

Farmer and Rancher Research in the West



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Sustainable Agriculture
Research & Education

Western Sustainable Agriculture Research and Education

SARE's mission is to advance—to the whole of American agriculture—innovations that improve profitability, stewardship and quality of life by investing in groundbreaking research and education.

SARE's vision is an enduring American agriculture of the highest quality. This agriculture is profitable, protects the nation's land and water and is a force for a rewarding way of life for farmers and ranchers whose quality products and operations sustain their communities and society.

At Western SARE, we serve 13 western states and the four Pacific island territories and are supported by the USDA's National Institute of Food and Agriculture.

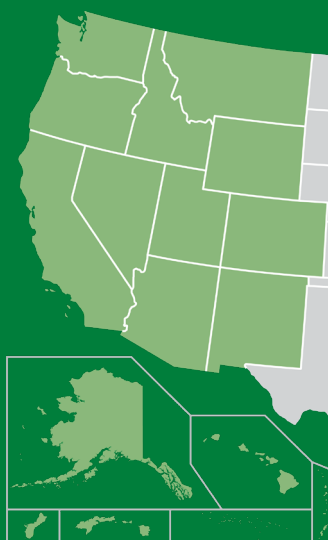
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Cover photo: Mike Williams on Chanch, courtesy of Diamond W Cattle Co.



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FROM THE CHAIR

The SARE Difference

We Help Western Farmers and Ranchers Test Ideas and Solutions without Betting the Farm

Farmers and ranchers in the West are innovative, resilient and productive. Our familiarity with the land means that we know firsthand what is working and what is not working. When it's not working, we frequently have ideas of what needs to be done differently – to improve the soil, reduce pests, increase yields and profits, conserve natural resources.

However, making changes involves taking risks. What if the idea doesn't pan out? Farmers and ranchers have to watch their bottom-line. One or two years spent experimenting can lead to a financial hit too difficult to recover from.

That's where Western SARE's Farmer/Rancher and Professional + Producer grants help out. Launched in 1995, the two grant programs were designed from a foundation of respect for farmers and ranchers. Farmer/Rancher projects are led by producers, while Professional + Producer projects are conducted by an ag professional with strong participation by producers. Both involve on-farm research and demonstration.

Grantees, like the ones highlighted in this report, come up with the possible solution to a problem they face on their farm or ranch, propose a way to research the idea, and then Western SARE provides the critical support needed to experiment. The projects explore sustainable solutions to problems through on-farm research, demonstration, and education. It is expected that the results are shared with other producers.

Since the grants programs' beginnings, Western SARE has funded more than 600 projects with a total of \$8.7 million. So the highlights you'll read here are just a fraction of the creative projects attempting to solve real-world problems the grants programs have funded. In this report, you'll find many examples of that, from looking at plant architecture as a way to benefit bees, to trying new ways to harvest hazelnuts. You'll read about ranchers trying different ways to ranch, and a mushroom grower testing new growth material that could benefit three industries at once.

I am full of admiration for the farmers' and ranchers' ingenuity and willingness to take a risk. These grants give us a chance to explore new and innovative ideas in grassroots agriculture and will sustain the land and food chain for generations to come. As an Administrative Council member, I am proud of Western SARE's programs that give these resourceful producers an opportunity to try something new, determine if it will work, and share what they find with others.



Kent Wasson

Kent Wasson

Chair, Western SARE Administrative Council

Perfecting the Pollinator Patch

For years, Susan Fluegel had wanted to look more closely at the interactions between different plants and different pollinators on her eastern Washington farm.

“What I’ve wondered about is when you’re designing pollinator strips or pollinator patches, what factors encourage greater numbers of pollinators, or a greater diversity of pollinators?” she said. “I’m really excited about that whole idea, and somebody told me about the Western SARE grants and I decided to apply.”

It was a good decision.

Fluegel recently received a Farmer/Rancher grant from the Western Sustainable Agriculture Research and Education program, and has an ambitious plan to look at a number of different flowering plants alone and paired with others species to see what kinds of pollina-

tors come calling.

