Lay of the Land & Levers for Change:

Farming for Climate Resilience in Oregon 2021 and Beyond

Lay of the Land & Levers for Change:

Farming for Climate Resilience in Oregon 2021 and Beyond

A look at the context of climate resilience and farming in Oregon & pathways for the future

Oregon Climate & Agriculture Network
August 2021
ASHLEY J. ROOD

Photos clockwise feature: Restoration at My Brother's Farm, Sakari Farms with Hopi Red Amaranth, Blue Raven Farm's no-till soil, My Brother's Farms pastured pigs, and Sakari Farms value added products. All photos by Studio XIII Photography.

Introduction

What does an agricultural economy resilient to a changing climate in Oregon look like? What is already happening in Oregon to make this vision a reality? How do farmers and ranchers need and want to improve their operations? Where are the gaps in research, outreach, and technical support for farmers? These questions shaped the focus of Oregon Climate and Agriculture Network (OrCAN) from March of 2020-June of 2021. As the Covid-19 pandemic shifted our lives beyond the contours of business as usual, we found a community ready for conversations about climate change and agriculture in a way they hadn't been before. The enthusiasm was palpable.

OrCAN talked with over 72 agricultural professionals statewide and beyond. We spoke with soil health specialists with Oregon's Natural Resource Conservation Service (NRCS) and observed their local working group discussions. We've worked with the Yamhill Soil and Water Conservation District on their Carbon Farm Planning project; and we spoke with SWCD staff from across the state who can't talk about climate change with their producers because it is too politicized. We heard from state agency staff connecting the dots between water quality and soil health. We found OSU Extension researchers who are developing practical tools for farmers on the ground. We discussed the need for specific one-on-one farmer technical assistance with watershed council staff. We were inspired by innovations happening at the local and regional levels through non-profit partners. For example, Ecotrust is hosting a new fellowship program for Black and Indigenous food system leaders in the Portland Metro area, and their Ag of the Middle program focuses on the importance of farm viability as a climate resilience strategy. We learned from the successes of farmer-to-farmer education networks like Woody Lane's pasture management groups on the west side of the Cascades and American Farmland Trust's learning circles for women ranchers. And we're excited to report that there are many conversations we still need to have.

In addition, OrCAN held two convenings of agricultural professionals and four producer discussion sessions about barriers and opportunities surrounding the shift to more climate resilient agriculture. We held six discussion sessions on what producers want to see from statewide policy and program development, including one session that was only for farmers who are Black, Indigenous and People of Color. We've received survey responses from 82 producers about their practices and what they want to learn more about. We've also surveyed over 100 agricultural professionals through the state to better understand the kind of training they need to better support farming for climate resilience in the state. We've connected with individuals and organizations working on the cutting edge of research and implementation of farming for soil health across the country.

This report shares out what we've heard. This is a snapshot in time as we're on the cusp of extraordinary change. Support for climate resilience in farming is moving rapidly in an upward direction throughout the world. In the US, that change is currently bolstered by the momentum of the Biden Administration as well as the groundswell of interest and participation from farmers. It's an important time to share the wealth of information that we've gathered to date. This is a work in progress—and an invitation for you to join us.

Table of Contents

Context

A Note on OrCAN's Perspective: Big Picture & Rooted in the Ground

We recognize that agriculture has an important role to play as we address a changing climate. According to the International Panel on Climate Change, we cannot reach our goals to cool the planet without investing in soil carbon sequestration strategies in addition to cutting global greenhouse gas emissions. Agricultural land management is one of the most ready and cost-effective pathways for soil carbon sequestration, reducing greenhouse gas emissions, and providing clean water and air. In Oregon, a recent report conservatively estimated that agricultural lands could sequester an amount equal "to removing 63,000+ cars from the road for one year."[1] The solutions we've focused on in this report are primarily land management and on-farm-related solutions, rather than a focus on the bigger picture of transportation, energy systems, and the development of ecosystem markets.

We also recognize that our farmers and ranchers are at the forefront of dealing with the impacts of climate change in their day-to-day lives. We heard from producers time and time again that ecological resilience, economic resilience, and community resilience are intertwined. Addressing these three pillars, and understanding what producers need to fit their farms, drives our work.

A Note on Terms

OrCAN is intent on using language that works. At the intersection of climate change and agriculture, many terms are being used interchangeably and most are not well defined or commonly understood. Climate smart, soil health, climate resilience, and regenerative agriculture are just a few of these terms. Whether you're a farmer talking to your neighbor, a technical assistance provider talking with a land manager, or a policy maker talking to a constituent, it is important to meet people where they are. It's important to listen and use the terms that resonate best with the person you're talking with, and to define those terms. We've found that talking about the principles of soil health is a great entry point with producers. For those more interested in talking directly about climate change, climate resilience resonates. As one producer told us, "It's empowering."

We have producers of all types in our network, from coastal ranchers to eastern wheat farmers, from the Hood River Fruit Loop orchards to nurseries and diverse vegetable farms throughout the state. We look forward to continuing to expand as a statewide network in Oregon, which is home to over 220 crops on over 37,000 farms[2]. When we use the term "farming", "farmers", or "producers" we're talking about them all.

What is Farming for Climate Resilience?

This is not about a single practice or a rigid methodology. Farming for climate resilience requires a holistic approach that includes a diverse set of management practices. Each farm and ranch has its own geography, conditions, and management needs, and solutions can be found that work for that specific land.

---

[1] Moore, J.M., Manter, D.K., Brown, T., McClelland, S. 2021. Potential for conservation practices to reduce greenhouse gas emissions and sequester carbon on croplands and grazing lands – Oregon. Oregon Global Warming Commission; 4/16/2021; Meeting/Virtual Meeting.

[2] From Oregon Department of Agriculture's: Agricultural Statistics and Directory 2021.

One holistic approach to farming for climate resilience is to focus on the four principles of soil health:

1. Keep the soil covered
2. Minimize soil disturbance and inputs
3. Maximize biodiversity (which can include integrating animals)
4. Maintain living roots

Practices that address these principles include:

- no till and reduced tillage
- cover cropping
- strip cropping
- compost application (or other organic amendments like biochar)
- mulching
- rotational grazing
- conservation crop rotation
- integrated pest and nutrient management
- hedgerow and riparian plantings
- agroforestry practices, including: alley cropping and silvopasture and agroforestry
- grassland restoration
- improved manure management
- sustainable and organic production systems

Figure 1. Summary of the four soil health principles and key practices associated with each as defined by NRCS.

Image courtesy of NRCS (Roesch-McNally et al., 2019)

Figure 1 shows how these principles and practices are connected.

These practices not only build healthier soils to sustain agriculture and increase profits for farmers and ranchers, they also improve water conservation and wildlife habitat on farms, sequester carbon, and help farmers better adapt to a fast-changing climate. Additional resilience approaches include localized (on-site) renewables, irrigation modernization, and other innovative practices.

What we heard from producers

OrCAN's primary job is to better understand and respond to what Oregon producers need and want on the ground to be successful in our changing climate. We want to build a bridge to the research and policy communities that can often be disconnected from farmers' practical needs. We started by listening. In the fall of 2020, OrCAN brought together four small groups of producers into discussion sessions about farming for climate resilience. The producers we've talked with are already in the process of transitioning to more climate resilient practices. They are classic innovators, lifelong learners, and experimenters. While a few conversations with farmers cannot be fully representative of all farmers and farmworkers in Oregon, we made sure to talk with producers working in a variety of contexts—from different cropping systems and ecosystems, with different values and goals. Despite these differences, we found similar themes in their stories of success as well as similar barriers. They are all continually refining their systems. They don't have one set way of doing or understanding. Whether they are growing cows, carrot seed, cucumbers, or community food hubs, they value the power of healthy soil and stewardship of the land.

We talked about some of the big questions: How are you farming for climate resilience? What are the barriers you are facing to implementing best conservation practices? We were in conversation with ranchers, wheat, and seed growers from the dry eastside. We spoke with others managing pastures from north to south throughout the Willamette Valley. And we spoke with a group of women farmers with social justice as their driving value. These conversations were hosted in collaboration with our partners including Ecotrust, Friends of Family Farmers' Oregon Pasture Network, and Oregon State University.

The solutions these farmers generate are incredibly dynamic, creative, and inspiring. From dry farming orchards and no-till mixed vegetable operations, from diverse cover cropping mixes and prescribed burning in Central Oregon to integrating animals into crop production, restoring degraded land with livestock, and research on multispecies rotational grazing and the soil microbiome. Their stories of works in progress, of success and failures, are the real wealth of information here in the state. These are the solutions that will drive us towards a more resilient future for farming in Oregon. OrCAN looks forward to sharing these stories in more detail through farm profiles and farmer-to-farmer learning circles in the future. Read on to learn what we learned from farmers and what they told us they need.

