

PROMOTING AND ASSESSING SOIL HEALTH AND SUSTAINABLE IRRIGATION PRACTICES FOR VEGETABLE PRODUCERS IN THE GREAT PLAINS

LARIMER COUNTY, CO & GALLATIN COUNTY, MT

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PROJECT INTRODUCTION

- Internship focused on sustainable agriculture research and outreach to improve soil health and drought resiliency in vegetable production across the Great Plains
- Research involved studying three different mulch types and three different irrigation practices on winter squash production
- Collaboration between Colorado State University and Montana State University
- Combined applied field research (soil sampling, lab analyses, crop performance) with extension outreach (planning and hosting a soil health field day)

INTERNSHIP GOALS

- Conduct on-farm soil sampling and lab analyses
- Support planning and implementation of a soil health field day and agrivoltaics field day for producers in Larimer County
- Collect and analyze post-event survey data
- Contribute to outreach and communication of soil health and irrigation research findings
- Travel to Montana for on-farm research collaborations
- Identify soil health and irrigation strategies that support sustainable, drought-resilient vegetable farming while communicating findings directly to producers

HOW THIS APPLIES TO MY EDUCATION

- I study perceptions of sustainable agriculture and adoption of drought-resistant practices
- This internship allowed me to see what sustainability looks like on the ground
- First-hand experience with soil health practices deepens my ability to empathize with farmers' challenges
- Strengthens my ability to connect social science research with real-world agricultural practices
- Working with soil scientists is an essential part of how I study science communication

WHAT I DID

- **Larimer County (first third of summer)**
- Helped run two field days: *Agrivoltaics Field Day* and *Soil Health Demonstration Day*
- Prepared printed materials for attendees
- Developed marketing tools to promote events
- Assisted with event coordination to ensure smooth operations
- **Montana (next seven weeks)**
- Worked on a research farm studying three mulch types and irrigation methods with winter squash
- Collected field data across 36 research plots, including:
 - Volumetric soil moisture
 - Soil temperature
 - Plant height and diameter (four plants per plot)
 - Number of flowers and fruits on selected plants
- Took surface-level soil samples at depths of 0–15 cm, 15–30 cm, and 30–45 cm in each plot
- Traveled across Montana to collect measurements from replicated plots at community partner sites
- **Laboratory work**
- Conducted KCl extractions and dried soil samples from collected samples

Figure 1. Community Partner



One of our replicated plots at the Western Agriculture Research Center in Corvallis, MT.

WHAT I LEARNED

- Gained hands-on experience testing three mulch types and three irrigation practices in winter squash production
- Learned how different soil management strategies affect moisture retention and crop performance
- Developed technical skills: soil sampling, lab-based soil health testing, survey evaluation, and event planning
- Observed how water limitation and nutrient management challenges directly shape farmer decision-making
- Learned how agricultural stakeholders—farmers, extension agents, and researchers—collaborate to address sustainability issues
- Strengthened understanding of the importance of communication and trust-building when engaging producers in sustainable practices

Figure 2. Soil Health Demo Day



Me and my mentor, Jessica Callen, at the Soil Health Demo Day

NEXT STEPS

- Apply insights from this internship to my graduate research on climate resilience and adoption of sustainable practices
- Continue exploring how opinion leaders and Extension play roles in influencing farmer decision-making
- Strengthen outreach and communication skills for future work in agricultural engagement
- Seek further opportunities to combine social science theory with hands-on agricultural practice