“I’m interested in the architecture of the plants – their shape and form,” she explained. “My guess is with a diverse architecture of plants we’ll get a much more robust community of pollinators.”

To test her theory, Fluegel will use time-lapse photography to record pollinator visits to varieties of flowers planted alone, then also test those flowers in multiple pairs. They’ll be planted side-by-side with similar-looking flowers of different species, and in separate blocks they’ll be planted with flowers with a completely different architecture.

“We’ll evaluate all the plants separately, then evaluate all the pairings,” she said. “We’ll be able to see what types of plants attract what types of pollinators and say this plant attracts primarily bumble bees, or honey bees or solitary bees, and see what happens in the pairings.”

With 10 treatments and five repetitions of each treatment, there will be a ton of time-lapse images to evaluate.

“My mom, Jane Fluegel, has already offered to help,” Fluegel said. “It’s going to be our winter activity.”

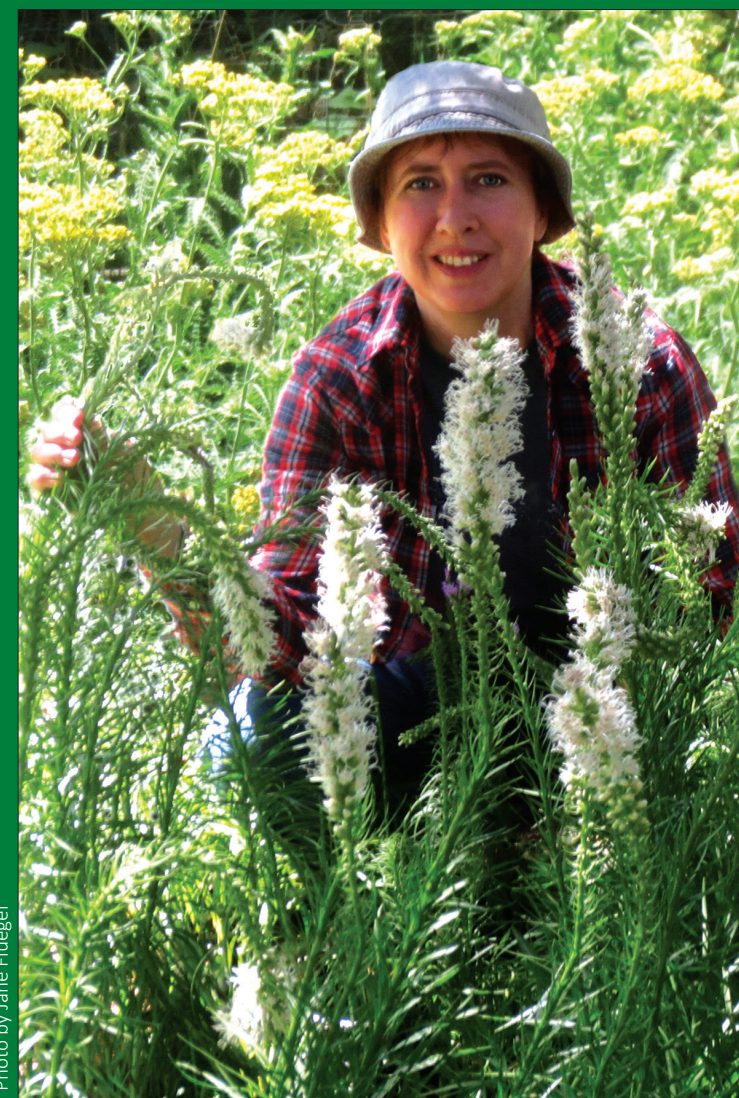
Fluegel purchased the flowers she’ll plant next spring, including species like catmint, Shasta daisy, car-donna sage and blanket flower.

“We’re only looking at varieties that are robust enough for this area, but they can’t look weedy or turn into weeds,” she explained. “Growers hate weedy, especially organic farmers. And for small farms, these have a potential economic benefit if they harvest them for cut flowers.”

Fluegel is anxious to get the plants in the ground and start recording the data.