What We Learned

On the benefits of transitioning to more climate resilient practices:

- "Instead of measuring success just with profit, we measure it with our quality of life, cattle, timber and grass and enjoying abundant wildlife."
- "We applied a holistic management plan over the past five years and have seen an increase in production over 50%. It's a lot less work and more enjoyable."
- "Improving our soil is having the greatest impact for water retention and making the most out of the water that we do have."

- From a younger generation farmer, "there's obvious overlap between improving our resources and soils and making ourselves economically sustainable. That is the story that is sometimes hardest to tell but also resonates particularly with my generation."

On the impacts of extreme weather events:

Some farmers were less interested in talking about climate change directly while others are actively engaged in climate solutions. As one farmer put it: we are dealing with climate chaos right now, today. Here are just a few of the concerns and questions we heard from farmers around climate change:

- Extreme weather events rolled out season after season in the 15 months we've been holding these conversations. From destructive hailstorms in Central Oregon the early summer of 2020, to the devastating wildfires of 2020 when many of our farm partners and their livestock were evacuated, to an ice storm in February of 2021 that left many of our farm partners without electricity for almost a week and devastated orchards. As we close out this report in the summer of 2021, our producers are facing record breaking heat waves and limited water resources due to drought.
- For many farmers, cleaning up after these extreme weather events is hard. Those with limited access to capital and resources can't bounce back easily.
- Many farmers were evacuated during the fires of 2020. We heard from smaller farmers that they are focusing on developing mobile infrastructure, particularly for animals. What policies and programs can support producers during a disaster and recovering from a climate disaster?
- What policies are impediments to producers in terms of recovering from disasters? For example: in California, some producers needed special permits to return to fire damaged areas to care for animals, is this an issue for Oregon?
- Disasters will continue to happen. Proactive development of disaster funding and planning tools need to be available to producers, particularly Black, Indigenous, and other farmers of color, all year. As one producer put it, "This isn't the last extreme weather event that we will experience in our farming careers, in our tenure stewarding this land. It needs to become a level one priority in systems design that you might need to pick up and move."
    - » Current disaster funding efforts range from "GoFundMe" efforts to more cumbersome process that the USDA requires and typically only fits larger farms. There needs to be something in between that's more streamlined and less dependent on detailed accounting for losses.
- Beyond these disaster related issues, there are continual increasing climate related stressors: more consistent and higher intensity winds, increased pest pressures, smoke damage to crops, declines in pollinators, and seed germination challenges.
- Higher stress levels for farmers translates to an increase in mental health issues. There have been some webinars on this (Farm Bureau / OSU) but what else can be done?

What Producers Need

BETTER, MORE CONNECTED, TECHNICAL ASSISTANCE—RESEARCH—EDUCATION

We heard loud and clear from producers that all too often research, education, and technical assistance (TA) are removed from farmers' needs. These three things must be interconnected. The large web of existing resources can be challenging and overwhelming for producers to navigate, making it difficult to find what they specifically need. Like an internet search, you may Google something and get thousands of answers, but none of them are quite right, and many are quite wrong for your operation.

Holistic Planning

Farmers are planning at the farm scale, landscape scale, and markets-based scale, so technical assistance support should address all three scales. Farmers are interested in **one-on-one, holistic, soil health-driven** technical support on farm planning for climate resilience. This comprehensive TA support is needed consistently over time.

On Growing Healthy Soil

Producers want to know more about how to produce healthy soil, not just crops. As one producer put it, "On soil health I want to know: where am I right now? Where can I go? What's going to help me get there?" Answering these questions will require **improved research on assessing soil health,** and education on the best practices for soil testing, establishing a baseline, and monitoring changes over time that are manageable at different scales. From there, they need **place-based and crop-based knowledge** for how soil health principles and practices work for producers in a local area at different scales. Pasture and rangeland managers are often left out of support efforts for climate-resilient farming. The best pathway to getting this information will be producer-driven research to better understand how practices can work on the ground in each region for more specific crop types. Access to research on soil health should reduce the risks of transitioning to new practices. Research must also be transparent and accessible. For example: the science behind carbon markets in development is creating great data around measuring impacts of soil carbon sequestration of different practices, but that data is not publicly available.

Nuts & Bolts Support to Reach Healthy Soil & Holistic Farm Goals

Producers need to understand the nuts and bolts of implementing new management plans. What are the labor costs? They need to put the changes into a calendar and understand the impacts of these changes to equipment needs and irrigation. For example: if you start cover cropping for soil health, when and where do you get the seed, when do you plant it, when and how do you terminate it, and what do you do with the plant materials? What are the overall economic costs and benefits of implementing these practices? Producers benefit from equipment rental options to reduce the risks of trying a new practice. For example, several Soil and Water Conservation Districts offer no-till drills for rent.

Farmer-to-Farmer Education

Producers indicated that learning from other producers was the most important way to get

information to help them transition to new practices. The development of farmer-to-farmer education networks will be critical to moving forward. Producers indicated that could be both in person and via a relatively easy to use online platform like Zoom. As one producer put it, "a lot of people don't like zoom but frankly it's a lot easier for me to be on a phone call and still get work done and be engaged than having to stop and drive somewhere. It makes it a lot easier for me to be a participant." And another farmer from the eastside put it: "We go to people for support—we're missing hearing from people in other areas who are experiencing the same challenges that we have. We were going to form a management club something like 30 years ago, but we figured out that meeting halfway between us, we'd still have to drive 2.5 hours. It wasn't practical. We're all learning about distance learning now. If there's a way to set that up, I'd be all for it."

FINANCIAL INCENTIVES AND CAPITAL INVESTMENTS THAT FIT

Financial incentives are important, but they must be provided in a clear, streamlined, simplified way to take the burden off of farmers. Farmers are often juggling several different grant, loan, and certification programs to implement a project and every entity wants similar information but in a different format, or with a slightly different emphasis. Smaller farms, beginning farmers, as well as farmers who are Black, Indigenous, and other People of Color, have less resources to deal with this level of paperwork and cost-share. As one producer said, "FSA will give you a farm loan, but you've got to take all of these classes that cost a ton of money...NRCS will give you a high tunnel, but you have to go get a loan first to pay for it up front to get reimbursed." Timing of submitting applications and/or implementation of projects often doesn't line up with production calendars.

We heard concerns about the imbalance of direct payments going to larger commodity crops growers like corn and soybean producers. As one producer said, "We can start taking some of the money that is earmarked for big commodity crops and refocus some of that back into the soil for soil carbon sequestration. The general idea is that we want to lend our experience and expertise to helping bring this back home on a very real level and a lot of that is about putting money back into places it belongs."

Enhanced Infrastructure Funding

It's critical to provide enhanced support for capital investments in infrastructure like fencing and water for livestock, hoop houses etc. Many people would be served by lower interest loans outside of the federal government loan programs, which can be challenging for historically underserved producers to access.

Farm viability

Economic viability of farms is a climate mitigation strategy. Overall, many small and medium size farms that are implementing these climate resilience practices struggle to make an income through farming. Our conversations about climate resilience turned back to economic resilience time and time again in these discussions. While much of this stems from systemic challenges that need to be addressed via policy and other systems change, providing farmers with accessible business strategy and development support is also an area that could be expanded.

Concerns with payments for ecosystem services and soil carbon sequestration

The idea of recognizing soil health as a resource came through all our conversations. As interest in soil carbon sequestration and other ecosystem services on farms increases, the producers we spoke with are concerned that payment programs will not be equitable for all farmers, at different scales, and in diverse ecosystems. For example, some farmers on the eastside of the Cascades with limited natural ability to store carbon were most concerned about payments for soil carbon sequestration by acre in comparison to farms on the wetter side of the Cascades. There's also concern about a lack of standard metrics and methods for measuring soil carbon sequestration. The federal administration, supply chain buyers, and ecosystem service market developers are all creating new programs with different requirements. Individual farmers will need additional professional support to navigate these systems. To date, these programs are being developed with limited economic improvement for farmers. This 2021 Climate Solutions For Farmers publication from the National Sustainable Agriculture Coalition articulates many of these issues and more.

SUPPORT FOR FARM MANAGERS

Finding ways of working with farmers managing leased land and landowners leasing their land is critical. Many farmers who lease land are interested in conservation programs and investing in soil health but find it challenging to invest when their own tenure is uncertain. Creative lease options, like ground leases can support farm managers in implementing climate resilient practices[3]. Also, it's important to ensure equitable access to affordable legal assistance for all parties involved in land lease arrangements.

