

Carbon: ‘There is no cookie-cutter recommendation’

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Grower-led initiative

Established in 1931, CBARC is one of 11 research centers run by OSU in different growing regions around the state.

The USDA also shares space at the station, which it calls the Columbia Plateau Conservation Research Center. Though technically separate, they have similar missions to enhance dryland farming in the arid Columbia Basin.

However, the center faced a crisis in 2016 and 2017, with budget cuts threatening nearly half the annual funding on the USDA side.

The Oregon wheat industry lobbied to save the center's funding, but Greg Goad, a Pendleton-area farmer, said more was needed to find a stable injection of resources.

“It became clear to us that this was not a good long-term strategy for dealing with the problem,” Goad said.

Goad, who describes himself as semi-retired, serves on a grower liaison committee that works with both the USDA and OSU research programs. He said their focus became identifying proposals that could catch the eye of Congress and policymakers — hence the focus on climate change.

“We could see where we could be a help on carbon, and at the same time help the growers,” Goad said.

The \$2 million Resilient Dryland Farming Appropriation was approved by Congress in 2019, and the \$1.5 million soil carbon research appropriation was announced earlier this year.

Amanda Hoey, CEO of the Oregon Wheat Growers League and the state's Wheat Commission, said the projects will provide much-needed data specific to the Columbia Basin's unique climate and growing environment.

“It will assure data specific to the regional differences in Oregon and will ultimately lead to increased profitability and crop yield — good for our agricultural economy, our environmental stewardship and our rural economies,” Hoey said.

Region-specific data

Wheat is Oregon's sixth-most valuable agricultural commodity, with farmers harvesting nearly 47 million bushels worth more than \$294 million in 2020.

The vast majority of that



Francisco Calderon arrived Dec. 31 as station manager of OSU's Columbia Basin Agricultural Research Center in Pendleton, Ore. He previously spent 18 years working for the USDA in eastern Colorado.

production comes from Umatilla and Morrow counties, which together have roughly 61% of the total wheat acreage.

Annual precipitation varies by location. For example, the Pendleton station, nestled along the Blue Mountains, gets 16-18 inches, while areas farther west get as little as 8-10 inches. As a result, most dryland farmers rotate their fields between growing a crop one year and leaving it fallow the next to rebuild soil moisture.

Francisco Calderon, CBARC station manager with OSU, said research must be tailored to this particular system.

“We cannot use data from the Midwest,” Calderon explained. “The answers to our questions about soil carbon have to be developed locally.”

Calderon knows the differences all too well. He came to OSU after 18 years working for the USDA in eastern Colorado.

Despite both regions producing dryland wheat, climatic differences mean Colorado farmers receive more moisture in the form of summer thunderstorms, as opposed to the Pacific Northwest, where most precipitation falls in the winter.

The timing allows farmers in Colorado to rotate wheat with other summer crops such as corn or sorghum. Mother Nature does not give farmers in northeast Oregon that option.

In turn, different farming practices and crops impact the amount of carbon that can be sequestered in the soil.

“There is no cookie-cutter recommendation,” Calderon said. “You have to weigh the local precipitation, conditions and soils to develop different recommendations for different regions.”



Eric Orem, a wheat farmer in Morrow County, Ore., behind the wheel of his combine during harvest.

Team science

The new federal appropriations, Calderon said, will work hand-in-hand to answer those questions.

Under the soil carbon research program, OSU and the USDA will evenly split the \$1.5 million, combining expertise from both teams across several disciplines.

OSU will also receive one-quarter of the \$2 million dryland farming appropriation to do the plot work for cropping trials. Hagerty, who is the project leader for OSU, said it is an opportunity to conduct “team science,” breaking out of their individual research “silos.”

“We can have a much better, broader impact for the growers,” Hagerty said. “No more one scientist, one bench.”

As part of the dryland farming appropriation, Hagerty said studies are underway both at the station and at Starvation Farms in Lexington, Ore., which is in a lower rainfall zone in Morrow County.