“I’m so excited by this project,” she said. “I really want it to be useful to farmers, so they can take what we learn and go out and use it and attract pollinators to their farms and enjoy the beauty of the flowers they plant and then be able to sell them, too. I’m already thinking of what we’ll look at next. I think it’ll be herbs in the future.”

Learn more at projects.sare.org/sare_project/fw18-030/



Susan Fluegel and some of the plants she’s testing.

Photo by Jane Fluegel

Grower Tests a Better Way to Harvest Hazelnuts

Oregon farmer Taylor Larson likes growing hazelnuts. He just doesn’t like how hazelnuts are traditionally harvested.

“Like a lot of nuts, hazelnuts are swept off the ground at harvest,” he said. “So to do that, you have to maintain clean, bare soil. As an organic farmer, and somebody who is concerned about healthy soil and a healthy environment filled with a lot of life, I find it depressing to have to go out and kill everything except the trees.”

So at his farm in Creswell, just south of Eugene, Larson is trying something different.

With a Farmer/Rancher grant from the Western Sustainable Agriculture Research and Education program, Larson is looking to adapt a shake-and-catch harvesting system developed for olives for his hazelnut orchards. Called an Olinet, it looks like an upside-down umbrella wrapped around the tree. The nuts shaken off the branches get trapped in the net and funneled into boxes without ever touching the ground.

Larson hopes shake-and-catch harvesting provides multiple benefits beyond getting away from the frequent mowing and leveling he has to do now to keep the ground bare for sweep harvesting.

“We want to integrate livestock into the orchards,” he said. “And I want to be able to intermix apples into our hazelnut orchards and reduce the pest loads of both crops by not having big monocultures of either.”

The livestock Taylor has in mind are pigs, and he believes they can help manage a key pest.

“The biggest pest challenge in organic hazelnuts is the filbertworm,” he explained. “The female moths lay eggs next to the nut, and the hatched larvae enter the shell to feed on the developing nut and cause it to fall early. Then the larvae crawl out and overwinter in the soil.”

His idea is to run the farm’s hogs into the orchards soon after the nuts are shake-harvested. The pigs eat the early-drop nuts (which is fine feed for them) and hopefully prevent the filbertworm larvae from getting into the soil.

Shake-and-catch harvesting will have to be done a week or two before the nuts drop naturally, so Larson’s big questions are around nut quality and yield and processing.



Photo by Taylor Larson

Taylor Larson believes pigs can help manage a pest.

“The upside or harvesting a week or two early will be avoiding the fall rains that can make sweep harvesting difficult,” he explained. “But maybe we won’t get as much nut-fill in the shell or too many nuts will come down in their husks and cause problems in processing.”

The Western SARE grant lets him try the system, which he’ll do in one-acre blocks, and not risk the farm if it doesn’t work.

“Good science and good business aren’t always the same thing,” he said. “A failed experiment is fine in science, but it can put a farmer out of business. These SARE grants allow farmers and ranchers to do good science within their business and takes some of that risk away. That’s so valuable.”

Learn more at projects.sare.org/sare_project/fw18-048/

Putting Riders Back on the Range

In August 2018, a wildfire traveled across the top of the ridge on Glenn Elzinga's Alderspring Ranch, burning a quarter of his Forest Service allotment in one night. It came within three miles of where Elzinga knew his cattle were. Watching forecasts showing a wind event coming in, Glenn moved his cattle to another ranch for safety. The fire storm did come in and burned about a mile from the cattle had been.

"One more day and we would have lost cattle. If we were running cattle conventionally, we certainly would have lost cattle – there wouldn't have been enough time to find all of them under that practice," says Elzinga.

The alternative practice Glenn uses is known as "inherding." Inherding, as first generation rancher Elzinga practices it, controls animal movements by moving them daily, 24/7, by herders on horseback.

One of the grazing practice's many benefits is knowing where cattle are located at all times. In this situa-

tion, Elzinga avoided the financial loss from searching for days and from potential cattle deaths.

