CENTER PIVOT IRRIGATION TECHNOLOGY TRAINING

Daugherty Water for Food Global Institute
University of Nebraska

About the training

The Center Pivot Irrigation Technology Training, scheduled for June 28–July 1, 2027, is an intensive four-day program designed to provide participants with a comprehensive understanding of center pivot irrigation systems, from their fundamental components and engineering principles to advanced technologies, management strategies, and real-world applications.

Learning in the global hub of center pivot irrigation

Hosted by the Daugherty Water for Food Global Institute at the University of Nebraska, the program combines classroom instruction, discussions with irrigation specialists and industry leaders, practical field experiences, and visits to farms, well-drilling operations, and major irrigation manufacturers. The training will be held in Nebraska, widely recognized as a global hub of center pivot irrigation. Nebraska is home to one of the world's largest concentrations of center pivot-irrigated farmland and to leading irrigation companies that have played a central role in the development, manufacturing, and worldwide expansion of technology. Approximately 2.6 million hectares of Nebraska's irrigated land is served by center pivots, highlighting the state's unique experience and expertise in irrigation engineering, agricultural water management, precision irrigation and water governance.

What participants will learn

Participants will learn how center pivot systems are designed, selected, operated, evaluated, and maintained. The program covers system components, hydraulics, pumping requirements, sprinkler-package design, fertigation, irrigation scheduling, application uniformity, preventive maintenance, energy use, investment costs, global marketing, and economic returns. It also introduces advanced technologies such as variable-rate irrigation, corner systems, remote monitoring, automation, crop and soil modeling, and decision-support platforms.

Practical field experience

Through field visits, participants will observe center pivot irrigation in commercial fields production, interact directly with producers and managers, and better understand the operational challenges and decisions involved in managing irrigation systems under real farming conditions. They will also visit irrigation and well-drilling facilities to learn how center pivots, pumping systems, and water-supply infrastructure are designed, manufactured, installed, and supported.

Where Innovation Meets Practice

Experience center pivot irrigation system where the modern industry took root. Learn from leading university specialists, producers, engineers, and global irrigation companies while exploring the technologies and management practices shaping the future of irrigated agriculture.

DAY 1 - June 28th

8:00 am – 9:00 am: Registration and Continental Breakfast

9:00 am – 9:30 am: Welcome and introduce the DWFI

9:30 – 10:00 am Nebraska, US as the Global Hub of Center Pivot Irrigation

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Session 1 ➔ 10:00 am - 12:00 pm – Center Pivot Systems & Market Overview

- Introducing the Center Pivot Irrigation System
  - Center pivot system characteristics
  - Water Distribution System
  - Drive and Power System
  - Water Supply and Pumping Interface
  - Filtration and fertigation system
- Center Pivot Market Overview
  - Global and US adoption of center pivot irrigation
  - Expansion in emerging markets (Brazil, Africa, Middle East)
  - Key drivers: water efficiency, labor savings, productivity
  - Main barriers: high investment cost, energy, infrastructure
  - Future trends and business opportunities in center pivot irrigation

  Questions & Answers: 15 minutes

12:00 pm – 01:30 pm – Lunch

Session 2 ➔ 1:30 pm - 5:00 pm: Basic Design of a Center Pivot Irrigation System

- Basic Hydraulic Design

- Total system flow rate based on crop water demand and area
- Application rate vs soil infiltration capacity
- Pressure requirements along the lateral
- Friction losses and pressure variation along the pipeline
- Troubleshooting Mechanical and Hydraulic Issues

- Basic Pumping System Design
  - Total Dynamic Head: static head + friction losses + operating pressure
  - Pump selection (type, curve matching, efficiency)
  - Power requirements and energy consumption
  - Well capacity and water source limitations

Break – 30 minutes

- Basic Sprinkler Package and Application Design
  - Selection of sprinkler type
  - Nozzle sizing and flow distribution along the pivot
  - Spacing and layout of emitters
  - Pressure regulators and uniformity optimization
- Basic Fertigation System Design
  - Injection Systems and Equipment
  - Fertilizer concentration and injection rate calculations
  - Synchronization with irrigation depth and timing
  - Compatibility, solubility, and clogging prevention

Questions & Answers: 15 minutes

6:00 pm – 8:30 pm: Evening Reception

- Honors and Live Music (American Speed Way Museum)