BEYOND FARMLAND MANAGEMENT

Producers highlighted several interconnected areas worth exploring further:

- **Farmland Preservation and Access to Land:**
  - » Over the next twenty years, Oregon will see the largest transition of farmland from one generation to the next[4]. First-generation farmers, many of whom are interested in farming for climate resilience, have limited access to both capital and land as farmland prices skyrocket. We must ensure that policies and programs both preserve farmland and improve access to land for first-generation, and BIPOC farmers.
  - » Simply providing access to land without the kinds of technical assistance support mentioned above sets up new farmers for failure.

- **Addressing water scarcity:** It will be critical to find ways to make water go farther and ensure producers are less vulnerable to water shortages.

- **Supporting stronger regional food systems:** Small and medium size farmers provide an increasingly important supply of food for people and yet they have the biggest hurdles economically and logistically in the state. Support for small farmers can take many different forms. They need:

[3] Ground leases can provide a mechanism for landowners to compensate tenant farmers for permanent improvements they make to the land. See more at the Center for Agriculture and Food Systems' Farmland Access Legal Toolkit

[4] Brekken, C. A., Gwin, L., Horst, M., McAdams, N., Martin, S., & Stephenson, G. (2016). The Future of Oregon's Agricultural Land. Oregon State University. Retrieved from https://ir.library.oregonstate.edu/concern/defaults/2r36tz03g.

    - » Additional administrative and professional support at affordable rates
    - » Efficient processing and distribution services
    - » Investments in local seed development and support for tribal seed sovereignty
- Supporting whole farm system emission reductions: Many farmers are interested in reducing transportation emissions, increasing on-farm renewable energy use, and reducing food waste.
- Mental health support: Farmers are under extreme stress, facing issues that include economic challenges and COVID-19, while also dealing with the impacts of climate change, from water scarcity to recovering from extreme weather events. These unique challenges require support.

As we move forward as a community dedicated to farming for climate resilience in Oregon, let's meet farmers' needs by focusing on better, more connected, technical assistance, research, and education, plus financial incentives and capital investments that fit, with support for farm managers. And, let's go beyond farmland management.

What we heard from technical assistance providers

Oregon has a large web of farm technical assistance (TA) providers throughout the state. Because OrCAN values meeting producers where they are, we needed to better understand the landscape of trusted technical service providers they depend on in Oregon. These providers offer farmers education, research, outreach, farm planning, project design, and financial support, as well as assistance with applications and implementation of projects. Key providers include: the USDA Farm Services Agency and Oregon Natural Resource Conservation Service, Oregon State University Extension, Soil and Water Conservation Districts, Watershed Councils, agronomists, non-profits, beginning farmer education providers, and more.

These organizations are well poised to collaborate on comprehensive TA for producers. As one NRCS staffer summed it up: "The main role of NRCS is to offset the risks of starting something new through access to financial incentives and information—this is their strength. OSU Extension can provide research, technology, and hands on support. Soil and Water Conservation Districts and Watershed Councils can provide one-on-one technical assistance as well as classes and demonstration sites."

While Oregon is lucky that collaboration is an important principle for many of our TA providers, during our conversations we discovered there's a need for a state-wide organization to drive these collaborations on climate resilience moving forward. For example, there was a multi-state "Healthy Soils, Healthy Region Workshop" that took place in March of 2019 in Pendleton, Oregon with 151 agricultural stakeholders. You can see a summary of the event here. Many great research questions and needs were identified—yet that work in Oregon has not been revisited in a collaborative way to date. Any progress on these research questions is happening in isolation without sharing information. In conversations with an Oregon NRCS staff member, we heard that, "The takeaway was that there's a lot of good will towards opening up conversation, but without anybody driving it, further conversation and implementation is not happening."

Each agency and organization has strengths and weaknesses inherent in the way they are structured and governed, the culture they create, their funding situation, and their abilities to provide farmers with responsive support. Some areas are well staffed and sustainably funded, while others lack a sustainable funding source (particularly SWCDs without a tax base), and cannot provide consistent or adequate TA support. The services they provide and the trust they have built with farmers also varies widely depending on geographic location and often the personalities of the individual service providers.

Our survey of over 100 agricultural service providers throughout the state highlighted both a need for climate resilience training and interest in the following specific topics:

- the science on climate change impacts to Oregon agriculture;
- solutions for farmers on the ground;
- economic benefits of soil health practices;
- strategic communications around climate change;
- whole farm planning.

Some of these issues were addressed through the "Train the Trainer Program for Oregon Agricultural Professionals: A Climate Resilience Toolbox for Working With Oregon's Farmers and Ranchers" which OrCAN organized in November of 2021 and 2022, but it will require sustained and updated training over time.

Overall, we've found that Oregon TA providers are:

- underprepared to address climate resilience questions from producers, due to a lack of training and access to information, unclear guidance from leadership and the politicization of climate change in Oregon, and...
- inconsistent in their levels of support across geography and crop type (in particular, small and mid-size growers, farmers of color, specialty crop growers, and livestock producers are underserved).
- Additionally, the large web of providers can be overwhelming for producers to navigate.
- There are limited opportunities for TA providers to give feedback to legislators and other decision makers based on their work with with producers on the ground. Such feedback would inform better policy and programs to match the needs of producers.

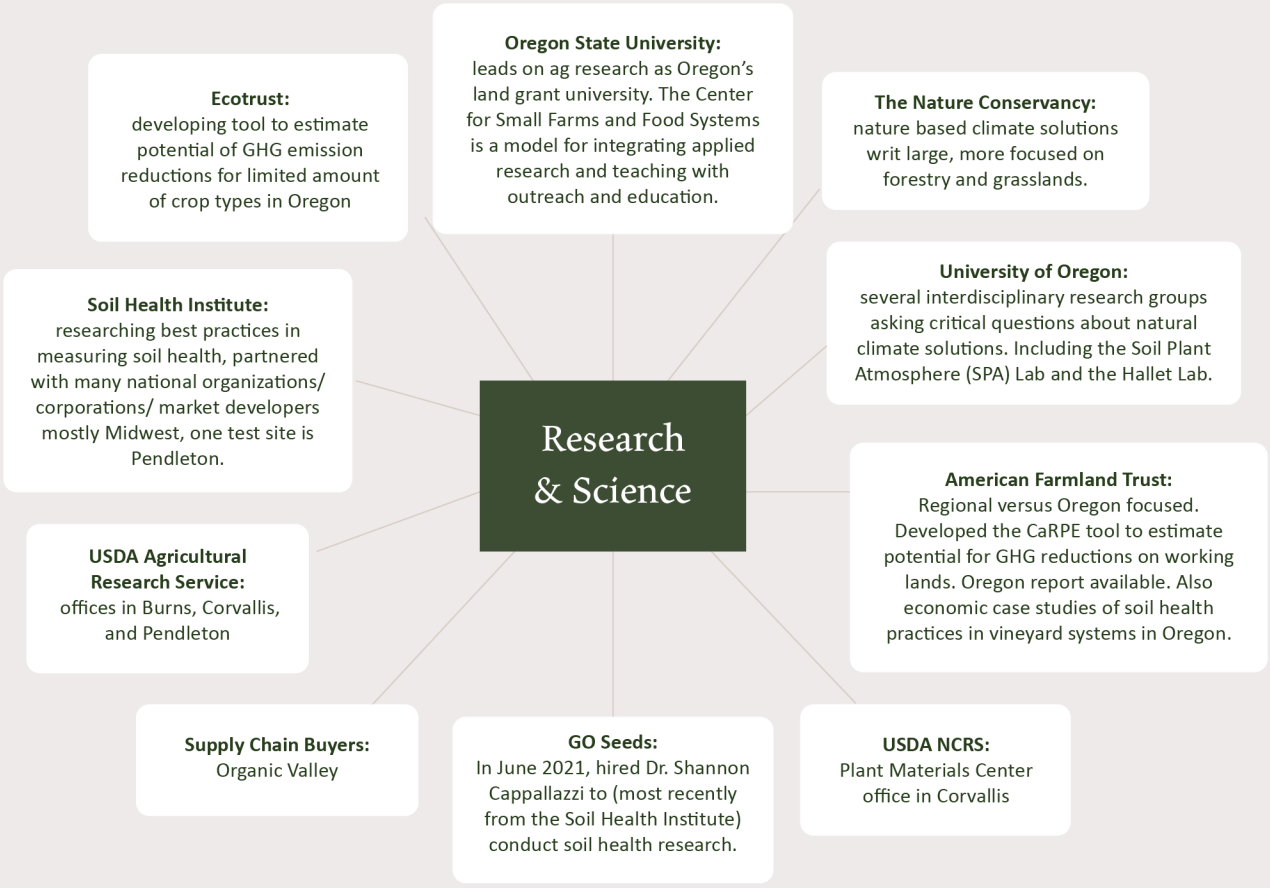
Oregon's TA providers need better tools, up-to-date knowledge, improved applied research, and increased capacity to provide the kind of assistance farmers need to meet the scope and scale of supporting a resilient agricultural economy in the state.