Typically, ranchers in the West allow cattle roam unmanaged on grazing allotments for the season. As this customary practice has become more controversial and challenging, Elzinga turned to inherding. Originally seeking a way to coexist with wolves while reducing cattle losses, Elzinga and his herders discovered even more exciting results from the management practice.

When first experimenting with inherding to reduce wolf impacts, Elzinga and his herders learned that with the complete control of the cattle's location, the cattle could be watered in selected sites. The cattle then had minimal impact on stream banks and they could avoid the springs altogether. They also saw benefits in the ability to use their allotment more lightly by bringing cattle to areas they wouldn't go to on their own.

With these observations, Elzinga realized they might be on to something. The practice of using targeted



Photos courtesy of Alderspring Ranch

Moving cattle in Idaho.

grazing – keeping cattle in where they want the land managed – would benefit ranchers facing challenges with endangered species listings, increased water quality regulations, reintroduction of wolves, and increased conflicts with recreational users.

Elzinga, with his Western SARE Farmer/Rancher grant, built upon what they had learned during that one summer by gathering more data on using inherding to meet ecological objectives.

By the end of the project, Alderspring Ranch had exceeded all 2016 Forest Service and Bureau of Land Management standards and guidelines. The Forest Service continues to be interested in the ecological benefits and requested Elzinga's help to get others involved. He believes that there may be some takers. But given the costs that accompany inherding, it would be useful if the Forest Service could provide those ranchers with incentives, he says, supporting the permittees as they figure it out in a way that takes care of the habitat.

Elzinga's goal is to get to an economy of scale, where the investment of additional employees and management time equals the cost of renting private pasture. Then other ranchers might start using the

practice.

For Alderspring Ranch, "It's gone well; our cattle have done better with weight gain this year. I spent time with the crew this year to train about feeding. I will certainly do this again next year."

Elzinga continues to share information about inherding on his blog, found at alderspring.com/organic-beef-matters.

Learn more at projects.sare.org/sare_project/fw16-042/



Inherding puts riders out with the cattle on Glenn Elzinga's Alderspring Ranch.

Photo courtesy of Alderspring Ranch

Can Almond Shells Grow Gourmet Mushrooms?

A good research project generates new knowledge and benefits growers across an entire industry.

Charlie Chen's research project might benefit growers in two completely different industries.

Chen grows mushrooms in Southern California, but is limited in what he can grow by the cost of the substrate he needs to grow them.

"We've been using the straw from local organic wheat farms," he explained. "But with that, you can only grow oyster mushrooms. The other varieties we want to grow, like lion's mane and shiitakes, need a more woody substrate."

He checked the local lumber mills for sawdust, but found it was mostly softwoods like pine and fir that mushrooms don't like.

"To get real hardwood sawdust, it's got to be trucked in from Oregon or Washington and it's too expensive," he said. "Just the trucking costs are over \$2,000, plus the sawdust. Hobby growers can order a pallet of sawdust for \$20 for 20 pounds, but if you're growing mushrooms to sell, that's way too expensive."



Photo by Charlie Chen

Blue oyster mushrooms.

A pound of sawdust is needed to produce a half-pound of mushrooms, he explained.

So Chen got an idea, and even better, a Western SARE Farmer/Rancher grant to test it out. California is the world's leading producer of almonds and pistachios, and both have hard, woody shells. Could they be used to produce the specialty mushrooms he wanted to grow for his farm?

"Handlers process the shells and have a lot they want to get rid of," he said. "They're basically waste."

He'll still need to bring shells down from California's Central Valley, but that's a lot closer than Oregon.

Early tests have shown what doesn't work. He tried using unground shells as a substrate and the mushrooms didn't grow, so he knows the shells will have to be milled. He discovered pistachio shells alone don't hold much water – which mushrooms need – so probably will have to be mixed with almond shells.

"Different mushrooms have different preferences for one or another, so we're experimenting," he said. "We're testing different combinations and preparations."

After the mushrooms are harvested, the used substrate is perfect mulch, and area avocado farmers use it in their orchards to cover the soil and hold in moisture.

