ROSHOLT FARM
Reduced Irrigation Study

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

OBJECTIVES
• To determine the grain yield impact when reducing the frequency of irrigation
• To determine the relationship between rooting depth and water use
• To determine the impact of reduced plant population under reduced irrigation frequency to optimize grain productivity

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.

DESIGN
• The study includes nine treatments in a randomized complete split-plot design. Each treatment is replicated three times.
• Treatments include three irrigation frequencies (100%, 75% and 50%) and three plant populations (20,000, 30,000, and 40,000 plants/acre).

MONITORING
• Weekly soil moisture content is measured at 6-inch intervals to a depth of 30 inches
• Corn grain yield

Status
Installation
2016
Data collection
2016 – 2018

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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.

The research shows timely irrigation becomes increasingly important as plant populations increase.
RESULTS

Overall, the results of this study support that corn can be grown with acceptable yields when skipping 1 out of 4 irrigation events (75%) and planting populations of 30,000-40,000 plants per acre in the central sands region of Minnesota under similar weather condition as in the research years. Skipping 2 consecutive irrigation events out of 4 (50%) resulted in significant yield reductions. The data also shows that timely and adequate irrigation becomes increasingly important as plant population increases.

Effect of Irrigation on Grain Yield

Grain yield indicated by the same letter is not significantly different

Effect of Population on Grain Yield

Grain yield indicated by the same letter is not significantly different

Graphics by Dr. Vasu Sharma, University of Minnesota