Current Landscape & Opportunities for Technical Assistance Services in Oregon Agriculture for Climate Resilience

We've provided a snapshot below of the current landscape of technical assistance, education, outreach, and research in Oregon. OrCAN has attempted to be as comprehensive as possible in this evaluation—but there are still gaps to fill. For example, Oregon State University is a vast institution with staff and faculty working on all sides of this issue in every county in the state. We have yet to speak with everyone there who is currently engaged in research and outreach to producers at the intersection of climate change and agriculture. In addition, almost all this work is grant funded—whether it's a staff member at a SWCD or NRCS or an OSU researcher, at some level they must raise money to do their work. This makes sustained work over time challenging. We look forward to continuing to build our network and create more stable collaboration moving forward.

Current Oregon Providers Working on Farming for Climate Resilience

Current Oregon Providers Advancing Place-Based Research on Farming for Climate Resilience



Emerging Opportunities & Barriers

Within the Landscape of Technical Assistance, Education, Outreach & Research in Oregon[5]

FEDERAL LEVEL INSTITUTIONS

USDA in Oregon

The Northwest Climate Hub

The official goal of our regional hub is to "provide information and technology to guide climate-informed decision making by farmers, ranchers, forest landowners, Native American tribes, Alaska Natives, natural resource managers and technology transfer specialists to generate sustainable and productive working landscapes in the Northwest. The Climate Hubs are science driven, stakeholder centered, efficient, cooperative partnerships with federal, state and local organizations." Our climate hub has a huge region to cover (Alaska, Idaho, Washington, and Oregon) and has typically focused most on forestry issues. Their strength is curating and sharing information. If you're looking for the latest in climate science, they are your first stop. Unfortunately, their funding waxes and wanes with the interests of the federal government. With the new Biden Administration, they have been highlighted as a key player in the USDA's new climate focus. We hope they will receive the kind of funding they need to do increased work. It is a possibility that they could become a funding partner for Oregon's agricultural technical assistance providers and researchers in the future.

Current projects of interest as of 2021: a rangelands postdoc Anna Maher is currently developing a summary of newly available rangeland management tools and their potential role in supporting land managers and ranchers' preparedness and economic resilience. She is also creating a synthesis of climate change impacts to rangeland management in the Northwest. The NW Climate Hub is also on the planning team for the Oregon Train the Trainer: Farm Planning for Climate Resilience program for Oregon agricultural professionals.

Barriers: Staff at USDA were underfunded, discouraged, and undervalued in the last Administration (see Climate 21 Memo). The Climate Hubs in particular have not had dedicated or sustained funding.

Opportunities: additional funding opportunities in the new Administration like the Extension, Education, & USDA Climate Hubs Partnership through the Agriculture and Food Research Initiative in 2021. The Hub has an important role to play in delivering regionally appropriate, climate resilience tools, research, and resources to producers.

Oregon Natural Resources Conservation Service (NRCS)

The NRCS provides technical and financial assistance through local service centers. Oregon is lucky to have a strong team of soil health focused staff and they prioritize cooperation and partnership. They are currently doing good work to improve the culture for better information sharing, both across the organization and with partners like SWCDs and OSU Extension. Cooperative funding and co-located offices help build these partnerships.

[5] See Appendix A. for an initial list of TA and research providers

Several existing funding programs can support farmers in their climate resilience practices. The Environmental Quality Incentives Program (EQIP) and the Conservation Stewardship Program (CSP) in particular support working lands conservation efforts. The EQIP program also provides Conservation Innovation Grant (CIG) funding for the "development, application, and demonstration of innovative conservation technologies and approaches." There's a classic CIG and then an on-farm trials CIG program area. In 2021, priority areas for the classic CIG program include "climate-smart strategies for water resources and increased resilience" as well as, "soil health for climate mitigation, adaptation, and resilience"

Current updates of interest: Oregon is one of four states that is piloting a new EQIP funding program Conservation Incentive Contracts, a stepping stone between classic EQIP and CSP. For this first round of funding, soil health was included as a priority practice for Oregon. A new communications structure update combines regional email updates in Oregon Farm Services Agency (FSA), NRCS and Risk Management Agency (RMA) for producers. And, Oregon NRCS recently added two new organic and small farms staff—one on each side of the Cascades. Development of a local Conservation Implementation Strategy (CIS) focused on the intersections between food security and conservation is underway in the Deschutes Basin area. As of March 2021, at the federal level, the Regional Conservation Partnership Program (RCPP) is funding $75M in 15 new, unique projects across the country under their Alternative Funding Arrangements (AFA). Through the AFA, they will prioritize projects related to climate smart agriculture and forestry that wouldn't have been funded under classic RCPP projects. Oregon NRCS staff are part of the planning team for the "Train the Trainer Program for Oregon Agricultural Professionals: A Climate Resilience Toolbox for Working With Oregon's Farmers and Ranchers".

Barriers:

- Staff at USDA were underfunded, discouraged, and undervalued in the last Administration (see Climate 21 Memo).
- Despite the high level of bureaucracy, the effectiveness of this service rests on the personalities of individual staff at the local level. Certain areas of the state are stuck with long-term employees that are rigid in their work while other areas see high turnover rates.
- NRCS doesn't have a way of measuring the outcomes of their funding. Results tend to be communicated in terms of dollars spent or number of contracts, rather than in terms of long-term conservation improvements on the ground.
- Producers are overwhelmed: the alphabet soup of programs, high level of paperwork, and timing of conservation contracts are challenging for many producers on the ground. Many producers require administrative support to apply for these programs.
- Demand exceeds availability for conservation funding exceeds available funding in almost all programs.
- The USDA nationwide continues to perpetuate institutional racism in the distribution of these limited funds.[6]
- Reductionist approach: The system of NRCS programs are primarily designed to be practice based. Innovative holistic solutions are hard to achieve within this system and low hanging fruit is missed. One anecdote shared by a technical assistance

[6] How USDA distorted data to conceal decades of discrimination against Black farmers From The Counter in 2019, accessed September 2021

provider is a good illustration: a livestock producer was trying to work on manure management, and while the NRCS staffer could talk about alternative ways of storing manure, they weren't able to offer the solution of composting manure and adding it as an organic amendment to improve soil health. Innovations like this have to go through the right channels, which are somewhat opaque.

- The ability for NRCS staff to talk about climate change on farms directly waxes and wanes with the federal administration's political position. As a result, their staff are underprepared to provide strong technical assistance to farmers who are interested in this work.

Opportunities: Local decisions guide much of the priorities for state funding; local working groups and long-term plans developed by local staff drive these decisions. It's important to work at this local level to ensure soil health practices receive priority funding and equally important to increase understanding of soil health benefits for other resource concerns like water quality. Climate smart agriculture is a priority within the Biden Administration and is already creating new pathways of financial and technical assistance for farmers throughout the state.

Oregon Farm Services Agency (FSA): Administers funding for certain programs that support farming for climate resilience as well as federal crop insurance, low interest loans, and disaster relief for farmers in Oregon. Key programs include the Conservation Reserve Program (CRP) which: "encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filter strips, or riparian buffers. Farmers receive an annual rental payment for the term of the multi-year contract. Cost sharing is provided to establish the vegetative cover practices." They also administer the Organic certification cost-share program.

Current updates of interest: The CRP has a new initiative to quantify the climate benefits of CRP contracts. This multi-year effort will enable USDA to better target CRP toward climate outcomes and improve existing models and conservation planning tools while supporting USDA's goal of putting American agriculture and forestry at the center of climate-smart solutions to address climate change." Targets specific state or nationally significant conservation concerns, and federal funds are supplemented with non-federal funds to address those concerns.

Barriers

- Many of our smaller farm partners struggle with both communicating with FSA staff and finding accurate information and financial tools suitable for their farms.
- Large administrative lift for producers in terms of documentation.
- In some cases, crop insurance is required to access disaster funds—many producers in Oregon do not have crop insurance.
- Lag in timing of disaster relief funding—depending on the program
- Historical discrimination mentioned above is also present in the FSA[7]

[7] USDA Data: Nearly All Pandemic Bailout Funds Went to White Farmers. From Environmental Working Group, accessed August 2021. Further suggested reading: Why a Debt Relief Program for Farmers Matters for Racial Equity in America, by Georgetown University law professor Sheryll Cashin.

