The goal of this study is to improve irrigation water use efficiency by better understanding the interaction of water requirements of the crop and plant population.

## OBJECTIVE

- To determine if there is a grain yield impact when reducing the frequency of irrigation  
Question: What impact does reduced water application have on crop yield?
- To determine the relationship between rooting depth and water use  
Question: Does reduced irrigation force the crop to pursue water deeper in the soil and thus increase water use efficiency?
- To determine the role of reduced plant population under reduced irrigation frequency to optimize grain productivity  
Question: Can reducing plant populations stabilize yield in periods of water stress?

## LOCATION

The study site is located at the Rosholt Research Farm in Westport, Minnesota. The 40-acre farm is owned by Pope Soil & Water Conservation District and is devoted to water quality research and crop production demonstration. The site has a long history of research dating back to 1968.



*Reduced irrigation will help determine relationship between crop and water use to corn in 2017*



## MONITORING

- Collect weekly volumetric water content measurements every 6 inches to 30 inches of soil depth using a neutron probe and TDR (Time Domain Reflectometry) meter and TDR (Time Domain Reflectometry) meter
- Measure corn yield at the end of the season to evaluate impact of reduced irrigation and variable plant population treatments

## DESIGN

The study includes nine treatments in a randomized complete split-plot design. Irrigation is the main plot effect and plant population is the split-plot effect. Each treatment is replicated three times.

Treatments include:

- Three irrigation levels
  - 100% full irrigation treatment based on irrigation scheduling checkbook method
  - 75% of full irrigation (skip 1 out of 4 irrigation events)
  - 50% of full irrigation (skip 2 consecutive irrigation events out of 4)
- Three tested plant populations within each of the three irrigation levels
  - 40,000 plants per acre
  - 30,000 plants per acre
  - 20,000 plants per acre

## PLOT LAYOUT

	100% Irrigation	50% Irrigation	75% Irrigation	50% Irrigation	75% Irrigation	100% Irrigation	75% Irrigation	100% Irrigation	50% Irrigation
←	40,000	20,000	20,000	30,000	20,000	40,000	30,000	40,000	20,000
	30,000	30,000	40,000	40,000	40,000	30,000	40,000	30,000	30,000
	20,000	40,000	30,000	20,000	30,000	20,000	20,000	20,000	40,000

## PAST RESEARCH AT ROSHOLT

The partnership at the Rosholt Farm provides the opportunity to better understand nitrogen fertilizer management and the associated water quality impacts on irrigated, sandy soils. In addition it supports the study of how to better manage irrigation water in crop production.

## PROJECT PARTNERS