DAY 2 - June 29th

8:00 am – 9:00 am: Registration and Continental Breakfast

Session 3 ➔ 09:00 am - 12:00 pm – Economic Aspects and Irrigation Tools

- Economics Aspects of a Center Pivot Irrigation System
  - Capital investment and cost components of center pivot systems
  - Operational costs (energy, maintenance, labor)
  - Economic return and payback period estimation
  - Irrigation vs. rainfed production profitability
- Variable Rate Irrigation/Corner System
  - Field Variability and Management Zones
  - VRI Technology and System Components
  - Data Inputs and Decision Support
  - Purpose: increasing irrigated area beyond the pivot circle
  - Impact on flow rate, pressure, and system capacity
  - Economic considerations: added area vs. higher energy and investment costs

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Break – 30 minutes

- Remote Monitoring and Control (Smart Pivots) (60 minutes panel - Valley, Lindsay, Reinke/T&L)
  - Mobile and web-based pivot control (start, stop, speed adjustment)
  - Real-time monitoring of system status (pressure, position, operation)
  - Automated alerts and notifications (failures, shutdowns, low pressure)
  - Pivot durability and remote monitoring control
  - Remote troubleshooting and diagnostics

  Questions & Answers: 15 minutes

12:00 pm – 01:30 pm – Lunch

Presentation: Work Force Development in Emerging Center Pivot Markets

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Session 4 ➔ 01:30 pm - 03:30 pm: Center Pivot Manufacturers and Irrigation Management Tools

- Principles of Irrigation Scheduling for Center Pivot System
  - Crop Water Requirements
  - Soil Water Dynamics
  - Irrigation Timing and Frequency
  - System Capacity and Application Control
- Valley Scheduling - Valley Industry (30 minutes - Valley)
  - Smart Irrigation Scheduling Platform
  - Data Integration for Decision Making
  - Automation and Precision Irrigation
  - Performance Monitoring and Water Management
- Field Advisor - Lindsay Industry (30 minutes - Lindsay)
  - Advanced Irrigation Scheduling Platform
  - Crop and Soil Modeling
  - Data Integration and Remote Sensing
  - Automation and Decision Support

  Questions & Answers: 15 minutes

Break – 30 minutes

Session 5 ➔ 04:00 pm - 05:00 pm: Center Pivot System Performance Evaluation and Maintenance

- Application Uniformity Assessment
  - Christiansen and Distribution Uniformity Coefficient
  - Pressure measurements along the pivot
  - Flow rate and pressure losses verification
  - Nozzle and regulator performance
- Preventive Maintenance on Center Pivots
  - Routine inspection of towers, spans, and alignment
  - Drive system maintenance

- Inspection of pipes, joints, and leaks
- Nozzle and regulator checks
- Sprinkler and nozzle cleaning and replacement
- Electrical system and control panel checks

- **Adjourn**

DAY 3 - June 30th

Session 6 ➔ 10:00 am - 12:00 pm: Field Visit

Irrigated Center Pivot Farm in York, NE (Corn\soybean)

- This session covers the operation of center pivot systems in commercial corn/soybean production irrigated by center pivot irrigation system with corner and VRI systems. The session also includes discussions with farmers and managers to provide practical insights into system management, challenges, and decision-making in real-world operations.

12:00 pm – 13:00 pm – Lunch at Farm site (Lunch box)

- **02:00 pm - 04:00 pm: –** Sargent Irrigation and Drilling (Broken Bow, NE)
  - Sargent Irrigation and Drilling is one of the largest privately owned water well drilling companies in the world, and leading irrigation well drilling and pumping systems in the U.S.
- **Back to Lincoln, NE:** 5:00 pm.

DAY 4 - July 1st

Session 7 ➔ 9:00 am - 3:00 pm: Center Pivot Manufacture's Visit

- **9:00 am - 11:30 am:** Valley Irrigation (Valmont Industries, Valley, NE)
  - Valley Irrigation is a global leader in center pivot manufacturing. Visit the manufacturing facility and learn about the industrial process of center pivot production, including system design, fabrication, and assembly, as well as innovations in automation and precision irrigation technologies.

11:30 am – 12:30 pm – Lunch at Valley Irrigation

- **1:00 pm - 03:00 pm: –** Zimmatic (Lindsay Corporation – Field visit by Zimmatic)
  - Lindsay Corporation is especially well known in agribusiness for its global Zimmatic brand, which manufactures center pivot and lateral move irrigation systems for large-scale farming operations, and is recognized as a leader in advanced center pivot technologies, offering some of the most innovative and widely adopted solutions in the industry.
- **Departure 3:00 pm –** Stop at the Nebraska Crossing Outlet
- **Back to Lincoln, NE:** 5:00 pm.

Registration fee: To be determined.

- Center Pivot Irrigation Management Handbook (printed version will be provided)

Friday suggestions:

- Henry Doorly Zoo and Aquarium
- Strategic Air Command & Aerospace Museum
- Salt Dogs Baseball Game

The schedule is subject to change, and the final program, including complete information on sessions, speakers, and registration fee, will be available soon.