Opportunities

- FSA has a new state director as of 2021 and has recently begun coordinating outreach and information sharing with NRCS and the Risk Management Agency (RMA), which will be helpful for producers on the ground.
- The Conservation Reserve Enhancement Program is an offshoot of this program that is a collaboration with FSA, NRCS, and state agencies led by the Oregon Watershed Enhancement Board.
- The National Sustainable Agriculture Coalition (NSAC) has online resources that highlight FSA programs that support smaller farms, more diversified farming operations, as well as beginning and underrepresented farms that include:
  - » Microloans
  - » Whole Farm Revenue Protection for Diversified farms
  - » The Noninsured Crop Disaster Assistance Program: Helps level the playing field for organic and diversified farmers while providing incentives to beginning, socially disadvantaged, and limited resource farmers to enroll
  - » Organic Crop Insurance, Down Payment Loan Program: A joint financing option to help beginning, veteran, and socially disadvantaged farmers purchase farmland
  - » Land Contract Guarantee Program: Provides federal loan guarantees for farmers who self-finance the sale of their land to a beginning or socially disadvantaged farmer),
  - » CRP Transition Incentives Program: Encourages landowners to transition CRP farmland to beginning, minority and veteran farmers and ranchers). NSAC is also a consistent advocate for improving

Oregon Risk Management Agency (RMA): In 2021, RMA will offer subsidies of up to $5 per acre on federal crop insurance premiums for producers who planted cover crops this spring. This has limited application beyond larger commodity crop growers.

Western Sustainable Agriculture Research and Education (WSARE) Grants: a key funding source for researching farmer-driven innovations in agriculture that improve profitability, stewardship, and quality of life.

Oregon Rural Development (RD): offers two different Rural Energy for America Program (REAP) grants. The Renewable Energy and Energy Efficiency Loan and Grant Program provides grants to agricultural producers "for renewable energy systems such as biomass, wind generation, and solar generation, and purchasing and constructing energy efficiency improvements such as insulation, heating, cooling or refrigeration units, and lighting." And REAP Energy Audit and Renewable Energy Development Assistance Grants, "provide funding to state and local governments and other entities to conduct energy audits, and renewable energy development assistance. The funds must be used to assist rural businesses in eligible rural areas and agricultural producers."

USDA Research Facilities in Oregon:
Corvallis Plant Materials Center: conducting cover crop research and pollinator habitat. Serves areas in the States of California, Oregon, and Washington.

Pacific West Agricultural Research Service (ARS): Oregon has three ARS sites – located in Burns, Corvallis, and Pendleton focused on Oregon specific farm research. Research is focused on the following areas: Animal Production and Protection; Crop Production and Protection, Natural Resources and Sustainable Agricultural Systems, Nutrition, Food Safety, and Quality.

STATE LEVEL INSTITUTIONS

Oregon Department of Agriculture (ODA)
ODA is very interested in expanding their soil health work. To date, they have primarily focused on how much of their current work already connects to addressing climate change, such as efforts to improve water quality on farms. They are also interested in advocating for Oregon's cover crop seed industry through their marketing team.

Barriers: Their role as a regulator in the agricultural space makes partnerships with producers a bit more challenging. Limited funding to date.

Opportunities: Hiring for a new Soil Health position in 2021. And Oregon's Specialty Crop Block Grants requirements have been updated to include climate smart ag provisions.

Oregon Association of Conservation Districts (OACD): A private, non-profit 501(c)(5) statewide membership organization that represents, supports, and strengthens Oregon's 45 Soil and Water Conservation Districts (SWCDs). Currently with a staff of one, they provide an important common voice for conservation in Oregon's legislature. They hold an annual meeting for district board members that is a good avenue to share information.

Opportunities: new working lands committee that will have plans for SWCDs to focus more on soil carbon sequestration. An important partner on policy advocacy and networking with all SWCDs.

Soil & Water Conservation Districts (SWCDs): emerging out of the Dust Bowl era, SWCDs were created to be a local partner in soil and water conservation with the federal government and the state department of agriculture. Out of the 45 SWCDs throughout the state of Oregon, 14 have tax bases. Since the 90s, a large focus of SWCDs has been to help ODA and the State of Oregon reach its goals on agricultural water quality management. Oregon Conservation Education and Assistance Network (OCEAN) helps provide training and professional development to the conservation districts throughout the state, primarily through an annual conference.

Current projects of interest identified: Yamhill SWCD's Carbon Farm Planning Pilot project is testing out the carbon farm planning process developed in California on three different farms in Oregon. To date, two plans have been drafted, one for a dairy and another on a vineyard. West Multnomah SWCD and Tualatin SWCD have hosted a Soil School for nine years.

Barriers: limited funding for consistent technical assistance over time.

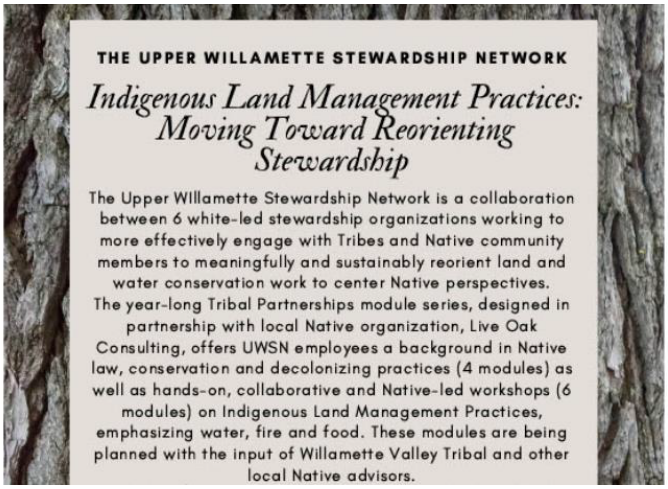
Opportunities: SWCDs are some of the most trusted local farm advisors with the largest geographic representation. They have been working with private landowners on conservation for decades. Many SWCDs have producers on their boards, which helps amplify outreach to other farmers. Some SWCDs also manage farmland, providing an opportunity to demonstrate farming for climate resilience on the ground in Oregon. SWCD's are also often the first point of contact for new rural landowners interested in learning how to best manage their land. Increased investment in SWCDs can leverage existing relationships and networks to rapidly expand farming for climate resilience across the state.

Oregon Watershed Enhancement Board (OWEB): well established administrator for funding restoration projects on private land.

Opportunities: OWEB is interested in incorporating a more explicit climate funding lens for their work. They are working in collaboration with Oregon Department of Agriculture and Forestry to develop this work. Their work on the Conservation Reserve Enhancement Program (CREP) and their CREP technicians grant program could be an avenue to push forward on climate mitigation goals. In 2021, they're hiring a water and climate staff coordinator to engage more explicitly on these emerging issues, particularly in the policy context.

Oregon Watershed Councils

Oregon's watershed councils are community-based, voluntary, non-regulatory groups that work on watershed conservation issues. "Oregon is one of the few states to have this community-based model – supported by the state and recognized by local governments – to focus on restoring land and water from 'ridgetop to ridgetop.'" They are funded by the OWEB and organized under the umbrella of the Network of Oregon Watershed Councils.



Current projects of interest: The Upper Willamette Stewardship Network is an innovative example of how watershed councils can drive multi-stakeholder collaboratives to improve work on the ground. Four watershed councils, a land trust, and a conservation non-profit have come together "improve and expand programs, increase cost effectiveness, eliminate duplication of efforts, and achieve long-term organizational stability to serve the region's land and water resources and its communities." What is most innovative about their work is a new effort to engage with Tribes more effectively.

The Coast Fork Watershed Council also has a Working Lands program leading the way to better integrate research and technical assistance that works for farmers on the ground. They are interested in building out more comprehensive technical assistance on climate resilience that better supports holistic farm management for water quality benefits.

Opportunities: work with the Network of Oregon Watershed Councils to identify and prioritize councils working most closely with farmers and ranchers. There are several points of intersection for climate resilience on farms and the work of watershed councils, like riparian reforestation.

Oregon State University and OSU Extension

Leads on agricultural research and outreach to farmers as Oregon's land grant university. One of the most trusted resources for producers. The Center for Small Farms and Community Food Systems is a model for integrating applied research and teaching with outreach and education.

Barriers: Many producers remarked on the decline in OSU Extension support throughout the state.[8] Those with successful Extension offices tend to receive supplemental funding and support through commodity commissions and other private companies. Despite these funding challenges, demands on Extension staff are still high. They tend to be asked to do even more with less. Farmers' expectations of what Extension service provides versus their job descriptions do not align. And vice versa, the current structure of institution makes it hard for Extension to provide the services and research that producers need. There is currently limited climate-focused research or outreach.

Projects of Interest: OSU Extension is a leader in the nation in developing an organic Extension service. As of 2021, they have two organic staffers one in specialty crops the other in pasture and forage management (will come on board August 2021). They are increasing staff capacity on water issues. There's one new staff focused on irrigation management, another on soil and water quality management. Extensive innovative research on cover cropping throughout the state. See Appendix A for an initial list of staff interested in working at the intersection of agriculture and climate. Via WSARE, OSU Extension is funding and partnering on the "Train the Trainer Program for Oregon Agricultural Professionals. OSU's Dry Farming Project started in 2014 with on farm trials and demonstrations and has expanded to a more farmer-to-farmer focused Dry Farming Collaborative in 2016. There's an excellent resource hub here.