So make that three industries Chen's research might benefit.

Learn more at projects.sare.org/sare_project/fw18-042/



Photo by Charlie Chen

Almond shells before grinding.

Working Around Wireworms in Washington



Photo by Steve Elliott, Western IPM Center

Lopez Harvest organic farm is facing more difficult wireworm problems.

Christine Langley has successfully run Lopez Harvest, an organically managed farm on Lopez Island in Washington state's famed San Juan Islands, for more than two decades. But for most of that, she wasn't fighting wireworms.

Those showed up about a dozen years ago.

"I have other disease problems and insects, but they crop up here and there and you can control them," Langley said. "Wireworms affect everything. When I talk to my farmer friends, it's the first thing we talk about. 'How are your wireworms? Oh, ours are fine.' But I'm not fine with them being fine."

And here's how bad fine can be.

"I grow a lot of lettuce for the restaurants and grocery stores here," she said. "I would plant 100 feet of lettuce and maybe 40 percent of them would die. That's not really acceptable when you're trying to make a living."

For years, Langley has been working around the wireworms – the larval form of click beetles that spend several years in the soil before emerging as adults.

"I noticed that it was worse in certain places in the field, so I'd plant things other than lettuce and potatoes in those areas," she said. "I also found it was more problematic for me in late summer, so I would make sure that my least wireworm-infested rows were avail-

able then."

Langley has also been growing and plowing under mustard crops as one way to reduce the wireworms in her vegetable plots. To give herself more options and space, she recently opened up a new field by converting a section of pasture.

"I thought I was solving the problem by opening some new ground," she said. But wireworms love pasture, and Langley's new field was even more infested.

"Wireworms prefer sod and certain grain crops," explained Brook Brouwer, the director of Washington State University Extension in San Juan County, which encompasses all the islands. "As vegetable and market farmers move into those pastures, they're tilling up that ground and you can have a really robust population of wireworms living in that soil. They're hungry, and if you plant a crop it can be wiped out."

So with a three-year grant from Western Sustainable Agriculture Research and Education program, Brouwer is looking for ways vegetable growers can mitigate wireworm problems. He's testing planting a trap crop of wheat, both with and without an organic spinosad pesticide bait product.

"There's really very little that will kill wireworms,

See **WIREWORMS**, page 10

Experimenting with Soil-Health Practices

“If you want to improve your soil health, you have to experiment. Try some changes since soil health is the key to good crop quality and quantity,” advises Robbie Taylor, Madison Soil & Water Conservation District.

Yet, changing traditional farming practices can prove difficult with potential crop failures and financial loss. If success with new practices can be seen first-hand, taking the risk by adopting new practices becomes easier.

With that in mind, five innovative farmers in eastern Idaho, in collaboration with the Madison Soil & Water Conservation District, led the way in experimenting with sound soil health practices.

“We have been interested to learn the advantages and disadvantages of using cover crops and no-till and minimum tillage practices on our farm for several years. We have launched into learning on our own ground, and our crop rotations. We wanted to know, just what are the best practices that will be sustainable for us,” writes farmer-partner Keith Wilcox and Sons.

The idea behind the project is that the region’s historic erosion and soil health problems can be lessened with a change in farming culture. Recognizing that changing farming culture requires peer-to-peer learning and farm-specific quantitative and qualitative data, the project team gathered data on inputs, costs, yields, and farming practices on their experimental fields for comparison with a control field on each of their farms, managed as usual.

Five farms adopted practices such as cover crops, sound crop rotations, fertilizer use, and changing irrigation methods.

The Madison Soil & Water Conservation District then collected the necessary data on the farmers’ fields, demonstrating that these soil health practices can improve soil productivity, conserve irrigation water, increase resource savings, greatly reduce wind erosion, and be economically viable. With the potential of more farmers using these practices, the region can benefit from a reduction of chemical applications and an improvement of soil organic matter.

“There is definitely lots of interest from farmers – especially younger farmers – in learning about our results,” says Taylor. And post-project, some of the farmers who were interviewed during the project continue to experiment with cover crops, making changes each year based on what worked and what didn’t work.