She highlighted trials to determine whether certain types of cover and rotational crops — such as winter peas, barley or canola — can naturally improve soil health, break up soil-borne diseases



Darren Padgett, a wheat farmer and president of the U.S. Wheat Associates, stands along one of his fields in Grass Valley, Ore.

and minimize erosion without sapping too much water from the farms' cash crop.

“What we're trying to understand here is, do the benefits outweigh the cost?” she said.

The soil carbon program, meanwhile, is still being finalized, but Calderon said it breaks down into three general objectives.

First is maintaining experiments to see if different growing practices sequester carbon. Second is seeing how weeds and plant diseases interact with changes in soil carbon, and third is analyzing the system's total carbon footprint.

“That goes beyond just quantifying how much carbon stays in the ground, but how much reducing fertilizer applications, tillage or other things affect the carbon cycle,” Calderon said.

Stewart Wuest, a USDA research soil scientist at the Pendleton station, is one of the project leaders on the soil carbon sequestration study. Additional funding will allow the agency to hire four new scientists, including a bioinformatics expert to do statistical work, and an agricultural economist.

For now, Wuest said he is skeptical of how much more carbon can be sequestered in soils given the limitations of the dryland wheat-summer fallow rotation.

“We want to avoid policies that are unrealistic and ask farmers to do something that can't be done,” he said. “The main point is to be realistic.”

Carbon offsets

In 2019, the Oregon Legislature seemed poised to pass cap-and-trade legislation requiring large producers of carbon dioxide and other greenhouse gases to buy “allowances” for every metric ton of carbon they generate.

Such a marketplace would have also allowed farmers to generate credits by sequestering carbon. Companies could also purchase those carbon credits to offset greenhouse gas emissions.

Senate Republicans ultimately blocked the bill by staging a walkout, though Democratic Gov. Kate Brown followed up last year by signing an executive order targeting ambitious greenhouse gas emission reduction goals — at least 45% below 1990 levels by 2035, and at least 80% below 1990 levels by 2050.

Freya Chay, a policy associate for Carbon Plan, a non-profit organization based in Santa Cruz, Calif., said offset credits for soil carbon sequestration currently exist in voluntary markets, though they are not yet well defined.

“It's pretty opaque,” Chay said. “It takes some real tracing to figure out how a ton (of

carbon) was quantified.”

Chay said local research like that at CBARC is critical. Without that data, she said independent registries will struggle to quantify and credit soil carbon sequestration.

Meanwhile, farmers say they are in a wait-and-see mode.

Darren Padgett, who farms in Grass Valley, Ore., and is chairman of U.S. Wheat Associates, the national organization that serves as the industry's overseas marketing arm, said the cost of inputs such as fuel and fertilizer are only going up.

“The question is whether any credit that we get will offset our increase in inputs,” Padgett said. “We hope it's a net positive, financially. If it isn't, then it's going to be a pretty hard sell.”

Extreme drought

Amid lingering uncertainty, farmers across the West are feeling the effects of extreme drought, underscoring the urgency of the research.

Eric Orem, a Morrow County farmer, plans to harvest about 2,500 acres of wheat this year. He anticipates his yield may be down by as much as half in some of his fields, where just 6 inches of precipitation has fallen since planting last fall.

Combined with a heat wave in June that pushed temperatures as high as 118 degrees, Orem said the crop's quality may also be affected. Most wheat grown in the Pacific Northwest is a lower-protein variety predominantly exported to Asia, where millers use the flour to make noodles, sponge cakes and crackers.

Heat stress tends to create higher protein levels in wheat. If the percentage goes too high, Orem said customers pay less for the product.

“Conditions have just been tough,” he said. “It's going to be crop insurance year.”

Orem said he has already done several things to make his operation more efficient. He adopted no-till farming, which saves him money on fuel, and uses variable rate seeding on his seed drills and avoids over-spraying fertilizer and herbicides to save on inputs.

Orem has also contributed 10 acres for OSU to trial different mixes of cover crops.