Opportunities: The University has a huge opportunity to step up and lead on climate resilience. Chico State University's Center for Regenerative Agriculture and Resilient Systems provides a good model for how a university can create trans-disciplinary teams and strategic focus on the future of farming in addition to leveraging partnerships with conservation districts and other technical assistance providers. In 2021, the Center received a $6.9M RCPP award through NRCS to support: " 'Soil Health Management Systems for Northern California,' a five-year project designed to help orchard/vineyard, rangeland, dairy and row crop producers in Northern California build food and fiber production resiliency to counter climate change challenges. OSU's Hannah Gosnell is a participant on this project.

[8]This is a challenge throughout the country. Good resources include Cooperative Extension System: Trends and Economic Impacts on U.S. Agriculture by Sun Ling Wang from 2014. And this information from the Pew Charitable Trusts in 2014: " 'Extension back in the day was funded about one-third federal, one-third state and one-third county,' said Sonny Ramaswamy, director of the federal National Institute of Food and Agriculture. 'That model has frayed quite a bit.'. . . 'Federal funds now account for only about 10 percent of current extension budgets, with 45 percent coming from states (including grants and gifts) and 45 percent from counties and cities' said Jimmy Henning, chairman of extension's national governing board."

University of Oregon (U of O)

Several interdisciplinary research groups are asking critical questions about natural climate solutions. The Soil Plant Atmosphere (SPA) Lab with Lucas Silva as principal investigator is conducting interdisciplinary research at the crossroads of natural and human systems. And the Hallet Lab is conducting innovative research on community ecology in a variety of systems. Some of Hallet's research includes cover crops and pest management in hazelnuts, and compost amendments and grazing practices in relation to soil carbon and overall soil health.

Beginning Farmer & Next Generation Training Programs

Many of these programs are offering some level of farming for climate resilience training. Investment in these organization's capacity and priorities will push this work forward for the next generation of farmers in Oregon. Most of these programs are also part of the Beginning Farmer Rancher Working group within the Oregon Community Food Systems Network.

Provider	Programming	Serves
Adelante Mujeres	Regenerative Agriculture Program provides aspiring and existing Latino immigrant farmers and gardeners with the training and skills necessary to grow produce using regenerative methods and to successfully market their products.	Latino immigrants, courses taught in Spanish.
Clackamas Community College	Organic farming certificate, also a horticulture certificate program. In 2021, offering renewable energy plans for farmers.	Clackamas County.
Chemeteka Community College	New Agriculture Complex in development. Provides degrees and certifications: in Horticulture, Wine Studies and Agribusiness Management	Marian, Polk, and Yamhill Counties
Ecotrust	The Viviane Barnett Fellowship for Food Systems Leaders is an 18-month cohort-based fellowship program focused on leadership development at the intersection of agriculture, food systems, and climate. Ag of the Middle program provides business training to a cohort of producers throughout the region. Priority goes to producers using sustainable practices.	Black and Indigenous producers in Portland Metro region and regional agricultural producers interested in scaling up from small to mid-scale.
Headwaters Incubator	Headwaters Farm Incubator Program is designed to assist in the development of new farmers. The program involves leasing out sections of East Multnomah's SWCD's Headwaters Farm to motivated, experienced individuals who will use it as a launching pad for their own farming endeavors. They offer production trainings in conservation ag (nutrient management, IPM, irrigation water management, etc.)	Experienced farmers looking to launch their own farming operations in the Portland Metro region.
Huerta de la Familia	In the Organic Garden Program, Huerto de la Familia manages seven gardens across Lane County to provide Latino families with personal plots of land. In these plots, families can grow healthy, nutritious, and culturally appropriate food. Also provide business development training and counseling.	Latino gardeners in Lane County region.

Provider	Programming	Serves
Jefferson Center	Providing Holistic Management Institute training up and down west coast	Livestock producers throughout the region.
Mudbone Grown	Pathways to Farming Incubator program: Provides culturally competent farming programs and small business development services and a 3-year farmer incubator program seeking to support farmers of color in the Pacific Northwest to launch their own agricultural businesses	Farmers of color in the PNW.
Next Door	Offers Spanish garden education and garden space along with business development support.	Spanish speaking farmers in Hood River and Dalles area.
OSU Center for Small Farms & Community Food Systems	Organize conferences, workshops, field days, and networks for small-scale farmers and ranchers.	Statewide.
Rogue Farm Corps	Offers two farmer training programs: an internship and apprenticeship program. Provides some introductory trainings to beginning farmers on soil health, no-till, IPM, nutrient management, rotation, cover cropping, rotational grazing. Also offering TA on farm business and land access.	Central Oregon, Portland Metro, and Rogue Valley.

Other projects of interest Oregon based & Region-wide

American Farmland Trust (AFT): The leading national nonprofit on conservation agriculture focused on farmland protection. They are strong on research and policy. In addition, they have a strong focus on climate resilience. Check out their summary of the science report "Combating Climate Change on US Cropland." They've also developed the CaRPE tool to estimate the potential for greenhouse gas reductions when implementing soil health practices on working lands. (see the Oregon summary report here). They have a collaborative PNW regional team and new staff capacity for policy engagement. AFT has also developed economic case studies of soil health practices throughout the US, and has shared tools so that agricultural professionals in other regions can also develop these case studies. Case studies on vineyards in California and the PNW are available here. Beginning in the fall of 2021, AFT is leading a new collaborative Conservation Innovation Grant (CIG): Advancing Climate Resilience with Women Ranchers in Northeast Oregon. Women ranchers and ranchland owners will be trained to plan, implement, and demonstrate climate resilience and specific soil quality practices through at least 6 Learning Circles in targeted areas of Northeast Oregon, particularly Union, Baker, and Wallowa Counties.

Black Food Fund: as of 2021, a fund for Black and Black-Indigenous producers enabling them to adopt and scale practices that draw down carbon, increase soil health, and improve water quality and biodiversity.

Black Oregon Land Trust: An organization dedicated to "the redistribution of land to those who have historically faced barriers to land stewardship and wealth building, in Corbett, and across the state. A major part of our work is conservation: protecting the earth from development so it can be tended for generations to come and returning to our ancestral traditions of agricultural practices that support the land in thriving."

Cultivate Oregon: hosted a soil symposium Enabling Regenerative Agriculture: Getting Paid for Soil Health in 2020. In 2021, they offered an awards program, and they are interested in being a producer liaison for the Nori carbon markets program.

Dry Farm Institute: a nonprofit organization that engages growers and communities in collectively adapting to less water.

Ecotrust: has two key programs working with farmers and has been developing a tool for decision makers to better estimate the greenhouse gas emission reduction potential of working landscapes in Oregon, described below.

- **Viviane Barnett Fellowship for Food Systems Leadership.** The Fellowship is "an 18-month cohort-based fellowship program focused on leadership development at the intersection of agriculture, food systems, and climate. The fellowship is for aspiring, emerging, and experienced Black, Indigenous and people of color (BIPOC) leaders in the Portland Metro region. This program includes a community of practice where fellows will connect, explore new possibilities, solve challenging problems, and create new, mutually beneficial opportunities related to Indigenous and Afro-indigenous farming practices, climate justice, and soil regeneration. Fellows enter the program with a goal in mind for themselves and their organization, completing a project by the end of the fellowship to demonstrate the impact of their learning

journey. To strengthen this region's network of BIPOC food system leaders whose lived experiences are essential to our collective efforts toward building a more equitable and climate resilient food system, the Black Food Sovereignty Coalition, Mudbone Grown, Oregon State University's Center for Small Farms, the Multnomah County Health Department REACH program, and Ecotrust have partnered to offer this fellowship. We are proud to name this fellowship for Viviane Barnett–a Black Portlander and civic leader who spearheaded a groundbreaking community gardening movement from 1968-1970."

- **Ag of the Middle Accelerator Program** is a two-year, hands-on, capacity-building, business development program. It is designed to cultivate a thriving cohort of mid-sized, independent farms, ranches, and fishing operations in the region that spans Northern California, Oregon, Washington, and Alaska. The goal is to help rebuild the local food system at scale. Producers must show that they are using sustainable practices to be a part of the program. In the past, soil health workshops have been a part of the cohort training.
- And on the research side, Mike Mertens is creating new mapping tool that can illustrate the greenhouse gas emission reduction impact of changing practices on a suite of Oregon's commodity field crops, cover crops, and perennial crops. This analysis can also look at scenarios in which farmers and ranchers use multiple practices at once on a farm (for example, switching to using cover crop and no-till).

