#FridaysontheFarm: Cover Crops and Dryland Wheat? Challenge Accepted.

From the kitchen table to the boardroom table, the USDA brings people together across the nation for: healthier food, natural resources and people; a stronger agricultural industry; and economic growth, jobs and innovation.

Each Friday, meet those farmers, producers and landowners through our #Fridaysonthefarm stories. Visit local farms, ranches, forests and resource areas where USDA customers and partners *do right and feed everyone*.

This Friday, meet Noah Williams and learn how he's using data and experimentation to manage cover crops where they're far from common: a dryland wheat operation in The Dalles, Oregon.

Wheat and Water

Noah Williams loves it when people tell him he can't do something, like make cover crops work across a dryland wheat cropping system.

"It's my motivation to find a way to do it," he says. "I like the challenge."

Williams owns 900 acres of land and rents an additional 1,900 acres spanning portions of northern Oregon's Wasco and Sherman counties. His primary cash crop is winter wheat.

Winter wheat here is typically followed by a year of chemical fallow, where the ground is sprayed with herbicide and left unplanted. The fallow year is standard for controlling weeds and storing valuable soil moisture in an area with low annual precipitation rates.

Equipped with data and determination, Williams is working with the Natural Resources Conservation Service (NRCS) and the Wasco Soil and Water Conservation District to try new, innovative approaches for integrating cover crops in rotation with his wheat crops instead of leaving land fallow. Benefits of cover crops include reduced soil erosion and improved soil health.

Experimenting with Cover Crops

In 2015, Williams leveraged financial assistance from NRCS's Environmental Quality Incentives Program (EQIP) - a Farm Bill program - to plant cover crops for the first time.

"I considered seeding cover crops on 5-acre plots," says Williams, "but something that small wasn't going to teach me what I needed to know. I had to play with something bigger."

That first year, Williams planted 30 acres of cover crop in a strategic location for educating others—a field close to the road.

Williams divided this field into four management sections: winter cover crop, warm-season cover crop, spring cool-season cover crop and a fallow section with no cover crop to be used as a control.

As the months went by, the cover crops took root and flourished. When it came time to terminate them, Williams used a combination of spraying and mowing. Then came the true test.

Winter Wheat's Response

With termination of the cover crops complete, Williams seeded winter wheat and eagerly awaited the results. After a few months, he could see a difference between wheat grown in fields that had been cover cropped and those that had not.

"The wheat where we had the cover crop stayed greener longer," says Williams, "which indicated it was retaining more moisture. I was really amazed at how green it was. That wheat looked healthier than what I'd seen in the field before."

That first year, Williams saw similar wheat yields from the cover cropped fields compared to wheat grown in fields previously left fallow. Since then, he's had fields where cover cropped wheat out-yielded wheat planted in fields left fallow and vice versa.

Each new year is a valuable learning experience for Williams. "To me, it's not about the short-term gain," says Williams. "It's about the long-term benefit. If it takes 10 years of cover crops so I can farm for 20 years longer without depleting my soils, that's a benefit to me."

Data-Driven Conservation

Williams uses sensors to monitor soil moisture within two neighboring fields: one with cover crops and one without. By providing moisture measurements at three depths - 6 inches, 1 foot and 2 feet - these sensors allow Williams to comprehensively track soil moisture in response to precipitation and different management practices.

Williams uses data from these sensors to fine-tune the timing of his cover crop termination and evaluate the overall impact of cover crops on soil moisture. They provide a quantifiable way to record the differences he sees.

So far, probe results support the theory that well-managed cover crops can lead to sustainable dryland wheat production.

“Every hour, these sensors measure the soil water content in real-time,” says Garrett Duyck, an NRCS soil conservationist who helps Williams track the data and interpret the results. “This is a lot more thorough than other manual measuring methods.”

The sensors have already captured one value of cover crops: improved infiltration of water into the soil after precipitation events.

"The soil sensors in cover cropped fields show water infiltrating deeper and sooner after rainfall events than in fields managed without cover crops," says Duyck. "This suggests an improvement in water infiltration as a result of cover crops being incorporated into this system."

Williams is working with NRCS to tweak his plans for planting cover crops next season with the understanding that it’s not a sprint, but a marathon. He wants to try new crop rotations and enhance his existing cover crops to add more diversity to his soil.

“In the end, I believe we’ll have a longer run than the guys who are just pumping dollars into their ground with synthetic fertilizers,” Williams says. “I think it’s going to be a lot healthier for our ground, so the next generation will have something there that’s sustainable. I know it can be done.”

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