The results were provided to other area farmers

during well-attended field days and farm tours, and in detailed reports. They heard directly from the experimenting farmers, such as this statement from a wheat and potato grower:

“I have found cover crops and minimum tillage to be very beneficial. This experiment has proven to me that we can grow quality crops with reduced tillage, have little to no wind erosion, and healthier soils – all while using less fertilizer and water. I am now working on reducing my tillage practices in potatoes and have seen very promising results. My potatoes have never looked better,” according to Desert Gems Farms.

Learn more at projects.sare.org/sare_project/ow15-032/

WIREWORMS:

Continued from page 9

so our approach is looking at damage mitigation,” Brouwer said. “If we can find a way to reduce the immediate damage they do, especially in new fields, in the long term we can begin to reduce their population.”

Some strategies that have been promoted to control the pests are intensive cultivation and bare-ground fallowing – cultural practices Langley is loath to do.

“Those things are so counterintuitive to me as an organic farmer that I’m hoping that’s not the solution,” she said. “I’m hoping there are other ways to approach this problem.”

So she’s curiously watching the trap-crop trials Brouwer has in her new field. In those, a strip of wheat is intercropped between rows of lettuce transplants, giving the wireworms a more-familiar food source.

“If it works, I’d do it for sure,” she said of the wheat. “One of the side benefits to me with both the mustard production and the wheat would be that it’s good organic matter for the soil. I’m an organic farmer and we’re all about organic matter. But I also realize organic matter is what the wireworms are attracted to.”

Learn more at projects.sare.org/sare_project/ow18-018/

Low-Stress Stockmanship for Pasture Health



Mike Williams will be trying new herding techniques on his rugged Southern California ranch.

Cattle can be good for the land or bad for the land – depending on how and where they graze.

Ranchers like Mike Williams of the Diamond W Cattle Company know that, and look for ways to keep cattle where they’ll be beneficial and benefit. Those techniques can include installing off-stream water sources, cross-fencing pastures or other techniques.

Left to their own devices, cattle will overgraze some areas and can foul streams. At the same time, they’ll leave other available forage untouched and ranchers in the rugged West end up with low stocking levels of cows per acres.

Western SARE is funding research to address that. An ongoing research project is looking at a breeding test ranchers could use to find hill-climbing cows – cattle that are naturally inclined to graze those harder-to-reach areas. That’s ongoing.

Williams is using a Farmer/Rancher grant to test the opposite approach – keeping cattle together.

“The idea is adjusting some of the stockmanship techniques we use and train the cattle to stay together as a herd,” he explained. “We can have more of those cattle, and place them in different locations on our ranch. And like the buffalo herds of the past, achieve a high-density grazing benefit.”

Williams said that the healthiest pastures are grazed then allowed to rest.

Over the next two years, Williams is going to learn

more about using pressure-release techniques to guide cattle (rather than pressure-only techniques to force cattle) and redeploy the cows and calves on his mountainous, high-desert ranch in Acton, California. He’ll use GPS collars to monitor the cattle and measure a whole host of inputs and results.

“What we’re hoping to see are the challenges of implementing this system, then identifying some of the benefits and costs,” he explained. “One of those costs will be labor, moving the cows around every couple of days. It’ll be more scheduled than what I do now, but if I count the time I’m in a pickup, or on a quad or on horseback I’m spending a lot of time now and only seeing half or a third of my herd.”

Seeing all of his stock more frequently could help Williams manage the health of his cattle better and having the cows clustered could reduce the number of bulls he needs to produce a new crop of calves.

“I expect the benefits to my herd will offset the additional time,” he said, “but the driving force is managing the health of our pasture.”

Next spring, Williams will host a demonstration and show other ranchers what he’s up to, then another field day later in the project to tell them how it all worked.

“Hopefully, if we find some value in it we’ll help others implement these practices and avoid some of the mistakes we made,” he said.

Learn more at projects.sare.org/sare_project/fw18-044/