Friends of Family Farmers: works to "promote and protect socially responsible agriculture in Oregon." Coordinates the Oregon Pasture Network, which is designed to support the growth of pasture-based farming. Their website provides connections between producers and consumers. In addition, they host farmer-to-farmer education programing and soil health workshops. FoFF also provides land access workshops and hosts Oregon FarmLink, an online platform connecting land holders looking for someone to manage their land and beginning farmers looking for land. As of 2021, FoFF is providing one-on-one support and coaching for selected farmers of color seeking land in Oregon through their Navigator program. They also offered an awards program for producers on soil health in 2021. An important advocate for sustainable farms in Oregon's legislature.

High Desert Food and Farm Alliance: focused on markets support of farmers in the Central Oregon region. Partners with OSU Extension Small Farms Program, Oregon Tilth, the Oregon Department of Agriculture, and others to coordinate workshops and hands-on training opportunities for farmers to sharpen their skills on everything from crop planning and cost of production to marketing strategies and food safety. Recently held a Resiliency Award process for Central Oregon producers.

Land Connection Technical Assistance Pilot Program in Oregon via the Oregon Community Food System Network (OCFSN): A collaborative project to address the challenge of farmland succession and land access in Oregon to build a future for agriculture in Oregon. In 2019, the year-long pilot program focused on better understanding the need for more technical assistance for both beginning and elder farmer generations. Committee members including Farm Commons, Friends of Family Farmers, Rogue Farm Corps and Headwaters Incubator

Program helped on all aspects of farmland transition, which included help searching for the right land and the right new farmer, securing financing, writing leases, and other legal aspects around leasing and purchasing land. The pilot program revealed that the need is clear, now the OCFSN organizations are currently planning the next steps of the program. More information here.

Nez Perce Tribe and Climate Smart Agriculture: The Tribe is currently working on a "USDA NIFA (National Institute of Food and Agriculture) grant to study the social-ecological effects of climate smart and regenerative agriculture practices on the Reservation's landscape via a collaborative network of producers, Tribe resource managers, University Extension agents, and industry professionals." While agricultural producers across the Reservation have started experimenting with and learning about Climate Smart and Conservation Agriculture practices, such as no-till, cover cropping, crop rotations, etc. they have encountered several barriers. Such barriers include but are not limited to crop failure, crop insurance support, capital investments in equipment, a lack of specific knowledge of practices that work locally, and the best means to transition from one production system to another." Through this project they will build a participatory framework of scientists, producers, and Tribe resource managers that supports regenerative agriculture adoption on Nez Perce lands.

Oregon Agricultural Trust: Statewide organization focused on farmland preservation—a critical component of a resilient future for agriculture in Oregon. A study by American Farmland Trust found that "an acre of farmland in California produces 58-70 times fewer greenhouse gas emissions than an acre of urban land[9]." Focal areas of OAT are Mid-Columbia, Willamette Valley, SE Oregon, and North Coast. Developing a conservation plan that will include climate change considerations.

Oregon Tilth: Current education programming is limited, but they are working in close partnership with NRCS to be able to provide better TA for organic producers across the country. They are active in policy advocacy at the state and federal levels.

Organic Valley: a business leading the way on innovative research and planning with their dairy producers. From participating in the Yamhill SWCD's Carbon Farm Planning pilot project to working with the Croatan Institute on developing an innovative new financing mechanism: Rural Regenerative Agricultural Districts.

Our Family Farms: a southwestern Oregon focused organization leading on a WSARE grant focused on - Regenerative Agriculture: connecting soil health, native bee habitat, and climate resilience through on-farm management strategies.

Rogue Farm Corps: in addition to their training program mentioned above, their Changing Hands program contributes to the resilience of Oregon's agriculture through ensuring the success of intergenerational farm transfers. They provide training and technical assistance on succession planning and land access through their Changing Hands workshops and their new Farm Launch program.

Sustainable Northwest: piloting an ecosystem service market project on rangeland and soil carbon sequestration in Oregon via an Oregon Conservation Innovation Grant (CIG). They are working with ranchers in the Klamath Basin testing out controlled burns and prescribed

[9] California Greener Fields project

grazing. In eastern Oregon, they are testing out prescribed grazing and cover cropping. In addition, they are providing placed based education and outreach to ranchers in the Klamath Basin on drought resilience. As part of their rural electrification program, in 2021, they have an electric tractor pilot project with three tractors rotating at different farms around the PNW.

The Nature Conservancy Oregon: is leading research on natural climate solutions throughout Oregon. In eastern Oregon, they also work closely with ranchers on rangeland management and hold easements on rangelands protected under a carbon offset like the Zumwalt Prairie.

Western Cover Crop Council - Pacific Northwest Regional Committee: This group's goal is to facilitate and enhance communication and collaboration that promotes the successful adoption and integration of cover cropping in the PNW. Participants in the bi-monthly meetings include farmers, GO Seeds, OSU Extension, Oregon Climate and Agriculture Network, Palmer Soil and Water Conservation, University of Idaho, Washington State Department of Agriculture, Washington State University. In Spring of 2021, they hosted a series of "From the Ground Up: Cover Crop Solutions for Western Farmers" on the latest in on-farm experiments and research, as well as results from a regional survey on Cover Crop Use in the Pacific Northwest by Lauren Golden. Interested farmers, researchers and technical service providers are welcome to join the group and listserve.

Seven Key Levers for Farming for Climate Resilience in Oregon

WE ALREADY HAVE THE TOOLS WE NEED. THE TIME IS RIGHT.

The elements of farming for climate resilience are not new—from their foundations in traditional Indigenous and Black agricultural systems to their more recent interpretation as best conservation practices (aka: NRCS conservation practice standards). What is new is that our changing climate has become an emergency. Extreme weather events pummeled growers season after season in the 15 months we've held these conversations.

To meet the need this crisis demands, we must better articulate both the principles of farming for climate resilience, and how farmers can translate them into practices on the ground in Oregon. As practitioners of holistic land management put it: If you want to make small changes: change how you do things. If you want to make major changes, change how you see things. "We do not need to tell farmers what to do. Instead, we need to help them think about the issues and how to come up with a plan," says Lauren Gwin of the Center for Small Farms & Community Food Systems at OSU Extension. Much like the internet writ large, there's too much general information and too few specific, practical tools about farming for climate resilience. Farmers need to translate soil health and other best practices into practical, locally appropriate decision-making tools that fit their landscape.

IMPLEMENTATION WILL BE THE HARD PART.

The creativity, beauty, savvy, and grit with which the producers in our network relate to the land and feed us every day gives us hope. As a community in Oregon, we can revision this hope, not just as an aspiration, but instead as practice, as a discipline. That said, we should not sugar coat this process. Changing behaviors and habits and ways of being is hard. When the current systems reward the status quo over change, extraction over sustenance, scarcity over abundance, commodities over healthy ecosystems, it's even harder. It is up to us to stay tenacious, to follow through. Here are 7 key levers for building climate resilient agriculture in Oregon, a reflection of what we heard from our producers and partners, verified by similar efforts to develop place-based climate resilience throughout the nation. Here's a tangible picture of what our follow through can look like.

I. STATEWIDE, INCLUSIVE COLLABORATION

We have a lot of people working at the intersection of climate change and agriculture in Oregon, but this work has been disconnected and disparate. We are also fortunate to have an existing strong web of agricultural professionals in the state working at different scales and on different aspects of solutions to climate change. The kinds of system-wide challenges we are facing require cross-sector collaboration. To better leverage our shared knowledge and shift towards solutions implemented on the land, the agricultural community in Oregon needs to:

- Listen to the needs of farmers and ranchers;
- Better integrate collaboration and information sharing as part of the working culture of this community;
- Improve collaboration and communication with Tribal Governments and Indigenous producers, as well as Black, Latino and other Farmers of Color;
- Align and connect researchers, nonprofits, federal and state agency staff, policy makers and other farm service providers throughout Oregon through state-wide network development and convenings.

II. ON-FARM STRATEGIES FOR FARMING FOR CLIMATE RESILIENCE

These are recommended priorities for land management to increase effectiveness of practices, improve rates of adoption of practices over time, and increase soil carbon sequestration on Oregon's working lands:

- Focus on whole-farm planning and implementing land management practices with multiple benefits.
- Lead with soil health principles versus prescriptive practices. Provides producers with both flexibility and ownership. Some producers will also want to know about specific practices, tailored to their region and cropping types.
- Promote perennials, particularly on field borders: from silvopasture projects to riparian forest buffers to protecting perennial grasses in grazing systems.
- Rotational grazing for pasture and range management systems are critical pieces of the puzzle that are often left out of the discussion.
- Layer multiple best practices when possible and where appropriate—combining no-till with cover cropping and compost application for example, or grazing cover crops.