The partnership between growers and researchers in the area has been great, he said, with both sides collaborating for a common good.

“Looking at these programs and seeing what farms can do to benefit our soil health and the environment is great,” he said. “It's a win-win for everybody.”

Fire: ‘I wish we could’ve got all our cows out, but we did what we could’

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“I'm sorry. It's still fresh.”

Her brother-in-law, Joe Jayne, a fifth-generation rancher, lost dozens of his cattle to the fire.

“I wish we could've got all our cows out, but we did what we could,” he said.

The wildfire consumed all but one of his permitted pastures. Because of hay prices and shortages, Jayne plans to sell many of his cattle this year, keeping only the best breeding stock.

Jimmy Gallagher, a Sprague River rancher who



The view from Beatty, Ore. looking north, July 8.

lost about 20 cow-calf pairs and one bull, said fire struck hardest in regions where grazing and prescribed burning had been restricted. These

swathes of land, he said, are now white with ash — “looks like the moon.”

On the southwest tip of the Bootleg Fire, in Beatty,

Jana Walker, fourth-generation cattle rancher, said she emerged from the fire luckier than most because she was able to evacuate all her cattle, about 250 to 300 head.

“We didn't lose any,” she said. “I think we're one of the few producers that can say that.”

But Walker did lose crucial summer forage. She's in “scramble mode” now spreading out cattle, paying freight to haul water, looking for micro-pastures to graze — she calls them “yards.”

Walker said the fire was another tragedy in a series

of natural disasters. Before the Bootleg Fire hit, her pastures were already thin from drought, heat waves and swarms of grasshoppers.

“That's one of the jokes we make: The only good thing about the fire is it burned up the grasshoppers,” she said.

Ross Fleming, a Klamath Falls farmer, similarly joked about “Biblical plagues.”

“I mean hell, right here in Klamath County a few of the prophecies have been fulfilled already this year. And I'm not a churchgoing guy that much,” he said.

Although Fleming is removed from the immediate fire, its smoke has blocked some sunlight from reaching his potatoes and garlic.

“I think we've added a fifth season in Klamath County: smoke season,” he said.

Dan Chin, another Klamath Falls farmer who grows potatoes, onions, garlic, alfalfa and wheat, said he believes all of his crops this year will be impacted by smoke, especially since sunlight was blocked at a crucial time for crop development.

“I think we'll see less yield this year,” he said.

Prices: Farm machinery sales this year have risen sharply

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The enthusiasm for investing in machinery doesn't appear much diminished by the higher cost of steel and other inputs, which have made equipment more expensive, he said.

“Even though the costs are higher, the returns are strong enough to offset that,” he said.

Manufacturers are trying to keep the supply chain running smoothly despite tight supplies of steel, labor and transportation, said Blades. “All three of those

things are facing pressure in the global marketplace.”

The industry is also struggling with a shortage of computer chips that are needed to “run everything from toasters to tractors,” he said.

As a result, “there's not a lot of inventory standing around on lots” and orders may take longer to fulfill, he said. “The only solution is a little bit of time.”

Despite a recent softening in commodity crop prices, the prospects remain good for farmers based on the futures market and a fairly low ratio of stocks to

usage, said Langemeier.

The drought is the “wild card” that will impact some farmers more severely than others, depending on the region, he said.

Generally, though, crop prices can be expected to remain healthy until inventories are replenished, which usually requires two to three years, Langemeier said. “When you get in that situation, it takes a while to get out of it.”

Sales of smaller tractors have also shot up in 2021 — 15% for those under 40 horsepower, 19% for those 40-100 horsepower — after

an already impressive performance in 2020, according to AEM.

The market for smaller machinery, which was invigorated by people spending more time at home, has recently shown signs of leveling off, Blades said. However, that's largely a function of demand becoming “more rational” after being “on fire” for so long.

“That market is going to find its correct footing and it's going to be stronger than it has in the past, though it may not grow at the rate it has been growing,” he said.



Farm machinery sales have risen sharply in 2021 as growers reap the benefits of higher commodity crop prices.