III. ENHANCED TECHNICAL ASSISTANCE—RESEARCH—OUTREACH—EDUCATION

Oregon has a well-established and extensive web of technical assistance providers (as discussed in the technical assistance providers section of this report). To better prepare for a changing climate, the following are critical opportunities for Oregon to improve services to farmers and ranchers from trusted technical assistance providers, educators, and researchers:

- Build upon existing technical assistance provider networks and create comprehensive, collaborative, consistent and place-based programming
- Producers need follow up accountability over time.
- Ensure there are regional hubs for sharing relevant climate resilient information with farmers of different scales.
    - » Whenever appropriate, these hubs can be built into existing structures like Soil and Water Conservation Districts and/or where TA providers are already co-located. In some counties, NRCS is co-located with FSA and the Soil and Water

Conservation Districts, they will go out on farm visits together enabling them to better provide technical assistance and financial support to farmers.

- Develop and support **farmer-to-farmer education** networks throughout the state.
- Fill Information Gaps:
  - » Translate general soil health knowledge into practical decision making. Provide regionally appropriate information to support farmers and farming for climate resilience. As one TA provider put it: "There is a difference between general knowledge of a topic like soil health and knowing how to integrate it into a specific cropping system. I am unlikely to be interested in a training on cover crops, irrigation efficiency, IPM, etc. because I have a good general understanding of these topics. I would benefit from information that is specific to the cropping system I am working in."
- Make existing information more accessible:
  - » NRCS and OSU Extension websites are challenging navigate and finding relevant information is almost impossible. These means information about good research projects and great fact sheets can get lost.
  - » Some SWCDs have great websites with good information but not all do.
  - » The information that is accessible is overwhelmingly general information, while there's a lack of specific information for crop types and geographic areas.
- Create **economic case studies** examining the costs and benefits of farming for climate resilience for a variety of crop types and systems.
- A focus on **applied research** for farming for climate resilience in a variety of crop types and systems.
  - » Access WSARE and CIG funding to support these innovative applied science projects that will help producers on the ground.
- Better tracking of what's already being done on the ground (including adoption rates of multiple practices), where funding is going, and the outcomes as a result.
- Better incorporate landscape scale perspective into planning, design and implementation of programs and farm support.
- As land goes to fallow for drought and other reasons, focus on ensuring producers are able to keep the soil covered.
- Support the development of Oregon NRCS Conservation Implementation Strategies and Oregon Regional Conservation Partnership Programs through NRCS focused on climate resilience.
- **Create a systems approach to new research agendas**
  - » As a recent report on the current barriers to resilient agricultural systems put it, there is a need to better link "farmers, soil experts, social scientists, economists and participatory farming networks to gather data and share evidence. We need to quantify ecosystem services and economic benefits of scaling up, while transferring lessons learned across geographies. We need support for innovative

individuals and anchor institutions, like Ecdysis Foundation, Chico State University, and The Land Institute, that are already supporting interdisciplinary research and serving as centers of excellence and innovation by pushing the boundaries of what academia has allowed to this point'"[10]

IV. IMPROVED LAND ACCESS

As current farmers retire and farmland prices skyrocket, land access for new and beginning farmers is a critical piece of the puzzle[11]. We must:

- Preserve existing farmland in Oregon
- Connect new and underserved farmers, including Black, Indigenous, Latino, and other Farmers of Color to land
- Conduct non-farming landowner outreach about climate resilience land strategies

V. FUNDING NEEDS

We must get creative about funding sources. As cities and counties, food supply chain buyers, health care providers, and businesses large and small set climate goals, investing in agricultural solutions to climate change is a cost-effective way to make change toward ecological, economic and community resilience.

- Funding for Infrastructure & Incentives: improved access to capital and increasing incentives is critical to helping many farmers, particularly historically underserved farmers, reduce the risks of transitioning to new practices.
  - » Elevate financial incentives for whole farm planning and soil health practices
- Funding for continued research in climate resilient agriculture

VI. IMPROVE REGIONAL FOOD SUPPLY CHAINS

While the majority of these levers are focused on pathways towards improving land management, issues of local markets to support local farmers, the transportation of food, of improved security, and thriving rural economies are all integrally interconnected. We need to bring together conservation conversations with food security and local food systems and vice versa.

[10] Jennifer O'Connor. 2020. Barriers For Farmers & Ranchers To Adopt Regenerative Ag Practices In The US. (also available at https://forainitiative.org/wp-content/uploads/Barriers-to-Adopt-Regnerative-Agriculture-Interactive.pdf).

[11] See the Emerging Opportunities and Barriers section for more info on organizations involved in land access like: Black Oregon Land Trust, Friends of Family Farmers, EMSWD/Headwaters Incubator, and the Oregon Agricultural Trust

VII. POLICY SOLUTIONS

Policies are one of the most powerful tools of systems change. It's time to implement policies and programs that support farming for climate resilience and farmworker protection. Highlights from OrCAN's detailed 2021 State-Wide Policy Recommendations include:

- Support expansion of education and technical support to beginning farmers and those who are newly transitioning to implementing practices with the potential to sequester carbon in the soil and reduce greenhouse gas emissions. Expand support provided by experienced producers, Soil and Water Conservation Districts, OSU Extension, non-profits, and/or ODA in these areas:
  - » Support on-farm demonstrations, mentoring, communities of practice and educational/informational resources and outreach.
  - » Provide free/reduced-cost soil health testing (including soil biology) to help producers understand the state of their soils, assess the potential for improving soil health on their land, assist researchers in linking management practices to outcomes, and potentially provide baseline data for carbon markets.
  - » Increase capacity for soil health technicians to work on behalf of the state to support Oregon's farmers and ranchers including: BIPOC producers, tribal liaisons, those in all parts of the state, and range and pasture soils.

- Provide streamlined, equitable financial incentives to support implementing practices with the potential to sequester carbon in the soil and reduce greenhouse gas emissions.
  - » Encourage the legislature to adopt Healthy Soils legislation to create a Soil Health Grant Program

- Create a sustained source of funding for research on climate change and climate mitigation strategies on Oregon's agricultural lands.
  - » Incentives, such as grants, for implementation of soil health practices that promote carbon sequestration, listed above in the Practices section;
  - » Facilitate multi-stakeholder collaboration, both public and private, to advance the recommendations above.
  - » Fund the Oregon Agriculture Heritage Program to protect agricultural lands.

- Reexamine existing policies that disincentivize farming for climate resilience and don't work for farmers on the ground.

Acknowledgments

Thank you to all the contributors who made this report possible and who do the hard work of creating a future for farming in Oregon. A list of many of the organizations who participated in these conversations is below—and you'll also find contacts in the Appendix.
The author gives a special shout out to Spring Alaska Schreiner, Maia Hardy, Taylor Larson, Mimi Casteel, Jennie London, Nicole Maness, the Train the Trainer Planning team (Amy Garrett, Hannah Gosnell, Joe Kline, Cory Owens, Maud Powell, Holly Prendeville, and Marie Vicksta) and all of the producers I've spoken with. You have been so generous with your time and partnership, always willing to pick up the phone and hash out the big questions during a chaotic year. Your ways of seeing and being in relationship to the land are an inspiration.
A big thank you to Tao Orion for your careful editing and feedback on this report. All photos credited to: Studio XII Photography/Jamie Thrower.
And, most of all, thank you to the producers out there every day feeding us.

Affiliated Tribes of Northwest Indians

American Farmland Trust

Black Food Fund

Black Food Sovereignty Coalition

Central Oregon Intergovernmental Council

Coast Fork Willamette Watershed Council

Cultivate Oregon

Ecotrust

Eugene Water and Electric Board

Farm Commons

Friends of Family Farmers / Oregon Pasture Network

High Desert Food and Farm Alliance

Natural Resource Conservation Service - OR

Nez Perce Tribe Natural Resource Department

Oregon Agricultural Trust

Oregon Association of Conservation Districts

Oregon Community Food Systems Network

Oregon Department of Agriculture

Oregon Environmental Council

Oregon Food Bank - Mudbone Grown - Pathways to Farming program

Oregon Health Authority

Oregon Organic Coalition

Oregon Tilth

Organic Valley

Oregon State University

Our Family Farms

Outgrowing Hunger

PNW Western Cover Crops Council

Rogue Action

Rogue Farm Corps

Soil & Water Conservation Districts (Benton, East Multnomah, Jackson, Tualatin, and Yamhill)

Sustainable Northwest

Theodore Roosevelt Conservation Partnership

Tillamook

University of Oregon

USDA NW Climate Hub

Wild Salmon Center

Willamette Partnership

Appendix A: 2021 list of people in working at the intersection of agriculture and climate (will be a living updated document)